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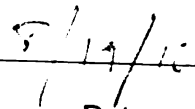
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ON THE COMPOSITIONAL NATURE OF STATIVITY

by

E. Matthew Husband

A DISSERTATION

Submitted
to Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

LINGUISTICS

2010

ABSTRACT

ON THE COMPOSITIONAL NATURE OF STATIVITY

by

E. Matthew Husband

Since at least Verkuyl (1972), aktionsart has been considered a property of phrasal configurations minimally resulting from a combination of a predicate and its internal argument. This has been demonstrated most clearly in the literature on telicity where certain predicate-argument configurations allow for a telic interpretation while others permit only an atelic interpretation. The properties shared by nominals and events and the manner of their composition has been the source of much debate, leading to a rich literature on the composition of events. Largely left out of this debate, however, has been the role that arguments might play, if any at all, in the composition of states.

This dissertation explores the role arguments and predicates play in determining the availability of an existential interpretation of a stative subject, one property distinguishing between the stage-level and individual-level behavior of predicates. It develops a theory of aktionsart in which quantization, the opposition of quantized and homogeneous structures, plays a central role in determining the aspectual behavior of stative predicates. It argues that the distinction between stage-level and individual-level states is determined compositionally, taking into account properties of the predicate, both verbal and adjectival, and its arguments.

I begin by observing two empirical puzzles which affect the availability of existential interpretation: the effects of internal arguments in verbal statives first observed in Fernald (1994) and the scale structure effects of adjectival predicates. Pursuing an analogy between the availability of existential interpretation in states and telicity in events, I explore the possible role verbs in stative predicates play in determining the existential interpretation of their subject, ultimately arguing that there are no individual-level or stage-level verbs.

I then turn to the role played by verbal arguments in stative predicates. I propose, in opposition to topic-comment theories of the internal argument effects, that the quantization of the object of transitive stative verbs determines whether they license an existential interpretation of their subject. Predicates with quantized objects license an existential interpretation, while those with homogeneous objects do not. Given the structural analogy between the availability of existential interpretation and telicity, I propose that stative and eventive predicates are composed by the same mechanisms, with the distinction between states and events arising from the selectional restrictions on Voice, following Kratzer (1996, 2004).

I then turn to adjectival predicates and the observation that their scale structure influences the availability of existential interpretation. I demonstrate that scale structure is a type of quantization (closed scales are quantized; open scales are homogeneous) and argue that this compositionally determines their stage-level/individual-level behavior. I further consider the role arguments play in determining the availability of existential interpretation, observing that, as with telicity, the quantization of arguments affects a predicate's stage-level/individual-level behavior.

The dissertation closes with an overview of its content and presents a highly speculative discussion on the role played by quantization in language and the possible role it may play in vision, suggesting that quantization may be a core component of cognition more generally.

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To Whiskey McMurdurs and the Big Ol' Appalachian Titties

ACKNOWLEDGEMENTS

Oh god, where to even begin... This has been seven years long in coming and, because of that, I have seven years worth of thanks to dole out. So sit back and get comfortable, because this could get long.

First and foremost, I must thank my advisor Marcin Morzycki, who I basically harassed by email before he had even arrived at Michigan State. He let me come into his office, take over extraordinarily long periods of his time with some ungrounded crazy theoretical idea of mine, and, without complaint, guide me towards some reasonable, empirical hypotheses. Any real insight this thesis may have, intentional or otherwise, is due in great part to his questions, patience, and general enthusiasm for the field. In addition to being wonderful one-on-one, Marcin also knitted those of us interested in semantics at Michigan State into a productive and lively group which has been a fruitful source of discussion and commentary. I want to also thank my other committee members, Alan Munn, Cristina Schmitt, and Alan Beretta, for their guidance, questions, and criticism. This dissertation is much the better for it. In addition, my reading (and rereading and rereading) of Hagit Borer's two *Structuring Sense* volumes inspired many of the ideas found in this dissertation and I would be remiss to not mention the serious intellectual debt owed to her right up front.

In another life quite close to this one, this dissertation would have been on my research in language processing. I would like to extend my gratitude to Fernanda Ferreira who first introduced me to psycholinguistics and has always been encouraging and helpful. The Eyselab, alongside the Department of Psychology and the Cognitive Science Program, was a second academic home at Michigan State, and I wouldn't be where I am now if it wasn't for their generosity and guidance. Linnaea Stockall has been my long time collaborator and every bit of our work together has benefited from her sharp insights. (And so help us, but we will have that paper published soon!) I was also fortunate to collaborate with David

Zhu (and Lisa Kelly!) who introduced me to fMRI and has been extremely generous with his time and funding to help get what may have seemed like a fool's errand of a project off the blackboard, into the scanner, and hopefully into publication soon! Finally, I was very fortunate to spend Spring 2007 in the Department of Linguistics and the Cognitive Neuroscience of Language Laboratory at the University of Maryland, College Park, working with David Poeppel and Colin Phillips, who have been both inspiring and encouraging – I can only hope to one day be just half as cool as these two.

A great majority of the actual writing of this dissertation took place in Department of Cognitive and Linguistic Sciences at Brown University during my first real faculty job – a special thanks to Polly Jacobson and Sheila Blumstein for giving me the opportunity to teach in the ivy league! Polly Jacobson, in particular, has been such a wonderful colleague with great enthusiasm for the field and always willing to share her wisdom with me about all things semantics or otherwise. The ideas presented in this dissertation have benefited from her advice and comments.

I would also like to thank Connie Hood, my undergraduate mentor, who was instrumental in shaping the person I am still becoming. I honestly don't know where I would be today if it wasn't for her drive to reach the best in each of her students so each of us could catch a glimpse of it ourselves.

A great big thanks to all those friends who have shared a part of the wacky ride. The dysfunctional family, Mareika Wieth, Monica Castelhana, Chris Velarde, Tom Wagner (hey ol' roomie!), and its extended members Sian Beilock, Laurie Carr, Lisa Helder Babcock, and Kim Fenn. Our adventurous Sunday breakfasts of pomegranate pancakes and long walks on the beach ahead of Tom and Monica kept me balanced during those first bunch of years. The MSU linguists and those guilty by association, Steve Johnson, Greg Johnson, Ai Matsui, Irina Agafonova, Jan Anderssen, Olga Eremina, Chris Tremlett, Tara Savannah Sanchez, Isabel Alvarez-Sancho, Tania Soriano Aquino, and Angelika Kraemer – thank you for the judgments, the laughs, and the camaraderie. The old Eyelab members,

Paul Engelhardt, Nikole Patson Huffman, Ben Swets, Karl Bailey, Aaron Pearson, Dan Gajewski, and Alena Patsenko (and our research assistants, Samantha Bissell, Timothy Bond, Lisa Davis, and Twila Starosciak, without whom nothing would have gotten accomplished) – Psych Research is sorely missed. And those who I see far too infrequently, Annie Gagliardi, Brian Dillion, Ming Xiang, Jon Brennan, Kiel Christianson, Thomas Farmer, Elizabeth Smith, Emma Cunningham, Alexis Wellwood, Lisa Levinson, Craige Roberts, Judith Tonhauser, and Adam Szczegieliński – I hope to conference with you all soon.

A special thanks to Terje Lohndal for giving me feedback on an earlier draft of this behemoth – where you find the time, I’ll never know – and Micalee Sullivan, punk rocker, derby girl, 1950’s housewife, labor historian, and Sunday bruncher. We’ll be hitting up Golden Harvest, or Pablo’s, when I get back in town. And last, but certainly not least, I raise a Monday Mojito to Julie Delgado who has truly worked miracles for me behind the bureaucratic curtains of Michigan State – I’m looking forward to having many cups of coffee on your couch again.

This dissertation would not have been possible without the climate of Espresso Royal Cafe (my ‘first’ office), The Peanut Barrel, or the Greater Lansing Hash House Harriers – I’ll be joining you all with chalk in hand very soon.

And finally, I want to thank my mom, dad, and sister. Thank you for always being there with your support, guidance, and love.

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Chapter 1

INTRODUCTION

1.1 The State of Aktionsart

How are arguments related to their verbs and what consequences result from such a relationship? Explorations of questions like these have flourished into a variety of linguistic theories that have focused on argument structure and its relationship to eventualities.¹ The perhaps surprising link between argument structure and eventualities goes back to observations made since at least Verkuyl (1972)², and nowhere has this observation been more clear than in the literature arising out of research concerned with the syntactic and semantic properties of telicity. For instance, lacking an internal argument, the event of reading in (1a) is interpreted without any natural endpoint, a so called atelic or durative interpretation. As such, the endpoint of the event cannot be measured by *in an hour* because there is no endpoint to the event. Adding an internal argument, however, does not necessarily change the interpretation of a reading event; example (1b) is also durative as there is no specified amount of literature or books being read and again *in an hour* cannot be used. Only certain types of internal arguments, like those found in (1c) provide a natural endpoint to the reading event by specifying the amount of reading to be done, i.e. the reading is over when

¹The literature on aspect is a terminological nightmare. The term *aspect* itself is taken to cover at least two very different phenomena. The first of these, interested in the distinction between perfective and imperfective aspect, is referred to, alternatively, as grammatical aspect, outer aspect, or viewpoint aspect. The second of these, interested in the temporal contour of an eventuality, is referred to as lexical aspect, inner aspect, or situation aspect. Each of these terms presupposes a particular treatment of aspectual phenomena; as such, I will avoid them throughout. As this dissertation focuses on the second of these two phenomena, I will use the term *aktionsart* to remain neutral, taking this to be a technical term with no presupposed analysis. I also follow Bach (1981, 1986) in using the term *eventualities* to refer to both events and states.

²Earlier research, such as Allen (1966), had observed this link between argument structure and eventualities; however, Verkuyl was the first to systematically study this link.

a/every/the/three/those books are finished. This is a telic or terminative interpretation and now, the endpoint of the event can be measured by *in an hour*.³

- (1) a. John read _____ for an hour/*in an hour.
- b. John read literature/books for an hour/*in an hour.
- c. John read *a/every/the/three/those* book(s) #for an hour/ in an hour.

To account for the effect arguments have on the aspectual interpretation of a sentence, Verkuyl (1972) argued that telicity, originally taken to be a property of verbs, should be properly defined over VPs. This strongly suggests an analysis in which a predicate is constructed from not only properties of its head but also from properties of its internal arguments.⁴ Because of this, theories of argument structure, as theories of how arguments are related to predicates, have been central to our understanding of the representation and composition of eventualities.

This effect that arguments have on the aspectual interpretation of a predicate has been the source of a continuing debate as to how “non-temporal” arguments, in Verkuyl’s (1993) words, affect “temporal” predicates. As first proposed in Verkuyl (1972), terminative interpretations emerge in only those predicates whose arguments have a certain property which has been called Verkuyl’s Generalization.

- (2) Verkuyl’s Generalization:

Telic interpretation can only emerge in the context of a direct argument with property α . (Borer, 2005c)

Work on how to characterize property α and the consequences of Verkuyl’s Generalization on the composition of arguments with their predicates has been the focus of much

³These tests for telicity go back to at least Dowty (1979). Under a single event interpretation, the acceptability of *for X time* modification, without an iterative or incomplete interpretation, diagnoses durative (i.e. atelic) interpretation, while the acceptability of *in X time* modification of a potential endpoint diagnoses terminative (i.e. telic) interpretation. Note that modification of atelic predicates by *in X time* is unacceptable; whereas, modification of telic predicates by *for X time* is acceptable, but requires further contextual support (Piñón, 2008; Smollett, 2005).

⁴Verkuyl and others have also observed effects of external arguments on the aspectual behavior of sentences. See Section 3.4.2.3, fn. 23 for examples and some discussion.

interest and has generated a lot of study and debate on the relationship between argument structure and event predicates in both syntactic and semantic theory (Bach, 1986; Bennett and Partee, 1978; Borer, 1994, 1998, 2005b; Dowty, 1979, 1991; Filip, 1999; Hinrichs, 1985; Kiparsky, 1998; Kratzer, 2004; Krifka, 1989, 1992, 1998; Link, 1998; MacDonald, 2006, 2008a,b; Ramchand, 1997, 2008; Rosen, 1999; Rothstein, 2004; Schmitt, 1996; Smith, 1997; Tenny, 1994; Thompson, 2006; Travis, 2005; Verkuyl, 1972, 1993, 1999, 2005; Winter, 2006; Zagona, 2005; Zwarts, 2005, and many others).

Largely left out of this debate has been the role properties of arguments might play, if any at all, in the properties of stative predicates. In the traditional view of aktionsart, events have received almost all of the attention while states are often given only passing note. This is in part because states are often taken to be of a unified aspectual type in the major theories of aktionsart. Vendler (1957) introduced his very influential four-part classification of aktionsart which argued for three types of events (activities, accomplishments, and achievements), while states remained a single aspectual type. Verkuyl (1993), departing somewhat from Vendler, also organized his aspectual typology with states as a uniform type apart from processes and events (the latter corresponding to Vendler's accomplishments and achievements). While both of these theories lead naturally to questions concerning the relationships between their different aspectual types, especially among events, they have obscured the possibility that states themselves may be more complex. Questions about the effect arguments may have on a stative predicate's interpretation may therefore have been ignored because stative arguments *prima facie* cannot affect their interpretation as there is only one type of state.

Particularly interesting are cases where states are explicitly given multiple subtypes. A striking instance of this is Bach (1986), which represents an early attempt to capture a connection between the mass/count distinction in nominals and telicity in events. Drawing on work by Carlson (1981), Bach's classification of eventualities included, in addition to the variety of nonstate aktionsart (processes, protracted events, happenings, and culminations),

two types of stative aktionsart: dynamic states given in (3a) and static states given in (3b). Interestingly, Bach (1986), focusing exclusively on a relationship between count/mass arguments and telicity, proposes a system for events but never returns to a discussion of how his algebra of event(-ualitie-)s might serve to distinguish between these two types of states.

- (3) a. sit, stand, lie + LOC
- b. be drunk, be in New York, own x, love x, resemble x

Dowty (1979) also pointed out examples suggesting complexity within stative predicates in his work on aktionsart. He distinguishes between three types of statives (interval statives, momentary stage-predicates, and object-level statives) and argues that the truth-conditions of interval statives depend on an interval rather than on a moment, whereas the truth-conditions of momentary stage-predicates and object-level statives depend only on moments, i.e. they are true at an interval and for all moments within that interval. Dowty even notes the role of the subject as part of his discussion of interval statives, suggesting that the progressive of these is sensitive to whether the referent of the subject is movable in space. However, this is taken to be a property of the particular lexical items, i.e. the *sit-stand-lie* class, and throughout his discussion of these differences. Dowty says nothing about the role arguments play in these types of statives.

- (4) a. Interval Statives: *sit-stand-lie* class of stage predicates
- b. Momentary Stage-Predicates: *be on the table, be asleep*
- c. Object-Level Statives: *know, like, be intelligent, etc.*

A second possible reason for the lack of discussion of types of states may be the underlying ontological commitments of much of the work on eventualities. Starting with Dowty (1979), much of the research on lexical meanings has assumed, at least implicitly, that states (perhaps via some understanding of ‘states of affairs’) are the semantic primitives for lexical semantics. However, proposals which argue for subtypes of states challenge the possibility of states being semantic primitives. If states have subtypes they cannot neces-

sarily be taken to be the semantic primitives of lexical meaning as they themselves would no longer be primitive.

Rothstein (2004) represents a particularly recent and explicit example of this approach. Her work returns to Dowty's aktionsart and proposes that states are the most basic lexical type with all other types of aktionsart built up from them through a variety of operators as shown in (5). These operators may be thought of as establishing relationships between different states (or states of affairs) which are represented in the domain of eventualities which e ranges over.⁵ Since states are predicates without additional operators, they relate directly to the domain of eventualities which can consist only of states. What the operators then do is construct events out of (multiple) states. However, if there are multiple types of states, the domain of eventualities as a domain consisting of states (of affairs) becomes less direct, requiring that more be said about how the domain of eventualities is represented.⁶

- (5) a. State: $\lambda e.P(e)$
 b. Activity: $\lambda e.(DO(P))(e)$
 c. Accomplishment: $\lambda e.(BECOME(P))(e)$
 d. Achievement: $\lambda e.\exists e_1 \exists e_2 [e = (e_1 \sqcup^S e_2) \ \& \ (DO(P))(e_1) \ \& \ Cul(e) = e_2]$

A final case where our current theoretical mechanisms obscure the possible role which arguments play in stative predicates is the in way stative predicates are typically formalized. Often, researchers present stative predicates as a unified predicate even when they take overt arguments. For example, Krifka et al. (1995) refer to a class of lexical statives whose representations are provided in (6). These representations take the internal argument of

⁵Indeed, whether the domain of eventualities consists entirely of states (of affairs) or has a sortal distinction between states and events is an open question.

⁶Dowty (1979) gives the following examples for each of the Vendlerian verb classes:

- (i) a. State: know, believe, have, desire, love
 b. Activity: run, walk, swim, push a cart, drive a car
 c. Accomplishment: paint a picture, make a chair, deliver a sermon, draw a circle, push a cart, recover from illness
 d. Achievement: recognize, spot, find, lose, reach, die

statives to be somehow fused with the predicate itself, suggesting that *know.French* is some kind of unified representation unlike an alternative representation such as (7). It is, however, likely not the case that the lexicon stores forms like *know.French(x)* where the argument *French* is taken to be stored directly with *know*.⁷ Instead, the lexical form is likely closer to *know(y)(x)*. While these fused forms are often taken as a simplification and may be useful when the distinction of argument and predicate is not directly relevant; taken seriously, fused forms suggest that the internal argument of statives is not an argument, but instead a core part of the predicate.⁸

⁷There are several studies on ‘semantic incorporation’ which suggest that perhaps for certain cases a fused formalism is the proper representation. However, one of the key features of these cases is that they are not fully productive. Carlson (2009), citing examples of Norwegian singular bare object constructions from Borthen (2003), reports that such constructions are only licensed if the predicate and object denote a ‘conventional situation type’, which Carlson, citing Borthen, defines as “a property, state, or activity that occurs frequently or standardly in a given contextual frame, and has particular importance or relevance in this frame as a recurring property”. The examples in (i), which may be thought of as “multi-word lexical items”, are natural and acceptable while the examples in (ii) are not because the examples in (i) are supported by an idiosyncratic meaning.

- (i) a. Han anbefalte rullestol.
He recommended wheelchair
‘He recommended a wheelchair.’
- b. Jeg kan lese bok, jeg.
I can read book I
‘As for me, I can read a book’
- (ii) a. *Ulven drepte okse.
Wolf-the killed bull
- b. *Hun vasket sykkel ren.
She washed bicycle clean

⁸Things become more difficult for the copular forms as the predicate in these cases is often argued to be the adjective itself, as in (ia). Regardless of whether (ia), (ib), or (ic) is the right form, by not separating arguments from predicates, these logical forms may obscure the treatment of arguments in stative predicates.

- (i) Mary is infertile.
 - a. infertile(m)
 - b. be.infertile(m)
 - c. be(infertile)(m)

- (6) a. John knows French. know.French(j)
- b. John loves Mary. love.Mary(j)
- (7) a. John knows French. know(French)(j)
- b. John loves Mary. love(m)(j)

Perhaps as a result of overlooking stative predicates, research into the aktionsart of states has remained underdeveloped, especially compared to that of events. However, several researchers aside from Dowty (1979) and Bach (1986) have focused on the possibility that there are multiple types of stative aktionsart. For instance, Olsen (1994, 1997) uses a feature theory of aktionsart to argue that in addition to states (+durative) there is a class of stage-level states (+telic, +durative). A similar separation for types of states has also been motivated from empirical observations. Spanish has been particularly useful in this respect. Luján (1981), for instance, argues that the copula *ser* and *estar* mark aspectual distinctions between imperfective and perfective and requiring an undelimited or delimited period of time for their interpretation, respectively. Nishida (1994) argues that the reflexive clitic *se* is an aspectual marker and uses its distribution with certain stative verbs to propose that states are divided into non-dynamic non-delimited states and a non-dynamic delimited states in a manner similar to events (see also Marín and McNally (2005, to appear) on *se* in psychological predicates). In Chinese, Chang (2003) proposes that the particle *le*, typically taken to be a perfectivity marker, also cuts the class of states into a class of bounded states and a class of unbounded states.

Here, I follow the broad program of these and other researchers who challenge the assumption of a unified class of states in aktionsart. States vary systematically in their interpretation and that variation is related to their aspectual interpretation. In this dissertation, I will be interested in fleshing out one possible distinction within states which has received broad interest in the literature, that of stage-level/individual-level predicates.⁹ In

⁹The stage-level/individual-level classification of predicates can be found under sev-

pursuing this distinction within states, several surprising and interesting possibilities will arise, including a configurational account of stative interpretation, a linking of existential interpretation to temporal constitution, and the suggestion that quantization forms a core distinction in natural language.

This chapter focuses on two broad points. First, I introduce the stage-level/individual-level distinction and argue that the distinction between stage-level and individual-level predicates is aspectual in nature. Second, I provide initial evidence which suggests that certain properties of stage-level/individual-level predicates manifest themselves under two different grammatical conditions, the type of internal arguments and underlying scalar properties – both phenomena which affect the telicity of eventive predicates. I then review several theories of stage-level/individual-level predicates, but conclude that none of them provide an explanation for the alternation of stage-level/individual-level behaviors due to internal arguments or scale structure. Finally, I end the introduction with a word of caution concerning the contextual and coercive behavior of the stage-level/individual-level distinction and provide a road map for the remainder of the dissertation.

1.2 Stage-level and Individual-level Predicates

Under one classic description, predicates are taken to express properties which are ascribed to individuals. Given the variety of different types of properties, many different classifications can be made. Of these, the distinction between stage-level and individual-level predicates has endured as a grammatically relevant predicate classification.

First identified in Milsark (1974) as a difference between state-descriptive and property properties¹⁰ but more often referred to using Carlson's (1977) labels of stage-level

eral other guises often depending on the focus of the research, including essence/accident, bounded/unbounded, state-descriptive/property. The bounded/unbounded distinction in particular is common in research where the temporal interpretation of states is under scrutiny.

¹⁰Several other earlier works also noted a distinction roughly related to that of stage-level/individual-level predicates. While looking for English correlations to Spanish *ser* and *estar*, Bolinger (1973) notes several grammatical environments distinguishing between what he calls

and individual-level predicates, these two types of predicates have generated much work on the syntax-semantics interface (Arche, 2006; Bennis, 2000, 2004; Chierchia, 1995; Diesing, 1992; Fernald, 1994, 2000; Glasbey, 1997, 2007; Higginbotham and Ramchand, 1997; Hoekstra, 1992; Jäger, 1997, 1999, 2001; Kratzer, 1988/1995; Kratzer and Selkirk, 2007; Ladusaw, 1994; Landau, 2006, 2009; Magri, 2006, 2009; Maienborn, 2004; Marín, 2009, 2010; McNally, 1994, 1998b; Mittwoch, 2007; Musan, 1995, 1997; Ramchand, 1997; Schmitt, 1992, 1996; Stowell, 1991; Stump, 1985, and many others).

The distinction between stage-level/individual-level predicates has been demonstrated to have wide applicability in a variety of grammatical environments, some more prominent than others. In general, individual-level predicates are often far more restrictive in the variety of grammatical environments they can tolerate. For instance, only stage-level predicates are found in the coda of *there*-constructions (Milsark, 1974, 1977) and in the restriction of *when*-conditionals (Carlson, 1979; Kratzer, 1988/1995). They can be the complement of perception verbs (Carlson, 1977) and may function as depictive predicates (Rapoport, 1991; McNally, 1994) and also as post-nominal adjectives (Bolinger, 1967; Larson, 1998). Absolute adjuncts and conditionals, while allowing for both stage-level and individual-level predicates, show a contrast in interpretation (Stump, 1985; Iatridou, 2000). The subjects of stage-level/individual-level predicates also show a difference in interpretation; only stage-level predicates license an existential interpretation of bare plural and indefinite singular subjects and a cardinal interpretation of weak quantifier subjects (Milsark, 1974, 1977; Carlson, 1977). Additionally, the subjects of individual-level predicates in the past tense are subject to lifetime effects, where subjects are inferred to be dead (Kratzer, 1988/1995; Musan, 1995).

Abstracting away from the particulars above, many of the grammatical environments appear to be sensitive to whatever aspectual nature is ascribed to stage-level/individual-level predicates that captures the intuitive temporary nature of stage-level predicates compared to *essence* and *accident* predicates. Additionally, Lasnik and Fiengo (1974) pointed out syntactic facts related to indefinites in *characteristic* (individual-level) predicates.

pared to the relative permanency of individual-level predicates. Indeed, it may be natural to think of these temporal distinctions as a part of a predicate's aktionsart. However, the connection between stage-level/individual-level predicates and aktionsart has been unclear.¹¹ This may be in part due to the typical characterization of stage-level/individual-level predicates as a distinction about individuals, whether properties of individual are essential or accidental, or whether they are permanent or temporary. This characterization was presented in Carlson's (1977) classical treatment of stage-level/individual-level predicates which focused on a revision of the domain of individuals. However, what makes a property permanent or temporary (or essential or accidental) may be more about the temporal characteristics of properties than about individuals themselves.

For the purposes of this dissertation, I focus here on a few core distributional and interpretative properties which are arguably most relevant to the aspectual nature of stage-level/individual-level predicates: existential interpretation, restrictions on locative and temporal modification, and lifetime effects. I also preview the analysis of existential interpretation as an aspectual issue.

1.2.1 Existential Interpretation

Existential interpretation will be of primary concern in this dissertation and thus deserves some initial discussion. First, one might ask what it means to say that an argument receives an existential interpretation. Essentially, existential interpretation is an interpretation where a new individual who was not presupposed in the context or shared as part of the common ground is introduced into the discourse. As such, existential interpretation may be best understood in opposition to generic, presupposed, or quantificational interpretations.

There are two primary means of diagnosing the presence of existential interpretation:

¹¹Mittwoch (2007) considers the exclusion of stage-level/individual-level distinction in the literature on aktionsart to be a historical accident; Milsark's (1974) and Carlson's (1977) introduction of the distinction came well after Vendler's (1957) four-part aspectual classification had become standard in the field.

there-constructions and the existential interpretation of subjects.

1.2.1.1 *There*-constructions

The initial classification of stage-level/individual-level predicates began with Milsark's (1974) observations on the existential *there*-construction. He noted that certain predicates are unacceptable in the coda of *there*-constructions, leading him to a partition in the types of predicates now referred to as the stage-level/individual-level distinction. For instance, predicates like *sick*, *drunk*, and *open* are all permitted as codas of *there*-constructions, while *intelligent*, *tall*, and *wooden* are not.¹²

- (8) a. There were people sick.
b. There were people drunk.
c. There were doors open.
- (9) a. *There were people intelligent.
b. *There were people tall.
c. *There were doors wooden.

In addition to adjectival predicates, verbal predicates show similar behaviors.

- (10) a. There were people watching the movie.
b. There were people spending money.
c. There were doors being opened.
- (11) a. *There were people owning the movie.
b. *There were people owing money.
c. *There were doors containing mail slots.

Arguably, the use of *there*-constructions often provides the most robust test for stage-level/individual-level predicates. However, there are drawbacks to this construction, par-

¹²The examples in (8) made have an initial oddness associated with them. The inclusion of a locative can improve the acceptability of these constructions. Note in addition that locatives fail to rescue the examples in (9). See Section 1.2.2 for further discussion on locatives in stage-level/individual-level predicates.

ticularly when it comes to stative predicates which are independently known to resist the progressive. For instance, the acceptability of (10c) is arguably more degraded than (10a) and (10b) and it strongly favors an eventive interpretation. However, *there*-constructions are not the only grammatical environment sensitive to the stage-level/individual-level distinction, as we will explore in the following sections.

1.2.1.2 Existential Interpretation of Subjects

Another restriction of *there*-constructions revolves around the type of subject which is acceptable in their post-verbal position. Those nominals which are blocked from appearing as subjects of *there*-constructions have come to be called strong, while those which are allowed as subjects of *there*-constructions are called weak. Predominately, this distinction between strong and weak nominals is linked to the type of determiner which heads the nominal; for instance, the determiners *every*, *most*, and *the* given in (12a) are examples of strong determiners while the determiners *many*, *several*, and *three* given in (12b) are examples of weak determiners.

- (12) a. *There were every/most/the people in the room.
 b. There were many/several/three people in the room.

Interestingly, the distinction between strong and weak determiners is also active in the subject position of stage-level/individual-level predicates as a contrast in the interpretations they can receive. While strong subjects are never interpreted existentially, weak subjects can be. However, whether a weak subject receives an existential interpretation is conditioned by the type of predicate: weak subjects of stage-level predicates can receive an existential interpretation, but weak subjects of individual-level predicates cannot. This pattern of subject interpretation is summarized in Table 1.1.

Consider the following examples which have bare plural subjects, a type of weak nominal. As noted by Carlson (1977), bare plural subjects can exhibit an ambiguity in their interpretation; they may either be existential or generic. In a stage-level predicate like

Table 1.1: Existential Interpretation of Subjects

	Stage-level Pred.	Individual-level Pred.
Strong Subj.	*	*
Weak Subj.	✓	*

available, the bare plural is ambiguous. (13a) can mean that there are particular firemen which are available or that firemen in general are available. However, bare plural subjects of individual-level predicates like *altruistic* have no ambiguity and can only be interpreted generically. (13b) can only mean that altruism is true of firemen generally with no particular firemen in mind.

- (13) a. Firemen are available. (existential possible)
b. Firemen are altruistic. (generic only)

Other weak subjects behave like bare plurals in that they have an ambiguous interpretation with stage-level predicates, related again to the availability of an existential interpretation. In (14a), *several firemen* for instance can be interpreted partitively to mean either several out of all the firemen or can be interpreted to mean the firemen are several in number. Note again that this ambiguity disappears under individual-level predicates. In (14b), *several firemen* can only mean several out of all the firemen are altruistic.

- (14) a. Many/several/three firemen are available. (cardinal possible)
b. Many/several/three firemen are altruistic. (partitive only)

Finally, singular indefinite subjects deserve special mention. Ignoring a kind interpretation of the singular indefinite, these subjects are unacceptable in individual-level predicates. As acceptability judgments may at times be more sensitive to the presence of an existential interpretation when a particular interpretation is difficult to diagnose, singular indefinites will prove useful to clarifying whether particular stative predicates license an existential interpretation.

- (15) a. A fireman is available.
b. #A fireman is altruistic.

One of the primary concerns throughout this dissertation will be capturing conditions in which an existential interpretation of a bare plural or indefinite subject is available, though as we will see, conditions which license an existential interpretation have further consequences for the interpretation of all subjects.

1.2.1.3 A Note on the Aspectual Nature of Existential Interpretation

Underlying all of this discussion of existential interpretation is an implicit question to be addressed presently: why is the availability of an existential interpretation for subjects relevant to a theory of aktionsart? While not immediately obvious, I take data concerning the existential interpretation of subjects to be an issue of aktionsart; as such, something should be said as to why this is the case. What is it about the existential interpretation of subjects that makes it aspectually relevant?

Going back to at least Carlson (1977), the domain of individuals has been argued to contain not only *individuals* as they are typically conceived but also to contain *stages of individuals*. Carlson (1977), following Quine (1960), takes stages of individuals to be “roughly, a spatially and temporally bounded manifestation of something” with individuals being “(at least) that whatever-it-is that ties a series of stages together to make them stages of the same thing” (p. 115). Thus individuals are in a real sense spatio-temporally structured as they are the “whatever-it-is” that binds stages together, and are thus aspectually relevant. We can think of stages of individuals as representing the internal temporal structure of individuals, so while we often take aktionsart to be about the internal temporal structure of eventualities, a real case can and should be made for the same kind of characterization of individuals.

But even if the domain of individuals is taken to have two sortals, i.e. individuals and stages of individuals, and stages of individuals represent the internal temporal constitution of an individual, how does existential interpretation play a role? In brief, I take existential interpretation to be the result of the predication of a particular stage of an individual; since

these stages are spatio-temporal in nature, their existence is guaranteed.¹³ That is, their realization in space-time requires them to exist. As such, evidence from the availability of an existential interpretation will be taken to relate to the way a predicate relates to the temporal structure of an individual, and thus is relevant for inferring a difference in the aspectual structure of predicates. As we will see in the following sections, this difference in aspectual structure also illuminates what might be thought of as more natural aspectual phenomenon of stage-level/individual-level predicates, i.e. the licensing locative and temporal modifiers and the case of lifetime effects. I will discuss these issues in more detail in Section 3.3.3.

1.2.2 Restriction on Locative and Temporal Modification

Returning to the broad properties of stage-level/individual-level predicates that will be important throughout this dissertation, we move on to locative and temporal modification. Individual-level predicates are highly restricted in the types of locative and temporal modifiers they will allow, as seen in the contrast between (16a) and (16b). Indeed, the only interpretation given in (16b) is that altruism is a variable property of John which is only present when he is in the house – arguably a type of coercion which I will return to in Section 1.5.

- (16) a. John is available in the house.
 b. #John is altruistic in the house.

Temporal modifiers show a similar restriction, as seen in the contrast between (17a) and (17b). Again, the only interpretation allowed to (17b) is one where John's altruism is variable, present today, but maybe not yesterday or tomorrow.

¹³Certainly however it is possible to talk of stages of individuals that we know do not exist, such as unicorns or Santa Claus. Therefore, this claim ultimately needs to be weakened to say that existence is guaranteed in some possible world. As I will primarily be concerned with only an extensional viewpoint for this dissertation, I will ignore the possible intensional interpretations a full account will surely require. Thanks to Marcin Morzycki for making this point explicit.

(17) a. John is available today.

b. #John is altruistic today.

Certain exceptions to this restriction have been observed in the literature. Percus (1997) notes examples like (18) where individual-level predicates appear to allow temporal modifiers if they provide a reasonable context for the individual-level property. He argues that we interpret these kinds of sentences in the “basic context”, i.e. our world knowledge, when they are presented out of the blue. Since our world knowledge tells us that properties like being tall tend to be stable over time, only those modifiers which are acceptable with this kind of stability will be licensed.¹⁴

(18) a. #John was tall yesterday.

b. John was tall in his youth.

Percus (1997) also points out that context itself can license the presence of a temporal modifier. Although (19a) is odd out of context, when placed in a context that suspends our world knowledge about the stability of intelligence, use of (19a) is acceptable.

(19) a. #John was intelligent yesterday.

b. John had a quite serious accident early this morning. Although he was intelligent yesterday, I am afraid that today he is to all intents and purposes a vegetable.

c. A: I finally spoke to John this morning. What an idiot. He has no creativity, no spark of originality, not even any common sense. Nothing.

B: That’s pretty bizarre. He was intelligent yesterday.

Locatives and temporal modifiers have also formed an important part of the treatment of stage-level predicates. Kratzer and Selkirk (2007), following Jäger (2001), proposed that silent locatives may play a role in the existential interpretation of stage-level predicates. I will return to the role of locatives in stage-level/individual-level predicates in Sections 3.3.2, 3.4.2.5, and 4.3.3.2.

¹⁴How we know the stability of a property is a question I will return to in Section 3.3.2.

1.2.3 Lifetime Effects

In the past tense, the subject of an individual-level predicate is inferred to be dead at utterance time (Kratzer, 1988/1995; Magri, 2009; Mittwoch, 2007; Musan, 1995, 1997).¹⁵

- (20) a. John is from Cardiff. $\rightsquigarrow$ John is alive.
b. John was from Cardiff. $\rightsquigarrow$ John is dead.

Kratzer (1988/1995) takes lifetime effects to be semantic in nature, resulting from the binding of an individual by the past tense operator. Her representation of (20b) is given in (21).

- (21) [before-now(John₃)] & [from-Cardiff(he₃)]

This position has been challenged by Musan (1995, 1997) and Magri (2009) who have argued for a pragmatic account of lifetime effects. Musan (1997), for instance, proposes to capture lifetime effects through a conversational implicature, given in (22b). She notes that predicates in the past tense assert that a situation is over, and since individual-level predicates hold throughout an individual's lifetime, the past tense of an individual-level predicate triggers a conversational implicature based on informativeness: if the subject were still alive, it would be more informative to use the present tense instead of the past tense.

- (22) a. Gregory was from America.
b. Since being from America is a property that, if it holds of an individual at all, holds of that individual over its entire lifetime, and since the speaker has implicated that Gregory's being from America is over, the speaker has implicated furthermore that Gregory is dead.

¹⁵I use $\rightsquigarrow$ to indicate that this is a type of pragmatic inference, not an entailment. See Musan (1997), Mittwoch (2007), and Magri (2009) who make the case for this inference being either a presupposition or implicature.

Whether semantic or pragmatic, lifetime effects are an unique aspectual phenomenon of stage-level/individual-level predicates. I will return to lifetime effects in Sections 3.3.1 and 3.4.2.5.

1.2.4 Stativity and Stage-level/Individual-level Predicates

A final point should be made concerning stage-level/individual-level predicates and their role in stativity. Fernald (2000) notes that all individual-level predicates are stative while stage-level predicates may be either stative or eventive.¹⁶ I will refer to this observation as Fernald's Generalization, which is summarized in the following table.

(23) Fernald's Generalization:

All eventive predicates are stage-level predicates, and all individual-level predicates are stative predicates.

Table 1.2: Fernald's Generalization

	Stative	Eventive
Stage-level	✓	✓
Individual-level	✓	*

Fernald's Generalization is important in that, as he observes, we cannot collapse the stage-level/individual-level distinction to one between stative and eventive predicates. That stage-level/individual-level predicates interact with aktionsart is actually our first clue to the aspectual nature of the distinction itself.

Lakoff (1970) proposed several tests to distinguish states from nonstates. States occur in the present tense without receiving a habitual interpretation as in (24) and are blocked from occurring in the progressive and wh-clefts, as in (25) and (26), respectively.¹⁷ The

¹⁶This claim has been challenged by Kearns (2003) and Arche (2006). As I will be primarily interested in states throughout this dissertation, I will accept Fernald's Generalization here, setting aside the case of its validity for future research.

¹⁷Lakoff (1970) proposed several other tests, though these were later criticized as being more about agentivity than about stativity.

following examples are taken from Katz (2008).¹⁸

(24) Present Tense

- a. ??John kisses Mary.
- b. John appreciates Mary.

(25) Progressive

- a. John is kissing Mary.
- b. *John is appreciating Mary.

(26) Wh-clefts

- a. What John did was kiss Mary.
- b. *What John does is appreciate Mary.

Both stage-level and individual-level predicates can be stative. They can both occur in the present tense without a habitual interpretation as in (27a) and (28a) and are blocked from occurring in the progressive as in (27b) and (28b) and in wh-clefts as in (27c) and (28c).

(27) Stage-level Stative Predicate

- a. John is available.
- b. #John is being available.
- c. #What John did was be available.

¹⁸Katz (2008) maintains that the present tense is crucial to stativity. In particular, for verbs like *think* which are ambiguous between eventive and stative interpretations, the present tense forces a stative interpretation. In the present tense, these verbs become incompatible with manner adverbial modification, another hallmark of stativity. As such, throughout this dissertation, I will try to keep examples in the present tense to avoid unwanted eventive interpretations from arising.

- (i) a. John thinks (*worriedly) that the sky is blue. (stative)
- b. John is thinking (worriedly) about Mary. (eventive)
- c. What John did was think (worriedly) about Mary. (eventive)

- (28) Individual-level Stative Predicate
- a. John is altruistic.
 - b. #John is being altruistic.
 - c. #What John did was be altruistic.

1.3 Two Observations for Stage-level/Individual-level Predicates

Previous analyses of the stage-level/individual-level distinction have to one extent or another appealed to lexical-semantic properties of predicates, for instance proposing a sortal distinction (Carlson, 1977), a distinction between their argument structures (Diesing, 1992; Kratzer, 1988/1995), or that they carry different presuppositions (Mittwoch, 2007). However, several lines of evidence cast doubt on capturing the stage-level/individual-level distinction as a lexical distinction. The main line of evidence comes from the variable behavior of predicates. Systematic variable behavior has often lead researchers to posit different types of structural distinctions. For stage-level/individual-level predicates, many researchers have noted that predicates which are argued to be of one type can be “coerced” into behaving like the other: stage-level predicates may behave as individual-level, as in (29), and individual-level predicates may behave as stage-level, as in (30) (Escandell-Vidal and Leonetti, 2002; Fernald, 1999, 2000; Green, 2000).¹⁹

- (29) a. Same goes jogging after work.
 b. Hakeem plays basketball for a living.

¹⁹Harley and Noyer (2000), discussing examples of stage-level/individual-level coercion along side other cases, argue that the oddness of examples like (i) is due entirely to encyclopedic knowledge.

(i) #Mary sometimes has green eyes.

Harley and Noyer also argue that there is no need to encode the stage-level/individual-level distinction in the formal features or licensing conditions of the syntax for such cases; however, it is not clear then under their account why *sometimes* forces stage-level behavior if (*has*) *green eyes* doesn't, i.e. how is it that functional items force certain interpretations that lexical items cannot if there is nothing grammatically encoded about the stage-level/individual-level distinction?

- (30) a. Nancy is rarely clever.
b. Maria is occasionally blond.
c. Suddenly, John knew the answer.

Kratzer (1988/1995) also notes the variable behavior of stage-level/individual-level predicates and makes the following suggestion.

If a distinction between stage-level and individual-level predicates is operative in natural language, it cannot be a distinction that is made in the lexicon of a language once and for all. ... This being said, we will make use of the convenient classifications just the same. As long as we are careful, no harm is likely to result from this simplification. (Kratzer, 1988/1995, 125–126)

Certainly there are cases where Kratzer's simplification is useful, but it is clear that a theory which does not predict the variable behavior of the stage-level/individual-level predicates is not capturing their full import. Also, if examples like (29) and (30) were the only evidence for variable behavior, a strong case could still be made for lexicalizing whatever it is that classifies predicates as stage-level or individual-level by capturing the apparent variable behavior through composition with the kinds of adverbals which appear necessary for coercion cases. However, two further observations concerning the variable behavior of stage-level/individual-level predicates prompts a more drastic reconsideration.

1.3.1 Internal Arguments

The first comes from Fernald (1994, 2000) who observed that predicates alternate between stage-level and individual-level interpretations based on their internal argument.

- | | | |
|---------|------------------------------------|------------------------|
| (31) a. | Monkeys live in trees. | (generic only) |
| | b. Monkeys live in that tree. | (existential possible) |
| (32) a. | Tycoons own banks. | (generic only) |
| | b. Tycoons own these banks. | (existential possible) |
| (33) a. | Villages sit on riverbanks. | (generic only) |
| | b. Villages sit on this riverbank. | (existential possible) |
| (34) a. | Students know answers. | (generic only) |
| | b. Students know this answer. | (existential possible) |

The (a) examples behave as individual-level predicates while the (b) examples behave as stage-level predicates; bare plurals in subject position cannot receive an existential interpretation for (a) predicates, while (b) predicates allow an existential interpretation of bare plurals in subject position. Changing the internal argument from a bare plural to a demonstrative affects the type of predicate. For transitive stative verbs, bare plural internal arguments lead to individual-level predicates and demonstrative internal arguments lead to stage-level predicates.

The effect of the internal argument on the type of predicate is reminiscent to the effect internal arguments have in eventive predicates.

- | | | |
|---------|-------------------------------|--------------|
| (35) a. | John solved problems | *in an hour. |
| | b. John solved these problems | in an hour. |
| (36) a. | Mary built houses | *in an hour. |
| | b. Mary built this house | in an hour. |

The (a) examples here are considered to be atelic since they are incompatible with *in X time* modifiers, while the (b) examples here are considered to be telic since they are compatible with *in X time* modifiers. Examples such as these have led researchers to the conclusion that telicity is not encoded into verbs themselves, but instead emerges from

the type of syntactic structure these verbs are embedded in. In a similar manner then, the data from (31) to (34) strongly argues for a similar compositional analysis of the stage-level/individual-level distinction, one in which the internal argument and the verb compose together to determine the type of their predicate.

Chapters 2 and 3 will examine the effect of the internal argument on the stage-level/individual-level behavior of a predicate, following in large part the analogy between telicity and the availability of an existential interpretation.

1.3.2 Scalar Predicates

A second observation is that the scale structure of adjectival predicates also influences stage-level/individual-level behavior.

- | | | | |
|---------|----------------------------|---------------------------|------------------------|
| (37) a. | Whiskey bottles are brown. | (generic only) | |
| | b. | Whiskey bottles are full. | (existential possible) |
| (38) a. | Norwegians are tall. | (generic only) | |
| | b. | Norwegians are drunk. | (existential possible) |
| (39) a. | Rules are immoral. | (generic only) | |
| | b. | Rules are necessary. | (existential possible) |

Here again, the (a) examples behave like individual-level predicates while the (b) examples behave like stage-level predicates; bare plural subjects cannot receive an existential interpretation for (a) predicates while (b) predicates allow an existential interpretation. What is of interest here is that the (a) predicates all come from open-scale adjectives whereas the (b) predicates all come from closed-scale adjectives. These differences can be seen using tests which are sensitive to the scale structure of adjectives (Kennedy and McNally, 2005).²⁰

²⁰These modifiers have multiple interpretations. The relevant interpretation here is one of degree, such that *the whiskey bottle is half brown* cannot be interpreted as *the degree of the whiskey bottle's brownness is half*, as compared to *the whiskey bottle is half full* which can mean *the degree of the whiskey bottle's fullness is half*.

- (40) a. #half/mostly/completely brown/tall/immoral
 b. half/mostly/completely full/drunken/necessary

Also, there is convergence between the availability of an existential interpretation and telicity when it comes to properties of scale structure. Working on issues concerning degree achievements in a series of papers, Hay et al. (1999), Kennedy and Levin (2002), and Kennedy and Levin (2008) have proposed that scale structure affects the resulting telicity of eventive predicates. Closed-scale adjectives, for instance, can provide a telic endpoint which otherwise would have to be provided contextually, as seen with the imperfective paradox in which an imperfective entails the perfective, an indication of atelic interpretation.

- (41) a. They are widening the road. → They have widened the road.
 b. They are lengthening the rope. → They have lengthened the rope.
 (42) a. They are straightening the rope. ↗ They have straightened the rope.
 b. The tub is emptying. ↗ The tub has emptied.

Although predicative adjectives form a large class of stative predicates, the effect of the scale structure of these adjectives on their stative interpretations has not been widely explored. Interestingly, Holtheuer's (2009) experimental work in acquisition of *ser/estar* has recently demonstrated that children make strong connections between a predicate's scale structure and its use as a stage-level or individual-level predicate. *Ser* and *estar* are Spanish copula verbs which appear to correlate with individual-level and stage-level predicates, respectively (Arche, 2006; Bolinger, 1973; Luján, 1981; Marín, 2009, 2010; Roby, 2007; Schmitt, 1992, 2005). As such, certain adjective only occur with *ser*, as in (43a), and others only occur with *estar*, as in (43b), arguably because these adjectives are individual-level and stage-level.

- (43) a. Juan *es/está peinado/cansado.
 Juan ser/estar combed/tired.
 ‘Juan is combed/tired.’
- b. Juan es/?está inteligente/sincero.
 Juan ser/estar intelligent/sincere.
 ‘Juan is intelligent/sincere.’

However, many adjectives can occur with both *ser* and *estar*, as in (44). Interestingly, however, the interpretation of these sentences changes depending on which copula is present. Thus, *María es bonita* means that Maria is a pretty person, but *María está bonita* means that Maria is pretty right now. Why some adjectives show this flexibility and others do not has been a puzzle and one source of on going debate in the literature.

- (44) María es/está bonita/alegre/callada.
 Maria ser/estar pretty/happy/quiet
 ‘Maria is pretty/happy/quiet.’

Holtheuer’s research brings another piece to the puzzle. She discovered that children have a strong tendency to use *ser* with open-scale adjectives and *estar* with closed-scale adjectives. While use of *ser* and *ester* is not an absolute indicator of a predicate’s type (Schmitt, 1992, and others), Holtheuer’s discovery provides some empirical motivation to the initial observations above concerning the relationship of scale-structure of stage-level/individual-level predicates.

The question to ask then is why scalar structure matters in adjectival predicates? One proposal, coming from Kennedy and McNally (1999), is the existence of a mapping between the scale structure of the adjective and the eventuality structure of the predicate, the consequences of which are the differences in stage-level/individual-level behavior. This analysis presupposes that adjectives encode their scale structure. However, while the effect of scale structure seem at first glance to be evidence for the lexical nature of stage-level/individual-level predicates, scale structure itself is also known to be variable, even

within a single adjective. As such, a more radical explanation may be that the structure which embeds adjectives whose meanings are compatible with closed-scale structure licenses the eventuality structure for telic and stage-level interpretation.

Chapter 4 will examine the effect of scale structure on the stage-level/individual-level behavior of a predicate, again following the analogy between telicity and the availability of an existential interpretation.

1.4 Previous Theories of Stage-level/Individual-level Predicates

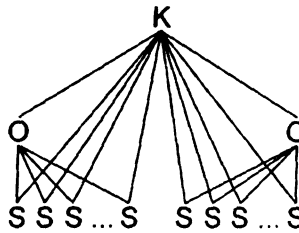
Since first discussed in the literature, the stage-level/individual-level distinction has maintained its status as an interesting, relevant, and difficult natural language distinction to analyze. The following sections outline some of the most influential theories concerning stage-level/individual-level predicates, each discussion a different level of representation thought to influence stage-level/individual-level behaviors.

1.4.1 Distinctions in the Domain of Individuals

Carlson (1977) coined the terms stage-level and individual-level in his discussion about bare plurals as briefly discussed above. He proposed that the domain of individuals is partitioned into three sortal types: kinds, objects, and stages. Objects are the usual individual sort, such as those picked out by proper names and most common noun phrases. Stages related to objects as a spatio-temporal manifestation of an object. According to Carlson, noun phrases do not refer to stages directly, but instead, when we are using stage-level predicates, we are making claims about stages. Finally, kinds are related to objects and stages in that they tie objects and stages of the same kind together. Bare plurals, according to Carlson, denote kinds. The following figure provides an illustration of Carlson's idea and the relationship between kinds (K), objects (O), and stages (S).

Carlson uses these sortal type distinctions in the domain of individuals to distinguish

Figure 1.1: Carlson's Domain of Individuals



between stage-level and individual-level predicates. Roughly, stage-level predicates take stages as their arguments; whereas, individual-level predicates take either objects or kinds as their arguments. Given this relationship, Carlson refers to the collection of objects and kinds as individuals.

The denotation of an individual-level predicate like *altruistic* is given in (45b). As a predicate of individuals, *altruistic* takes an object or kind as its argument. Since *John* represents an object, the predicate applies to it straightforwardly.

- (45) a. John is altruistic.
b. *altruistic*(j)

Since no noun phrase has stages as its denotation, interpreting a stage-level predicate is not straightforward. To address this, Carlson introduces a relation *R* (standing for realize) which mediates between stages and individuals. Thus predicates like *available* which take stages as their arguments apply indirectly to the denotation of their subject. The stage-level interpretation is given in (46b) where y^s is a variable ranging over stages.

- (46) a. John is available.
b. $\exists y[R(y^s, j) \ \& \ \text{available}(y^s)]$

Carlson (1977) does not make mention of the possible effects internal arguments or scale structure can have on the stage-level/individual-level distinction. In order to capture this alternation, Carlson's theory would have to be sensitive to the properties of internal arguments and the scale structure of adjectives. Certainly, the kind of lexicalist approach he advocates would need drastic revision, as predicates themselves encode whether they

are predicates of individuals or predicates of stages. As such, Carlson's theory appears to be unable to handle the two observations in Section 1.3.

1.4.2 Distinctions in Argument Structure

The focus of the analysis of the stage-level/individual-level distinction changed from a sortal distinction within the domain of individuals to a property of predicates with Kratzer (1988/1995) and Diesing (1992). The key insight of both frameworks is a syntactic view of the scope of existential closure, captured by the Mapping Hypothesis.

(47) The Mapping Hypothesis

Material from the VP is mapped into the nuclear scope.

Material from the IP is mapped into a restrictive clause.

In both proposals, unselective existential closure applies to the nuclear scope of a sentence. Therefore, unbound variables that are VP-internal receive an existential interpretation as they are mapped into the nuclear scope. Unbound variables that are outside the VP, however, are mapped to the restrictive clause and must be bound by some other operator; otherwise, they lead to ungrammaticality.

Concerning stage-level/individual-level predicates, the subjects of stage-level predicates are argued to be VP-internal and are subject to existential closure. Subjects of individual-level predicates, however, are argued to be base generated outside the VP and are not subject to existential closure. Kratzer and Diesing each formulated a different approach to stage-level/individual-level predicates which manipulates argument structure to account for the structural position of subjects with respect to the VP-IP divide.

1.4.2.1 Argument Structure

Kratzer (1988/1995) approaches the problem of stage-level/individual-level predicates by arguing that stage-level predicates contained an extra variable in their denotation which

individual-level predicates lack, namely a Davidsonian variable. The primary claim made is that the Davidsonian variable in stage-level predicates, which ranges over spatiotemporal locations, is the external argument of the predicate. Kratzer uses the externality of the Davidsonian argument in stage-level predicates to force all its other arguments to project VP-internally, adopting Williams's (1981) argument linking theory in which all arguments except the external argument are base generated within the VP. Since the subject of stage-level predicates is not considered the external argument, it projects within the VP and becomes subject to existential closure. Lacking a Davidsonian variable, the subjects of individual-level predicates are marked as external arguments, project outside of the VP, and are not subject to existential closure. Lexical entries for a stage-level predicate and an individual-level predicate are given in (48a) and (48b) respectively. The argument which is underlined is the external argument, where *location* stands for the Davidsonian argument for stage-level predicates.

- (48) a. available <location, theme>
 b. altruistic <theme>

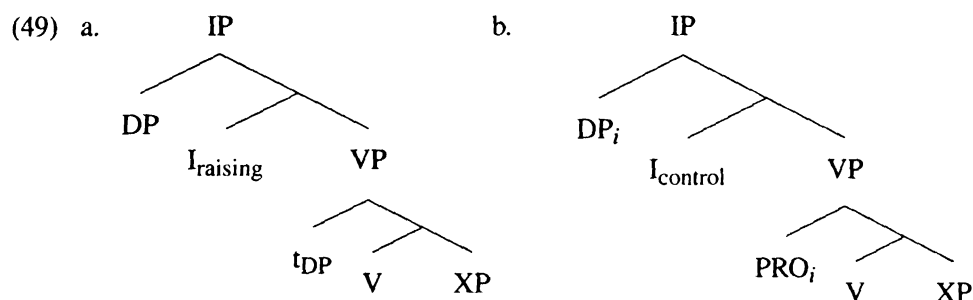
The extra argument of stage-level predicates derives many of the differences between stage-level and individual-level predicates, including capturing the availability of an existential interpretation.

Concerning the effect of internal arguments and scale structure on the availability of an existential interpretation, Kratzer's system would require the internal argument to affect the inclusion of the Davidsonian variable in the argument structure of the predicate; however, such a mechanism would require a vast overhaul of the system as presented.²¹

²¹ Kratzer's system does have a point of sensitivity to the internal argument in the licensing of *when*-conditionals. She argues that the antecedent of a *when*-conditional requires quantification, and thus requires a variable to quantify over; otherwise, it is ruled out under vacuous quantification. Stage-level predicates have a Davidsonian argument to quantify over and thus are predicted to always be licensed in *when*-conditional antecedents, unlike individual-level predicates. Kratzer claims that individual-level predicates can be rescued if another variable is available for quantification, as with the indefinite subject in (ib) and the indefinite object in (ic).

1.4.2.2 Two Types of INFL

Diesing (1992) approaches the problem of stage-level/individual-level predicates by proposing two types of Infl, each which selects only one type of predicate. Raising Infl, shown in (49a), selects for stage-level predicates while control Infl, shown in (49b) selects for individual-level predicates.



Diesing derives the availability of an existential interpretation through the different properties of the two Infl. Raising Infl allows the subject to be base generated within the VP. As such, the subject may be VP-internal (via reconstruction) at LF and subject to existential closure. Control Infl requires the subject to be base generated outside the VP, as its usual VP-internal position is occupied by PRO. Since the subject is outside of the VP at LF, it is not subject to existential closure and must be bound by another operator.

Concerning the effect of internal arguments and scale structure on the availability of an existential interpretation, Diesing's system suffers from many of the same difficulties as Kratzer's system. While arguably less ridge than Kratzer's system, there is no explanation forthcoming which would seem to explain why the type of internal argument would change the predicate such that it would be selected by either a raising Infl (i.e. for a demonstrative object) or a control Infl (i.e. for a bare plural object).

-
- (i) a. #When Mary knows French, she knows it well.
 b. When a Moroccan knows French, she knows it well.
 c. When Mary knows a foreign language, she knows it well.
 d. When Mary speaks French, she speaks it well.

1.4.3 Aspectual Approaches

Though often apart from the particular concerns of stage-level/individual-level predicates, several researchers have considered stage-level and individual-level related phenomena in their aspectual classifications. Previous work has attempted to characterize the classification of aktionsart through a variety of parameters. Verkuyl (1993) for instance derived Vendler's (1957) aktionsart classes through two binary features: *continuousness*, or whether the eventuality has duration, and *boundedness*, or whether the eventuality has a natural terminal endpoint.

(50) Verkuyl's (1993) Parameters of Aktionsart Classes

- a. States: –continuous, –bounded
- b. Activities: +continuous, –bounded
- c. Accomplishments: +continuous, +bounded
- d. Achievements: –continuous, +bounded

Other researchers have also proposed feature decompositions of the aktionsart classes (Carlson, 1981; Moens and Steedman, 1988; Hoeksema, 1983; Rothstein, 2004). Rosen (1999) summarized this work on parameterization of aktionsart by presenting the most common parameters for the various aktionsart classes. Here, *extended* is taken to be an eventuality with duration and *bounded* is taken to be an eventuality with a natural terminal endpoint.

(51) Summary of Common Aktionsart Parameterizations

- a. Extended: States, Activities, Accomplishments
- b. Nonextended (momentaneous): Achievements
- c. bounded (countable, definite): Accomplishments, Achievements
- d. unbounded: States, Activities

Since these features do not allow for the subclassification of states, I focus on theories which break states down into two classes.

I begin by taking a closer look at Carlson's (1981) aktionsart classification as she is one researcher who posits aspectual distinctions within states. She makes use of three linguistic tests to categorize predicates: momentaneous adverbials (*at once, at that (very) moment, at 8:30*), the progressive aspect, and durative adverbials (*for a while, from 1:00 to 10:00, all day (long)*). States in Carlson's theory are either stative or dynamic, and are emphasized in the following table.

Table 1.3: Carlson's Aspectual Classes

Classes	Momentaneous adverbials	Progressive aspect	Durative adverbials
Momentaneous	+	–	–
Stative	+	–	+
Achievement	+	+	–
Dynamic	+	+	+
Accomplishment	–	+	–
Activity	–	+	+

If we examine the properties of the internal argument alternation with respect to Carlson's (1981) tests for her aktionsart classes, we find that those with demonstrative objects (stage-level states) fall into her Statives category, as shown in (52). They can occur with momentaneous adverbials and durative adverbials, and are unacceptable in the progressive. Those predicates with bare plural objects (individual-level states) however have no classification, as show in (53). They can occur with durative adverbials and are unacceptable in the progressive, but they are also unacceptable with momentaneous adverbials.²²

²²These stative predicates are presented in the past tense as this allows for natural interpretations of temporal modifiers to arise. Note that even in the past tense, they are unacceptable with manner adverbials (Katz, 2008).

- (52) a. George lived in these trees at 8:30.
 b. John owned this bank at 8:30.
 c.??George was living in these trees.
 d. *John was owning this bank.
 e. George lived in these trees for a while.
 f. John owned this bank for a while.
- (53) a. *George lived in trees at 8:30.
 b. *John owned banks at 8:30.
 c.??George was living in trees.
 d. *John was owning banks.
 e. George lived in trees for a while.
 f. John owned banks for a while.

Another parameterization of aktionsart which marks distinctions within states comes from Olsen (1994, 1997). His classification differs in two ways from that of Carlson (1981). First, his features are taken to be privative, that is they have only a positive value and are otherwise unmarked/unspecified in the representation. He also uses different tests and thus has different parameters: telic (iterativity when combined with durative adverbials), dynamic (*What happened/occurred/took place was...*, imperatives, progressive aspect), durative (durative adverbials and when-clauses). Olsen's theory divides states into two subclassifications: states and stage-level states.²³

Applying Olsen's (1994) tests for aktionsart classes to the internal argument alternation, we find that both bare plural and demonstrative object predicates (individual-level/stage-level states respectively) show the same behavior and are classified as states, as given in

²³Olsen (1997) argues against Olsen's (1994) specific instances of stage-level states (*Michael is sick*) noting that their "telicity" is cancelable (*Michael is chronically sick with arthritis*). He maintains, however, that stage-level states with properties [+telic, +durative] should exist as these properties are not incompatible.

Table 1.4: Olsen's Aspectual Classes

Classes	Telic	Dynamic	Durative	Examples
<i>State</i>			+	<i>know, have</i>
<i>Activity</i>		+	+	<i>run, paint</i>
<i>Accomplishment</i>	+	+	+	<i>destroy</i>
<i>Achievement</i>	+	+		<i>notice, win</i>
<i>Semelfactive</i>		+		<i>cough, tap</i>
<i>Stage-level State</i>	+		+	<i>be sick</i>
<i>Unattested</i>	+			
<i>Unattested</i>				

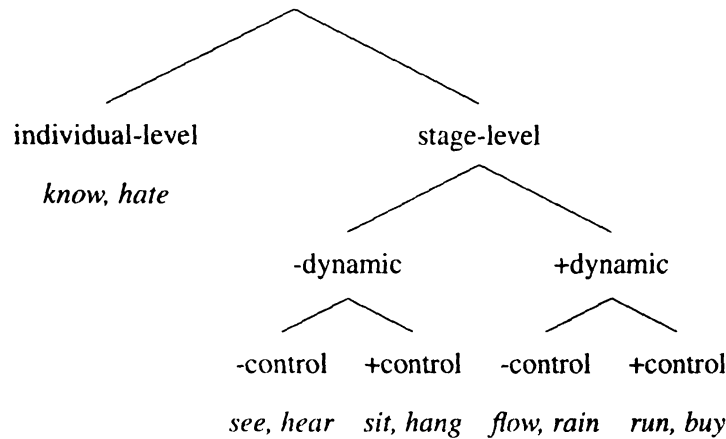
(54) and (55).

- (54) a. George lived in these trees for years. $\nrightarrow$ iterative
b. John owned this bank for years. $\nrightarrow$ iterative
c. *What happened was George lived in these trees.
d. *What happened was John owned this bank.
e. George lived in these trees when he was young/for a while.
f. John owned this bank when market conditions were favorable/for a while.
- (55) a. George lived in trees for years. $\nrightarrow$ iterative
b. John owned banks for years. $\nrightarrow$ iterative
c. *What happened was George lived in trees.
d. *What happened was John owned banks.
e. George lived in trees when he was young/for a while.
f. John owned banks when market conditions were favorable/for a while.

The theories of aktionsart classification from both Carlson (1981) and Olsen (1994, 1997) fail to make a distinction between stage-level/individual-level states with respect to the internal argument alternation, though this may be due to the particular tests chosen.

Concerned with the aspect of small clauses, Hoekstra (1992) proposes that the stage-level/individual-level distinction is a parameter for aktionsart alongside dynamism and control (or agentivity). His aspectual classification, which to my knowledge is the only one to directly include the stage-level/individual-level distinction, is given in (56).

(56)



Hoekstra also discusses briefly the aspectual difference between stage-level and individual-level aspect: “There is a certain unclarity as to the temporal structure of such states [i.e. individual-level states]: in principle, such states have a temporal extension in that they include all temporal slices of the individual they are predicated of” (159). He suggests that this property would make the temporal extent of individual-level aspect larger than other aktionsart classes. However, he also notes that temporal extension may be irrelevant for individual-level aspect. Given their behavior in the present tense, there temporal extent might be only a point, with the extension over other temporal slices taken only as an implicature. Hoekstra points to the unacceptability of the present tense when the temporal extension is given.

- (57) a. John knows French.
b. *John knows French three years already.
c. John has known French three years already.

What Hoekstra takes at the aspectual distinction between stage-level and individual-level predicates remains unclear; however, his viewpoint of adopting Carlson’s (1977) characterization of the aspectual differences inherent in individuals as a characterization of the aspectual dimension of predicates is akin to the thesis being explored throughout this dissertation.

1.4.4 Distinction in Discourse

The final theories concerning stage-level/individual-level predicates all share the common dimension of motivating discourse and information structure distinctions between stage-level and individual-level predicates. In addition, all of the following theories have proposed explicit analyses of the internal argument alternation.

1.4.4.1 Situated Discourse

Glasbey (1997), taking on Fernald's (1994) observations concerning the internal argument along with her own observations concerning the availability of existential interpretations, argues that the existential interpretation of subjects is a property of discourse context. She suggests that if the context supplies a situation which supports an existential interpretation of the subject, then the subject can receive an existential interpretation via inference. For instance, Glasbey observes that it is difficult to get an existential interpretation for the bare plural subjects in the examples in (58) in out-of-the-blue contexts, but when additional context sets up the "situatedness" of the scenario of these sentences, as in (59), an existential interpretation becomes available for the bare plural subjects *drinkers*, *men*, and *ministers*. She also argues that this is the case for discourse contexts alone, arguing that the bare plural *drinkers* can receive an existential interpretation even in (60).

- (58) a. Drinkers were under-age.
b. Men are bald.
c. Ministers are gay.
- (59) a. I was shocked to discover in the Red Lion last night that drinkers were under-age.
b. Men are bald as a result of using this brand of hair restorer.
c. In this church, ministers are gay.
- (60) John was shocked by his visit to the Red Lion. Drinkers were under-age, drugs were on sale, and a number of fights broke out while he was there.

Glasbey's approach to the effect of internal arguments on existential interpretation is to argue that demonstrative objects provide a situated discourse which licenses the inference for an existential interpretation. This approach is adopted by Fernald (2000) who uses it to maintain the core of the Kratzer/Diesing approach and not require him to argue for an analysis where non-verbal arguments may introduce their own Davidsonian variable.²⁴ Thus, Fernald's theory has the availability of an existential interpretation arise from multiple levels of representation. An existential interpretation can come from either the argument structure of the predicate via the Mapping Hypothesis, or they are inferred from the discourse context because other elements of the sentence require a situated interpretation, and thus introduce a specific situation into the discourse which licenses existential inference.

While these approaches speak towards the internal argument alternation found in stage-level/individual-level predicates, two problems present themselves. First, it is not clear what types of internal arguments are predicted to give rise to a situated predicate, i.e. which are supported by a situation and which are not. Demonstratives are supported by a situation and bare plurals are not, but the property that distinguishes between demonstratives and bare plurals is not clear. How would this categorize other arguments, like indefinites or quantifiers? Second, it is unclear how a situation-theoretic approach accounts for the effect of scale structure on stage-level/individual-level predicates. In order to analyze scale structure effects as a discourse phenomenon, one would have to know why it is that closed scales relate to a specific situation but open scales do not.

1.4.5 Requiring Topics

Another approach which has been independently motivated in several papers focuses on the role played by information structure, specifically addressing the way stage-level/individual-level predicates associate with topics (Heycock, 1994; Jäger, 2001; Lee, 1996, 2009).

²⁴Fernald (2000) notes that, by being referential, demonstratives, for instance, are not available to introduce a free variable into the representation.

Jäger (2001) provides a recent account of the role topics play in the stage-level/individual-level distinction. He argues for the role of the discourse linking principle given in (61).

(61) *Discourse Linking Principle:*

Every atomic clause has a topic.

For Jäger, the topic requirement may be met by either the presence of a strong nominal (i.e. one that is anaphoric to a previously introduced discourse referent), or, for stage-level predicates, the eventuality's location, which then acts as a default topic. Individual-level predicates lack this second option as they are incompatible with locatives (McNally, 1998b) and require their subject to be a topic when a strong non-subject argument is unavailable.

Kratzer and Selkirk (2007) adopt (61) and argue that the relationship between subject position and the stage-level/individual-level distinction given in Diesing (1992) follows from the requirement of a syntactically represented topic. In their account, for a “hard core” individual-level predicate like *spinnen* ‘crazy’, given in (62a), the topic can only be the subject *Quacksalber* ‘quacks’. They argue that the subject *Quacksalber* ‘quacks’ must raise to topic position to satisfy the topic constraint. Being a topic then requires that *Quacksalber* ‘quacks’ be presupposed in the context, i.e. it is interpreted generically in out-of-the-blue contexts. Additionally, Kratzer and Selkirk observe that the predicate must also receive a pitch accented.

- (62) a. Ich vermute, dass Quácksalber spínnen. (generic only)
 I suspect that quacks are.crazy
 ‘I suspect that quacks are crazy.’
 b. [CP [TopicP Quacksalber_i [TP t_i [vP t_i [v t_v] spinnen_{V+V}] T] Topic]]

To account for the internal argument alternation, Kratzer and Selkirk follow Jäger's proposal that the strong non-subject argument acts as the topic. Thus, in (63a), the topic is the object PP *in diesem Baum* ‘in these trees’ and the subject *Affen* ‘monkeys’ may remain low, be non-topical, and the predicate can be deaccented (63b). Similarly, in (63c), the topic is

a scrambled discourse-given object *dieses Haus* ‘this house’ and the subject *Maffiosi* ‘mafia members’ may remain low, be non-topical, and the predicate can be deaccented (63d).

- (63) a. Ich glaube, dass in diesem Baum Affen leben. (existential possible)
I think that in this.DAT tree monkeys live

‘I think that monkeys live in this tree.’

- b. [CP [TopicP in diesem Baum [TP [_{VP} Affen [_V t_V] leben_V+v] T] Topic]]

- c. Ich weiss, dass dieses Haus Maffiösi besitzen. (existential possible)
I know that this house mafia.members own

‘I know that mafia members own this house.’

- d. [CP [TopicP dieses Haus [TP [_{VP} Maffiösi [_V t_V] besitzen_V+v] T] Topic]]

Finally, for examples of stage-level predicates which have no strong non-subject argument, but whose subjects receive an existential interpretation, Kratzer and Selkirk adopt Jäger’s proposal that the eventuality’s location acts as the topic. They propose that a silent locative can be base generated in the topic position to satisfy the topic constraint. Thus, in (64a), the topic is a silent locative *pro* and the subject *der Rhine* ‘the Rhine’ may remain low, be non-topical, and the predicate can be deaccented (64b). Alternatively for stage-level predicates, the subject can move to satisfy the topic requirement, as in (64c). A distinguishing feature between these two alternatives is the obligatory presence of a pitch accent on the predicate if the subject raises to the topic position.

- (64) a. Ich hab’ geträumt, dass (dann) der Rhéin ausgetrocknet (existential possible)
I have dreamed that (then) the Rhine dried.up
ist.
is

‘I dreamt that the Rhine dried up (then).’

- b. [CP [TopicP *pro*/dann [TP [_{VP} [_{VP} der Rhine ausgetrocknet ist] v] T] Topic]]

- c. [CP [TopicP der Rhine_i [TP t_i [_{VP} t_i [_{VP} t_i ausgetrocknet ist] v] T] Topic]]

Although the topic account provides an analysis for the internal argument alternation, as with the situation-theoretic account, it is unclear how it would be extended to account for

the effect of scale structure on stage-level/individual-level predicates. In order to analyze scale structure effects as a topic phenomenon, one would have to know what it is about closed scales that satisfies the topic requirement and why open scales cannot do the same. However, it also provides us with a testable predication we will return to in Section 3.2. The topic account predicts that weak internal arguments should not lead to an existential interpretation of the subject as weak arguments cannot function as topics.

1.5 A Note on (Local) Context

As we have seen above, factors that are not of a direct concern in this dissertation do play a strong role in determining the stage-level/individual-level behavior of predicates. In particular, the variable behavior of predicates, their ability to be coerced, and the role context plays in licensing these shifts in interpretation matter a great deal and deserve special mention before continuing.

First and foremost, context plays a key factor in regulating the behavior of stage-level/individual-level predicates. As mentioned previously, Percus (1997) provides strong evidence that even out-of-the-blue utterances are contextualized minimally by our world knowledge. He notes that the restriction on locative and temporal modifiers for individual-level predicates reviewed in Section 1.2.2 is susceptible to contextual effects. Once a context is made available that suspends our typical world-knowledge understanding of the properties underlying individual-level predicates, the restrictions on them disappear. Percus provided a temporal example, but spatial examples are not hard to construct.

- (65) a. #The paint is off-white in the living room.
- b. Because of the quality of the lighting and the arrangement of our furniture, the paint is off-white in the living room, but ivory in the bedroom.

Glasbey's (1997) examples also strongly suggest that existential interpretations are susceptible to contextual manipulation. Local context may obviate even those cases like (62a)

which Kratzer and Selkirk (2007) argue require their subjects to raise to topic position to satisfy the topic condition. In out-of-the-blue contexts, an English equivalent to (62a), given in (66a), follows the same pattern as the German example. The subject does not remain low and cannot receive an existential interpretation, and additionally, locatives are blocked. However, adding a local context like (66b) allows the subject to remain low and receive an existential interpretation, and locatives are licensed.

- (66) a. Mental health patients are crazy (*there). (generic only)
 b. Mark visited the mental health hospital today and he (existential possible)
 exclaimed to me that mental health patients are crazy
 (there)!

While the exact mechanism guiding the use of (local) context is outside the scope of this dissertation, certainly Kratzer and Selkirk's silent locative could play a key role. Indeed, context supports the presence of overt locatives like *there* in (66b), and the absence of an overt locative is certainly not enough evidence to say that no locative is present, as a covert locative could be. Kratzer and Selkirk's observation about deaccenting stage-level predicates suggests that prosody may be used as a further diagnostic for the presence of covert locatives.

So while this dissertation is focused on the VP-internal factors which affect stage-level/individual-level predicates, care must be taken when considering judgments of the data. I will often be concerned with out-of-the-blue contexts because it is in these contexts that an existential interpretation is most difficult to get and is often unlicensed without the presence of certain VP-internal factors, but unobserved local contexts or silent temporal and locative elements may still be present and may, therefore, cloud judgments.

1.6 Summary of the Dissertation

The dissertation is structured as follows. In Chapter 2, I begin exploring the analogy between those factors which license an existential interpretation and telicity, arguing that

stage-level/individual-level behavior is a property of the VP predicate and not verbs themselves. I further explore the properties which stative verbs may possess in analogy to eventive verbs which are argued to be insensitive to their internal arguments, e.g. activity and achievement verbs. In Chapter 3, I continue exploring the analogy between those factors which license existential interpretations and telicity by focusing on the type of internal argument which licenses an existential interpretation of the subject. I provide data arguing that quantization plays the key role in licensing an existential interpretation. I then propose a mechanism to capture the internal argument alternation through mapping to events and objects and explore the consequences of this mechanism for the aspectual characterization of states with respect to lifetime effects and temporal modification. In Chapter 4, I extend the analysis of verbal stative predicates to adjectival predicates. Here I argue that an adjective's scale structure is relevant to the stage-level/individual-level behavior of its predicate and provide an analysis of scale structure as a special case of quantized/homogeneous structures more generally. I turn also to the role that arguments play in determining stage-level/individual-level behavior for adjectives which appear to have internal arguments. Finally, in Chapter 5, I conclude the major results of the dissertation and speculate on the role quantization plays in the grammar and cognition more widely.

Chapter 2

STATES AND COMPOSITIONALITY

The availability of an existential interpretation for subjects is intimately tied up with what has become known as the stage-level/individual-level distinction among predicates. Many researchers have taken the stage-level/individual-level distinction to be a lexical property of predicative heads, typically verbs and adjectives (Diesing, 1992; Kratzer, 1988/1995). However, in this chapter I will argue that the stage-level/individual-level distinction is not a lexical property of verbs. Instead, I will present an argument that the stage-level/individual-level distinction is made at the phrase level by a configuration of the verb and its internal argument.

The heart of this chapter rests on the following observation concerning stative sentences extended from those made in Section 1.3.1. Bare plural subjects in predicates like (1a) may be interpreted existentially while those in predicates like (1b) and (1c) cannot.¹

- | | | | |
|-----|----|------------------------------------|------------------------|
| (1) | a. | Students understand this homework. | (existential possible) |
| | b. | Students understand homework. | (generic only) |
| | c. | Students understand. | (generic only) |

This data is very reminiscent of a contrast found in the traditional literature on telicity. Terminative modifiers like *in five minutes* are acceptable with predicates like (2a), but are blocked in predicates like (2b) and (2c).

¹Throughout this chapter, I will use judgments which primarily contrast in the interpretation of the bare plural. This intuition, however, is not always clear-cut, but for a majority of these sentences the singular indefinite can be substituted for the bare plural. Ignoring the possibility of a kind interpretation, this substitution displays a contrast in acceptability.

- | | | |
|-----|----|--------------------------------------|
| (i) | a. | A student understands this homework. |
| | b. | #A student understands homework. |
| | c. | #A student understands. |

- (2) a. John read the book in five minutes.
 b. John read books *in five minutes.
 c. John read *in five minutes.

The relationship between the examples in (1) and (2) is quite striking. What is it about the objects in (1a) and (2a) that license existential interpretations of subjects in stative predicates and telic interpretation in eventive predicates? Why would the lack of an object in (1c) and (2c) cause these predicates to fail to license existential interpretations of subjects and telic interpretation? And finally, the type of the object itself matters. Why do the particular objects in (1b) and (2b) lead these predicates to reflect the behavior of those whose objects are absent in (1c) and (2c) and not act in a way similar to (1a) and (2a)?

I address these questions in turn. In this chapter, I set aside the distinction between the types of objects and focus on the account for the stage-level/individual-level behavior of predicates as a phrasal distinction.² I first return to the original arguments concerning the analysis of examples like (2) which were used to argue for a compositional understanding of telicity. Why was Verkuyl (1972) so persuasive and do his arguments carry over to the existential interpretation of subjects? I then turn to some structural analogies between telicity and existential interpretation. While the examples in (1) and (2) show alternation between existential interpretation and telicity, respectively, the literature on telicity has observed cases of non-alternating verbs. I review these claims and then turn to a possible case of a non-alternating stative verb, the verb *exist*.

2.1 Telicity as a Phrase-level Category

Verkuyl (1972) discussed telicity as a “compound category”, one which is not specified at a terminal node like V, but instead is the result of a particular configurational category like

²Chapter 3 will delve into issues concerning the type of objects which license an existential interpretation of the subject.

VP.³

- (3) a. Mary walked three miles #for an hour.
b. Mary walked for an hour.

Verkuyl's reason for rejecting the verb as the locus of telicity followed from the consideration of several alternative analyses which I review below.

The first analysis supposed that *walk* is homophonous between two lexical items, one with a DURATIVE (atelic) feature and the other with a NONDURATIVE (telic) feature. Verkuyl quickly abandoned this analysis because it is unclear why there would be multiple lexical items for *walk*. In particular, positing multiple lexical entries fails to illuminate why the change between (3a) and (3b) is related to the presence or absence of *three miles* and not to a change reflected by the verb itself. To add to these complications, I further note, along with many others, that a large number of verbs participate in this alternation, suggesting that this alternation is far more systematic than a multiple lexical entry approach would suggest.

The second analysis maintained that *walk* is DURATIVE and suggested that the NONDURATIVE feature is a part of *three miles*. For this analysis to work, there also has to be a rule which neutralizes the DURATIVE feature of the verb with the NONDURATIVE feature of the direct object. Verkuyl notes four difficulties with this analysis. First, this analysis suggests that aspect is not truly a "verbal" phenomenon if nonverbal constituents can receive aspectual features. Second, the analysis requires a rule which states that the nonverbal constituent's aspectual feature overrides the aspectual feature on the verb. More importantly, this analysis predicates that *three miles*, along with any other constituent which bears aspectual features, should express NONDURATIVE aspect in other sentences. However, Verkuyl

³Verkuyl initially argued his point with the presence or absence of locatives in sentences like *Greetje walked (#from the Mint to the Dam) for hours* and then continued on to make his classic observations concerning the effects of objects on telicity. Here I walk through his original arguments using the presence or absence of an object as the example speaks more closely to the phenomenon of interest.

notes that expressions like *three miles* do not always express a NONDURATIVE feature. In particular, *It's three miles to the nearest exit ramp* does not have a nondurative interpretation even though it has *three miles* as a constituent. Finally, this analysis misses an important generalization between nondurative aspect from nonverbal expressions like *three miles* and nondurative aspect from verbs like *fall* and *stumble*. Both of these express events which have iterative interpretations when combined with *for hours*; however, in one case the iterativity arises from the inherent NONDURATIVE feature of the verb while in the other the verb inherits a NONDURATIVE feature from its complement. The shared nondurative aspect reflected by shared iterative interpretations would have to be explained as a correspondence between the inherent NONDURATIVE verbal feature and an accidental NONDURATIVE feature coming from the verbal complement.⁴ Since neither the verb itself nor its object can host aspectual features without conflict, Verkuyl proposes that aspect is part of the configurational category of the verb and its object, the VP.

In retrospect, several of these arguments may no longer be as important as they once were. Certainly many researchers have been arguing that nonverbal expressions *do* have aspectual features. Aspect has been extended productively to nouns, adjectives, and prepositions, arguing against the prevailing view that aspect is a purely verbal phenomenon (Jackendoff, 1991; Marín, 2009; Rijkhoff, 1991; Zwarts, 2005). Indeed, many of these analyses pursue generalizations and relationships between verbal and nonverbal domains. However, the core issue of aspect as a configurational category has remained.

Most intimately connected to the configurational argument for aspect was the role played by the object. For instance, (4e) which has no object has a non-iterative single event (i.e. durative) reading compared to both (4a) and (4b) which have objects and have iterative event (i.e. nondurative) readings. However, (4c) and (4d), which also have objects,

⁴Indeed, Verkuyl's discussion of this hints at the special status of NONDURATIVE (telic) feature, as this determines the aspect of the predicate. More recent theory could have proposed that NONDURATIVE is a privative feature, and that durative interpretation arises due to its absence (Olsen, 1994, 1997).

pattern with (4e) in having a non-iterative single event reading.

- (4) a. Robby read these two books #for an hour.
b. Robby read a book #for an hour.
c. Robby read books for an hour.
d. Robby read literature for an hour.
e. Robby read for an hour.

Verkuyl goes to much trouble to pull apart the differences between those objects which yield nondurative interpretations and those objects which yield durative interpretations. The opposition cannot be due to plural/singular as (4a) is plural and (4b) is singular but both yield nondurative interpretations, nor can be reduced to definite/indefinite as (4a) is definite and (4b) is indefinite, but again, both yield nondurative interpretations. However, the distinction between count (quantized) and noncount (nonquantized) objects^{5,6} does correspond with the alternation in aspect.

Hinrichs (1985) makes a strong point concerning this relationship between the count/noncount distinction of nominals and telicity. He notes that the assumption of compositionality requires that the difference between the sentences in (4) is due to the way in which the denotation of the verb *eat* combines with the denotation of its object in each case. “Ceteris paribus, the difference in event type must be due to the semantic difference between mass and count noun semantics.”

Finally, Verkuyl also observes that the intervening preposition in pseudo-intransitive sentences like (5a) and (5b), which correspond to (4a) and (4b) respectively, yields durative aspect.⁷ The connotive alternation given in (5c) and (5d) also shows similar effects for prepositions.

⁵Noncount object include both mass noun and bare plural objects.

⁶Verkuyl (1972) also argues that the opposition of (4b) and (4c) requires the count/noncount distinction to be made at a node other than the noun. It is now common to analyze the count/noncount distinction as a syntactic distinction (Ritter, 1991, 1995).

⁷It is important to note that not all prepositions block nondurative (telic) interpretation. Some prepositions in fact license telic interpretation regardless of the type of object.

- (5) a. Robby ate from two sandwiches for an hour.
 b. Robby ate from a sandwich for an hour.
 c. Robby ate at two sandwiches for an hour.
 d. Robby ate at a sandwich for an hour.

Verkuyl incorporates these observations into the configuration of aspect by ultimately arguing that nondurative (telic) aspect results from the configuration of a verb with an object of specified quantity of x , where specified quantity of x underlies the count/noncount distinction.

- (6) Nondurative aspect: [VP V [NP SPECIFIED QUANTITY OF X]]

In much subsequent work, determining whether a phrase is a specified quantity or not has become the focus of extensive research and gone under a variety of names, including specified quantity of α ($\pm$ SQA) (Verkuyl, 1993), quantization (Krifka, 1989, 1992, 1998), boundedness (Kiparsky, 1998), and quantity (Borer, 2005a,b). I will set aside the particular details distinguishing these proposals for the time being, returning to them in Chapters 3 and 4.

- (i) a. Robby wrote up two papers #for an hour.
 b. Robby wrote up papers #for an hour.

Interestingly, the prepositions which license telic interpretation have a different syntactic behavior from those which block telic interpretation. This may suggest that prepositions like *from* introduce their objects while prepositions like *up* may not.

- (ii) a. Robby wrote up two papers #for an hour.
 b. Robby wrote two papers up #for an hour.
 c. Robby drank from two beers for an hour.
 d. *Robby drank two beers from for an hour.

2.2 Existential Interpretation

We are now in a position to consider some initial analyses of (1a) and (1c), repeated in (7) below. As a reminder, the bare plural subject in (7a) can receive an existential interpretation, but cannot in (7b).

- (7) a. Students understand this homework. (existential possible)
b. Students understand. (generic only)

The first analysis to pursue assumes that the availability of an existential interpretation in (7b) comes from the predicate *understand* (Kratzer, 1988/1995). Let us assume that *understand* is an individual-level predicative head since the bare plural subject in (7b) cannot receive an existential interpretation. Assuming this to be on the right track, we would expect all instances of *understand* to behave as individual-level predicates. However, the presence of an existential interpretation in (7a) is not predicted. Continuing to assume that the stage-level/individual-level distinction is a property of predicative heads then leads us to propose that *understand* is homophonous between two lexical items, differing only in whether they are stage-level or individual-level. The *understand* in (7a) is stage-level and the *understand* in (7b) is individual-level.

Clearly the assumption that the stage-level/individual-level distinction is part of predicative heads gets us into trouble. It leads us to two separate lexical entries differing only in this distinction, but more importantly it fails to illuminate why the change between (7a) and (7b) is related to the presence or absence of *this homework* instead of a change reflected on *understand*.

The second analysis maintains the core assumption that predicative heads are stage-level or individual-level, but adds that non-predicative expressions are also stage-level or individual-level. Therefore, in addition to *understand* being individual-level, we assume that *this homework* is stage-level and that there is a rule stating that a stage-level object overrides a individual-level predicative head. Let's consider this analysis in light of some

of Verkuyl's objections to this analysis for telicity.

One of those objections, as applied here, would be that by allowing non-predicative phrases to be stage-level or individual-level, we lose the observation that this is a distinction between predicates. Indeed, it is not clear how the stage-level/individual-level distinction would distinguish non-predicative phrases like *this homework* from others, such as *homework*, *two homeworks*, *homeworks*, *every homework*, etc. For instance, by not being predicative, we have no way of observing whether *this homework* could license an existential interpretation of an argument. However, other characteristics of the stage-level/individual-level distinction such as temporariness or preceptability could apply. Perhaps *this homework* is not temporary in any intuitive sense although many stage-level predicates are characteristically temporary, but it can appear in the complement of perception verbs, *John saw this homework*, another characteristic of stage-level predicates. So this objection raises important questions and clarifications. What are the core observations about stage-level/individual-level predicates which could apply to non-predicative expressions were it to be extended to them?

Assuming that the stage-level/individual-level distinction was successfully extended to non-predicative phrases, the next objection concerns the addition of a rule which projects the object's stage-level status over that of the verb's individual-level status. Why, for instance, would non-predicative phrase features projected over predicative head features and not the other way around? Does this work the same way regardless of the verb's features or the object's features? Of course, there are many possible ways to maneuver. Perhaps this rule only operates over individual-level verbs, or perhaps expressions are only marked stage-level in the lexicon and individual-level interpretation arises from the absence of a stage-level lexical item. Regardless of the direction one takes, however, a principled explanation of why these patterns are this way would be required, and not just a stipulation of rules.

Finally, one of the more interesting predictions this analysis makes is that that *this*

homework should always express stage-level properties in sentences. Consider the following observation. Putting *this homework* in a position where a bare plural subject fails to receive an existential interpretation, such as the sentence *Homework sucks*, also results in a sentence in which the subject fails to receive an existential interpretation. In the sentence *This homework sucks*, the homework in question is presupposed and does not receive an existential interpretation. So much like the case for telicity, *this homework* does not always behave like it is stage-level.

Having applied the arguments of Verkuyl (1972), are we in a position to claim that the stage-level/individual-level distinction is neither a property of verbs nor a property of objects, and thus should be treated as a phrase-level distinction? Though the evidence leans in favor of a phrase-level analysis, many possibilities still remain that could rescue a lexical-level analysis of the stage-level/individual-level distinction. In particular, the availability of existential interpretation could be linked to argument expression and transitivity of the verb. However, there is an important observation to consider: the type of the object matters to the availability of existential interpretation. Turning to the type of the object in more detail, note that (8) which has an object like (7a) is still unable to assign an existential interpretation to its subject.

(8) Students understand homework. (generic only)

If we follow Hinrichs (1985) again, we are lead to the conclusion that the difference between these sentences must be due to the way in which the denotation of *understand* combines with the denotation of these objects. That the ability to license an existential interpretation of subjects is linked to both the presence of an object and, when present, the particular type of the object provides us with strong evidence that this phenomenon is compositional and not a fact about the lexical entry of *understand*.

As to what types of objects matters for the licensing of an existential interpretation of subjects, we will return to the role played by the object in more detail in the next chapter

where I will argue that quantization is operative in the domain of stative predicates and is reflected in their ability to license an existential interpretation of their subjects.

The final observation which Verkuyl made concerning the phrase level behavior of telicity concerned what he called pseudo-intransitive sentences. For these sentences, the properties of the object introduced through a preposition did not affect the telicity of the predicate. The same could hold true for the availability of an existential interpretation of subjects in stative predicates.

Many stative verbs obligatorily require the presence of a preposition in transitive constructions, including *belong to*, *consist of*, *depend on*, *live in*, and *matter to*. However, each of these examples alternates in their availability of an existential interpretation of subjects.

- | | | | |
|------|----|---|------------------------|
| (9) | a. | Students belong to this club. | (existential possible) |
| | b. | Students belong to clubs. | (generic only) |
| (10) | a. | Skin cream consists of these ingredients. | (existential possible) |
| | b. | Skin cream consists of ingredients. | (generic only) |
| (11) | a. | Laws depend on this election. | (existential possible) |
| | b. | Laws depend on elections. | (generic only) |
| (12) | a. | Monkeys live in these trees. | (existential possible) |
| | b. | Monkeys live in trees. | (generic only) |
| (13) | a. | People matter to this company. | (existential possible) |
| | b. | People matter to companies. | (generic only) |

Transitive *believe* takes either a direct object or a prepositional object; however, again both of these forms show the alternation.⁸

⁸Transitive *think* can also take a direct object or prepositional object, but the same comparisons cannot be made since the direct object form is stative while the prepositional object form is habitual.

- | | | | |
|-----|----|---|---------------------------------|
| (i) | a. | Philosophers think about these crazy ideas in language. | (habitual) |
| | b. | Philosophers think about crazy ideas in language. | (habitual) |
| | c. | Philosophers think these crazy thoughts about language. | (stative: existential possible) |
| | d. | Philosophers think crazy thoughts about language. | (stative: generic only) |

- (14) a. Linguists believe in this theory about language. (existential possible)
 b. Linguists believe in theories about language. (generic only)
 c. Linguists believe this theory about language. (existential possible)
 d. Linguists believe theories about language. (generic only)

These observations suggest that the preposition in stative predicates may not be related to their objects in the same manner as the prepositions in eventive examples like those (5) are.⁹

Summing up, Verkuyl's initial observations about telicity as a configurational category can be made about the availability of an existential interpretation for subjects in stative predicates. The most convincing line of evidence comes from the interaction between the verb and its object. In particular, those stative predicates which lack an object are unable to license an existential interpretation. However, the mere presence of an object is not sufficient; only certain types of objects are able to license an existential interpretation. I will return to the role objects play in licensing an existential interpretation in Chapter 3.

2.3 Other Relationships between Telicity and Existential Interpretation

If there is a tighter connection between telicity and existential interpretation, then we expect other parallel behaviors to arise. Here I will explore the possibility that the availability of

⁹Observe also that these prepositions cannot follow the object, similar to those prepositions which do not affect telicity mentioned in fn. 7.

- (i) a. Linguists believe in this theory.
 b. *Linguists believe this theories in.
 c. Laws depend on this election.
 d. *Laws depend this election on.
 e. Monkeys live in these trees.
 f. *Monkeys live these trees in.

As the role of prepositions in stative predicates is not a main concern of this dissertation, I set these observations aside for future consideration.

an existential interpretation may depend only on the particular stative verb. I first review the literature on telicity that concerns those verbs which block the alternation of telicity based on their objects. I then turn my attention to *prima facie* cases of stative verbs which block the alternation of existential interpretation based on their objects.

2.3.1 Non-alternating Verbs

In the literature on telicity, there are cases where verbs do not follow the pattern of (2) and appear to be insensitive to their objects. One class is activity verbs and another is achievement verbs. I review both in turn below, starting first with the class of activity verbs whose predicates appear to receive an atelic interpretation even in the presence of a quantized object, and then turning to the class of achievement verbs whose predicates appear to receive a telic interpretation even without a quantized object.

2.3.1.1 Activity (Atelic) Verbs

A classical issue for the compositional analysis of telicity is verbs like *push* and *pull* which, regardless of their object, appear to remain durative in their interpretation. Even with a quantized object like *the cart*, as in (15), the predicate appears to remain atelic, blocking *in X time* modifiers and accepting *for X time* modifiers.

- (15) a. Kim pushed the cart *in five minutes/for five minutes.
 b. Kim pulled the cart *in five minutes/for five minutes.

Kiparsky (1998), Schein (2002), and Borer (2005b), however, all claim that the prototypical activity verbs, like *push* and *pull*, are sensitive to their internal argument. I summarize the arguments of Schein (2002) and Borer (2005b) below.

Schein (2002) notes that context plays an enormous role in the interpretation of these sentences. He notes that examples like (16a) are unacceptable if the cannon is moving linearly towards the Union battery. However, if the cannon is being rotated to face the Union

battery, then (16a) is acceptable. Note that the same is true of example (16b). This observation demonstrates that activity verbs like *heave* and *push* can have telic interpretation.

- (16) a. Johnny Reb heaved the cannon toward the Union battery in ten seconds.
 b. Johnny Reb pushed the cannon toward the Union battery in ten seconds.

Borer (2005b) points out that with *push* and *pull*, a telic interpretation is easily available given objects like buttons, ropes, and levers; the examples in (17) are most naturally interpreted as iterative events.¹⁰ She notes that our world knowledge of pushing buttons and pulling ropes is filled with telic events whereas pushing carts is not. This leads her to claim that there is nothing necessary or sufficient in *push* or *pull* which forces a telic or atelic interpretation.

- (17) a. Kim pushed the button/the lever #for five minutes.
 b. Kim pulled the rope/the lever #for five minutes.

To this evidence, I add evidence coming from the interpretation of coordinated predicates (Kamp, 1979; Partee, 1984). When coordinated, two telic predicates give rise to a sequential interpretation. As such, the truth-conditions for (18a) and (18b) are distinct. Coordination of two atelic predicates, however, allows for a simultaneous reading. (19a) and (19b) could be truth-conditionally equivalent (though a sequential interpretation is also available).

- | | | |
|---------|--------------------------|-------------------------|
| (18) a. | The vase broke and fell. | (sequential only) |
| b. | The vase fell and broke. | (sequential only) |
| (19) a. | Kim ran and sang. | (simultaneous possible) |
| b. | Kim sang and ran. | (simultaneous possible) |

It should be noted that this test does not obviate the importance of the object. The truth-conditions of (20a) and (20b) are distinct, while those of (21a) and (21b) are not.

¹⁰Borer (2005b) notes, however, that these predicates are ambiguous between a telic and atelic interpretation.

- (20) a. Terry read and sang the music. (sequential only)
- b. Terry sang and read the music. (sequential only)
- (21) a. Terry read and sang music. (simultaneous possible)
- b. Terry sang and read music. (simultaneous possible)

When coordinated, *push* and *pull* mirror this behavior of depending on their internal argument for their interpretation. (22a) and (22b) are most naturally interpreted as sequential (abet iterative) events and not as a single event; whereas, (23a) and (23b) are interpreted as simultaneous, describing a single event.

- (22) a. Kim pushed and pulled the cart. (sequential only)
- b. Kim pulled and pushed the cart. (sequential only)
- (23) a. Kim pushed and pulled carts. (simultaneous possible)
- b. Kim pulled and pushed carts. (simultaneous possible)

Taken together, activity verbs do not provide evidence for a class of verbs which are not sensitive to their objects. However, as the review above demonstrates, caution is in order. Verbs which do not appear to alternate may in fact allow for alternation under very particular circumstances. Understanding the nature of these circumstances is part of what the theory of aktionsart should provide us.

2.3.1.2 Achievement (Telic) Verbs

The status of achievement verbs has, like their activity counterparts, elicited controversy in the literature. Achievements are reported to differ from accomplishments in terms of their punctuality, and it is this punctuality that arguably underlies their telic interpretation. Demonstrating that achievements are not punctual would provide the first line of evidence against their inherent telicity. Evidence for their punctuality traditionally comes from the unavailability of the progressive, which has been the classic test distinguishing states and

achievements from activities and accomplishments. However, many examples like (24) exist to counter this claim.

- (24) a. He is leaving.
b. He is arriving.

Rothstein (2004) also notes that achievements in the progressive do not entail their simple past versions as in (25). This failure of entailment, called the imperfective paradox, is also found for accomplishments (26) and has been argued to reflect the intermediate stages leading up to the culmination of a telic event. These examples, then, suggest that achievements may have intermediate stages and therefore cannot be truly punctual.

- (25) a. The plane was landing. ↗ The plane landed.
b. Jane was reaching the summit. ↗ Jane reached the summit.
(26) a. Mary was building a house. ↗ Mary built a house.
b. Jane was writing a paper. ↗ Jane wrote a paper.

The seminal observations in Mittwoch (1991) challenge the view that the existence of progressive achievements in (24) denies the underlying punctuality of achievements. First, some achievement verbs like *notice* and *spot* in (27) simply do not admit a progressive interpretation. Second, aspectual verbs like *still*, *stop*, and *finish* in (28), which are sensitive to the activity progression, do not take achievement complements.

(27) #She is noticing/spotting the eagle.

- (28) a. #He is still arriving.
b. #She stopped arriving.
c. #She finished leaving.

Rothstein (2004) observed further distinctions between progressive achievements and other types of progressives. She noted that progressive achievements like (29a) have a “slow motion” reading (brought out with the addition of *just* or *finally*). Progressive accomplishments like (29b) lack this reading. Also, progressive achievements can be para-

phrases with *about to* without a futurate interpretation. (30b) is a good paraphrase of (30a), whereas (30d) is not a paraphrase of (30c).

- (29) a. Jane is (just/finally) reaching the summit.
b. Jane is (just/finally) building a house.

- (30) a. The train is arriving at the station.
b. The train is about to arrive at the station.
c. Jane is building a house.
d. Jane is about to build a house.

Related more strongly to the telic interpretation of achievements is their insensitivity to their internal arguments. Mittwoch (1991) observes these effects in both the conjunction test used in Verkuyl (1989) and the interpretation of *for X time*. As Verkuyl noted, (31a) requires that there were two printing events, the first on Saturday and the second on Sunday. Similarly, (31b) may have a two event interpretation, but it also has a one event interpretation in which the computer has been working constantly all weekend.

- (31) a. The computer printed a paper on Saturday and on Sunday. (two events only)
b. The computer ran on Saturday and on Sunday. (one event possible)

What Mittwoch pointed out is that sentences with achievement verbs like *strike* and *notice* in (32) only admit a two event interpretation, even when their objects allow atelicity when paired with non-achievement verbs as in (33). The same facts hold true with *for X time*. The sentences in (34) are only good on iterative interpretations although these objects allow continuous interpretations as in (35).

- (32) a. The prospector struck oil on Saturday and on Sunday. (two events only)
b. Mary noticed ink on her sleeve on Saturday and on Sunday. (two events only)
day.
(33) a. The prospector pumped oil on Saturday and on Sunday. (one event possible)
b. The machine produced ink on Saturday and on Sunday. (one event possible)

- (34) a. The prospector struck oil #for two weeks.
 b. Mary noticed ink on her sleeve #for five minutes.
- (35) a. The prospector pumped oil for two weeks.
 b. The machine produced ink for five days.

Returning to the examples of progressive achievements, Mittwoch's observation makes a predication about the entailment patterns of the imperfective paradox. Progressive achievements with bare objects should still fail to entail their simple past counterparts, whereas non-achievement verbs with bare objects should now entail their simple past counterparts. This prediction is born out. Certainly, the process of finding oil or receiving ink can be interrupted such that no oil was actually ever found and no ink was actually ever received.

- (36) a. The prospector was finding oil. $\nrightarrow$ The prospector found oil.
 b. Mary was receiving ink. $\nrightarrow$ Mary received ink.
- (37) a. Mary was eating cake. $\rightarrow$ Mary ate cake.
 b. Jane was drinking coffee. $\rightarrow$ Jane drank coffee.

Finally, Mittwoch claims that there are no simple intransitive verbs other than achievement verbs that are unequivocally telic in their interpretation.¹¹ The following examples are taken from Borer (2005b).

- (38) a. Lava erupted (from Vesuvius) on Sunday and on Monday. (two events only)
 b. Poisonous gas exploded in Fairfax on Sunday and on Monday. (two events only)
 day.

¹¹Importantly, given the sensitivity of verbs to their *internal* arguments, one must be careful that these are unergative verb (which do not have an internal argument) and not unaccusative verbs (which do). As evidence, *erupt* and *explode* do not participate in the causative alternation, as in (i). Thus, in no way is *lava* or *poisonous gas* a subject derived from an internal argument position in (38).

- (i) a. *Vesuvius erupted lava.
 b. *The bomb exploded poisonous gas in Fairfax.

Considering the evidence above, there is reasonable support for the class of achievement verbs. This class of verbs always admits a telic interpretation for the sentences they are found in. Furthermore, this class of verbs blocks atelic interpretations of their sentences.

2.3.2 Non-alternating Stative Verbs

As we saw in Section 2.2, the presence of an internal argument may affect a predicate's ability to license an existential interpretation of its subject. A natural question to ask, in parallel with telicity, is whether there are stative verbs which either license or fail to license an existential interpretation of their subject regardless of their internal argument. I will first consider the possibility of individual-level verbs, those verbs whose predicates fail to license an existential interpretation of their subjects even in the presence of demonstrative objects. I will then turn to the possibility of stage-level verbs, those verbs whose predicates license an existential interpretation of their subjects even without an object at all.

2.3.2.1 Individual-level (Generic-only) Verbs

Although evidence for activity verbs has consistently been overturned in the literature, it is possible that, in analogy with the possible existence of activity verbs whose predicates are atelic regardless of their internal argument, we might find stative verbs whose predicates obligatorily fail to assign an existential interpretation to their subjects. The skepticism of the existence of activity verbs in light of Section 2.3.1.1 should be tempered, here, as the realm of stative predicates may not behave like eventive predicates.

As part of a larger project aimed at separating out the subproperties of stage-level/individual-level predicates, Jäger (1997; 2001) proposes that a predicate's ability to license an existential interpretation of its subject is a property independent from other classic stage-level/individual-level behaviors. These studies are useful here in that they delimit the cases where we would most likely expect to find verbs whose predicates fail to license an existential interpretation of their subjects as they have been independently claimed to not

license an existential interpretation even when they allow for other stage-level behaviors like transitoriness and perceptability.

The first of these cases is the verb *tower*. Jäger (2001) observes that the verb *tower* has a strongly preferred generic interpretation as shown in (39a) and predicates over the lifetime of its subject as in (39b), both characteristic of individual-level predicates. However, this verb is allowed in the complement of perception verbs as in (39c), a property of stage-level predicates.

- (39) a. Skyscrapers tower over the Empire State Building. (generic strongly preferred)
b. Next year, the new skyscraper will tower over the Empire State Building.
→ The skyscraper does not exist yet.
c. We saw the World Trade Center tower over the Empire State Building.

We are immediately interested in the judgment concerning the availability of an existential interpretation in (39a). Although judgments are claimed to strongly favor generic interpretation, the question for us is whether an existential interpretation is possible at all. Certainly in the context given in (40), (39a) seems to allow an existential interpretation.

- (40) The Empire State Building stands at 1250 feet and was the tallest building in the world for over 40 years after its construction. But man's ambition for bigger and taller has lead the the construction of 15 taller buildings. Nowadays, skyscrapers tower over the Empire State Building.

The verb *tower* also can be seen to alternate in its ability to license an existential interpretation given its internal argument. The sentence in (41a) with a demonstrative object allows for a clear existential interpretation, but with a bare plural as in (41b), the ability to license an existential interpretation is blocked. Even when embedded in contexts like that in (40), (41b) cannot license an existential interpretation.

- (41) a. Skyscrapers tower over this building. (existential possible)
b. Skyscrapers tower over buildings. (generic only)

The next case to consider is main verb *have*. Jäger (2001) gives the following examples to show that *have* cannot license an existential interpretation of its subject (42a) and cannot be the complement of a perception verb as in (42b), both properties of typical individual-level predicates. However, main verb *have* does not predicate over the lifetime of its subject as in (42c), a characteristic of stage-level predicates.

- (42) a. Kids have toys. (generic only)
 b. #We saw the kid have a toy.
 c. Bill had a new toy last week, but he lost it. ↗ Bill is dead.

Importantly, the failure of existential interpretation in (42a) may be due to the properties of the object in Jäger's example. Bare plurals, as discussed above, block existential interpretations of subjects. Placing this example in a context like (43) shows that an existential interpretation is not available for the subject when the object is a bare plural, but when the object is a demonstrative, an existential interpretation is available.

- (43) Not knowing what to get for my niece's 4th birthday, I bought her a doll. After she opened my present she wailed "I hate dolls!" The mothers around the room were a bit surprised and said that their children all had this doll and so I mentioned to my niece, "Kids have #toys/this toy."

Interestingly, with main verb *have* we find that inalienably possessed objects are degraded with demonstrative objects. This form of *have* is argued to have the prototypical behavior of an individual-level predicate (Jäger, 2001). The effect of inalienably possessed objects may be related to observations by Borer (2005a,b) concerning the role that world knowledge plays in determining whether an interpretation licensed by the grammar is filtered out through extra-linguistic processes.

- (44) a. ??Swedes have those blue eyes.
 b. Swedes have blue eyes. (generic only)

As found with activity verbs, the stative verbs reviewed here, which are arguably the best candidates for true individual-level verbs, do not block an existential interpretation regardless of the properties of their objects. As it stands, we may suspect, as stated in (45) and in accord with the failure to find true activity verbs, that there are no individual-level stative verbs, i.e. stative verbs which block an existential interpretation of their subject regardless of their object.

(45) There are no individual-level (generic-only) verbs.

2.3.2.2 Stage-level (Existential-only) Verbs

Concerning the existence of true stage-level verbs, the most natural place to start with, in analogy with the literature on achievement verbs, is to ask if there are cases of intransitive stative verbs whose predicates always license an existential interpretation of their subject. Intransitive stative verbs provide the most extreme case since they do not have objects at all and therefore, if an intransitive stative verb whose predicate always licensed existential interpretation of its subject was found, it would provide a strong case for the existence of stage-level verbs more generally. The examples in (46) are all intransitive statives, but each of these fail to license an existential interpretation.

- (46) a. Causes matter. (generic only)
 b. Lawyers stink. (generic only)
 c. Exams suck. (generic only)

There is, however, a *prima facie* case of an intransitive stative verb whose predicate appears to license an existential interpretation of its subject, namely *exist*. Intuitively, the example in (47) requires the existence of individual electrons and, therefore, appears to license an existential interpretation of its subject.

(47) Electrons exist.

Below, I will examine the evidence concerning *exist* and its ability to license an existential interpretation of its subject.

2.3.2.3 *Exist*

Before exploring the hypothesis that *exist* is always able to license an existential interpretation of its subject, we want to make sure that *exist* is a stative predicate. The tests below support the stativity of *exist*. It does not receive a habitual interpretation in the present tense (48a) and is odd in the progressive (48b) and in pseudo-clefts (48c). Therefore, if *exist* does in fact license an existential interpretation of its subject, it could not be claimed to be due to *exist* being an eventive predicate.

- (48) a. Electrons exist. (non-habitual)
b. #Electrons are existing.
c. #What electrons do is exist.

Turning to the interpretive properties of *exist*, there is an intuition that *exist* requires the existence of individuals and, therefore, licenses an existential interpretation of its subject. However, Moltmann (2009) argues that bare plural subjects refer to kinds with the predicate *exist* and not to individuals. She points to data coming from scope, relative clause modification, anaphora, aspectual/temporal modifiers, locatives, and singular indefinites to support her claim. I assess and extend her arguments below.

Scope Moltmann observes that bare plural subjects do not take scope over negation in *exist* predicates.

- (49) a. Dinosaurs do not exist anymore. (*BP > ¬)
b. Two dinosaurs do not exist anymore. (two > ¬)

Existential bare plurals, however, are independently known to exhibit narrow scope. Carlson (1977) notes that (50a) has only a contradictory reading, while (50b) has a contra-

dictory reading only on a narrow scope reading. If *a man* takes scope over negation, then a noncontradictory reading can be recovered.¹²

- (50) a. Men are in this room and men are not in this room. (contradiction only)
b. A man is in this room and a man is not in this room. (noncontradiction possible)

Similar scope phenomena can be observed in *exist* predicates. (51a) has only a contradictory reading, while (51b) has both a contradictory and noncontradictory reading.

- (51) a. Dinosaurs exist in Africa and dinosaurs do not exist in Africa. (contradiction only)
b. Some dinosaurs exist in Africa and some dinosaurs do not exist in Africa. (noncontradiction possible)

This supports Moltmann's observation that *dinosaurs* in (49a) has narrow scope, but as this test is about the representation of bare plurals, and not predicate types, it does not reveal anything deep about the predicate *exist*.

Relative Clause Modification Moltmann also argues that the bare plural subject of *exist* predicates can be modified with a kind-referring relative clause as in (52). She takes this as further evidence that *exist* is kind-referring.¹³

- (52) Dinosaurs which used to be widespread in Europe do not exist anymore.

However, the bare plural subjects of the sentences in (53) also are modified with kind-referring relative clauses even though their main clause is eventive and requires an existential interpretation. Thus (52) also does not demonstrate that *exist* is a kind-referring predicate.

¹²While this judgment is widely held, it has not been uncontroversial. McNally (1998b, fn. 4) reports a claim by Chierchia that the entity/quantifier-type interpretation is only strongly dispreferred for bare plurals, as opposed to impossible.

¹³E.T. Cunningham (p.c.) also notes that the relative clauses given in these examples are typically non-restrictive. Restrictive relative clauses, however, also demonstrate the same behavior with bare plural subjects.

- (53) a. Peacocks which are widespread in India can now be seen in the local zoo.
 b. Smallpox which use to be widespread all over the world can now be found only in the CDC.

These examples with relative clause modification are similar to observations of conjoined predicates attributed to Schubert and Pelletier (1987) in Krifka et al. (1995). Although the examples in (54) conjoin a kind-referring predicate to an existential predicate, they are acceptable. Therefore, conjoining an *exist* predicate with a kind-referring or existential predicate also cannot help us determine the predicate type of *exist*.

- (54) a. Peacocks are widespread in India and can now be seen in the local zoo.
 b. Smallpox use to be widespread all over the world and is now found only in the CDC.

Downward Entailments Krifka et al. (1995) supplied other diagnostics for generic expressions. In upward-entailing environments, an existential subject can be replaced with a less informative subject without making the sentence false as in (55a). This is not possible with generic subjects as in (55b). Using this test with *exist* sentences like (56), we seem to find evidence that the subject is interpreted existentially.

- (55) a. Berber lions escaped from the zoo. → Lions escaped from the zoo.
 b. Berber lions are extinct. ↗ Lions are extinct.
 (56) Berber lions exist. → Lions exist.

But, as Krifka et al. (1995) notes, this test is only valid for kind-referring stage-level predicates. Replacement of *lions* for *Berber lions* in a kind-referring individual-level predicate like (57) does not block the entailment.

- (57) Berber lions are well adapted to cold weather. → Lions are well adapted to cold weather.

As such, this test cannot be used to determiner the stage-level/individual-level status of *exist*.

Anaphora Moltmann argues that anaphora behave differently with bare plurals when compared to existential nominals. In (58a), *they* stands for the entire kind, whereas *they* in (58b) can only stand for particular instances of the kind. She claims that particular instances are not suitable for the predicate *once did exist*. For clarification of her judgment, note that replacement of *they* with *three dinosaurs* in (59) yields an unacceptable sentence.

- (58) a. Dinosaurs_i do not exist. But they_i once did exist.
 b. Three dinosaurs_i do not exist. *But they_i once did exist.

(59) #Three dinosaurs once did not exist.

What appears to be going on here is that bare numerals are unacceptable as the subjects of negated *exist* predicates. Indeed, it is unclear to me that the first sentence in (58b) is itself acceptable. However, given better supporting context, bare plurals in negated *exist* predicates become acceptable.

(60) Thanks to the miracles of modern medicine, three babies that once did not exist now do.

However, even putting these difficulties aside, Carlson (1977) noted that it is possible to have anaphoric connections between kind-referring and existential bare plurals. In (61a), *raccoons* is kind-referring, but *they* is existential. The reverse holds in (61b). *Raccoons* has an existential interpretation while *them* is kind-referring.

- (61) a. May hates raccoons_i because they_i stole her sweet corn.
 b. Raccoons_i stole May's sweet corn, so she now hates them_i with a passion.

In addition, Carlson-esque examples which makes clear connections to Moltmann's examples in (58) can be constructed, as in (62).

(62) John found dodos_i, although they_i were believed to not exist.

As such, it is not clear whether *they* in (58a) is referring to a kind or not. Tests using anaphora do not appear to make a clear distinctions between kind-reference and existential interpretation.

Evidence from reflexives, however, has been argued to provide a stronger test for distinguishing between kind-referring and existential NPs as reflexives are argued to enforce coreference between the two argument positions. The contrast between the examples in (63), coming from Krifka et al. (1995) who attribute the observation to Rooth (1985), is argued to strongly demonstrate that the bare plural *Martians* is kind-referring.

- (63) a. At the post-WW III peace meeting, Martians_i presented themselves_i as almost extinct.
 b. #At the post-WW III peace meeting, some Martians_i presented themselves_i as almost extinct.

Modifying this example slightly, we find the same contrast between (64a) and (64b).

- (64) a. After man's first landing on Mars, Martians_i presented themselves_i as existing.
 b. #After man's first landing on Mars, some Martians_i presented themselves_i as existing.

So while pronominal anaphora do not appear to give clear results concerning the predicate type of *exist*, we do find evidence for *exist* as a kind-referring expression using reflexive anaphora.

Temporal Modifiers and Aspectual Verbs Moltmann goes on to argue that the temporal modifiers and aspectual predicates in (65) operate over the life-span of the kind and not the life-span of particular individuals. This claim seems true. Particular individual dolphins may be born or die, but the truth of (65a) and (65b) is preserved as long as one individual dolphin exists. Similarly, the truth-conditions of (65c) and (65d) require that no single individual dinosaur exists.

- (65) a. Dolphins still exist.
 b. Dolphins continue to exist.
 c. Dinosaurs no longer exist.
 d. Dinosaurs ceased to exist.

In addition to providing more evidence that *exist* is a kind-referring predicate, these examples point out an important relationship between kinds and individuals. While kinds are not directly related to any particular individual, they still share a relationship with their instances. What might be responsible for the *prima facie* intuition that *exist* licenses an existential interpretation may in fact be tied to this relationship between kinds and individuals.

Locative Modifiers Moltmann also observes that, in general, *exist* predicates resist locative modification, a hallmark of individual-level predicates.

- (66) a. #The man we talked about yesterday exists in another city.
b. #Mary does not exist in Germany.
- (67) a. #Every cat we talked about yesterday exists in this city.
b. #Most people mentioned in this book exist in Germany.
- (68) a.?#Five million people exists in that country.
b.?#Three scientists exist in the other laboratory.

Nor can the locative be implicitly understood. *Exist* sentences without locatives, like *the man we talked about/five million people exist(s)*, are not restricted to a particular location. This is true even though, if asked, we would naturally infer that the man and the five million people are located somewhere.¹⁴

There is a straightforward pragmatic account of these contrasts. Since existence is location independent, i.e. something that individuals have regardless of location, there is a stronger statement to be made than the sentence with a locative, namely, the same sentence without the locative modifier (McNally, 1998b). If, however, the location is somehow tied to the existence of the individual (i.e. the individual's existence is location-dependent), then locative modification should become acceptable. This predication is born out given examples like (69).

¹⁴Naturally, this location inference does not extend to abstract entities. *The freedom of the Iraqi people exists* does not require freedom to be located in space.

- (69) Here at CERN we have these particles that exist only inside this special containment field. If the field were to collapse, the particles would cease to exist.

Another place where locative modification is acceptable is with bare plurals and mass nouns.

- (70) a. Giraffes exist only in Africa.
b. Syphilis does not exist in Europe anymore.

Moltmann argues that these examples are acceptable because *exist* “applies to a kind *k* just in case there are some instances of *k* at the location in question” (33). This restriction on locative modification can be seen when we consider the truth conditions of *exist* sentences. The truth conditions of (71a) and (71b) have nothing to do with whether the kind *life* or *unicorns* exist anywhere. Instead they are only concerned with whether instance of the kind *life* or *unicorns* are found on Mercury.

- (71) a. Life does not exist on Mercury.
b. Unicorns exist on Mercury.

The *usually* test for generic interpretation found in Krifka et al. (1995) also interacts in an interesting way with locative modifiers. Sentences with generic subjects that are modified with *usually* exhibit only a “slight” change in meaning, while sentences with existential subjects that are modified with *usually* exhibit a “drastic” change in meaning. However, for *exist* sentences, *usually* modification is blocked.

- (72) a. Dolphins exist.
b. #Dolphins usually exist.

Interestingly, *exist* sentences with locative modifiers allow *usually* modification. Since the meaning change between (73a) and (73b) is slight, this suggests that even with locative modifiers, *exist* behaves as an individual-level predicate that cannot license an existential interpretation of its subject.

- (73) a. Dolphins exist in the Puget Sound.
 b. Dolphins usually exist in the Puget Sound.

The behavior of *exist* with locatives, thus, is indicative of an individual-level predicate.

Weak Subjects Most importantly for Moltmann's claim is the observation that singular indefinites and other existential expressions like reduced 'some' (*sm*) are unnatural as subjects of *exist*.

- (74) a. #A giraffe exists.
 b. #Sm giraffe exists.

As this class of expressions requires an existential interpretation and are acceptable as the subjects of stage-level predicates, this observation lends strong support to the claim that *exist* cannot license an existential interpretation of its subject.

Well-established Kinds Krifka et al.'s (1995) "well-established kinds" test for generic interpretation adds to the evidence for the individual-level behavior of *exist* predicates with respect to their subjects. Since *the Coke bottle* names a well-established kind, (75a) is acceptable. Oddness arises in (75b), however, since there is no well-established kind referred to by *the green bottle*.

- (75) a. The Coke bottle exists.
 b. #The green bottle exists.

This observation extends to cross-linguistic facts concerning syntactic features of subjects. French marks this distinction by its determiner. The definite determiner *les* marks generic interpretation and *de* marks an existential interpretation. Moltmann notes that both *les* and *de* subjects are allowed in *exist* predicates as in (76), but only if the nominal denotes a natural class. In (77),

- (76) a. Les nombres naturels existent.
 LES numbers natural exist
 'The natural numbers exist.'
- b. De nombres naturels existent.
 DE numbers natural exist
 'The natural numbers exist.'
- (77) a. *Les nombres primes entre 10 et 15 existent.
 LES numbers prime between 10 and 15 exist
 'The prime numbers between 10 and 15 exist.'
- b. De nombres primes entre 10 et 15 existent.
 DE numbers prime between 10 and 15 exist
 'The prime numbers between 10 and 15 exist.'

In addition to evidence from French, Krifka et al. (1995) note that Japanese *-wa/-ga* marking also distinguish between generic and existential interpretations.

In Japanese, generic subjects are marked with *-wa* and existential subjects are marked with *-ga*. Interestingly, Japanese also has two verbs for *exist*. The first, *sonzaisuru* 'exist' appears to be more like English *exist*, while the second *iru/aru* 'exist' is consistently glossed as a *there*-construction.¹⁵

¹⁵ *iru* is used for animate subjects and *aru* is used for inanimate subjects.

- (78) a. Tora-ga iru.
tiger-ga exist

'A tiger exists.'
- b. Tora-wa iru.
tiger-wa exist

'Tigers exist.'
- c. Tora-ga sonzaisuru.
tiger-ga exist

'Tigers exists.'
- d. Tora-wa sonzaisuru.
tiger-wa exist

'Tigers exist.'

If we look at evidence from well-established kinds, a similar contrast emerges.

- (79) a. Koora-no-botoru-wa/#ga sonzaisuru.
Coke-GEN-bottle-wa/ga exist

'The Coke bottle exists.'
- b. Midori-ro-no-botoru-#wa/ga sonzaisuru.
green-GEN-bottle-wa/ga exist

'The green bottle exists.'

Similar to previous examples of *exist* predicates with locatives, *sonzaisuru* 'exist' also resists locative modification.

- (80) ?Koora-no botoru-wa teeburu-no ue-ni sonzaisuru.
Coke-GEN bottle-TOP table-GEN top-LOC exist

'The Coke bottle exists on the table.'

Thus, Krifka et al.'s (1995) "well-established kinds" test can be used to further determine that *exist* does not license an existential interpretation of its subject.

The following table sums up the evidence concerning existential interpretation in *exist* predicates.

Table 2.1: Summary of *exist* results

	Existential Interpretation
Scope	N/A
Relative Clause	N/A
Downward Entailment	N/A
Anaphora	
Pronouns	N/A
Reflexives	*
Temporal Modifiers	*
Locative Modifiers	*
Weak Subjects	*
Well-established Kinds	*

As we can see, there is no evidence for *exist* to license an existential interpretation of its subject, and thus at this point we have no evidence yet for the existence of stage-level verbs. As with individual-level verbs, we could make the claim in (81) that there are no stage-level verbs. Unlike events, where there was evidence for a class of verbs which do not alternate their telicity (i.e. achievement (telic) verbs), in states we have no evidence yet of a class of verbs which do not alternate in their ability to license an existential interpretation of their subject.

(81) There are no stage-level (existential-only) verbs.

2.4 Conclusions

In this chapter, I have put forward an argument against marking the stage-level/individual-level distinction for predicative heads. This analysis draws on a striking correspondence between the availability of an existential interpretation and telicity. Like telicity, the availability of an existential interpretation appears to be governed by the type of object the predicate has if it has one at all. Predicates without objects fail to license an existential interpretation of their subject, and even with objects, a predicate may fail to license an existential interpretation, as appears to be the case when the object is a mass noun or a bare plural.

The correspondence between the availability of an existential interpretation and telicity also lead to the interesting hypothesis that some stative verbs might not vary in their ability to license an existential interpretation. Some verbs could show individual-level behavior even with demonstrative objects or show stage-level behavior regardless of, and even in the absence of, an object. Concerning the possibility of individual-level verbs, I explored several verbs which are claimed to be unable to license an existential interpretation, but found that under the strongest condition for an existential interpretation, the presence of a demonstrative object, these predicates all licensed an existential interpretation. Concerning the possibility of stage-level verbs, I argued that the strongest evidence comes from intransitive stative verbs and the *prima facie* candidate supporting this hypothesis was the verb *exist*. However, after examining several lines of evidence, I argued that *exist*, in fact, does not license an existential interpretation of its subject and is not a stage-level verb.

Chapter 3

THE ARGUMENTS OF STATIVES

3.1 Introduction

The received wisdom concerning a predicate's type is that it is stored as part of its lexical representation (Diesing, 1992; Kratzer, 1988/1995). The heads of stage-level predicates are stage-level, the heads of individual-level predicates are individual-level, and sentences with these predicates behave in a manner dictated by the type of its head. As we have seen in Chapter 2, however, there are good arguments for making the stage-level/individual-level distinction at a phrasal level. As I argued there, perhaps the strongest argument for this position comes from evidence that the presence and type of internal argument affects whether a predicate behaves as a stage-level or individual-level predicate. It is to this argument that we now turn.

As a reminder, Fernald's (1994) observation concerned the availability of an existential interpretation of a subject. He noted that for transitive stative verbs, a demonstrative object licensed an existential interpretation while a bare plural object failed to license an existential interpretation. His examples are repeated in (1) and (2).

- | | | | |
|-----|----|------------------------------|------------------------|
| (1) | a. | Monkeys live in trees. | (generic only) |
| | b. | Tycoons own banks. | (generic only) |
| (2) | a. | Monkeys live in these trees. | (existential possible) |
| | b. | Tycoons own this bank. | (existential possible) |

As discussed previously, many have taken this observation to argue that the presence of a strong non-subject argument licenses an existential interpretation of the subject; however, while bare plurals are weak arguments and demonstratives are strong arguments, there are

other characteristics which distinguish these two types of nominals. The goal of this chapter is to discover what object types license the availability of an existential interpretation and provide an analysis which captures this effect.

This chapter is organized in the following manner. In Section 3.2, I will review the distinction between weak and strong and compare it to the distinction between quantized and homogeneous, the latter being strongly connected to the theory of telicity.¹ Importantly, the weak/strong distinction and the quantized/homogeneous distinction make different predictions concerning the availability of an existential interpretation. By observing the behavior of a wide range of object types, I will conclude that quantization, and not weak/strong, makes the proper characterization of the objects which both fail to license an existential interpretation and those which license an existential interpretation. In Section 3.3, I will then explore this result in the broader terms of the temporal interpretation of stage-level/individual-level predicates and conclude that the availability of an existential interpretation is, itself, a matter of aspect. This will lead me propose that stage-level predicates are quantized, applying to a quantized stage of an individual, while individual-level predicates are homogeneous, applying to homogeneous stages of an individual, i.e. the individual itself. In Section 3.4, I propose a compositional analysis to capture the relationship between the quantization of the object and the interpretation of the predicate and its subject. I will argue that stative and eventive VPs are composed via the same mechanisms, while the compositional characteristic distinguishing states and events is their relationship to their subject. Stative predicates map their part structure onto their subject, deriving the subject's interpretation. Finally, I conclude this chapter in Section 3.5.

¹I will be assuming definitions from Borer (2005a,b) for quantization (*quantity* in her terms) and not those of Krifka (1998). I will continue to use the term quantized to refer to those predicates which Borer would call quantity, and will use the term quantization to refer to the quantized/homogeneous distinction.

3.2 The Availability of Existential Interpretation

The argument of this chapter is not only that the stage-level/individual-level distinction is made at a phrasal level, but also that particular types of arguments, when present, determine the behavior of the predicate. Previous theories which have discussed the availability of an existential interpretation have, at least implicitly, proposed that the correct distinction between those objects which license an existential interpretation and those which fail to do so is the distinction between strong and weak arguments.

In this section I first establish that topic accounts for stage-level/individual-level predicates predict the weak/strong distinction as the relevant distinction for the availability of an existential interpretation. I then review the weak/strong distinction and the case for quantization, observing where these two distinctions make different predictions concerning the availability of an existential interpretation. Finally, I will provide data which argues that, as in the case of telicity, quantization makes the right distinction concerning the availability of an existential interpretation.

3.2.1 Topics Again

Previous theories directly addressing the alternation of existential interpretation have argued for Jäger's (2001) discourse linking principle requiring every clause to have a topic. Here I will focus on Kratzer and Selkirk (2007) as an explicit proposal concerning the syntactic representation of topics and the consequences for the availability of an existential interpretation.

As noted in Section 1.4.5, Kratzer and Selkirk (2007) propose that for transitive statives, the object can satisfy the requirement for a syntactically represented topic. Examples from object scrambling in German make this more visible; when the object is demonstrative, as in (3), the object scrambles to TopicP, becoming topical, and the embedded subject remains low and non-topical. For both (3a) and (3c), the italicized section is understood as all-new

and the bare plural subject, as part of the all-new part of the utterance, can receive an existential interpretation. Finally, the predicate can be deaccented in both cases.

- (3) a. Ich glaube, dass in diesem Baum *Áffen* leben. (existential possible)
I think that in this.DAT tree monkeys live

‘I think that monkeys live in this tree.’

- b. [CP [TopicP in diesem Baum [TP [_{VP} Affen [_V t_V] leben_{V+V}] T] Topic]]

- c. Ich weiss, dass dieses Haus *Maffiósi* besitzen. (existential possible)
I know that this house mafia.members own

‘I know that mafia members own this house.’

- d. [CP [TopicP dieses Haus [TP [_{VP} Maffiosi [_V t_V] besitzen_{V+V}] T] Topic]]

While Kratzer and Selkirk do not provide examples where the object is a bare plural, these are easily elicited as in (4) and (5). Interestingly, constructions with bare plural objects resist scrambling and are dispreferred compared to their unscrambled versions. Given the analysis pursued by Kratzer and Selkirk, since object scrambling is a way of topicalizing the object (i.e. having appear in TopicP), weak objects like bare plurals are unable to scramble because they are unable to be topics.

- (4) a. Ich glaube, dass Affen in Bäumen leben. (generic only)
I think that monkeys in trees live

‘I think that monkeys live in trees.’

- b. ?Ich glaube, dass in Bäumen Affen leben.
I think that in trees monkeys live

‘I think that monkeys live in trees.’

- c. [CP [TopicP Affen_i [TP t_i [_{VP} t_i [_{VP} Bäumen leben_V] v] T] Topic]]

- (5) a. Ich weiss, dass Maffiosi Häuser besitzen. (generic only)
 I know that mafia.members houses own
 'I know that mafia members own houses.'
- b. ?Ich weiss, dass Häuser Maffiosi besitzen.
 I know that houses mafia.members own
 'I know that mafia members own houses.'
- c. [CP [TopicP Maffiosi_i [TP t_i [vP t_i [vP Häuser besitzen_v] v] T] Topic]]

An important part of this analysis is that the requirement of a syntactically represented topic can only be met by a strong object, i.e. those arguments which are presupposed in the discourse. Jäger (2001) argues that an existential interpretation of a subject depends in part on the presence of a strong object and Kratzer and Selkirk (2007) likewise assume a similar role for weak and strong arguments in their analysis as well. Thus both accounts argue for the relationship between objects, subjects, and topicality summarized in Table 3.1. For the case of weak objects, the subject is required to satisfy the topic requirement and thus cannot receive an existential interpretation.² However, when the object is strong, it can satisfy the topic requirement and, if weak, the subject can receive an existential interpretation.

Table 3.1: The Relationship between Objects, Subjects, and Topicality in Transitive Statives

Object	Subject	Topic	Existential Interpretation of Subject
Strong	Strong	Subject or Object	–
Strong	Weak	Subject only	✓
Weak	Strong	Object only	–
Weak	Weak	Subject only	*

²As reviewed in Section 1.4.5, both Jäger (2001) and Kratzer and Selkirk (2007) also propose that a silent locative can satisfy the topic requirement. I set this option aside for now, noting however that judgments may be affected by the presence of silent locatives.

3.2.2 Varieties of Arguments

Topic accounts for the availability of an existential interpretation predict that a subject can only receive an existential interpretation if a strong non-subject argument is available to satisfy the topic requirement. This prediction requires that the distinction between the kinds of objects which license an existential interpretation of their subjects and those which fail to license an existential interpretation of their subject be made by the weak/strong distinction.

For the data available in the literature, this appears to be the case. Demonstrative objects are strong and license an existential interpretation of their subject, and bare plural objects are weak and fail to license an existential interpretation of their subject. However, demonstratives and bare plurals are also distinguished by a number of other distinctions. Here, I contrast the weak/strong distinction with the promising distinction between quantized and homogeneous nominals. This distinction is promising because the quantization of nominals is thought to be relevant for establishing telicity, and as discussed previously, the availability of an existential interpretation and telicity appear to have many analogous characteristics worth exploring.

The goal of the following sections is to clarify the status of both the weak/strong distinction and of quantization to identify clear cases where the two positions make competing predications concerning which objects license the availability of an existential interpretation.

3.2.2.1 Weak/Strong

Milsark (1974, 1977) introduced the weak/strong distinction to account for the definiteness restriction of DPs in English existential *there*-constructions. Milsark classified those determiners which are acceptable in *there*-constructions as weak and those which are unacceptable in *there*-constructions as strong. He also argued for the often standard assumption that weak determiners are non-quantificational (i.e. cardinal) whereas strong determiners are quantificational by proposing that the function of existential *there*-constructions was to

existentially quantify the post-verbal DP. Those DPs which are already quantificational cannot occur in existential *there*-constructions because of their inherent quantificational status (perhaps a species of Kratzer's (1988/1995) more general ban on vacuous quantification).

- (6) a. *There were every/most/the people in the room.
b. There were many/several/three people in the room.

Since Milsark's proposal, several theories have been proposed which refine and clarify the standard account, particularly with respect to the status of weak DPs.

Diesing (1992) and de Hoop (1996) maintain the idea that strong DPs are quantificational and propose that weak DPs are interpreted as variables, adopting proposals made in Heim (1982) and Kamp (1984). As such, the weak/strong distinction for both Diesing and de Hoop is characterized as an issue of interpretation. Diesing (1992) proposes that strong DPs are presuppositional, and de Hoop (1996) proposes that strong DPs are referential, partitive, generic, or generic collective (all types of presuppositional interpretation).

Weak DPs, as variables, must be bound to receive an interpretation, and thus weak DPs must have narrow scope. However, the proposal that weak DPs denote variables does not capture the wide scope possibilities for indefinites. Compare, for instance, the existential interpretation of a bare plural, which requires narrow scope, to that of the indefinite which may take wide scope (McNally and Van Geenhoven, 1998). To account for these wide scope indefinites, Diesing and de Hoop would have to require the indefinite to be quantificational. However, quantificational DPs are also known to exhibit restrictive scope, typically bounded by the clause, unlike indefinites. This suggests that treating weak DPs as variables is on the wrong track.

- (7) a. Marta must read articles this weekend. (*BP > must)
b. Marta must read an article this weekend. (an > must)
(8) a. The meeting was not attended by professors. (*BP > not)
b. The meeting was not attended by a professor. (a > not)

More recently, several researchers have argued for a different type-theoretic difference in the weak/strong distinction. Strong DPs are still claimed to be quantificational, type $\langle\langle e, t \rangle, t\rangle$, but weak DPs are argued to be property denoting, type $\langle e, t \rangle$ (Ladusaw, 1994; Dobrovie-Sorin, 1997; McNally, 1998a).

McNally (1998a) begins with the assumption that DPs are not a single uniform type, but instead are divided into those which are quantificational and those that are not. She follows observations made in by Partee (1987) which noted that a type-shift from quantifiers to properties ($\langle\langle e, t \rangle, t\rangle \rightarrow \langle e, t \rangle$) using (9) does not always generate well-defined properties. McNally proposes that those quantifiers which lack well-defined property denotations form the set of strong DPs. This is because the determiners of these quantifiers are relations and thus cannot be treated as one place predicates and cannot be used to identify an individual.

(9) $BE(\alpha) = \lambda x[\alpha(\lambda y[y = x])]$, where α is a set of sets of individuals, type $\langle\langle e, t \rangle, t\rangle$.

Following McNally's proposal, the determiners in (10a) are weak as they may denote properties, and the determiners in (10b) are strong as they do not denote properties. Partee (1987) demonstrates that the determiners in (10a) have a well-defined property denotation. Application of *BE* to *the bicycle* yields the singleton set consisting of a unique bicycle. McNally argues that the determiners in (10b) typically yield the empty set. Although well-defined when applied to a singleton set, these quantifiers are typically ruled out by pragmatic requirements that the set they are applying to have more than one member. She also proposes that English (existential) bare nominals denote properties as they have a different syntax from DPs in general since they lack a determiner.³

(10) a. the/this/these

b. each/every/most/both

If the determiners in (10a) are weak, a question arises as to why they are typically blocked from occurring in *there*-constructions. McNally argues that there is a pragmatic

³McNally and Van Geenhoven (1998) note bare nominals in Romance languages all appear to denote properties.

condition which requires the DP to introduce a novel referent to the discourse. As such, definites of many types are blocked from appearing in *there*-constructions because they presuppose a discourse referent.

In addition, McNally observes that even necessarily quantificational determiners in (10b) which she argues are strong are not always prohibited from appearing in *there*-constructions. Those cases in which quantify over “non-particulars” are acceptable.

- (11) a. *There was every doctor at the convention.
b. There was every kind of doctor at the convention.
- (12) a. *There were most books in his library.
b. There were most sorts of books in his library.
- (13) a. *There were both bottles for sale.
b. There were both varieties of wine for sale.
- (14) a. *There was each question on the exam.
b. There was each kind of question on the exam.

Quantification over non-particulars in *there*-constructions also affects the scope possibilities of the quantifier. Examples like this lead McNally to argue that the distinction between weak and strong DPs does not rest solely on the semantics of determiners themselves.

- (15) a. I would be surprised if there weren't some questions answered (*some > NEG) in the press conference.
b. I would be surprised if there weren't some kind of question he (some > NEG) had expected on the exam.

Ultimately, this suggests that the weak/strong distinction is much more difficult to diagnose than usually thought. However, following McNally's (1998a) observations about the pragmatic conditions required for a property denotation of definites and keeping in mind the special status of non-particulars, the weak/strong distinction partitions the class of DPs

as in Table 3.2. Note that I continue to make use of the standard labels for determiners for ease of exposition.

Table 3.2: Weak and Strong DPs

Weak					Strong	
Mass Noun	Bare Plural	Bare Numeral	Weak Determiner	Weak Quantifier	Strong Determiner	Strong Quantifier
land	trees	three trees	a tree	many trees	the tree	every tree
silverware	houses	two houses	a house	some houses	the house	each house

A Note on the Weak/Strong Distinction and Telicity Given the importance of the analogy between telicity and existential interpretation being made throughout this dissertation, I turn for a moment to de Hoop (1996) who argues that the weak/strong distinction is relevant to telicity. de Hoop is primarily concerned with a theory which relates case marking to the interpretation of noun phrases. In particular, she claims that (structural S-structure) accusative case marks quantificational DPs while (structural D-structure) partitive case marks DPs which are “interpreted as part of the predicate” (102). As such, de Hoop is interested in examples from Finnish like (16) which bare either partitive (weak) or accusative (strong) case. However, she, like others, observe that in Finnish DPs can occur with partitive case and still be interpreted as quantificational, such as (16a). To address this, de Hoop suggests that when the object bares accusative case as in (16b), the sentence is taken to be about both the subject and the object, i.e. that the president did the shooting and the bird was shot. However, when the object bares partitive case as in (16a), the sentence is taken to be about the event, i.e. the president shot at a bird. The suggestion, it seems, is that accusative case licenses a definiteness about the object that the partitive case does not.

- (16) a. Presidentti ampui lintua
 president shot bird.PRT
 “The president shot at a/the bird”
- b. Presidentti ampui linnun
 president shot bird.ACC
 “The president shot a/the bird”

de Hoop also notes that verbs with intrinsic atelicity in Finnish, like those in (17), are subcategorized for partitive case and that resultative predicates (those with perfective particles, presumably *valmiiksi*) like (18) only take accusative case.

- (17) a. Ajattelen sinua.
 think.1ST.SG you.PRT
 ‘I think of you.’
- b. Minä rakastan sinua.
 I love you.PRT
 ‘I love you.’
- (18) Chris maalasi taulun valmiiksi
 Chris painted picture.ACC ready
 ‘Chris finished painting the picture.’

Examples (16) through (18) demonstrate a tight relationship between telicity and case marking. However, if case marking is also tightly related to the weak/strong interpretation of noun phrases, we would also predict a tight relationship between telicity and the weak/strong distinction, such that either the telicity of a predicate constrains the range of interpretations a noun phrase can receive or the interpretation of a noun phrase can shift the telicity of a predicate.

de Hoop provides some evidence concerning the predicted relationship between telicity and noun phrase interpretation through the behavior of perfective particles.⁴ She observes

⁴Whether perfective particles in English and Hungarian reflect aktionsart or grammatical aspect

(19) a. Jane is drinking wine.
b. Jane is drinking.

(20) a. Jane is drinking up wine.
b. *Jane is drinking up.

(21) a. Ildikó evett tortát
Ildikó eat.3rd.SG.PAST.INDEF cake
'Ildikó was eating a cake.'
b. Ildikó evett
Ildikó eat.3rd.SG.PAST.INDEF
'Ildikó was eating.'

(22) a. Ildikó meg-evett tortát
Ildikó eat.3rd.SG.PAST.INDEF cake
'Ildikó eats up/has eaten up a cake.'
b. *Ildikó meg-evett
Ildikó eat.3rd.SG.PAST.INDEF

is not addressed in de Hoop (1996). Certainly, the English examples (20) and (24) suggest that bare nominals are not blocked by the presence of *up* alone – the progressive with *up* in (20) allows for bare nominals while they are unacceptable in the simple (perfective) past with *up* in (24).

- (23) a. John drank the beer in an hour.
 b. Mary ate the cake in an hour.
 c. John drank #in an hour.
 d. Mary ate #in an hour.

To address the issues of noun phrase interpretation, de Hoop further observes that perfective particles cannot co-occur with indefinite objects, as in (24) and (25).⁵

- (24) a. Jane drank up the wine.

- b. *Jane drank up wine.

- (25) a. A fiu eszik kenyeret
 the boy ate bread

‘The boy ate (some) bread’

- b. *A fiu meg-eszik kenyeret
 the boy PERF-ate bread

‘The boy ate up (some) bread’

de Hoop also reports examples from Szabolcsi (1986) that perfective particles obviate the definiteness restriction of certain verbs in Hungarian. Certain verbs, like *talál* ‘find’ do not allow definite objects, as shown by the acceptability difference between (26a) and (26b). However, this definiteness restriction is obviated by the presence of the perfective particle *meg*, given in (26c).

The difference between the interpretation of (26a) and (26c) concerns the existence of the object. In (26a), the existence of two pens is taken to be the result of what Mari did, whereas in (26c), Mari successfully located two pens whose existence was independent from what Mari did. Szabolcsi (1986) characterizes the difference between these examples in the following way: in (26a) *két tollat* ‘two pens’ has only an existential interpretation, whereas in (26c) *két tollat* ‘two pens’ can be either existential or presupposed.

⁵de Hoop (1996) takes bare nominals to “behave as the weakest among weak NPs” (95).

- (26) a. Mari talált tollat / két tollat / (némi) tejet.
 Mari found pen.ACC / two pen.ACC / (some) milk.ACC
 'Mari found a pen/two pens/(some) milk.'
- b. *Mari talált(a) a tollat / Péter tollat / minden tollat.
 Mari found the pen.ACC / Peter's pen.ACC / every pen.ACC
 'Mari found the pen/Peter's pen/every pen.'
- c. Mari meg-talált(a) a tollat / két tollat.
 Mari PERF-found the pen.ACC / két pen.ACC
 'Mari found the pen/two pens.'

Taken together, de Hoop (1996) says that "the connection between resultative [telic] aspect and strength of the object seems far from coincidental" (95). She suggests that objects of telic predicates are strong regardless of their other characteristics, and that objects of atelic predicates (and indefinite objects in general) have a weak reading, and proposes that strong and weak case reflects an object's *affectedness* in the sense of Tenny (1987). However, de Hoop also issues a word of caution about relating weak/strong objects and telicity, noting that the object *two glasses of wine* in (27), for instance, is not required to have a partitive or referential (strong) reading; indeed, an existential interpretation may be preferred.

(27) Jane is drinking up two glasses of wine.

Ultimately, this suggests that factors apart from the weak/strong interpretation of noun phrases play an important part in determining telicity, including specified (quantized) and unspecified (homogeneous) quantity, to which we now turn.

3.2.2.2 Quantization

Verkuyl (1972) proposed that an argument's quantization is the relevant factor determining the telicity of a predicate. Specified quantities trigger telic interpretation while unspecified quantities fail to trigger telic interpretation. The exact characteristics of specified or

unspecified quantity nominals became one necessary condition for a proper description of telicity. A semantic characterization of quantization came from an application of mereological (a.k.a. part) structure of nominals and events. The intuition, spelled out in Bach (1986), is that whatever the property is that characterizes the difference between specified and unspecified quantity arguments, it is also the property characterizing the telicity of events. Thus in part, an attempt to characterize the property which distinguishes between telic and atelic predicates generally is also suppose to capture the property distinguishing nominals which trigger telic and atelic interpretations.

Krifka, over the course of a series of papers (Krifka, 1989, 1992, 1998), proposed one of the earliest systematic theories for quantization and characterized predicates as *quantized* (specified quantity) and *cumulative* (unspecified quantity). A quantized expression is one whose part-structure has no proper subpart and a cumulative expression is one whose part-structure allows the sum of two elements to also fall under the same expression. Krifka's definitions for *quantized* and *cumulative* are given in (28a) and (28b) respectively.⁶

(28) a. *Quantized*:

$$\forall X \subseteq U_P [QUA_P(X) \leftrightarrow \forall x, y [X(x) \& X(y) \rightarrow \neg y <_P x]]$$

X is *quantized* iff for all *x* and *y* both with property *X*, *y* is not a proper part of *x*.

b. *Cumulative*:

$$\forall X \subseteq U_P [CUM_P(X) \leftrightarrow \exists x, y [X(x) \& X(y) \& \neg x = y] \& \forall x, y [X(x) \& X(y) \rightarrow X(x \oplus y)]]$$

X is *cumulative* iff there exists *x* and *y* both with property *X* (and *y* is distinct from *x*) such that for all *x* and *y* if *x* and *y* have property *X*, then the sum of *x* and *y* also has property *X*. (Krifka, 1998)

⁶Krifka's (1998) system has further requirements, including incremental themes, uniqueness of objects and events, and object-event mappings. It in, in particular, these tight relationships between objects and events which lead to problems in his theory, especially those cases where the part-structure of the object can, in no clear way, directly "measure out" the event, such as *climb the mountain*, *mow the lawn*, or *shoot the bear*.

Krifka's (1998) definitions of quantized and cumulative expressions successfully capture several types of objects which trigger telic interpretation. A sample of these is given in italics in (29). However, one problem for these definitions is that they fail to capture all of the objects which trigger telic interpretations. Examples of objects which fail to meet Krifka's definition of quantized, but nevertheless do trigger telicity, are given in italics in (30).

- (29) a. John read *three books* in two days.
 b. John read *the book* in two days.
 c. John read *every book* in two days.
 d. John read *a book* in two days.
- (30) a. John read *some books* in two days.
 b. John read *more than three books* in two days.
 c. John read *at least three books* in two days.
 d. John read *several books* in two days.
 e. John read *many books* in two days.

Another problem facing Krifka's system is that, while no expression can be both quantized and cumulative (since cumulativity of an expression requires the existence of at least two distinct parts which both fall under the expression), some expressions fail to be either quantized or cumulative, such as *less than three books*, which is not cumulative (if you have two books and another two books, both fall under *less than three books*, but their sum does not fall under *less than three books* as it is four books) or quantized (if you have two books, it and its one book parts fall under *less than three books*, but the one book parts are a proper part of the two books). Cases like this leave the predictions for whether *less than three books* triggers telic or atelic interpretation unclear at best, though *less than three books* does lead to telic interpretation as given in (31) and thus should ultimately be a specified quantity.

- (31) John read less than three books in several days.

Kiparsky (1998), exploring the relationship between telicity and case in Finnish, improved on Krifka's system by defining a bounded (specified quantity) expression as the failure for that expression to be unbounded (unspecified quantity). He proposed that an unbounded expression must be *divisive*, *cumulative* and not *diverse*. A divisive expression is one whose non-atomic parts have a proper part which also falls under the expression. A cumulative expression is one where every proper superset also falls under the expression. Finally, a diverse expression is one where any two elements falling under the expression cannot be proper subsets of one another. Kiparsky's definitions for divisive, cumulative, and diverse are given in (33a), (33b), and (33c) respectively.

(32) P is *unbounded* iff P is *divisive* and *cumulative* and not *diverse*.

(33) a. P is *divisive* iff $\forall x[P(x) \ \& \ \neg \text{atom}(x) \rightarrow \exists y[y \subset x \ \& \ P(y)]]$

P is *divisive* iff for all non-atomic x with property P, there is a proper subset y of x with property P.

b. P is *cumulative* iff $\forall x[P(x) \ \& \ \neg \text{sup}(x, P) \rightarrow \exists y[x \subset y \ \& \ P(y)]]$

P is *cumulative* iff for all x with property P where x is not a maximal element with property P, there is a proper subset y of x with the property P.

c. P is *diverse* iff $\forall x, y[P(x) \ \& \ P(y) \ \& \ x \not\subset y \rightarrow \neg x \subset y \ \& \ \neg y \subset x]$

P is *diverse* iff for all x and y with property P where x is distinct from y, x is not a proper subset of y nor is y a proper subset of x. (Kiparsky, 1998)

Kiparsky's approach also addresses the problem of unclassified expressions found in Krifka's system by requiring that failure of divisiveness or cumulativity or not-diverseness results in an expression being bounded. This correctly captures *less than three books*, which fails to be cumulative, but still has problems capturing other examples which Krifka's system also failed to capture, given in (30). This includes expressions like *more than three books*. For Krifka's system, this expression is cumulative, and it is also cumulative in Kiparsky's system. However, at issue is whether *more than three books* is divisive. If, for instance you have five books, then there is a proper subset which also falls under *more than*

three books, namely a subset of four books.

Borer (2005a,b) offers a refinement of Kiparsky's idea that the failure of a property necessary for unspecified quantity leads to specified quantity and of Krifka and Kiparsky's definitions. She proposes that homogeneous (unspecified quantity) expressions are both *cumulative* and *divisive*, and that failure of either of these properties gives rise to a quantized (specified quantity) expression.⁷ Her definition of divisiveness relaxes the universal requirements found in Krifka's (1998) definitions for quantization (such that *more than three books* when subtracted from *more than three books* may not give rise to *more than three books* is sufficient to make the expression quantized).

(34) a. *Quantity*: P is *quantity* iff P is not *homogeneous*.

b. *Homogeneous*: P is *homogeneous* iff P is *cumulative* and *divisive*.

i. P is *cumulative* iff $\forall x, y [P(x) \& P(y) \rightarrow P(x \cup y)]$

P is *cumulative* iff for all x and y with property P, the union of x and y also has property P.

ii. P is *divisive* iff $\forall x [P(x) \rightarrow \exists y [P(y) \& y < x] \& \forall x, y [P(x) \& P(y) \& y < x \rightarrow P(x - y)]]$

P is *divisive* iff for all x with property P there is a proper part y of x which also has property P, and for all x and y with property P if y is a proper part of x then the subtraction of y from x also has property P. (Borer, 2005a,b)

⁷Borer (2005a,b) takes a particular stand on the role plural morphology plays in interpretation, noting that the interpretation of bare plurals in (i) are compatible with an interpretation in which "no single complete apple has been eaten (but, say, a number of chunks from assorted apples, perhaps no more than one), no whole house was built (by *Pat* or anybody else), and my kid sister's drawing gave rise to assorted arcs and incomplete circles, none which actually qualifies as a circle" (Borer, 2005a, 120–121). She goes on to argue that the plural morpheme acts only as a dividing function over mass, creating all possible divisions of a mass, including divisions with zero individuals, those with incomplete individuals, and normal individuals.

- (i) a. Kim ate apples this afternoon *in an hour
 b. Pat built houses *in three months.
 c. My kid sister drew circles *in half an hour.

Like Kiparsky (1998), Borer’s system does not suffer from the problem of unclassified expressions found in Krifka’s system, and also captures expressions like *more than three books* which, while cumulative, fail to be divisive (five books and its proper subpart of four books both fall under *more than three books*, but their subtraction leaves behind one book, which does not fall under *more than three books*).

For this dissertation, I adopt Borer’s system of quantization, here referred to as the distinction between quantized and homogeneity, as a working definition of what counts as specified and unspecified quantity. Given her definitions for quantized (a.k.a. quantity in her terms), I propose that the quantization distinction partitions the class of DPs as in Table 3.3.

Table 3.3: Homogeneous and Quantized DPs

Homogeneous		Quantized				
Mass Noun	Bare Plural	Bare Numeral	Weak Determiner	Weak Quantifier	Strong Determiner	Strong Quantifier
land	trees	three trees	a tree	many trees	the tree	every tree
silverware	houses	two houses	a house	some houses	the house	each house

3.2.3 The Range of Non-Subject Arguments

As a reminder, the current data concerning the role that non-subjects arguments play in licensing an existential interpretation of subjects has hinged on the difference between bare plural objects which fail to license an existential interpretation of their subjects and demonstrative objects which license an existential interpretation of their subjects. The claim in the literature is that this difference derives from the weak/strong distinction and thus researchers have proposed that the existential interpretation of a subject is linked to a topic requirement (Heycock, 1994; Jäger, 2001; Kratzer and Selkirk, 2007; Lee, 1996, 2009). While, indeed, bare plural objects are weak and demonstrative objects are strong, they are also distinguished on a number of other characteristics which could act at the source

of distinguishing stage-level and individual-level behavior, including notably the quantized/homogeneous distinction: bare plural objects are homogeneous and demonstrative objects are quantized. However, the data in the literature has not gone beyond bare plural and demonstrative and thus has not examined the data which would distinguish between these two positions.

Here, I observe the effects a wider range of non-subject objects have on the availability of an existential interpretation of subjects. Given the different partitions of DPs by the weak/strong distinction and the quantized/homogeneous distinction, the following predictions emerge which clearly distinguish between theories which rely on the weak/strong distinction to explain the availability of an existential interpretation for subjects and the one under development here which takes quantization as the core distinction. First, both weak/strong and quantization predict a failure of existential interpretation when the object is a mass noun or bare plural. Also, both weak/strong and quantization predict that strong determiners or quantifiers will license an existential interpretation. Where the two differ is on the so called weak DPs: bare numerals, weak determiners, and weak quantifiers. By the weak/strong distinction, these objects should fail to license an existential interpretation because they are weak, but by quantization, these objects should license an existential interpretation because they are quantized. A summary of these predictions is given in Table 3.4.

Table 3.4: Comparison of Predictions for Weak/Strong and Quantization Distinctions

	Mass Noun or Bare Plural	Bare Numeral, Weak Determiner, or Quantifier	Strong Determiner or Quantifier
weak/strong	generic only	generic only	existential possible
quantized/homogeneous	generic only	existential possible	existential possible

The following examples, ordered by Ladusaw's (1994) determiner construal, explore the interpretation of bare plural subjects with a broader range of DP objects than has been previously used. As a reminder, bare plural subjects can be interpreted either generically (such that they refer to the kind, typically part of common knowledge) or existentially

(where they introduce a set of individuals into the discourse).

Examples (35) and (36) makes use of mass nouns and bare plurals respectively. These nominals are both weak and homogeneous. Examples (37) to (40) make use of bare numerals, weak determiners, and weak quantifiers. These nominals are weak, but quantized. Examples (41) to (44) make use of strong determiners and strong quantifiers. These nominals are strong and quantized. Of particular interest then is the status of bare numerals, weak determiners, and weak quantifiers as they test the different predication the weak/strong distinction and quantization make concerning the availability of an existential interpretation. If the availability of an existential interpretation is related to the weak/strong distinction of objects, then we expect examples in (38) to (40) to behave like examples (35) and (36) in failing to license an existential interpretation of their subjects. If the availability of an existential interpretation is related to the quantization of non-subject arguments, then we expect examples in (38) to (40) to behave like examples (41) and (44) in allowing an existential interpretation of their subjects.

- | | | |
|------|-----------------------------------|-------------------------|
| (35) | a. Monkeys live on land. | (generic only) |
| | b. Tycoons own silverware. | (generic only) |
| (36) | a. Monkeys live in trees. | (generic only) |
| | b. Tycoons own banks. | (generic only) |
| (37) | a. Monkeys live in three trees. | (?existential possible) |
| | b. Tycoons own two banks. | (?existential possible) |
| (38) | a. Monkeys live in a tree. | (?existential possible) |
| | b. Tycoons own a bank. | (?existential possible) |
| (39) | a. Monkeys live in several trees. | (existential possible) |
| | b. Tycoons own several banks. | (existential possible) |
| (40) | a. Monkeys live in many trees. | (existential possible) |
| | b. Tycoons own many banks. | (existential possible) |

- | | | | |
|------|----|------------------------------|------------------------|
| (41) | a. | Monkeys live in the tree. | (existential possible) |
| | b. | Tycoons own the bank. | (existential possible) |
| (42) | a. | Monkeys live in these trees. | (existential possible) |
| | b. | Tycoons own this bank. | (existential possible) |
| (43) | a. | Monkeys live in every tree. | (existential possible) |
| | b. | Tycoons own every bank. | (existential possible) |
| (44) | a. | Monkeys live in each tree. | (existential possible) |
| | b. | Tycoons own each bank. | (existential possible) |

Following the hypothesis, mass noun (35) and bare plural (36) objects fail to license an existential interpretations of subjects. This is these cases, even if we provide contexts which are strongly biased for an existential interpretation, such as those in (45) which make it clear that the likely reference of the object is available, these sentences can only provide a generic interpretation to their subjects.⁸ Also following the hypothesis, definite (41) and demonstrative (42) objects and those objects with strong quantifiers (43, 44) license an existential interpretation of their subjects.

- | | | |
|------|----|---|
| (45) | a. | Monkey Context: "Behind my house is mangrove forest." |
| | b. | Tycoon Context: "In this city there are over 50 privately owned banks." |

Concerning those determiners which distinguish between the weak/strong distinction and quantization, we find that they broadly behave like examples (41) to (44) in licensing an existential interpretation of their subjects. Weak quantifiers (39, 40) are clear on allowing an existential interpretation of subjects. Bare numeral (37) and weak determiner (38) objects pose more challenge, though certain contexts allow for an existential interpretation. Given the clear behavior concerning weak quantifiers and the possible existential interpretations licensed by weak determiners and bare numerals, the distinction that makes the right

⁸These contexts can also be used in other cases where the object's referent is murky; however, they are not appropriate for all cases. In particular, where they violate the uniqueness/maximality presupposition of the definite, these contexts cannot be used.

predictions concerning which objects license an existential interpretation of subjects is that of quantization.

Acceptability judgments using singular indefinites confirm the interpretative judgments in (35) to (44). As above, mass (46) and bare plural (47) objects are unacceptable with a singular indefinite subject, reflecting their inability to license an existential interpretations of subjects. The observations for definite (52) and demonstrative (53) objects and those objects with strong quantifiers (54, 55) are also similar to the above examples. They are acceptable with a singular indefinite subject, reflecting their ability to license an existential interpretations of their subjects.

Also as above, the determiners which distinguish between the weak/strong distinction and quantization also broadly behave like examples (52) to (55) in acceptability of singular indefinite subjects. Weak quantifiers (50, 51) show full acceptability. Bare numeral (48) and weak determiner (49) objects are less clear, though certain contexts increase their acceptability. Given the clear behavior concerning weak quantifiers and the possible behavior of weak determiners, the distinction that appears relevant to triggering the existential interpretation of subjects is quantization.

- (46) a. *A monkey lives on land.
b. *A tycoon owns silverware.
- (47) a. *A monkey lives in trees.
b. *A tycoon owns banks.
- (48) a. ?A monkey lives in three trees.
b. ?A tycoon owns two banks.
- (49) a. ??A monkey lives in a tree.
b. ??A tycoon owns a bank.⁹
- (50) a. A monkey lives in several trees.
b. A tycoon owns several banks.¹⁰

⁹When these sentences are presented in a list, their acceptability improves (Schmitt, 1996).

- (51) a. A monkey lives in many trees.
b. A tycoon owns many banks.
- (52) a. A monkey lives in the tree.
b. A tycoon owns the bank.
- (53) a. A monkey lives in this tree.
b. A tycoon owns these banks.
- (54) a. A monkey lives in every tree.
b. A tycoon owns every bank.
- (55) a. A monkey lives in each tree.
b. A tycoon owns each bank.

The data concerning the interpretation of bare plural subjects and acceptability of singular indefinite subjects falls into two broad classes. The first class includes those with a mass (35, 46) or a bare plural (36, 47) object. This class completely blocks existential interpretations as seen by their failure to license an existential interpretation of their subject and their unacceptability with indefinite subjects. The second class includes all others. Within this class, weak determiner objects (*a/an* and bare numerals) are generally less acceptable, though an existential interpretation is possible. Weak quantifier (*several, many*), strong determiner, and strong quantifier objects are fully acceptable with licensing an existential interpretation.

3.2.3.1 Interim Conclusions

The following table summarizes the effect objects have on subject interpretation for transitive stative predicates.

This split in the types of object DPs is not a split between weak and strong. Instead, quantization makes the right classification of those objects which license an existential interpretation of their subject and those which fail to do so. Quantized object DPs allow

¹⁰ Alan Munn (p.c.) notes a preference for a partitive reading on sentences with *several* and *many*.

Table 3.5: Summary of Object Effects on Existential Interpretation of Subjects

	Mass Noun or Bare Plural	Bare Numeral, Weak Determiner	Weak Quantifier, Strong Determiner or Quantifier
Bare Plural	generic only	?existential possible	existential possible
Singular Indefinite	*	?	✓

for an existential interpretation; homogeneous object DPs do not. As such, theories which have relied on the weak/strong distinction, including theories which link the availability of existential interpretations to a topic requirement, are missing the full range of the evidence for the availability of existential interpretations of subjects in stative predicates. What is needed, then, is a theory in which quantization plays a key role in the lives of stative predicates. Of course, there are theories of telicity which at their core are theories about quantization in events. If states are also strongly related to quantization, then a more unified theory of aktionsart is possible and the domains of events and states may ultimately be more related than previously thought.

Important questions remain. First, what is the possible role of quantization for existential interpretation? Second, how does a quantized object affect the interpretation of the subject? And finally, what are the consequences of quantization for the aspectual characterization of states? These questions will occupy us in the next sections.

3.3 Temporal Interpretation of Stage-level/Individual-level Predicates

The central thesis of this dissertation is that stage-level/individual-level predicates are cases of aktionsart and are provide a division in the what is otherwise considered a unified classification of states. An important question to ask then is what makes stage-level/individual-level predicates aspectual? Since aktionsart is typically taken to be about the internal temporal structure of an eventuality, we begin by asking how the temporal interpretation of stage-level predicates differs from that of individual-level predicates.

Stage-level predicates are often described as temporary or unstable. Individual-level

predicates, on the other hand, are often described as permanent or stable. While it is well known that these descriptions are only approximate and that counter-examples are readily available in the literature, they form an initial conception of a difference in temporal structure of stage-level/individual-level predicates.

One way to think about the difference between permanency or stability is to consider how these distinctions might be given a model-theoretic analysis. Returning to the analogy of states with events, one of the observations made in the literature on telicity is that the same definitions for the quantization of nominals also operate over events. Telic events are quantized; atelic events are homogeneous. In the next sections I present evidence that phenomena related to the temporal interpretation of stage-level/individual-level predicates can be understood in terms of quantization. Ultimately, the evidence points us in the following direction: the aspectual nature of stage-level/individual-level states is related to the internal temporal organization of their subject.

3.3.1 Lifetime Effects

One observation concerning the temporal interpretation of stage-level/individual-level predicates comes from the different implications they have for the lifetime of their subjects discussed initially in Section 1.2.3 (Kratzer, 1988/1995; Magri, 2006, 2009; Mittwoch, 2007; Musan, 1995, 1997).

Kratzer (1988/1995) originally noted lifetime effects by observing that examples like (56a) have two interpretations depending on which argument is bound by the tense operator. For the first interpretation, represented in (56b), roughly means that Henry changed his nationality. Here, tense acts as a predicate over a Davidsonian argument, which, for Kratzer, makes this a stage-level predicate. The second interpretation, represented in (56c), does not have a Davidsonian argument to predicate over, and must instead predicate over the individual Henry, with the meaning that the individual Henry is located in the past and has the property of being French. However, since Henry is located in the past, there is also the

interpretation that Henry is dead.

- (56) a. Henry was French.
b. [before – now(*l*)] & [French(Henry, *l*)]
c. [before – now(Henry₃)] & [French(he₃)]

Further work has argued that lifetime effects are pragmatic (Magri, 2006, 2009; Maienborn, 2004; Mittwoch, 2007; Musan, 1995, 1997; Percus, 1997). Musan (1997), for instance, captures lifetime effects through a conversational implicature. She argues that predicates in the past tense assert that a situation is over, and since individual-level predicates hold throughout an individual's lifetime, the past tense of an individual-level predicate triggers a conversational implicature due to informativity: if the subject was still alive, it would be more informative to use the present tense.

- (57) Gregory was from America. $\sim$ Gregory is dead.

Several questions arise concerning Musan's approach. For instance, how does a speaker know that the predicate *be from America* triggers a lifetime effect? How does this speaker come to this knowledge, and how, for instance, would this be learned such that such uniformity occurs among speakers? Most of the literature supports a view that this is part of our world knowledge about these predicates,¹¹ but for states that are compositionally determined, such as those under investigation here, world knowledge cannot be the right factor. Where, for instance, would we locate the knowledge that a predicate holds over an individual's lifetime in transitive states? Is it a part of the verb's meaning? Does it somehow arise from the verb's arguments? Or should we suspect that it arises somehow from the configuration of verbs with particular types of arguments?

¹¹Most of the literature has focused on adjectival predicates which arguably have a strong world knowledge component. However, I will pursue an alternative account in Chapter 4 linking at least some of the temporal behavior of adjectives to their underlying scale structure, suggesting that even for adjectival predicates, lifetime effects may be derived from semantic structure.

While lifetime effects may derive ultimately from pragmatic considerations, the pragmatic computations rest on the properties of the semantic representations. Here, I propose that it is the homogeneity of predicates which can give rise to lifetime effects.

Consider the following examples and recall that bare plural objects fail to license an existential interpretation of their subject while demonstrative objects are able to license an existential interpretation of their subject. For bare plural objects, given in (58), there is a strong lifetime implication. However, for demonstrative objects, given in (59), the lifetime implication is greatly weakened if there at all. The quantization of the object not only affects the availability of an existential interpretation of subjects, but also appears to be linked to the lifetime effects of the subject.

- (58) a. George lived in trees. $\leadsto$ George is dead.
 b. John owned banks. $\leadsto$ John is dead.
- (59) a. George lived in this tree. $\nrightarrow$ George is dead.
 b. John owned this bank. $\nrightarrow$ John is dead.

This provides our first piece of evidence that the availability of an existential interpretation may be aspectual in nature. Recall that for transitive eventive verbs (ignoring achievement verbs), atelicity arises when their internal argument is homogeneous, and this atelicity is governed by the same homogeneity defining the homogeneous class of nominals. Suppose the same option is available for transitive stative verbs. The homogeneity of the internal argument in (58) and its effects on both the availability of an existential interpretation and lifetime effects is not coincidental. Instead, it suggests that we seek a theory which relates these processes together.

3.3.2 Temporal Modification

A second observation concerning the temporal interpretation of stage-level/individual-level predicates comes from the different restrictions they place on temporal modification, al-

ready discussed in Section 1.2.2. In general, individual-level predicates place tight restrictions on temporal modification. Most temporal modifiers cannot appear with individual-level predicates. Example (60a) is typical of individual-level predicates. However, Percus (1997) observed that some temporal modification was acceptable with certain individual-level predicates. Although the predicate is still individual-level, given a proper span of time, a temporal modifier like *in his adulthood* in (60b) can be acceptable.

- (60) a. #John was tall yesterday.
 b. John was tall in his adulthood.

Percus argued that examples like (60b) show that individual-level predicates are not incapable of receiving temporal modification. Instead, he proposes that examples like (60a) are blocked because they are “out-of-the-blue” utterances. All utterances are interpreted with respect to some context, and for Percus, out-of-the-blue utterances are no different. However, since they are given no local context, Percus suggests that we evaluate them with respect to our global context, i.e. our world knowledge. What our world knowledge tells us about individual-level predicates is that they denote properties of individuals which tend to be stable from one time point to another. Percus, following Chierchia (1995), defines tendential stability as in (61).

- (61) P is tendentially stable iff $\forall s_1, s_2 \in Wd, x, [P(s_1)(x) = 1 \ \& \ s_2 \text{ follows } s_1 \text{ temporally} \ \& \ P(s_2)(x) \text{ is defined}] \rightarrow P(s_2)(x) = 1$ (Percus, 1997)

What Percus concludes is that properties which tend to not change from one situation to the next (i.e. those which tend to be stable over time) are not acceptable with temporal modifiers because these modifiers run afoul of our world knowledge about these properties. However, there are at least two ways to obviate the restriction of temporal modification by individual-level predicates. The first is to use a temporal modifier which establishes a period of time that is compatible with our world knowledge about the property, such as (60b). The second way is to provide a local context which suspends the temporal stability of the property. Examples (62a) and (62b) are provided by Percus to do just that. In both

cases, *intelligent* is an individual-level, as temporally stable, property, but the local context supports a suspension of our assumptions of its stability for their particular cases.

(62) a. John had a quite serious accident early this morning. Although he was intelligent yesterday, I am afraid that today he is to all intents and purposes a vegetable.

b. A: I finally spoke to John this morning. What an idiot. He has no creativity, no spark of originality, not even any common sense. Nothing.

B: That's pretty bizarre. He was intelligent yesterday.

Concerning temporal stability and the restrictions it places on individual-level predicates, the same questions arise which I put forth concerning the pragmatic account of lifetime effects. For instance, how do we know that a property like *tall* or *intelligent* tends to be stable, and where do we locate this knowledge in compositionally derived states? While I do not disagree with the spirit behind Percus (1997), properties like temporal stability should be derived from the semantic representation of these predicates. As with lifetime effects, I propose that a predicate is treated as temporally stable if it is homogeneous.

Take the following examples into consideration and again recall that bare plural objects fail to license an existential interpretation of their subjects while demonstrative objects are able to license an existential interpretation of their subjects. For bare plural objects, the restriction on temporal modification is enforced, as in (63). However, the restriction on temporal modification is again, greatly weakened if present at all in examples with demonstrative objects, as in (64). So, as with lifetime effects, the quantization of the object, which effects the availability of an existential interpretation, also affects the restriction on temporal modification.

(63) a. #John owned banks yesterday.

b. #George lived in trees yesterday.

(64) a. John owned this bank yesterday.

b. George lived in this tree yesterday.

This provides the second piece of evidence that existential interpretation may be aspectual in nature. The quantization of the internal argument, which affects the availability of an existential interpretation of its subject, appears to also drive the temporal stability of the predicate itself. Together with lifetime effects, these effects support an aspectual view of the availability of existential interpretation of subjects.

3.3.3 The Aspectual Nature of Existential Interpretation

Phenomena like lifetime effects and temporal stability both make easy connections to notions of aspect and temporal structure. Existential interpretation, however, is much less clear. How could something like existential interpretation be linked to aspect and temporal structure? To make the connection, I turn to a literature which proposes that stage-level predicates are location and time dependent while individual-level predicates are not. Research on the location and time (in-)dependence of stage-level/individual-level predicates has made interesting links to the types of judgments that predicates support. Stage-level predicates are thought to supportthetic judgments, which are judgments about events. Individual-level predicates are said to support categorical judgments, which are judgments about individuals. Much of this work leads to the distinction between stage-level and individual-level predicates as a distinction between predicates of events and predicates of individuals. However, other literature has made the claim that, in general, stative predicates are predicates of individuals (Higginbotham and Ramchand, 1997; Ramchand, 1997; Raposo and Uriagereka, 1995). With that in mind, I will propose that stative predicates are predicates of individuals, and that the temporal structure of the individual is relevant to the aspectual nature of these predicates.

I will first turn to a notion of location dependence. This will be followed by a proposal that all stative predicates are about stages of individuals.

3.3.3.1 Location Dependence

Concerning the licensing of existential interpretations for bare plurals and indefinites, McNally (1998b) focuses on location independence and the individuation of individuals, drawing upon insights from Ladusaw (1994), Krifka et al. (1995), and Chierchia (1995).¹² McNally's first concern is to establish what thetic judgments are and how linguistic forms correlate with them. Following a series of papers by Kuroda (1972, 1992), she proposes that a thetic sentence is a complex description of an event. Discourse referents are introduced by a thetic sentence by the existential entailments of the sentence and not by an act of reference. For instance, the thetic sentence "*A cat is sleeping there* requires the existence of a particular sort of eventuality to support its truth; this eventuality necessarily contains a cat" (296).¹³

She further observes that with certain bare plural subjects, given in (65), locative stative constructions fail to license an existential interpretation of their subject, while in others, given in (66), an existential interpretation is possible.¹⁴ Thus the examples in (65) do not support thetic judgments. McNally notes that the bare plural subjects in (65) share a special relationship with the locative; they remain invariant across arbitrary changes in locations of the individuals (i.e. holes in pants). So while the locative properties of individuals are generally transitory, the individuals are location dependent in these particular cases.

¹²Dobrovie-Sorin (1997) also relates closely to the fundamental insights coming from this research with her ideas of space-localization.

¹³Glasbey (1997) makes a similar proposal concerning situated discourse. See Section 1.4.4.1 for further discussion.

¹⁴An analysis of locative states and the availability of existential interpretation is outside the scope of this dissertation. However, if Jäger (2001) and Kratzer and Selkirk (2007) are on the right track concerning the possible function of covert locatives in licensing existential interpretation reviewed in Section 1.4.5, then one possible proposal would be that covert locatives are sensitive to properties of location dependence.

- (65) a. Holes were in those pants.
 b. Dents were under the driver's side windows.
 c. Space was on the counter.
 d. Pains are in my arm.
 e. Riots were in the square.
- (66) a. Coins were in those pants. (existential possible)
 b. Dead bugs were under the driver's side windows. (existential possible)
 c. Mace was on the counter. (existential possible)
 d. Pins are in my arm. (existential possible)
 e. Rioters were in the square. (existential possible)

Based on examples like (65), McNally formulates a definition for location independence given in (67), and draws from it a relationship between the location independence of an eventuality andthetic sentences, given in (68).¹⁵

- (67) An eventuality e is *location independent* for an entity x bearing a role R in e at interval t iff $\Gamma l.in(x, l, t) \rightarrow [R(x, e) \ \& \ in(e, l, t)]$.

For generic locations l , if an entity x is in l at t , then x bears a relation R to e and e is also in l at t . (McNally, 1998b)

- (68) If an eventuality e is location independent for any participant x in e (with respect to the relevant role and interval), then e cannot be described in athetic sentence.

A question still remains: what is it about location independence that precludes an indirect means of introducing discourse referents via existential entailment whichthetic sentences permit? McNally claims that since location independence is defined with respect to an individual, the individuation of the individual in question is logically prior to making an

¹⁵Interestingly, the observations made in McNally (1998b) lead her to propose that the explanation for the interpretation of bare plurals cannot be made at the lexical level—a proposal very much in line with the theory being pursued here.

assertion of location independence. Thus individuals which are not already in the discourse cannot have location independent assertion made about them.¹⁶

Consider the following two examples, taking *tall* as location independent. Uttering *Mary is tall*, for instance, requires the speaker to believe that *Mary* is an individual for which *tall* is location independent. According to (67), the speaker must be able to generalize over *Mary* in various locations and must also assume that the characteristic *tall* will be accommodated into the common ground. As such, *Mary* needs to be represented as an individuated entity in the context. By uttering *a woman is tall*, the speaker again is asserting that the entity *a woman* is the sort of individual for which *tall* is location independent. The speaker is also assuming that the characteristic *tall* is asserted only of entities for which *tall* is a location independent property and that this will be accommodated into the context. Additionally, the speaker either cannot successfully individuate the individual woman or considers individuation irrelevant to represent the individual linguistically for the purposes of the utterance. McNally (1998b) claims that these commitments are in conflict with one another since location independence requires that an entity be individuated.

Given McNally's arguments, we may still ask what representation allows the speaker to generalize over an individual in various locations. Returning to Carlson (1977), I propose that the process of generalizing over an individual at various locations requires that individual to be represented as stages; that is, as spatio-temporal slices of that individual. For a predicate to be location independent then is for it to apply to the stages of an individual regardless of the spatio-temporal slice being used. However, representing the stage of an individual in this manner is tantamount to representing the individual itself.

3.3.3.2 Predicates of Individuals vs. Predicates of Events

Ladusaw (1994) and McNally (1998b) both point to categorical sentences (expressing cat-

¹⁶McNally (1998b) casts this proposal in terms of existential interpretations as property-denoting DPs. See Section 3.2.2.1 for further discussion.

egorical judgments) as being “about” individuals while thetic sentences (expressing thetic judgments) are “about” events. Assuming that individual-level predicates are categorical and stage-level predicates are thetic, this amounts to saying that individual-level predicates are “about” individuals and stage-level predicates are “about” events.

But what of stage-level states in particular? One of the intuitions shared in the literature on states is that they are always about an individual (Higginbotham and Ramchand, 1997; Ramchand, 1997; Raposo and Uriagereka, 1995). As such, stage-level events may be about events, but stage-level states cannot be so. Suppose that we assume that all stative predicates are about individuals in some way. What would be needed is a way of always talking about individuals. Carlson (1977) provides us with such a system. What is stage-level about stage-level states is that they are about some stage of an individual. In contrast, what is individual-level about individual-level states is that they are, in a sense, about all the stages of an individual. Taking these about-statements to be related to an ontology that represents individuals as stages, we can recast the generalizations of Ladusaw (1994) and McNally (1998b) as in (69).

- (69) a. Stage-level predicates are statements “about” a stage of an individual.
 b. Individual-level predicates are statements “about” all the stages of an individual, i.e. the individual itself.

What, then, does (69) tell us about the representation of stative predicates and their relationship to aktionsart?

Consider the role of quantization in determining the behavior of a transitive stative predicate. Transitive stative predicates which behave like stage-level predicates are those which have quantized objects. They are also those which are “about” a stage of an individual. Suppose that what a stage of an individual is is a quantized representation of that individual. Then (69a) amounts to saying that stage-level predicates are statements about a quantized stage of an individual. On the other hand, transitive stative predicates which behave like individual-level predicates are those which have homogeneous objects. They

are also those which are “about” all the stages of an individual, i.e. the individual itself. Suppose that what an individual itself is is a homogeneous representation of the individual. Then (69b) amounts to saying that individual-level predicates are statements about homogeneous stages of an individual.

What is aspectual about stative predicates then is how they predicate over their subject. Stage-level predicates predicate over a quantized stage of an individual, while individual-level predicates predicate over homogeneous stages of an individual. This reflects the internal temporal structure of individuals. Note that this also simplifies what we take the arguments of predicates to be. Under the theory being explored here, the arguments of predicates are only of a single sort, i.e. stages of individuals. Individuals themselves are only indirectly accessed then by means of a homogeneous predicate.

3.3.4 Interim Conclusions

In the above sections, I have observed that, for transitive stative predicates, taking a wider range of object types in to consideration demonstrates that the availability of existential interpretations of subjects is conditioned by the quantization of the object. This observation then lead me to propose that quantization, not the weak/strong distinction, is a the core of stage-level/individual-level predicates. I then proposed that this same distinction operates in related phenomena of stage-level/individual-level predicates, such as lifetime effects and temporal modification. As these temporal phenomena were also affected by the quantization of the object, I proposed that the availability of existential interpretations of subjects is aspectual in nature. Finally, I reviewed proposes which linked location dependence to existential interpretation. Once recast in terms of stages of individuals, I proposed that quantization determines how a predicate relates to its subject. Stage-level predicates are about a quantized stage of an individual, and individual-level predicates are about homogeneous stages of an individual. In this manner, stage-level/individual-level predicates are aspectual; they are about the internal temporal structure of individuals.

In the next section, I propose an analysis to compositionally build transitive stative predicates which relies on these observations.

3.4 Part Structure and Stage-level/Individual-level Predicates

How is it that stative predicates, and in particular the availability of existential interpretations, are sensitive to the quantization of their internal argument? Returning to events and telicity, there is now a standard assumption that the telicity of certain predicates is the result of a combination of the verb with its internal argument; that is, the interaction between the quantization of internal arguments and telicity of predicates can be compositionally determined (Bach, 1986; Borer, 2005a,b; Kiparsky, 1998; Kratzer, 2004; Krifka, 1989, 1992, 1998; Link, 1998; Verkuyl, 1972, 1993, 1999). In the following sections, I will review how internal arguments compositionally determine the telicity of eventive predicates. I will then propose that the same mechanisms used to compose eventive predicates also compose stative predicates. Of course, telicity and availability of existential interpretations are not the same – telicity is ultimately a property of events and existential interpretations are, roughly, properties of individuals. To capture this difference, I will propose that the functional head which introduces the external argument, Voice in Kratzer (1996), is responsible for relating the aspectual structure of individuals and events. For eventive predicates, this amounts to an individual-to-eventuality mapping, but for stative predicates, this mapping is from eventualities to individuals.

3.4.1 Quantization in Events

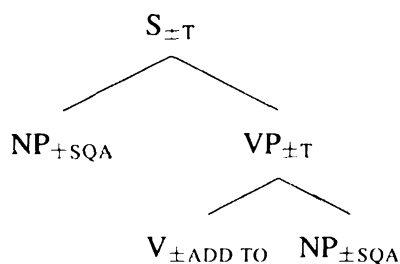
Much of the theoretical work surrounding telicity has been done to describe and explain how the internal argument can determine the telicity of a predicate. Here, I review three theories of telicity, focusing primarily on how they account for the composition of the internal argument and verb to construct telic and atelic interpretations.

3.4.1.1 Features and the Plus Principle

Verkuyl (1972) first proposed that telicity was a compositional phenomenon; that certain VP configurations admitted durative (atelic) or nondurative (telic) interpretations. He argued that certain verbal categories combined with (un)specified quantity of mass to produce durative and nondurative aspects. While certain verbal categories were featured in Verkuyl (1972) (including *state* versus *change* which he noted as important and relevant verbal criteria), much of the work focused on an opposition between specified and unspecified quantity.

Verkuyl (1993) continued in this vein and proposed that two semantic features were responsible for the composition of telicity. The first, carried by verbs, is $\pm\text{ADD-TO}$, and the second, carried by DPs, is $\pm\text{SQA}$. The composition of these two features to create durative ($-T$) or terminative ($+T$) interpretations is given in (70). $+\text{ADD-TO}$ represents a verb's dynamic characteristics, such that eventive verbs are $+\text{ADD-TO}$ and stative verbs are $-\text{ADD-TO}$. $+\text{SQA}$ represents a DP with a specified quantity of α and $-\text{SQA}$ represents a DP with an unspecified quantity of α .

(70)



Verkuyl proposes the plus principle, given in (71), to account for the behavior of aspectual composition. The aspectual 'atoms' are the verb and its arguments which bare the aspectual features $\pm\text{ADD-TO}$ and $\pm\text{SQA}$. Verbs are lexically specified for ADD-TO as part of their meaning, but DPs, as another 'configurational' category, require their own compositional account for their SQA specification. In Verkuyl (1993), whether a DP is plus or minus SQA depends on whether cardinality information is available in its denotation. Those DPs whose cardinality is undetermined (or zero via the empty set) are $-\text{SQA}$; other-

wise, a DP has a cardinality and is +SQA. Abstracting away from particular difficulties, the definitions for determining $\pm$ SQA are given in (72)

(71) *The Plus Principle*: Terminative aspect, +T, requires that all aspectual ‘atoms’ are plus-values.

- (72) a. **Bounded**: A set S is *bounded* if there is an $m \in \mathbb{Z}^+$ such that for all $x_i \in S$, $i \leq m$.
b. **Specified Quantity**: A DP denotes a *specified quantity* of A in E relative to B iff $A \cap B$ is bounded.
c. **Unspecified Quantity**: A DP denotes an *unspecified quantity* of A in E relative to B iff either a) $A \cap B = \emptyset$, or b) $A \cap B$ cannot be determined. (Verkuyl, 1987)

The plus principle, along with the asymmetry inherent in the syntactic characterization of VPs, gives the following analyses in (73).

- (73) a.

[S	Mary	[VP	walk	three miles	]]
[+T	+SQA	[+T	+ADD-TO	+SQA	]]

b.

[S	Mary	[VP	walk	miles	]]
[-T	+SQA	[-T	+ADD-TO	-SQA	]]

c.

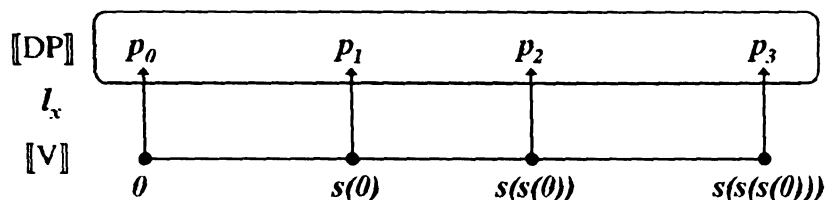
[S	Children	[VP	walk	three miles	]]
[-T	-SQA	[+T	+ADD-TO	+SQA	]]

d.

[S	Mary	[VP	save	three miles	]]
[-T	+SQA	[-T	-ADD-TO	+SQA	]]

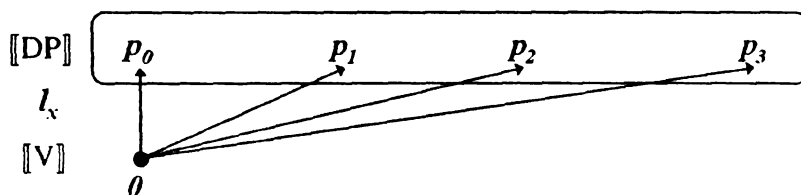
Verkuyl proposes that -ADD-TO verbs, i.e. stative verbs, are insensitive to the quantization information carried by their DPs, a clear difference to +ADD-TO verbs, i.e. eventive verbs, which are sensitive to the quantization information carried by their DPs. He relates the insensitivity of stative verbs to quantization to the construction of a path for aspectual interpretation. Verkuyl argues that +ADD-TO verbs represent a set of temporal indices generated by a successor function s . This allows the construction of a path, l_x which maps each subpart of the DP to a new temporal index. These subparts are determined by the cardinality of the DP, and the aspectual interpretation is determined by whether the path is bounded or not. The construction of an aspectual path for +ADD-TO verbs is shown in Figure 3.1.

Figure 3.1: Verkuyl's Aspectual Path



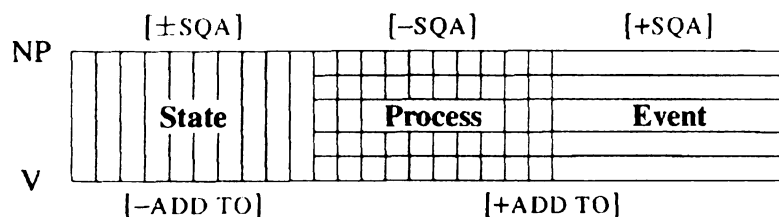
–ADD-TO verbs, however, do not create a true aspectual path because they do not represent a set of temporal indices. The temporal index of a –ADD-TO verb (if they have one at all) is just zero, indicating that they have no dynamic progression. Verkuyl suggests that the aspectual “path” created by a stative verb maps all the subpart of the DP to the same temporal index. Schematically, this is shown in Figure 3.2.

Figure 3.2: Verkuyl's Aspectual Path for Statives



Verkuyl's plus principle leads to an interesting aspectual classification given in Figure 3.3. The relationship between Verkuyl's aspectual classes and the Vendlerian classes is as follows: states are states, processes are activities, and events are accomplishments/achievements.¹⁷

Figure 3.3: Verkuyl's Aspectual Classes



¹⁷Verkuyl (1989) maintains that there are no true achievement verbs, taking issue with their punctuality. However, the behavior of achievement verbs with –SQA DPs suggests that more needs to be said about why this class of verbs always heads a telic predicate. See Section 2.3.1.2 for further discussion of this important issue.

Verkuyl's approach leaves little room for distinguishing any aspectual behavior of stage-level/individual-level statives as all stative predicates are –ADD-TO, and –ADD-TO verbs are not affected by their argument's SQA. To address this short coming in Verkuyl's theory, a modification of his core aspectual features would likely be necessary.

One option would be to interpret –ADD-TO in a different manner, maintaining Verkuyl's insight about states having only one temporal index, but allowing the quantization of the object to affect the subject's interpretation. A second approach, would be to add another aspectual feature which captures the behavior of stative predicates, leaving open, for now, an account of how all three features interaction.

Roby (2007) represents a specific implementation of this second approach, examining the aspectual classification of states using Spanish *ser* and *estar*. He proposes a modification of Verkuyl's aspectual composition by adopting the aspectual feature, $\pm$ PERF 'perfective', taken from Luján (1981), to Verkuyl's analysis. Luján proposed that *estar*-predicates are +PERF as they "must be interpreted as inherently referring to a delimited time period" as given in (74a), and *ser*-predicates are –PERF as "their temporal reference is with respect to an undelimited period of time, covering a number of distinct occasions or delimited time periods" (165) as given in (74b).

- (74) a. +PERF: A(x) at time t_j
 b. –PERF: A(x) at times $t_j \dots t_{j+k}$ (Luján, 1981, 177)

Roby proposes that Verkuyl's plus principle also operates in copular sentences, suggesting that a perfective state arises when all the relevant 'atoms' for perfective have plus-values. However, Roby notes the following examples in (75) which he analyzes in (76). Although (75a) has a –PERF feature, the sentence is given a perfective interpretation by the simple preterite aspect. Thus, unlike the plus-principle cases for telicity where minus valued feature on any atom leads to atelicity, grammatical aspectual marking seems to override all lower imperfectivity. Similarly, (75b), while appearing to follow the plus principle by delivering an imperfective interpretation, also appears to be driven by the im-

perfect preterite aspect. As Roby discusses, (75b) carries a habitual interpretation, and thus maintains its underlying perfective state.

- (75) a. El Imperio Romano fue próspero.
 the empire roman ser.3rd.PRET prosperous

‘The Roman Empire was prosperous.’

- b. Maribel estaba cansada (a veces).
 Maribel estar.3rd.IMP tired (sometimes)

‘Maribel was tired (sometimes).’

- (76) a. [IP INFL El Imperio Romano {VP ser próspero }]
 [+PERF +PERF +SQA {−PERF −PERF }]
 b. [IP INFL Mária {VP estar cansada }]
 [−PERF −PERF +SQA {+PERF +PERF }]

While this approach attempts to build a bridge between Verkuyl’s system and the aspectual interpretation of states, there are clear difficulties which need resolution. In particular, the plus-principle which Verkuyl argues for in the calculation of telicity, does not appear to operate over features like $\pm$ PERF. Given that the plus-principle forms a core assumption of Verkuyl’s aspectual composition, the exceptional behavior of $\pm$ PERF casts serious doubt on Roby’s theory. A much deeper explanation for the behavior of features like $\pm$ PERF is needed to truly connect the aspectual interpretation of states and events together under this type of analysis.

3.4.1.2 Towards a Compositional Account

A series of influential papers by Krifka developed an implementation of mapping the quantization of an internal argument to its event (Krifka, 1989, 1992, 1998) by relating the temporal structure of the event and the part structure of the object through their θ role. This θ role expresses an incremental theme which allows for the partitioning of an event into subparts; a property Tenny (1994) argued for as a “measuring out” or delimiting of an

event. Krifka (1998) proposes that incremental themes have the following properties given in (77) which ensures a proper mapping between objects and events.

(77) a. Uniqueness of Objects

There can be no two distinct objects which bare relation θ to the same event.

$$\forall x \in U_P \forall e, e' \in U_E [\theta(x, e) \ \& \ e' \leq_E e \rightarrow \exists! y [y \leq_P x \ \& \ \theta(y, e')]]$$

b. Uniqueness of Events

There can be no two distinct events which bare relation θ to the same object.

$$\forall x, y \in U_P \forall e \in U_E [\theta(x, e) \ \& \ y \leq_P x \rightarrow \exists! e' [e' \leq_E e \ \& \ \theta(y, e')]]$$

c. Mapping to Objects

If an event bares relation θ to an object, any subpart of that event bares relation θ to some subpart of that object.

$$\forall x \in U_P \forall e, e' \in U_E [\theta(x, e) \ \& \ e' \leq_E e \rightarrow \exists y [y \leq_P x \ \& \ \theta(y, e')]]$$

d. Mapping to Events

If an object bares relation θ to an event, any subpart of that object bares relation θ to some subpart of that event.

$$\forall x, y \in U_P \forall e \in U_E [\theta(x, e) \ \& \ y \leq_P x \rightarrow \exists e' [e' \leq_E e \ \& \ \theta(y, e')]] \quad (\text{Krifka, 1998})$$

Krifka regulates the relationship between telicity and quantization as in (78). He argues that a quantized predicate is clearly telic; the predicate does not apply to any proper part of the event, and thus the only ‘part’ of an event which a telic predicate applies to is the event itself.

$$(78) \ \forall X \subseteq U_E [\text{TEL}_E(X) \leftrightarrow$$

$$\forall e, e' \in U_E [X(e) \ \& \ X(e') \ \& \ e' \leq e \rightarrow \text{INI}_E(e', e) \ \& \ \text{FIN}_E(e', e)]]$$

Telicity is the property of an event predicate X that applies to event e such that all the parts of e that fall under X are initial and final parts of e .

Kratzer (2004) adopts the idea of object-event mapping from Krifka (1998) to construct a compositional account for telicity. Following work suggesting a tight link between accusative case and telicity, she proposes a division of labor between the semantics of case

and verbal roots. The verbs that Kratzer analyzes are all eventive verbs which permit alternations of telicity. The event argument of these verbs range over “activities and processes” (390), which we might take to be Bach’s (1986) processes and events.¹⁸

- (79) a. $\llbracket \text{climb} \rrbracket = \lambda x \lambda e. \text{climb-up}(x)(e)$
 b. $\llbracket \text{shoot} \rrbracket = \lambda x \lambda e. \text{shoot-at}(x)(e)$

She also proposes that accusative case, as an interpretable feature, contains the conditions for telicity based on the part structure of the DP bearing this case. This denotation encodes Krifka’s (1998) mapping to events, linking his proposal more directly to the compositional semantics.¹⁹ The measure function introduced avoids the problems inherent on

¹⁸Bach (1986) constructed an algebra of events which proposed a difference between atomic events and “bits of process” (8), which are related to one another through a homomorphism, h_e , given in (i).

- (i) a. E_e : the set of events with join operations $\sqcup_e$ and partial ordering $\leq_e$.
 b. $A_e \subseteq E_e$: atomic events
 c. $D_e \subseteq A_e$: bits of process with join $\sqcup_p$ and partial ordering $\leq_p$.
 d. α and $\circ$: temporal relations, strictly precedes and overlaps, respectively on $E_e \times E_e$.
 e. h_e : homomorphism $\langle E_e, \sqcup_e, \leq_e, \alpha, \circ \rangle \rightarrow \langle D_e, \sqcup_p, \leq_p, \alpha, \circ \rangle$ such that $h_e(\alpha) = \alpha$ iff $\alpha \in D_e$, $h_e(\alpha \sqcup_e \beta) = h_e(\alpha) \sqcup_p h_e(\beta)$, and $\alpha R \beta \rightarrow h_e(\alpha) R' h_e(\beta)$ for $R = \leq_e, \alpha, \circ$ and $R = \leq_p, \alpha, \circ$

Presumably the verbs used in Kratzer (2004) then have their event arguments range over E_e , having access to both processes and (atomic) events, similar to Bale and Barner’s (2009) proposal that most nouns range over Bach’s (1986) individuals and “portions of matter” (7).

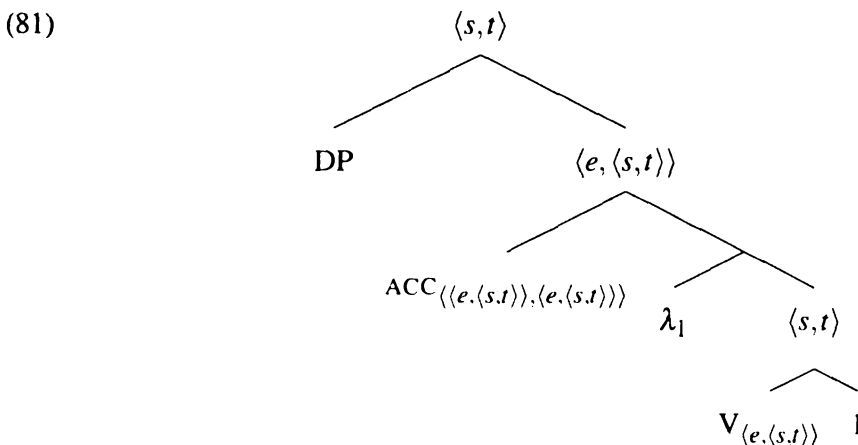
While not analyzed by Kratzer (2004), the denotations of achievement verbs may shed light on their behavior with respect to their internal arguments. Recent work by Barner and Snedeker (2005) on the mass/count distinction observes that mass nouns which are not able to occur with functional count structures like plural and *many*, such as *furniture*, are able to provide count meanings in comparatives. Using observations of this type, Bale and Barner (2009) propose that the denotation of these “mass” nouns are strictly atomic, and thus cannot occur in functional count structures which map non-individual semi-lattices to individual semi-lattices. Given this kind of proposal, one promising avenue would be to assume that the event argument of achievement verbs ranges only over sets of atomic events, A_e , and thus are not sensitive to the quantization of their internal argument because they do not have Bach-style processes in their denotations. As the denotation of achievement verbs is not the main focus of this dissertation, I set this analysis aside for future consideration.

¹⁹Naturally, Kratzer (2004) inherits some of the problems from Krifka’s system, in particular those DPs which are quantized, but also divisive, may have part-structures which will generate subevents of the same type. I set those aside as the core issue is the role that case places in the composition of telicity.

a material-only part-structure account by establishing the appropriate measure of the object relevant to the object to event mapping.

$$(80) \llbracket acc \rrbracket = \lambda R_{\langle e, \langle s, t \rangle \rangle} \lambda x \lambda e [R(x)(e) \ \& \ \exists f [\text{measure}(f) \ \& \ \forall x' [x' \leq f(x) \rightarrow \exists e' [e' \leq e \ \& \ R(x')(e')]]]]]$$

The composition of events is motivated by the type of [ACC]. Having an uninterpretable case feature [ACC], the object DP enters into an agreement relation with the interpretable verbal inflectional feature [ACC] which forces displacement of the DP. The index left behind is interpreted as a trace, with its binder index coming from the agreement relationship. The kind of structure Kratzer assumes is given in (81).



The telicity of the event then is determined by the object to event mapping given by the meaning of accusative case and the quantization of the object DP. Quantized DPs, lacking subparts which fall under their extension, will not create a series of subevents which bare the same *R* relation to the subpart of the object.

3.4.2 Quantization in States

Having reviewed the way in which an eventive verb and its object compose to license telicity, I now turn to an analysis of (transitive) stative predicates. The analysis to be proposed here will capture several observations. First, there are striking similarities between the VPs of events and states. As such, the internal semantic composition of VPs should operate in

the same way given that the alternation in interpretation due to the internal argument for both events and states is related to quantization. This means that the analysis should capture the idea that quantized arguments lead to delimited eventualities. Secondly, while eventive VPs are properties of events, I have argued that stative VPs are properties of individuals. Thus the semantic composition above VP differs between stative and eventive predicates. What is needed is a way to maintain that the internal workings of stative VPs are similar to the cases of eventive VPs; however, unlike eventive VPs which are properties of events and map their properties to that event, stative VPs are properties of individuals and map their properties to that individual.

Several options present themselves. One option is to put conditions on the θ role for stative subjects, similar to those argued for in Krifka (1998). A second is to encode the kind of mapping to objects into the functional structure which is related to the subject. I will be pursuing this second option, following work by Marantz (1984), Kratzer (1996), and Pylkkänen (2002) which assumes that the external argument is not a true argument of the verb. Instead, it is introduced through a functional head labeled Voice.

3.4.2.1 VP-internal Composition of States

I propose that composition inside the stative VP follows Kratzer (2004) along the analysis of (81). In this manner, the VPs of stative and eventive predicates are composed together by the same mechanisms. Through the mapping to events encoded in the semantics of case, the eventuality argument will receive the part-structure of the argument. Examples of a homogeneous stative VP and a quantized stative VP are given in (82) and (83) respectively.²⁰

²⁰In the following derivations, I suppress Kratzer's measure f to assist in the clarity of exposition as measure f is not directly at issue. For Kratzer, measure f indicates "the assumption that there is some general cognitive mechanism that determines a range of functions that map the referents of certain direct objects into concrete or abstract 'measuring rods' that are associated with those referents in some way or other" (394). Certainly some mileage could be gained by considering the "measuring rods" applicable in stative predicates, but as this is not the main focus of this dissertation, I set it aside for future consideration.

(82) a. $\llbracket \text{own banks} \rrbracket =$

$$\lambda s[\text{own}(\text{banks})(s) \ \& \ \forall x'[x' \leq \text{banks} \rightarrow \exists s'[s' \leq s \ \& \ \text{own}(x')(s')]]]$$

b. $\llbracket \text{live in trees} \rrbracket =$

$$\lambda s[\text{live-in}(\text{trees})(s) \ \& \ \forall x'[x' \leq \text{trees} \rightarrow \exists s'[s' \leq s \ \& \ \text{live-in}(x')(s')]]]$$

(83) a. $\llbracket \text{own this bank} \rrbracket =$

$$\lambda s[\text{own}(\text{this-bank})(s) \ \& \ \forall x'[x' \leq \text{this-bank} \rightarrow \exists s'[s' \leq s \ \& \ \text{own}(x')(s')]]]$$

b. $\llbracket \text{live in these trees} \rrbracket =$

$$\lambda s[\text{live-in}(\text{these-trees})(s) \ \& \ \forall x'[x' \leq \text{these-trees} \rightarrow \exists s'[s' \leq s \ \& \ \text{live-in}(x')(s')]]]$$

For a homogeneous state like (82a), the bare plural object *banks* has subparts which are also *banks*. This is because *banks*, as a bare plural, is divisive, and thus has some proper part which is also *banks*. What accusative case then does is map the part structure of *banks* to the part structure of the state *s* by stating the existence of substates *s'* which are ownings of the parts of *banks*. Since *banks* has unbounded numbers of (proper) parts which are also *banks*, an unbounded number of (proper) substates *s'* are asserted. This mapping then leads to a homogeneous state because its internal argument is also homogeneous.

For a quantized state like (83a), the demonstrative object *this bank* does not have subparts which are also *this bank*. This is because *this bank* fails to be divisive, and thus there is no proper part which is also *this bank*.²¹ What accusative case does here is the same as above, map the part structure of *this bank* to the part structure of the state *s* by stating

²¹Of course, *this bank* also fails to be cumulative. While outside the scope of this dissertation, I would like to point out that one limitation of the mapping to events inherited by Kratzer (2004) concerns expressions which are divisive but fail to be cumulative, like *less than five apples*. These expressions are quantized, triggering telic interpretations as in (ia) and licensing an existential interpretation for their subjects as in (ib), but since the mapping to events is concerned with subparts only and not superparts, this formulation misses these examples.

(i) a. John solved less than five problems in an hour.

b. Tycoons own less than five banks.

(existential possible)

Borer (2005b) notes that a consequence of weakening the conditions for quantization is “incompatible with the complete mapping of sub-events to sub-parts of the object, and the converse, as argued by Krifka” with his Mapping to Objects and mapping to events conditions (148).

the existence of substates s' which are ownings of the parts of *this bank*. Since *this bank* has only one part, the only substate s' asserted is the one identical with the state s . This mapping then leads to a quantized state because its internal argument is also quantized.

3.4.2.2 Evidence for Quantization in Stative VPs

Returning again to the analogy between states and events, Hinrichs (1985) argues that adverbs like *twice* are sensitive to the telicity of their predicate. They are acceptable with telic predicates, like (84a), but are claimed to be blocked by atelic predicates, like (84b).

- (84) a. John solved a problem twice.
b. *John solved problems twice.

Given the argument that *twice* is sensitive to the presence of quantization in telic predicates, we would expect a similar contrast to emerge in stative predicates.²² Quantized statives like (85a) with *twice* should be acceptable, but homogeneous statives like (85b) with *twice* should not be. However, a contrast in acceptability does not emerge.

- (85) a. John owned this house twice.
b. John owned houses twice.

Before claiming this as a counter-example to the claim that stative VPs are homogeneous or quantized; however, let's first review the initial contrast in Hinrichs (1985). First, (84b) is acceptable under an interpretation where John has participated in two separate sandwich-eating events. Similarly, (84a) also has this two event interpretation, though a one event interpretation is clearly possible.

²²Borer (2005b), following work in Bach (1981) and Mourelatos (1978), claims that quantized adverbials like *twice* coerce stative predicates into eventive predicates. While stative predicates with *twice* may more easily lend themselves to an eventive interpretation, they do behave as statives under the tests for stativity given in Section 1.2.4, as given in (i). The frame setting phrase *in this book* has been added to allow for multiple instances of the state in the present tense.

- (i) a. In this book, John loves Mary twice last summer.
b. *In this book, John is loving Mary twice last summer.
c. *In this book, what John does is love Mary twice last summer.

In the same way, there is a contrast between (85b) and (85a) that is similar to that between (84b) and (84a). (85b) is acceptable under an interpretation where John has been in two separate house-owning states. (85a) also has this two state interpretation, though clearly, John could have been in a single house-owning state of which there are two sub-states of owning-this-house. In the first case, John is in a house-owning state regardless of the number of houses he owns; whereas, in the second case, John must own this particular house to be in the own-this-house state. Thus, analyzing the acceptable interpretation of (84b) helps clarify the interpretational difference between (85b) and (85a). It seems then that *twice* is sensitive to the quantization of stative predicates.

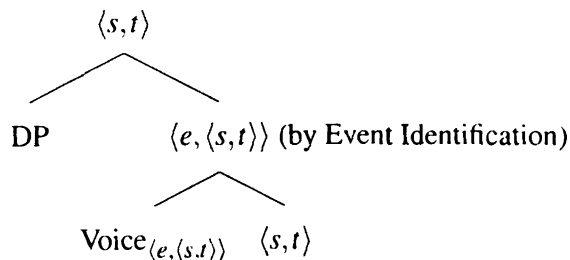
3.4.2.3 Introducing the Subject

At the point of the VP, we still have a property of eventualities. Following Marantz (1984); Kratzer (1996) and Pytkänen (2002), I assume that the external argument is not a true argument of the verb. Instead, the external argument is introduced by a set of functional heads, called Voice heads. The denotations of these heads are composed with meaning of a predicate by the compositional rule of Event Identification, given in (86), which allows one to add conditions to the eventuality, as in (87).

(86) Event Identification:

$$\begin{array}{lll} f_{\langle e, \langle s, t \rangle \rangle} & g_{\langle s, t \rangle} & \rightarrow h_{\langle e, \langle s, t \rangle \rangle} \\ \lambda x \lambda e [f(x)(e)] & \lambda e [g(e)] & \rightarrow \lambda x \lambda e [f(x)(e) \& g(e)] \end{array}$$

(87)



An interesting proposal that Kratzer makes about Event Identification is that its operation is constrained by selectional restrictions; namely, that the aktionsart of the predicates

it is combining together must be of the same type. She suggests that the connection between θ roles, such as Agent or Holder, and aktionsart, like events and states, comes about because of this selectional restriction. As such, eventive VPs can only combine with eventive predicates, and stative VPs can only combine with stative predicates. For eventive predicates, Kratzer proposes that the external argument is introduced by an eventive Voice head, given in (88a). For stative predicates, Kratzer proposes that the external argument is introduced by a different Voice head, given in (88b).

$$(88) \text{ a. } \llbracket \text{Voice}_E \rrbracket = \lambda x \lambda e [\text{Agent}(x)(e)]$$

$$\text{ b. } \llbracket \text{Voice}_S \rrbracket = \lambda x \lambda s [\text{Holder}(x)(s)]$$

Recall that the availability of existential interpretation of the subject, i.e. the external argument, of stative predicates is related to the quantization of the predicate, here identified by the quantization of the object much in the same way that eventive predicates are identified. To understand the manner in which quantization information from the object can affect the subject, I propose an extension of Kratzer's stative Voice head which includes a mapping to objects, à la Krifka (1998) and in the spirit of Kratzer's (2004) accusative case, given in (89).²³ The stative Voice head does two jobs. First, as in Kratzer (1996), it relates the external argument to the eventuality via its θ role. In addition, it maps the part-structure of the eventuality to the argument's part-structure. For every substate, there has to be a part of the subject which relates to that substate's temporal trace.

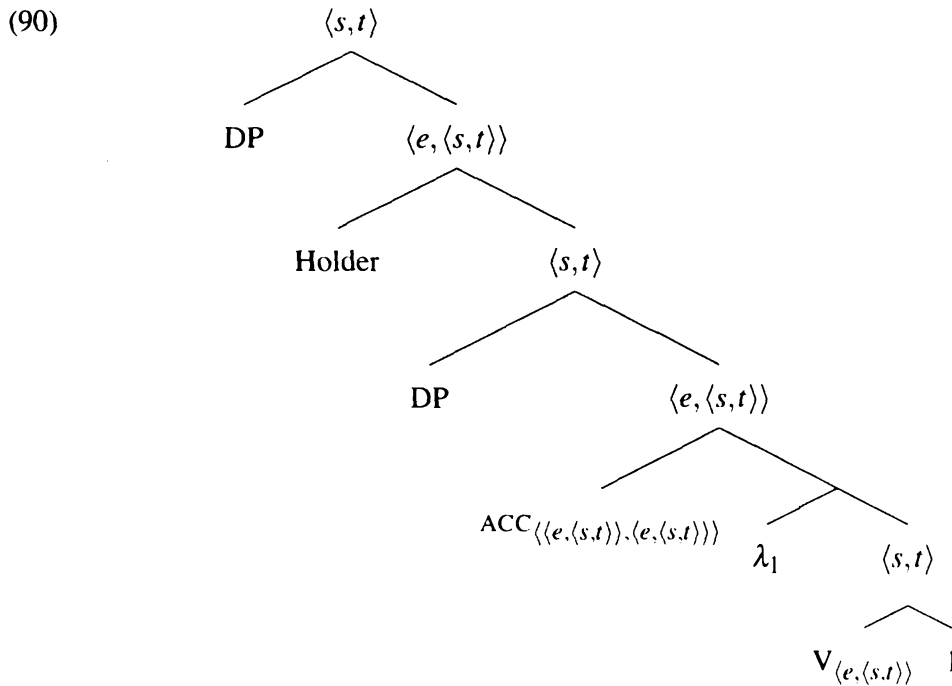
$$(89) \llbracket \text{Voice}_S \rrbracket = \lambda x \lambda s [\text{Holder}(x)(s) \ \& \ \forall e' [e' \leq e \rightarrow \exists x' [x' \leq x \ \& \ \text{Holder}(x')(s')]]]$$

²³Examples like those in (i) and (ii) suggests that a similar mapping appears to also be needed in events, although it is a mapping to events as the part-structure of the subject affects the part-structure of the event, given in (iii).

- (i) a. Settlers crossed the desert for years.
b. #The settlers crossed the desert for years. (Dowty, 1989)
- (ii) a. Water leaked through the roof for an hour.
b. #A gallon of water leaked through the roof for an hour.

$$(iii) \llbracket \text{Voice}_E \rrbracket = \lambda x \lambda e [\text{Agent}(x)(e) \ \& \ \underbrace{\forall x' [x' \leq x \rightarrow \exists e' [e' \leq e \ \& \ \text{Agent}(x')(e')]]}_{\text{Mapping to Events}}]$$

The full composition of a transitive stative predicate is given in (90). A stative VP is composed in the same manner as eventive VPs following Kratzer (2004) and given in (81). The presence of accusative case constructs a mapping to events between the part-structure of the object and the part-structure of the state. The external argument is then added via composition of the stative Voice head to the stative VP by Event Identification and a mapping to objects is constructed between the part-structure of the state and the part-structure of the subject.



Examples following from (82) and (83) are given in (91) and (92), respectively. In both cases, the stative voice head introduces the subject as the Holder of the state and also introduces a mapping to objects, i.e. from the state to the subject. For homogeneous states like (91a), the state consists of a (dense) part structure of substates, each an owning of banks, as discussed above. The mapping to objects then asserts the existence of a stage, i.e. a part, of the subject for each of these substates such that that stage of the subject is the holder of that substate. For quantized states like (92a), the state consists of a single state, an owning of this bank, as discussed above. The mapping to objects asserts the existence

of a stage of the subject for each substate, but since there is only one substate, namely, the state itself, only one stage of the subject is asserted as the holder of that state.

- (91) a. $\llbracket \text{Tycoons own banks} \rrbracket = \lambda s [\text{Holder}(\text{Tycoons})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists x' [x' \leq \text{Tycoons} \ \& \ \text{Holder}(x')(s')]] \ \& \ [\text{own}(\text{banks})(s) \ \& \ \forall x' [x' \leq \text{banks} \rightarrow \exists s' [s' \leq s \ \& \ \text{own}(x')(s')]]]]]$
- b. $\llbracket \text{Monkeys live in trees} \rrbracket = \lambda s [\text{Holder}(\text{Monkeys})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists x' [x' \leq \text{Monkeys} \ \& \ \text{Holder}(x')(s')]] \ \& \ [\text{live-in}(\text{trees})(s) \ \& \ \forall x' [x' \leq \text{trees} \rightarrow \exists s' [s' \leq s \ \& \ \text{live-in}(x')(s')]]]]]$
- (92) a. $\llbracket \text{Tycoons own this bank} \rrbracket = \lambda s [\text{Holder}(\text{Tycoons})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists x' [x' \leq \text{Tycoons} \ \& \ \text{Holder}(x')(s')]] \ \& \ [\text{own}(\text{this-bank})(s) \ \& \ \forall x' [x' \leq \text{this-banks} \rightarrow \exists s' [s' \leq s \ \& \ \text{own}(x')(s')]]]]]$
- b. $\llbracket \text{Monkeys live in trees} \rrbracket = \lambda s [\text{Holder}(\text{Monkeys})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists x' [x' \leq \text{Monkeys} \ \& \ \text{Holder}(x')(s')]] \ \& \ [\text{live-in}(\text{these-trees})(s) \ \& \ \forall x' [x' \leq \text{these-trees} \rightarrow \exists s' [s' \leq s \ \& \ \text{live-in}(x')(s')]]]]]$

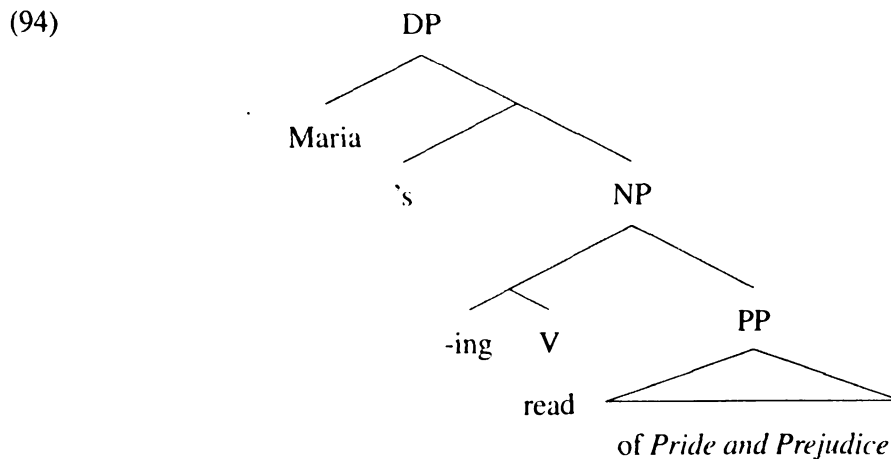
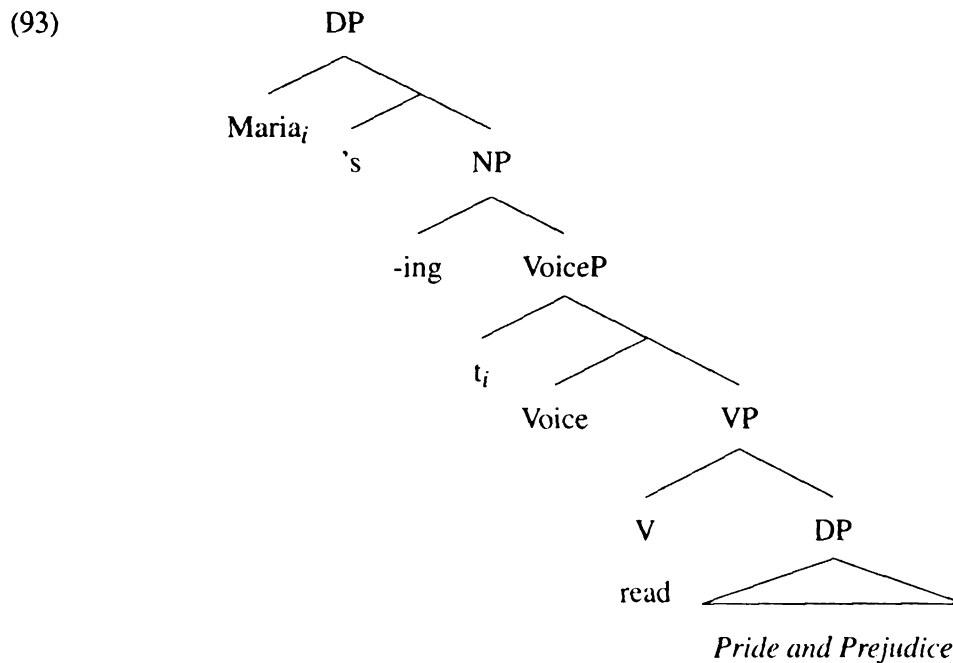
This analysis proposes that Voice is responsible for the availability of existential interpretation of subjects. In the next section, I provide evidence that the presence of Voice can be detected in stative predicates and that it is responsible for providing the mapping to objects between the state and the subject argument.

3.4.2.4 Evidence for Voice in Stative Predicates

In addition to introducing the external argument, Kratzer (1996) also proposes that Voice projects only when accusative case is assigned to the object. One source of evidence for this position comes from different types of nominalizations, which she argues can be used to detect the presence of Voice. Drawing on work by Abney (1987), Kratzer proposes that nominalizing affixes like *-ing* attach to different syntactic levels of the extended verbal projection. Thus, different types of gerunds are formed by nominalizing different segments of

the verb's extended projection. Two of these possible gerundive constructions are relevant for our purposes here: possessive gerunds and *of* gerunds.

Possessive gerunds result from *-ing* attaching to the VP. In these cases, accusative case is assigned to the object and, according to Kratzer, Voice must project as in (93).²⁴ *of* gerunds result from *-ing* attaching to the verb. This prevents the assignment of accusative case to the object and thus also blocking Voice, as given in (94).



²⁴The structure in (93) assumes that the external argument is generated in Spec-VoiceP and then moves to form the genitive DP, possibly for reasons of case.

What will be of particular interest here is the range of interpretations the genitive subject DPs can express. For possessive gerunds, the genitive DP must express the agent relation to the event, given in (95). It must be the case that Maria was the agent of the reading *Pride and Prejudice* event. However, for *of* gerunds, the genitive DP may express “a general notion of relatedness of which the agent relation is but a special case” (Kratzer, 1996, 128) to the event, given in (96). That is, Maria may have only attended a reading of *Pride and Prejudice* and we are using that to identify the event.

- (95) We remember Maria’s reading *Pride and Prejudice*.
 - a. Maria is the Agent of the reading *Pride and Prejudice* event.
 - b. *Maria is only related to the reading *Pride and Prejudice* event.
- (96) We remember Maria’s reading of *Pride and Prejudice*.
 - a. Maria is the Agent of the reading *Pride and Prejudice* event.
 - b. Maria is only related to the reading *Pride and Prejudice* event.

Since I, along with Kratzer, have argued that stative predicates also introduce their external argument by means of Voice, a question to ask is whether the same kind of examples can be used to detect the presence of Voice in statives. In (98) and (99), I present evidence that demonstrates the presence of Voice in stative predicates. (97) acts as a context for the second possible interpretation of these sentences. The possessive gerund in (98) requires that Glenn Beck be the holder of a state of hating Obama. However, the *of* gerund in (99), while allowing Glenn Beck to be the holder of a state of hating Obama, also allows for a general notion of relatedness of Glenn Beck to a state of hating Obama. Indeed, example (99) would be true even if Glenn Beck has no feelings at all towards Obama given (99). However, that would be false for example (98).

- (97) We all know that sometimes political pundits fake their personal feelings when speaking to their base. You know, anything for the rating!

- (98) Glenn Beck's hating Obama was contagious.
- a. Glenn Beck is the Holder of the hating Obama state.
 - b. *Glenn Beck is only related to the hating Obama state.
- (99) Glenn Beck's hating of Obama was contagious.
- a. Glenn Beck is the Holder of the hating Obama state.
 - b. Glenn Beck is only related to the hating Obama state.

Having demonstrated that gerunds can be used to detect the presence of Voice not only in eventive predicates, but also in stative predicates, two further predictions arise from the hypothesis that Voice is the locus of the mapping to objects which affects the availability of existential interpretation of subjects. First, by assigning accusative case to their objects, possessive gerunds should alternate in the availability of existential interpretation given the quantization of their object. Second, by not assigning accusative case to their objects, *of* gerunds should not alternate in the availability of existential interpretation given the quantization of their object. Furthermore, the genitive subjects of *of* gerunds, lacking Voice (and accusative case), should be unable to license existential interpretation because they are unable to construct the mapping to objects necessary for existential interpretation. This predicts that *of* gerunds not only should fail to alternate in existential interpretation, they also should only allow a generic interpretation of their subject.

While the judgments of the interpretation of bare plural subjects is difficult in these sentences, to the extent these judgments are clear at all, all of the predictions are born out. The possessive gerunds in (100) alternate in the availability of existential interpretation. A demonstrative object licenses an existential interpretation, and a bare plural object fails to license an existential interpretation. The *of* gerunds in (101) fail to alternate. Both the demonstrative object and the bare plural object fail to license an existential interpretation for their subject.²⁵

²⁵Many thanks to E.T. Cunningham for her clear judgments on these data.

- (100) a. News anchors' hating these politicians was contagious. (existential possible)
 b. News anchors' hating politicians was contagious. (generic only)
- (101) a. News anchors' hating of these politicians was contagious. (generic only)
 b. News anchors' hating of politicians was contagious. (generic only)

While preliminary, these results suggest that Voice acts as a locus for the existential interpretation of subjects. I propose that by providing a mapping to objects, Voice imparts the part structure of the state onto its external argument.

3.4.2.5 Returning to Temporal Interpretation

Given the proposal that stage-level predicates are quantized predicates and individual-level predicates are homogeneous predicates, I want to now return briefly to the temporal phenomena of stage-level/individual-level predicates from Section 3.3 to clarify how this approach illuminates both lifetime effects and temporal modification.

Lifetime Effects As a reminder, lifetime effects arise when an individual-level predicate is used in the past tense, with the implication that the subject is no longer live. The question I asked there was how do we know that a predicate carries a lifetime effect, especially given complex stative predicates of the type under study here. My proposal is that lifetime effects are derived from the quantization of the predicate. Since individual-level predicates are homogeneous predicates, they apply to homogeneous stages of the subject, i.e. the individual itself. Lifetime effects arise in these cases because all of the stages of the individual are put in the past. However, stage-level predicates, which do not carry lifetime effects, as quantized predicates, apply to a quantized stage of the subject, i.e. a stage of the individual. Lifetime effects do not arise because only some stage of the individual is put in the past.

Temporal Modification Following Percus (1997), the temporal stability of a predicate conditions the types of temporal modification they allow. Again, the same question arises: How do we know when a predicate is temporally stable, especially given complex stative predicates? Here, the same reasoning can be applied; temporal stability is derived from the quantization of the predicate. Individual-level predicates, which tend to be stable, are homogeneous states. Given cumulativity, the temporal contour of a homogeneous state is open ended and extends indefinitely. Thus only those temporal modifiers which can encompass these indefinite temporal extensions can modify individual-level predicates. Stage-level predicates on the other hand, which tend to not be stable, are quantized states. As such, they have multiple distinct instances, which are not open ended and can come and go. Thus the range of temporal modification for stage-level predicates is much wider than individual-level predicates.

3.5 Conclusion

In this chapter, I have delved into the role objects play in the availability of existential interpretations of subjects. I argued that topic requirements predict that strong objects license existential interpretations and weak objects fail to do so. However, investigation of a wider range of objects demonstrated that the quantization of objects, and not their weak/strong status, better classifies the availability of existential interpretations: quantized objects license existential interpretations and homogeneous objects fail to do so. This result suggested that quantization may be a unifying force in aktionsart, as telicity is also conditioned by quantization. I then observed that the same quantization distinctions of objects affected related temporal phenomena in stage-level/individual-level predicates. Predicates with quantized objects do not give rise to lifetime effects while those with homogeneous objects do, and predicates with quantized objects are more easily modified by temporal modifiers than those with homogeneous objects. I proposed that the availability of existential interpretations, like lifetime effects and temporal modification, is an aspectual phenomenon

based on the internal temporal contour of individuals and their stages. I then proposed that stative and eventive VPs are composed by identical mechanisms, capturing the regularity of quantization across stative and eventive VPs. Finally, I proposed that the difference between states and events comes from their relationship to their external argument which is regulated by the selectional restriction of aktionsart on the operation of Event Identification to compose Voice. The stative Voice head encodes a mapping to object between the part structure of the state and the part structure of the external argument. This part structure then has consequences for the aspectual interpretation of the subject: quantized subjects may have existential interpretations and do not suffer lifetime effects while homogeneous subjects fail to have existential interpretations and also lifetime effects.

Chapter 4

ADJECTIVAL PREDICATES AND SCALE STRUCTURES

4.1 Introduction

In Chapters 2 and 3, I focused almost exclusively on transitive stative verbal predicates. However, a large majority of stative predicates are adjectival, not verbal. This chapter focuses on predicative adjectives as a source of states and their classification as stage-level/individual-level predicates. Indeed, the stage-level/individual-level distinction is often highlighted using predicative adjectives such as those in (1) and (2) which demonstrate several stage-level and individual-level behaviors we have encountered in the previous chapters (see especially Section 1.2). (1) and (2) highlight the behaviors of *drunk* and *tall*, a stage-level and individual-level predicate, respectively. As a stage-level predicate, *drunk* is grammatical in *there*-constructions (1a) and licenses an existential interpretation of its subject (1b, 1c). In addition, it does not give rise to lifetime effects (1d). As an individual-level predicate, *tall* is ungrammatical in *there*-constructions (2a) and unable to provide an existential interpretation to its subject (2b, 2c). In addition, it gives rise to lifetime effects (2d).

- (1) a. There are men drunk.
b. A man is drunk.
c. Men are drunk. (existential possible)
d. John was drunk. ✗ John is dead.

- (2) a. *There are men tall.
 b. *A man is tall.
 c. Men are tall. (generic only)
 d. John was tall. $\leadsto$ John is dead.

However, this pattern of data leads to a question: Why, in the first place, is *drunk* a stage-level predicate and *tall* an individual-level predicate? Indeed, why do predicates behave in stage-level or individual-level ways at all? Is this something we know individually about these predicates (and thus must learn on an individual item-by-item basis and store in its lexical representation), or is this something we derive from other properties of these predicates? And if derived, what are the properties which these predicates all have that allow for such a derivation? Here, I will continue my argument that even if much of the stage-level/individual-level distinction is pragmatic, it is the semantic structure of stage-level/individual-level predicates which forms the basis for these pragmatic computations and has important consequences for deriving the types of interpretations typically linked to stage-level and individual-level predicates.

With transitive verbal predicates, I argued that the internal argument plays a key role in determining the availability of an existential interpretation of the subject. In a systematic way, quantized objects license an existential interpretation for their subjects and homogeneous objects fail to do so. Non-verbal predicates are also systematic in licensing existential interpretations; however, given they are most often found without arguments like those in verbal predicates, another source for the distinction appears to be required. The focus of this chapter is an exploration of one possible source for the distinction and its relationship to the availability of existential interpretation: the scale structure of adjectives.

This chapter is organized in the following manner. I will first make several observations concerning predicative adjectives and the stage-level/individual-level distinction, focusing on a correlation between the scale structure of the predicate and the predicate's ability

to licensing an existential interpretation of its subject. In Section 4.2 I discuss the role scale structure has played in the analysis of gradable predicates. Section 4.3 will highlight recent scalar analyses of the telicity of degree achievements. Using the observations of a relationship between scale structure and telicity, I will argue that scale structure is a case of quantization. I will then propose an analysis of predicative adjectives to capture the part structure mapping between the scale structure of the adjective and the state. Finally, I explore the role objects play in licensing existential interpretations in predicative adjective constructions in Section 4.4

4.2 Scale Structure and Stage-level/Individual-level Predicates

In addition to the differences highlighted in (1) and (2), *drunk* and *tall* also differ in their ability to take proportional modifiers.

- (3) a. half/100%/completely drunk
- b. ??half/100%/completely tall

Proportional modifiers have certain semantic requirements; roughly, they are acceptable only with adjectives which map their arguments onto a maximum or minimum point on a scale. Adjectives which are acceptable with proportional modifiers are, therefore, called closed scale adjectives, and likewise those which are unacceptable with proportional modifiers are called open scale adjectives.

One question to be asked at this point is if the scale structure of *drunk* and *tall* is a fact that is unrelated to these adjectives' behavior as stage-level or individual-level, or if these two behaviors are more deeply related to one another. Consider a few more adjectives alongside *drunk* and *tall*.

- (4) a. completely full/drunken/necessary
- b. ??completely brown/tall/immoral

When we examine these adjectives in their predicative uses, we find that those adjectives in (4a) which allowed for proportional modifiers also license an existential interpretation of their subject, as in (5); whereas, those adjectives in (4b) which did not allow for proportional modifiers do not license an existential interpretation of their subject, as in (6). The predicates in (5) all license existential interpretation of their subjects. (5a) can mean that there are full whisky bottles, but (6a) cannot mean that there are brown ones.¹ Similarly, (5b) can be about a particular group of Norwegians; whereas, (6b) can only be about Norwegians generally. Finally, even for rather abstract properties, similar relationships between scale structure and stage-level/individual-level behavior are seen. (5c) can mean that there is a particular set of rules needed, but (6c) cannot mean that there is a particular set of rules which are immoral.

- | | | | |
|-----|----|----------------------------|------------------------|
| (5) | a. | Whiskey bottles are full. | (existential possible) |
| | b. | Norwegians are drunk. | (existential possible) |
| | c. | Rules are necessary. | (existential possible) |
| (6) | a. | Whiskey bottles are brown. | (generic only) |
| | b. | Norwegians are tall. | (generic only) |
| | c. | Rules are immoral. | (generic only) |

This behavior is also seen as a contrast in acceptability when using singular indefinite subjects.

¹The semantics of color adjectives like *brown* have been notoriously difficult to pin down. A recent paper by Kennedy and McNally (2010) has suggested that this is in part because color adjectives are ambiguous between a gradable and nongradable interpretation, which could potentially muddy the scalar source of stage-level/individual-level behavior I am arguing for here. However, gradable and nongradable uses of ambiguous adjectives can be disambiguated using overt degree modifiers, which are acceptable with a gradable adjective and degraded with nongradable predicates, like *American* or *male* (to the extent these are not coercible). Note that even when disambiguated with a degree morpheme, *brown* does not license an existential interpretation of its subject.

- | | | | |
|-----|----|---------------------------------|----------------|
| (i) | a. | Whiskey bottles are very brown. | (generic only) |
| | b. | #Southerners are very American. | |
| | c. | #John is very male. | |

- (7) a. A whiskey bottle is full.
- b. A Norwegian is drunk.
- c. A rule is necessary.
- (8) a. #A whiskey bottle is brown.
- b. #A Norwegian is tall.
- c. #A rule is immoral.

This further examination of closed and open scale predicative adjectives demonstrates that the scale structure of the adjective plays an important role in determining the predicate's stage-level or individual-level behavior.

For adjectival predicates, the scale structure of the underlying adjective appears to affect whether the predicate can license an existential interpretation of its subject. How is it, then, that scale structure affects a predicate's ability to license existential interpretation and does this relate to quantization which was argued to affect the availability of existential interpretations in verbal predicates? To approach these questions, I first overview Kennedy and McNally's (2005) theory of scale structure.

4.2.1 The Structure of Scales

Following Kennedy and McNally (2005), scales are defined as triples, $\langle S, R, \Delta \rangle$, where S is a set of degrees, R is an ordering on S , and Δ is a value that represents the dimension of measurement. The structure of S is taken to be either totally open, closed on either the lower or upper side, or totally closed. Closure is taken as the presence or absence of a minimum/maximum point on the scale. R orders the scale as either increasing ($\prec$) for 'positive' adjectives like *warm* or decreasing ($\succ$) for 'negative' adjectives like *cool*. Δ is some dimension of measurement which distinguishes between different gradable adjectives, such as temperature, width, depth, linear extent, temporal extent, etc.

As scale closure will be an important feature of scale structure in the following analysis, the following provides further support and exposition of closed and partly closed scales and their relationship to the standard of comparison. As discussed below, closed scale adjectives have an absolute standard of comparison, whereas open scale adjectives have a relative standard of comparison. I will first discuss two properties of scale structure: scale closure and scale standards. I will then discuss how scale structure enters into the composition of predicative adjectives, focusing particular on three different theories of the so-called positive form.

4.2.1.1 Scale Closure

The distribution of certain modifiers is sensitive to the structure of scales. As noted above, proportional modifiers in particular have this distribution; they are acceptable with closed scale adjectives as in (9) but are degraded with open scale adjectives as in (10).

- (9) a. The glass is half/mostly full.
 b. Her eyes were half/most of the way closed.
 c. These images are half/mostly invisible.
- (10) a.??The rope is half/mostly long.
 b.??A 15-year-old horse is half/mostly old.
 c.??That car was half/mostly expensive.

Because proportional modifiers like *half* and *completely* make use of maximum and minimum in their interpretation, their acceptability can be used to diagnose the scale structure of an adjective.² Given that adjectives come in positive and negative orderings, the ac-

²Kennedy and McNally (2005) give the following denotions for *half* and *completely*, where **max** and **min** return the maximum and minimum point of the scale, respectively, and **diff** is a function that returns the difference between two degrees.

- (i) a. $\llbracket \text{half} \rrbracket = \lambda g \lambda x. \exists d [\text{diff}(\text{max}(S_g))(d) = \text{diff}(d)(\text{min}(S_g)) \ \& \ g(d)(x)]$
 b. $\llbracket \text{completely} \rrbracket = \lambda g \lambda x. \exists d [d = \text{max}(S_g) \ \& \ g(d)(x)]$

ceptability of proportional modifiers with antonym pairs which make use of the same scale (such as *tall/short*, *bent/straight*, *certain/uncertain*, or *full/empty*) can be used to probe the structure of the scale itself. Kennedy and McNally's (2005) examples of adjective pairings which belong to each of these scale types are given below.

(11) Open scale pattern

- a. Her brother is completely ??tall/??short.
- b. The pond is 100% ??deep/??shallow.
- c. Max is fully ??eager/??uneager to help.

(12) Lower closed scale pattern

- a. The pipe is fully ??bent/straight.
- b. The room became 100% ??loud/quiet.
- c. That author is completely ??famous/unknown.

(13) Upper closed scale pattern

- a. We are fully certain/??uncertain.
- b. This product is 100% pure/??impure.
- c. The treatment is completely safe/??dangerous.

(14) Closed scale pattern

- a. The room was 100% full/empty.
- b. The flower was fully open/closed.
- c. The figure was completely visible/invisible.

Since proportional modifiers are sensitive to the closure of a scale, they provide evidence for a maximum point on the scale at either the top or bottom. Positive adjectives, which have an increasing ordering relation ($<$), can provide evidence for an upper closure, and negative adjectives, which have a decreasing ordering relation ($>$), can provide evidence for an lower closure. The following table summarizes the judgment types for positive and negative adjectives.

Table 4.1: Summary for Positive and Negative Adjective Judgments

	Open	Lower-Closed	Upper-Closed	Closed
$[Deg_{max} A_{pos}]$	??	??	✓	✓
$[Deg_{max} A_{neg}]$	??	✓	??	✓

These judgments lead to the typology for scale structures in natural language given in (15).

(15) A typology of scale structures

- a. $\langle D_{(0,1)}, R, \Delta \rangle$ (Totally) Open Scale
- b. $\langle D_{[0,1)}, R, \Delta \rangle$ Lower Closed Scale
- c. $\langle D_{(0,1]}, R, \Delta \rangle$ Upper Closed Scale
- d. $\langle D_{[0,1]}, R, \Delta \rangle$ (Totally) Closed Scale

In other work, Kennedy (1997) argues that the denotations of adjectives are measure functions of type $\langle e, d \rangle$; that is, they take an individual and return the degree of that individual on the relevant scale (see also Svenonius and Kennedy (2006)). The difference between open and closed scale adjectives is encoded with respect to the scale they are relevant to. For instance, *tall* is relevant to a scale of height which is (totally) open, and *full* is relevant to a scale of extent which is (totally) closed. The denotations for both adjectives are given below.

- (16) a. $\llbracket \text{tall} \rrbracket = \lambda x [m_{\text{tall}}(x)]$
b. $\llbracket \text{full} \rrbracket = \lambda x [m_{\text{full}}(x)]$

I would like to point out that these denotations do not, as one might say, wear their closures on their sleeves. If you did not know the meaning of these adjectives, you could not tell that one was open scale and the other was closed scale. While this may just be a criticism of the notation, it could be the case that this reflects deeper issues for the relationship between the meaning of adjectives and their scalar structure.³ I will return to this point in Section 4.2.1.3.

³In a footnote, Kennedy and McNally (2005) provide a bit more explication for what $m_{\text{tall}}(x)$ and its antonym *short* stand for.

4.2.1.2 Scale Standards

In addition to their behavior with proportional modifiers, Kennedy and McNally (2005) argue that scale structure also determines the standard of comparison, which may be relative or absolute. In the case of relative standards of comparison, a contextually relevant comparison class must be determined. As such, the truth conditions for sentences in (17) vary based on the comparison class. For instance, to judge the truth of (17c), we must know what the relevant comparison class is. If the standard of comparison is set low, say, in a conversation about accessories, watches may indeed be said to be expensive, but if the standard of comparison is set high, say, in a conversation about NASA space missions, it is no longer the case that watches are truthfully expensive.

- (17) a. The man is tall.
 b. The basketball player is tall.
 c. The watch was expensive.
 d. The moon landing was expensive.

Interestingly, the cases which have a vague relative standard of comparison are also cases of open scale adjectives. This vagueness in the standard of comparison is not found for closed scale adjectives. Sentences such as (18) and (19) are not judged relative to some contextually relevant comparison class. The examples in (18) all have minimum standards: (18a) means that the baby has some non-zero degree of awokeness, not that the baby is awake above some contextually given standard of awokeness. Similarly, the examples in (19) all have maximum standards: (19a) means that the glass is filled to the maximum amount, not that the glass is filled above some contextually given standard of fullness.

-
- (i) a. **tall:** $f : H \subseteq U \rightarrow \langle D_{(0,\infty)}, \leq, \text{height} \rangle$
 b. **short:** $f : H \subseteq U \rightarrow \langle D_{(0,\infty)}, \geq, \text{height} \rangle$

- (18) a. The baby is awake.
 - b. The spot is visible.
 - c. The door is open.
 - d. The rod is bent.
- (19) a. The glass is full.
 - b. The road is flat.
 - c. The door is closed.
 - d. The rod is straight.

Kennedy and McNally (2005) argue that the vagueness of the relative standard is directly driven by the need to take into account a contextually relevant set, as this set may change and is not fixed. Absolute standards, however, do not need a contextually relevant set. Instead, they seem to be related more to the individual directly. Interestingly, this relation seems to be linked to some relevant part-structure of the individual. So for a road to be flat, all one needs to do is look at all the parts of the road itself and note whether these are flat or not. There is no need to compare the road to other things that can be measured in terms of flatness. Similarly for a door to be closed, we only need to examine that particular door and how far from the frame it is. One way to consider this is to say that we are looking at all the possible positions for the door to be in, and what closed does is select the one maximum point where the door is fully in line with its frame.⁴ Note also that for sentences like *the door is half closed*, we are still looking at door to frame positions, but now the point we are interested in is half way between the most open position and the most closed position.

⁴Certainly the observation here which relates part structure to standards is related indirect to the discussion of the quantization of scales in Section 4.3.2.

4.2.1.3 The Positive Form

Adjectives are assumed to be measure functions, type $\langle e, d \rangle$, and therefore, they cannot compose directly with an argument to yield a truth condition as a typical predicate does as a property of individuals, type $\langle e, t \rangle$. To derive properties of individuals from measure functions, Kennedy (1997) proposed that a null degree morpheme which will be referred to here to as *pos*. The basic denotation of *pos* is given in (20).

$$(20) \llbracket pos \rrbracket = \lambda g \in D_{\langle e, d \rangle} \lambda d \lambda x [R(g(x))(d)]$$

When considering the denotations of *pos* morphemes, spelling out the relation R that holds between the degree returned by the measure function $g(x)$ and another degree d , the standard of comparison, is important. Since the relation R depends in part on the scale structure of the adjective, i.e. closed scale adjectives have absolute standards of comparison while open scale adjectives have relative standards of comparison, capturing the interaction of the *pos* morpheme with the scale structure of the adjective is also important. Below, I review three ways in which *pos* may interact with scale structure, the first two proposed by Kennedy, and the last a new proposal.

Multiple *pos* forms Early approaches by Kennedy required multiple *pos* morphemes where each was sensitive to a particular scale structure. Under a multiple *pos* account, *pos* comes in three flavors which are in complementary distribution. The first, given in (21a), is used with open scale adjectives and returns a property of individuals such that the measurement of the individual with respect to the dimension of the scale is greater than some contextually provided standard of comparison. The second, given in (21b), is used with lower closed scale adjectives and returns a property of individuals such that the measurement of that individual with respect to the dimension of the scale is greater than the minimum of the scale. The third, given in (21c), is used with upper closed scale adjectives and returns a property of individuals such that the measurement of individual with respect

to the dimension of the scale is at the maximum point on the scale. An example of each is given in (22).

- (21) a. $\llbracket pos_{open} \rrbracket = \lambda g \in D_{\langle e,d \rangle} \lambda x [g(x) \succeq \mathbf{stnd}(g)]$
 b. $\llbracket pos_{lower-closed} \rrbracket = \lambda g \in D_{\langle e,d \rangle} \lambda x [g(x) \succ \mathbf{min}(g)]$
 c. $\llbracket pos_{upper-closed} \rrbracket = \lambda g \in D_{\langle e,d \rangle} \lambda x [g(x) = \mathbf{max}(g)]$

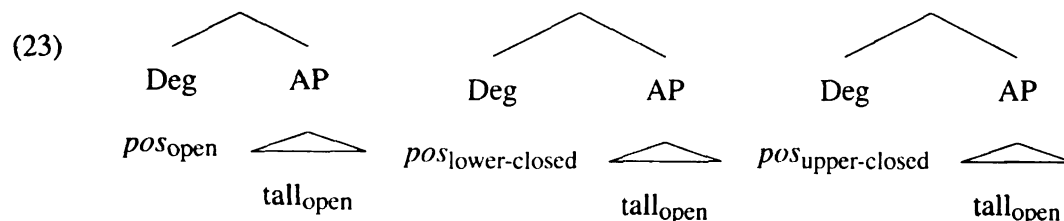
- (22) a. $\llbracket pos \text{ tall} \rrbracket = \lambda x [\text{tall}(x) \succeq \mathbf{stnd}(\text{tall})]$
 b. $\llbracket pos \text{ bent} \rrbracket = \lambda x [\text{bent}(x) \succ \mathbf{min}(\text{bent})]$
 c. $\llbracket pos \text{ full} \rrbracket = \lambda x [\text{full}(x) = \mathbf{max}(\text{full})]$

This proposal can cleanly capture the relationship between scale structure and the standard of comparison. There is, however, a conceptual problem – scale structure is introduced twice in the representation: first for the adjective itself, and second when applying the *pos* morpheme. Under this analysis, scale structure is implicitly a checking system; the *pos* morpheme must agree with the scalar property of adjective embedded in its projection.

This can be viewed in two ways. If we view scalar properties as syntactic features, then the *pos* morpheme agrees with the adjective in allowing the lexically specified property to be checked against the properties of the *pos* degree projection. Take, for instance, the adjective *tall* which is assumed to have some relevant open scale property and the derivations in (23). One could argue that the *pos_{open}* morpheme must merge to check that property, resulting in a well formed structure. Merger of *pos_{lower-closed}* or *pos_{upper-closed}* would result in ungrammaticality because the properties of those *pos* morphemes fail to agree with the property of the adjective, placing them on par with ungrammaticality due failure of subject-verb agreement.

If we view scalar properties as semantic, then the *pos* morpheme agrees with the underlying scale structure of the adjective in accessing certain relevant scale structure relationships, such as a minimum/maximum or an ordering. Again, take the adjective *tall* which measures individuals on some relevant open scale structure and the derivations in (23). The

*pos*_{open} morpheme is merged to establish the open scale associated standard of comparison. Merger of *pos*_{lower-closed} or *pos*_{upper-closed} results in uninterpretability because of a failure of the scale itself to have a minimum/maximum.⁵ Note that this is not the kind of uninterpretability that results from a type clash; the types of the *pos* morphemes are the same, as are the types of the adjectives.



Given either a syntactic or semantic analysis, the projection of certain morphemes which agree with the lexical properties of the embedded terminal node is fundamentally redundant. Why should the functional Degree head reiterate the scalar information of the adjective embedded in its projection by projecting a particular *pos* morpheme given that the adjective is already marked for a particular scale structure. We should do away with one of these markings. Given the use of the *pos* morpheme to create properties of individuals from measure functions, either the *pos* morphemes should be unified leaving the scale structure in the adjective, or adjectives should make no reference to scale structure in their representation and scale structure is instead encoded by *pos* morphemes. We will pursue each of these options in the following sections, respectively.

Unified *pos* form and economy A more recent approach found in Kennedy (2007) unified the *pos* morpheme. Kennedy argues that the meaning the *pos* morpheme contributes to the sentence is to say that the individual has a degree of the measured property that stands out relative to the kind of measurement that the adjective encodes. Here, I use **stand-out**

⁵Note that this is only true of open scale adjectives. Presumably both lower and upper closed scale adjectives can have a contextually supplied standard of comparison. This predicts that there should be no difficulty merging a *pos*_{open} morpheme with a closed scale adjective given that a well formed interpretation results.

to indicate this relation between the measured property of the individual and the standard of comparison.

$$(24) \llbracket pos \rrbracket = \lambda g \in D_{\langle e, d \rangle} \lambda x [\text{stand-out}(g(x))(\text{stnd}(g))]$$

According to Kennedy, the **stand-out** relation is realized in three ways. First, it is greater than minimum on the scale if there is a minimum, second it is equal to the maximum if there is a maximum, or third, it is greater than the contextual standard if there is no maximum or minimum. This is given in (25).

$$(25) \text{stand-out}(g(x)) = \begin{cases} \lambda d.d > \mathbf{min}(g) & \text{if } \mathbf{min}(g) \text{ is defined,} \\ \lambda d.d = \mathbf{max}(g) & \text{if } \mathbf{max}(g) \text{ is defined,} \\ \lambda d.d > \mathbf{stnd}(g) & \text{otherwise.} \end{cases}$$

To derive the difference between closed and open scale adjectives, Kennedy argues for an economy principle which required setting the standard of comparison to the maximum or minimum if that degree is given in the conventional meaning of the adjective.

(26) Interpretative Economy

Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

The purpose of interpretative economy in the particular case of the positive form is to make the contextual standard of comparison a last resort operation. Since closed scale adjectives come with a “natural transition” depending on the source of their closure, interpretative economy selects that degree as the standard of comparison over a contextually supplied standard of comparison. Lower closed scale adjectives have a transition from a zero to a non-zero degree of measurement as part of their conventional meaning, which economy will prefer over a contextually supplied standard, and upper closed scale adjectives have a transition from a non-maximal to a maximal degree of measurement as part of their conventional meaning, which economy will also prefer over a contextually supplied standard. Examples of closed and open scale adjectives with *pos* are given below. In the

case of *full* or *bent*, interpretative economy requires that **stand-out** take the equal to maximum/minimum interpretation because the *full* scale has a maximum point and the *bent* scale has a minimum point. The *tall* scale, on the other hand, does not have a maximum or minimum point leaving these two realizations of the **stand-out** relation are undefined and a contextually supplied standard of comparison the only option left.

- (27) a. $\llbracket pos\ tall \rrbracket = \lambda x[\text{stand-out}(\text{tall}(x))(\text{stnd}(\text{tall}))]$
 b. $\llbracket pos\ bent \rrbracket = \lambda x[\text{stand-out}(\text{bent}(x))(\text{stnd}(\text{bent}))]$
 c. $\llbracket pos\ full \rrbracket = \lambda x[\text{stand-out}(\text{full}(x))(\text{stnd}(\text{full}))]$

Of course, it is immediately apparent that **stand-out** has encoded it in the three-way split found in the multiple *pos* morphemes account outlined above. Also, Kennedy has to resort to an economy condition to select the correct meaning in order to unify these representations in this way. Certainly, economy conditions in the grammar are difficult to motivate theoretically and thus become quite suspect (see Jacobson (1998) for instance as an early discussion of the problems with a theory of optimization and economy conditions), and it is not clear that unifying these representations has provided a deeper explanation for the relationship between *pos* and the scale structure of adjectives.

Severing Scale Structure from the Adjective Another way to reduce the redundancy of the initial analysis of scale structure is to sever scale structure from the lexical items themselves. On the face of it, adjectives certainly seem to be the source of scale structure and the lexical scale structure of a wide variety of adjectives is used to explain the unacceptability of proportional modifiers, as in (28). Thus from an initial observation, severing scale structure from the lexical meanings of adjectives seems deeply problematic.

(28) ??completely tall/deep/bent/loud/uncertain/dangerous/etc.

However, not all adjectives are unambiguous in the kinds of scalar environments they can occur in. Some adjectives display variable behavior and can occur in either closed or

open scale environments.⁶ Kennedy and McNally (2005) point out that *dry*, for instance, is ambiguous between a closed and open scale.

When *dry* is used to describe a (more or less) permanent, stable property such as the average degree of moisture in the atmosphere, it has a relative interpretation. If, however, *dry* is used to describe a transient property like the amount of moisture on a surface, it has an absolute interpretation.

(Kennedy and McNally, 2005, 370)

We will return shortly to the relationship between “(more or less) permanent, stable” and “transient” properties of *dry* and the theory of stage-level/individual-level predicates being pursued in this dissertation. First consider the examples Kennedy and McNally consider. The comparative in (29a) allows for the possibility that both regions are considered to be dry, whereas the comparative in (30a) entails that the plates are not dry. Similarly, the negation in (29b) does not generate the entailment that the region is wet, but the negation in (30b) does generate the entailment that the glasses are wet.

- (29) a. This region of the country is drier than that one (though both are dry).
b. This region of the country is not dry (but it’s not wet either).
- (30) a. The glasses are drier than the plates (#though both are dry).
b. The glasses are not dry (#though they’re not wet either).

Kennedy and McNally note that variability between (29) and (30) corresponds to the acceptability of modification by *very* given in (31). Modification with *very* requires a relative standard of comparison which is available only for open scales. Modification of closed scales with *very* are degraded as these have an absolute standard of comparison. Examples like (29), (30), and (31) point to the variable behavior of lexical items given supporting context. As the variable behavior of a property is taken to be diagnostic against a lexical

⁶The following discussion owes a deep intellectual debt to Chapter 8 of Borer (2005b).

theory of that property, these observations point us away from a lexical theory of scale structure.

- (31) a. This region of the country is very dry.
 b. #The glasses are very dry.

One way to capture this variable behavior is to maintain that there are multiple *pos* morphemes in the grammar, but that adjectives themselves do not encode a scale structure as part of their lexical representations. Instead, the grammar allows all adjectives to occur freely with any *pos* morpheme. Restrictions like those in (28) come about because the resulting concept underlying the meaning of the adjective is unable to coerce its meaning to suit the scalar environment, leading to unacceptability. For the particular case of *dry*, suppose that it can occur with any *pos* morpheme in the grammar and thus be embedded in any scalar environment. When *dry* occurs in the environment of a *pos*_{open}, a relative standard is required and the concept underlying *dry* coerces to allow this open scale meaning which is supported in contexts like (29). When *dry* occurs in the environment of *pos*_{lower-closed}, a minimum absolute standard is required and the concept underlying *dry* coerces to allow this minimum point closed scale meaning which is supported in contexts like (30). However, when *dry* occurs in the environment of *pos*_{upper-closed}, a maximum absolute standard is required, but the concept underlying *dry* cannot be coerced to having a maximum point closed scale meaning as this conflicts with the conceptual meaning of *dry*, no amount of contextual support is able to remedy the conflict between the grammar's requirements and the concept's flexibility, and unacceptability results. Thus we do not expect to find examples of *dry* being used in upper-closed scale contexts.⁷

⁷ A recent proposal in Park (2008) proposes that the gradability of a predicate is severed from the lexical predicate and is carried instead by functional structure. Adjectives like those in (i) are typically thought to be nongradable; however, they can occur with degree modifiers.

- (i) a. This necklace is very/so golden.
 b. These ceramics are very/so Japanese.
 c. This bill is very/so fake.

Park argues that adjectives are properties of individuals, and a functional projection *G*, given in

Under this account, the scale structure of *dry*, or any adjective, is seen as a consequence of it occurring in the environment of a particular type of *pos* morpheme. Restrictions which appear to be carried by adjectives are regulated to a conflict between satisfaction of the grammatical requirements and the constraints of the conceptual system. While it is unclear what mechanisms the cognitive system employs to coerce concepts and what restrictions conceptual systems place on concepts generally, accepting that extralinguistic systems play a role in our acceptability judgments allows us to account for the variable behavior of adjectives in these examples.

Returning now to Kennedy and McNally's observation of the distinction between "(more or less) permanent, stable" and "transient" properties of *dry*, these temporal characteristics are certainly suggestive of the stage-level/individual-level distinction. Evidence that the scale structure possibilities of *dry* are related to the availability of existential interpretation of subjects is given in (32) and (33).⁸

- (32) a. Regions are dry. (generic only)
 b. Glasses are dry. (existential possible)
- (33) a. #A region is dry.
 b. A glass is dry.

The observation here, related to Kennedy and McNally's, is that the extent to which existential interpretation of the subject is licensed in a sentence is related to the extent to

(iia), turns these into gradable predicates.

- (ii) a. $\llbracket G \rrbracket = \lambda P_{\langle e,t \rangle} \lambda d \lambda x. x \text{ is } P \text{ to } d$ type $\langle \langle e,t \rangle, \langle d, \langle e,t \rangle \rangle \rangle$
 b. $\llbracket \text{tall} \rrbracket = \lambda x. x \text{ is tall}$ type $\langle e,t \rangle$
 c. $\llbracket G \text{ tall} \rrbracket = \lambda d \lambda x. x \text{ is tall to } d$ type $\langle d, \langle e,t \rangle \rangle$

⁸Note that as observed in Section 1.4.5 and elsewhere, the additional locative of *the country* changes the availability of existential interpretation.

- (i) a. Regions of the country are dry. (existential possible)
 b. A region of the country is dry.

which the predicate can receive a closed scale interpretation as diagnosed by the acceptability of *very*. What seems to be important then, is not so much the particular lexical items themselves, but the particular structures they are embedded in. The apparently strong restrictions of some adjectives may have more to do with the inability of the underlying concepts they evoke to conform to the requirements of the scalar environment than they do with a fact about the semantic contribution of adjectives.

4.3 Scale Structure in Eventualities

4.3.1 Scale Structure in Events

Having established a theory of scale structure, I have not yet linked the availability of existential interpretations to the underlying scale structure of the predicate. However, an analogy between the behavior of telicity in events and existential interpretation in states based on the previous literature on degree achievements can guide an analysis as it did in Section 3.4.

To understand how scale structure derives the aspectual behavior a predicate, I focus first on eventive predicates. A series of papers (Hay et al., 1999; Kennedy and McNally, 1999, 2005; Kennedy and Levin, 2002, 2008) has explored the relationship between scale structure and aspectual structure. These papers have highlighted the unusual properties of degree achievements which were first examined by Dowty (1979). Dowty worried about degree achievements because they not only have a terminative interpretation (34), but can also receive a natural durative interpretation (35), even without bare plural or mass noun phrases.⁹

⁹Importantly, *the soup* in (34) and (35) is the internal argument. Note that if the internal argument of degree achievements is a bare plural or mass noun, the terminative interpretation is blocked. The internal argument is critical for terminative interpretation of unambiguously telic degree achievements as well, as I will argue in Section 4.3.1.1.

- (34) a. The soup cooled in 10 minutes. (terminative)
 b. The ship sank in an hour. (terminative)
- (35) a. The soup cooled for 10 minutes. (durative)
 b. The ship sank for an hour. (durative)

Interestingly, not all degree achievements have this kind of alternative. Some of these predicates are strongly atelic (36) while others are strongly telic (37).

- (36) a. The gap between the boats widened for/??in a few minutes.
 b. The recession deepened for/??in several years.
- (37) a. The sky darkened ??for/ in an hour.
 b. The shirt dried ??for/ in several hours.
 c. The sink emptied ??for/ in a few minutes. (Kearns, 2007)

In addition, degree achievements with proportional modifiers or measure phrases do not exhibit variable telicity; they are unambiguously telic.¹⁰

¹⁰Proportional modifiers generally require a telic predicate (Schmitt, 1996). This data demonstrates another link between the licensing of telicity and the properties of closed scale adjectives.

- (i) a. John half-ate an apple.
 b. ??John half-ate apples.
 c. *John half-ate bread.
 d. John half-ate the bread.
- (ii) a. John ate an apple completely.
 b. ??John ate apples completely.
 c. *John ate bread completely.
 d. John ate the bread completely.
- (iii) a. John completely ate an apple.
 b. ??John completely ate apples.
 c. *John completely ate bread.
 d. John completely ate the bread.

- (38) a. The soup completely cooled ??for/in an hour.
 b. The basin filled halfway ??for/in an hour.
- (39) a. The soup cooled 17 degrees ??for/in an hour.
 b. The gap widened 6 inches ??for/in an hour.

Kennedy and Levin (2008), improving on Hay et al. (1999) and Kennedy and Levin (2002), propose an account of degree achievements which takes them to be functions that measure the degree to which an object undergoes change of a scalar property through its participation in the event. An important contribution of this work is demonstrating a link between the scale structure of the adjective forming the core of the degree achievement and the structure of the event expressed by the VP.

Kennedy and Levin propose that degree achievement verbs are built from the measure function underlying the adjectival core. The measure function in degree achievements, however, is of a special kind. First, they argue that the measure function is actually a difference function, as found in comparatives and argued for in Kennedy and McNally (2005).

(40) Difference functions

For any measure function m from objects and times to degrees on a scale S , and for any $d \in S$, $m_d^\uparrow$ is a function just like m except that:

1. its range is $\{d' \in S \mid d \preceq d'\}$, and
2. for any x, t in the domain of m , if $m(x)(t) \preceq d$ then $m_d^\uparrow(x)(t) = d$.

In degree achievements, the difference function is sensitive to event participation, or affectedness (Tenny, 1987), of the object. Kennedy and Levin capture this by proposing that a degree achievement denotes a measure of change function. This function takes an object and an event and returns the degree of change to the object in the property measured

due to its participation in the event. It maps the object onto a derived difference scale whose minimal element is the degree that the object possesses at the beginning of the event. The output is the difference between the degree the object possesses at the end of the event compared to the beginning of the event.

(41) Measure of change

For any measure function m , $m_{\Delta} = \lambda x \lambda e. m^{\uparrow}_{m(x)(\text{init}(e))}(x)(\text{fin}(e))$

Like other measure functions, the measure of change function does not combine directly with its argument. To derive a property of events, the measure of change must combine with some degree morphology. Essentially, Kennedy and Levin propose a verbal *pos* morpheme which takes a measure of change function and derives a property of individuals and events.

$$(42) \llbracket pos_v \rrbracket = \lambda g \in D_{m_{\Delta}} \lambda x \lambda e [g(x)(e) \succeq \mathbf{stnd}(g)]$$

This analysis captures the telicity in the following way. When m is a function to a closed scale, the standard of comparison must be directed to an endpoint. The positive form of a lower-closed scale is true of an object just in case the object has a non-zero degree of the measured property. The positive form of an upper closed scale adjective is true of an object just in case it has a maximal degree of the measured property. Context-dependent standards of comparison are available only for the positive form of adjectives that denote measure functions to open scales.

Because they are difference functions, measure of change functions always have a minimum on their measured scale, i.e. the degree of the object at the beginning of the event. Therefore, degree achievements always allow a minimum standard interpretation where it is true of an object and an event as long as the measure of change function returns a non-zero degree when applied to the object and event. The object always undergoes a positive change in the measured property due to its participation in the event. This minimum standard interpretation corresponds to the durative (atelic) interpretation.

In addition to having the minimum standard interpretation, measure of change functions derived from upper closed scale adjectives have a maximum standard interpretation. The

maximum point is inherited from the closed scale of the adjective. Thus there are two potential standards of comparison consistent with interpretive economy. Kennedy and Levin invoke Grice's *Maxium of Quantity* to capture the robust terminative interpretation of upper closed scale degree achievements: since the maximum standard entails the minimum standard, the maximum standard is more informative and thus preferred.

An example of each of these is given in (43) and (44). In the case of (43), the measure of change function **wide**_Δ builds in a minimum standard. Since there is no maximum point to inherit (as *wide* is an open scale adjective), the interpretation is atelic in which the width of the gap increased by some amount above the initial width of the gap at the beginning of the event. In the case of (44), although there is a minimum standard based on the measure of change function **straight**_Δ, the measure of change function also inherits the maximum point on the bent-straight scale. This predicts that (44) will be ambiguous between a telic and an atelic interpretation. By the *Maxium of Quantity*, the telic interpretation is preferred.

(43) a. The gap widened.

b. $\lambda e.\mathbf{wide}_{\Delta}(\text{the-gap})(e) \succeq \mathbf{stnd}(\mathbf{wide}_{\delta})$

(44) a. The rope straightened.

b. $\lambda e.\mathbf{straight}_{\Delta}(\text{the-rope})(e) \succeq \mathbf{stnd}(\mathbf{straight}_{\delta})$

Kennedy and Levin's analysis of degree achievements captures those which are atelic by means of the minimum standard created by the measure of change function as in (36), and those which are (strongly preferred) telic by means of accessing the maximum standard inherent in upper-closed scale adjectives as in (37).

4.3.1.1 Issues for the Measure of Change

In the following sections I discuss several issues raised by Kennedy and Levin's (2008) analysis of degree achievements, including those degree achievements which display truly variable behavior, the role played by context, and how arguments affect degree achievement telicity.

Capturing Variable Behavior The above analysis does well with atelic and (strongly preferred) telic degree achievements. Things are less clear with degree achievements which show variable telicity, repeated in (45). According to Kennedy and Levin, the telic interpretation of (45a) is derived from a conventionalized meaning “has a stabilized temperature” or “at room temperature” of *cool*, which allows cool_Δ to inherit a maximum point. The atelic interpretation of (45b) then derives from the norm-based meaning of *cool* which has no maximum point. As such, variable telicity of degree achievements is fundamentally a phenomenon of lexical ambiguity for Kennedy and Levin – two adjectives *cool*, each with a different standard of comparison, and thus a different scale structure, are needed.

- (45) a. The soup cooled in 10 minutes.
 b. The soup cooled for 10 minutes.

There are however, several precedents for telic predicates receiving atelic interpretations to which I now turn.

The first issue to be addressed is the role of a telos, or event(uality) end point, in the interpretation of telicity. Do telic predicates in fact require a telos to have a telic interpretation? Schein (2002) argues in the negative. He observes that there are telic predicates which do not require a telos like (46). He notes that (46) can be true at the point at which there is a visible haze seen everywhere, say at time t_1 after one began filling the room with smoke at t_0 , but one can also continue to fill the room with smoke until time t_2 , making the haze more dense, perhaps. So even though there is an event from t_0 to t_1 that made (46) true, there is a larger event from t_0 to t_2 that also is true of (46). In this way, there is no sense in which the telic predicate has a telos. Instead, what seems to matter is that there is some subpart of the event which does not fall under the event description of the predicate, say, for instance any filling-the-room-with-smoke event that begins at t_0 but ends before a visible haze is seen everywhere at t_1 .

- (46) The room filled (up) with smoke

Borer (2005b) also notes difficulty with the telos of telic predicates in examples like (47). She points out that a salient interpretation of this sentence is one in which the boat has gone under the bridge and emerged on the other side. Here again, there are events which are bigger than the smallest event under which (47) is true; however, subevents smaller than this smallest true event are subparts of the event which do not fall under the event description of the predicate. In Borer's words, "for examples such as *eat more than three apples*, or *fill the room with smoke*, a degree of change is measurable, although it need not coincide with the terminal point of the entire event" (150). Degree achievements, then, may also be no different from other telic predicates which receive a telic interpretation although no necessary telos, or endpoint, is reached.

(47) The boat floated under the bridge in an hour.

Perhaps variable telicity degree achievements are like these telic predicates in that they do not have a classic telos. Some evidence that this might be the case is given in (48) where a telic interpretation can be reached, and yet the event can continue uninterrupted.

(48) The soup cooled in 10 minutes, and continued to cool 30 more minutes after that.

A second, related issue, are telic predicates which can receive atelic interpretations more generally. Examples inspired by my initial misreading of a pair of examples in Kratzer (2004) demonstrate the ability for many telic predicates to receive atelic interpretations. Although (49) is arguably a telic predicate (felicitously combining with *in two hours* in (49b)), example (49a) is not uninterpretable. A possible interpretation of this sentence is one in which the mitten-knitting event is partially complete, leaving us with an incomplete mitten. It appears that *for an hour* can peer into a predicate's event structure and single out those parts which are homogeneous, particularly for accomplishment predicates.

- (49) a. Mary knitted a mitten for an hour.
 b. Mary knitted a mitten in two hours.

Perhaps variable telicity degree achievements is a case of incomplete events. The soup is taken to have undergone some amount of cooling, and still continues to cool outside of the time specified, as in (50a). Indeed, a salient reading of (45a) is one in which the soup itself is still warm enough to eat, as in (50b).

- (50) a. The soup cooled (for 10 minutes), and continued to cool (for another 30 minutes).
 b. The soup cooled (for 10 minutes), but it was still warm enough to eat.

In this way, we might address the ambiguity approach of Kennedy and Levin's (2008) norm-based standard and conventionalized maximum of the underlying adjective as a question of when we can actually access the subparts of a bigger event.

The Role of Context Kennedy and Levin (2002) initially observed that closed scale adjectives do not always have telic interpretation, using examples like those in (51). In discussing these Kennedy and Levin say that context and world knowledge can play a role in determining the telicity of a degree achievement. This position is refined in Kennedy and Levin (2008) by appealing to the (derived) minimal element of derived measure of functions and interpretative economy, suggest that all degree achievements have atelic uses when interpretative economy selects the minimal element as the standard and the pragmatic strengthening of the maximum element is overcome.

- (51) a. I straightened the rope, but not completely.
 b. The tailor lengthened my pants, but not completely.

What is most striking about the role of context, however, is its inability to push around grammatically determined telicity. When telicity is licensed by an overt proportional modifier or measure phrase, context cannot cancel the telicity of the predicate (Borer, 2005b).

- (52) a. #They straightened the rope completely, but the rope isn't completely straight.
 b. #They widened the road 5 meters, but the road didn't increase in width by 5 meters.

Kennedy and Levin (2008) addresses this short coming of their previous research by positing a verbal measure head μ_v , given in (53), which combines the adjective with the

measure phrase to derive a property of events and individuals. This μ_v morpheme does not make use of the standard of comparison, and thus does not fall under the purview of interpretative economy.

$$(53) \llbracket \mu_v \rrbracket = \lambda g \in D_{m_\Delta} \lambda d \lambda x \lambda e [g(x)(e) \preceq d]$$

(54) a. straighten the rope several feet.

b. lengthen my pants 2 inches.

c. widen the road 5 meters.

(55) a. $\lambda e [\text{straight}(\text{rope})(e) \preceq \text{several-feet}]$

b. $\lambda e [\text{lengthen}(\text{pants})(e) \preceq \text{2-inches}]$

c. $\lambda e [\text{wide}(\text{road})(e) \preceq \text{5-meters}]$

What this suggests is that the role played by the adjectives themselves is diminished somewhat. Even open scale adjectives can combine with measure phrases to create telic predicates. Indeed, anytime a $pos_{\text{upper-closed}}$ or μ morpheme is require in the derivation, a telic predicate results. Keeping in mine the discussion about variable behavior above, Kennedy and Levin's system seems to rely too heavily on the adjectival core of degree achievements when it may be these other morphemes which play the key roles in determining telicity.

The Role of Arguments I would like to return for a moment to the key role arguments played in determining the telicity of a predicate with respect to degree achievements. Interestingly, although upper-closed scale adjectives are claimed to license a telic interpretation, they can do so only in the presence of a quantized internal argument, as is shown in the following examples. This is observed in variable behavior degree achievements, as in (56) and also in strongly telic degree achievements repeated and extended in (57) and (58).

- (56) a. The soup cooled in 10 minutes.
- b. #Soup cooled in 10 minutes.
- c. John cooled the soup in 10 minutes.
- d. #John cooled soup in 10 minutes.
- (57) a. The shirt dried in 10 minutes.
- b. #Shirts dried in 10 minutes.
- c. The sun dried the shirt in 10 minutes.
- d. #The sun dried shirts in 10 minutes.
- (58) a. The sink emptied in 10 minutes.
- b. #Sinks emptied in 10 minutes.
- c. Mary emptied the sink in 10 minutes.
- d. #Mary emptied sinks in 10 minutes.

It is a bit surprising that even the strongly telic degree achievement require the presence of a quantized internal argument to create a telic predicate and that in the presence of a homogeneous internal argument they fail to create telic predicates given that there are achievement verbs which license telic interpretations even in the presence of a homogeneous internal argument (Mittwoch, 1991; Borer, 2005b, and see Section 2.3.1.2). This provides evidence that the underlying scale structure of the adjective is not sufficient for a telic interpretation and argues that the behavior of degree achievements is more like that of non-achievement eventive verbs than achievement verbs.

Also relevant to the discussion is whether the underlying scale structure of the adjective is necessary. Indeed, strongly atelic degree achievements do not necessarily provide a case for activity verbs, i.e. verbs which fail to give rise to telic interpretations even with quantized internal arguments (see Section 2.3.1.1). Kennedy and Levin (2002) point out several examples of typical strongly atelic degree achievements which can receive telic interpretations given certain arguments.

- (59) a. Kim is lowering the heat. → Kim has lowered the heat.
 b. The temperature is falling. → The temperature has fallen.
 c. The traffic is lengthening my commute. → The traffic has lengthened my commute.
- (60) a. Kim is lowering the blind. ↗ Kim has lowered the blind.
 b. The curtain is falling. ↗ The curtain has fallen.
 c. The tailor is lengthening my pants. ↗ The tailor has lengthened my pants.

4.3.1.2 Interim Conclusion

In their analysis of degree achievements, Kennedy and Levin (2008) propose that the telicity of degree achievements is tightly related to the scale structure of their underlying adjective. Having no maximum degree and thus no maximum standard of comparison, open scale and lower closed scale degree achievements are atelic. Upper closed scales, however, have a maximum degree and thus a maximum standard of comparison. This allows them to be telic under certain conditions.

4.3.2 The Quantization of Scales

Setting aside certain clarifications considered in the previous section, broadly speaking the telicity of degree achievements is sensitive to scale structure underlying the meaning of the adjective. But why is this the case? I address this question in this section, beginning with Kennedy and Levin's (2008) proposal that the connection between telicity and scale structure is related to *natural transitions*:

The difference between adjectives that use closed measurement scales and those that use open ones is that the former come with 'natural transitions':

the transition from a zero to a non-zero degree on the scale (from not having any degree of the measured property to having some of it) in the case of an adjective with a lower closed scale, or the transition from a non-maximal to a maximal degree (from having an arbitrary degree of the measured property to having a maximal degree of it) in the case of an adjective with an upper closed scale.

(Kennedy and Levin, 2008, 169)

There is a natural intuition that natural transitions are linked to the licensing of telic interpretation. But what is meant here by natural transition? While the intuition that a maximum or minimum point on a scale may act as a salient point of transition, and to “stand out” on a property of a closed-scale adjective is to have that property to the maximum/minimum degree as proposed in Kennedy (2007), we would like to better understand why this is the case. One way we might conceive of a natural transition is in terms of quantifiable divisions as discussed in Borer (2005a,b); indeed, Hay et al. (1999) and Kennedy and Levin (2002) originally proposed that natural transitions were quantized degrees of change. The denotation in (61) is a (slightly modified) example taken from Kennedy and Levin (2002) with the conditions relating quantization to telicity in (62).

(61) $\llbracket \text{lengthen the icicle} \rrbracket = \lambda e \exists d [\text{the length of the icicle at the end of } e = \text{the length of the icicle at the beginning of } e + d]$

- (62) a. If d is quantized, *lengthen the icicle* is true only of events whose endpoints correspond to that point in time at which the length of the icicle has increased by d .
- b. If d is not quantized, *lengthen the icicle* is true of any event of icicle-lengthening.

The degree d in (61) is comparable to the relationship between the degree of the affected object at the end of the event and the standard of comparison in Kennedy and Levin’s (2008) measure of change analysis. Kennedy and Levin (2002) argue that a quantized degree d can be inferred from the structure of closed scales – it is the degree required to

reach the maximum point on the scale. This inference is updated in a measure of change analysis where the maximum point is set as the standard of comparison for upper-closed scales. Thus, those cases where Kennedy and Levin (2002) say that *d* is quantized are the same cases where Kennedy and Levin's (2008) measure of change function has a maximum standard of comparison, which is a natural transition. This underlying relationship between scale structure, natural transitions, and quantization leads to the following extension of Kennedy and Levin's theory which I state in (63).

(63) Kennedy-Levin Extension

Scale structure is a case of quantization.

As a reminder, I have adopted definitions from Borer (2005a,b) for quantization for the purposes of this dissertation, repeated in (64). In Section 3.2.2.2, I observed that quantization distinguishes between homogeneous (mass noun and bare plural) and quantized nominals. Quantization is also thought to distinguish between atelic and telic predicates and, I have argued, individual-level and stage-level states. These are presented in Table 4.2.

(64) a. *Quantity*: *P* is *quantity* iff *P* is not *homogeneous*.

b. *Homogeneous*: *P* is *homogeneous* iff *P* is *cumulative* and *divisive*.

i. *P* is *cumulative* iff $\forall x, y [P(x) \ \& \ P(y) \rightarrow P(x \cup y)]$

P is *cumulative* iff for all *x* and *y* with property *P*, the union of *x* and *y* also has property *P*.

ii. *P* is *divisive* iff $\forall x [P(x) \rightarrow \exists y [P(y) \ \& \ y < x] \ \& \ \forall x, y [P(x) \ \& \ P(y) \ \& \ y < x \rightarrow P(x - y)]]$

P is *divisive* iff for all *x* with property *P* there is a proper part *y* of *x* which also has property *P*, and for all *x* and *y* with property *P* if *y* is a proper part of *x* then the subtraction of *y* from *x* also has property *P*.

Table 4.2: Examples of Quantization Structures

	Homogeneous	Quantized
Nominals	mass nouns/bare plurals	others
Events	atelic	telic
States	individual-level	stage-level

Here, I explore the hypothesis set forth in the Kennedy-Levin Extension; namely, that open scales which lack natural transitions are homogeneous and closed scales which have natural transitions are quantized.

4.3.2.1 The Part Structure of Scales

An initial barrier for the application of the definitions of quantization to scale structures is that it is not particularly obvious how part-structure applies to scale structure. Unlike individuals, which are considered separable entities, scales do not provide an intuitive way of summing together. *Apples plus apples* intuitively gives *apples*, but what about *tall plus tall*? How are we to understand notions like part of a degree or subtraction of degrees? In (65), I present the definition for a degree given in Kennedy (2001).¹¹

(65) A degree d is a convex nonempty subset of a scale S such that

$$\forall p_1, p_2 \in d, \forall p_3 \in S, p_1 < p_3 < p_2 \rightarrow p_3 \in d$$

Given that degrees are sets, I make use of natural set-theoretic operations to define what a part of a degree is in (66a).¹² These set-theoretic operations also lend themselves to natural definitions for the operations needed to define the part structure of scales. Subtraction

¹¹ Another attempt to unify degree-based and mereological theories is Gawron (2007) which focused on the remainder principle in part-structure found in Krifka (1998) to link degrees to part-structures. Essentially, r is the difference between x and y .

(i) Remainder Principle

$$\forall x, y \in U_P [x <_P y \rightarrow \exists! r [\neg [r \otimes x] \ \& \ x \otimes r = y]]$$

¹² Note the difference between being a part of a degree and a proper part of a degree. A degree is a part of itself, but not a proper part of itself.

of degrees is defined using set complement in (66c) which stays faithful to the application of subtraction as discussed in Borer (2005a,b) for the quantization of nominals and events.

(66) For all degrees d_1, d_2 of a scale S ,

- a. Part of Degree: $d_2 \leq d_1 =_{\text{def}} d_1 \cup d_2 = d_1$
- b. Proper Part of Degree: $d_2 < d_1 =_{\text{def}} d_1 \neq d_2 \ \& \ d_1 \cup d_2 = d_1$
- c. Subtraction of Degrees: $d_1 - d_2 =_{\text{def}} d_1 / d_2$

Given the above assumptions concerning the parts of degrees, we can now ask whether quantization makes a distinction between open and closed scales. To the degree that these approaches capture the phenomenon, we will have formal notion of natural transition.

Open Scales Consider first the case of the open scale of height and the adjective *tall*. As a measure function, *tall* takes an individual and returns the degree of height of that individual. For the scale structure of *tall* to be cumulative, any two degrees of tallness must union to be a degree of tallness. For the scale structure of *tall* to be divisive, any degree of tallness must have a proper part which also is a degree of tallness and the subtraction of any two degrees of tallness in which one is a proper part of the other must yield a degree which also falls under tallness.

Cumulative: Assume we have two individuals, Anthony a and Cleopatra c , such that the examples in (67) are judged true.

- (67) a. Anthony is tall. $\text{tall}(a) \succ \mathbf{stnd}(\text{tall})$
 b. Cleopatra is tall. $\text{tall}(c) \succ \mathbf{stnd}(\text{tall})$

Then there is a degree $d_a = \text{tall}(a)$ and a degree $d_c = \text{tall}(c)$, and $d_a \succ \mathbf{stnd}(\text{tall})$ and $d_c \succ \mathbf{stnd}(\text{tall})$. Suppose that Anthony was taller than Cleopatra, such that $d_a \succ d_c$. The question is: do $d_a \cup d_c$ yield a degree of tallness? Since $d_a \cup d_c = d_a$, and d_a is the degree of height of Anthony, and (67a) is true, then d_a is a degree of tallness, and open scales are cumulative.

Divisive: Assume again that (67a) is true; that is, $d_a \succ \mathbf{stnd}(\text{tall})$. Assuming that the scale of height is dense, then there is a degree $d_b \prec d_a$ such that $d_b < d_a$ and $d_b \succ \mathbf{stnd}(\text{tall})$, satisfying divisive's first conjunct. Now, as a (totally) open scale, $S_{\text{height}} = (0, \infty)$. As subsets of S_{height} , $d_a = (0, p_a)$, $d_b = (0, p_b)$, and p_b is less than p_a . Then $d_b - d_a = [p_b, p_a)$. Note of course that this interval contains values which are all heights that count as tall, satisfying divisive's second conjunct. Having satisfied both conjuncts, open scales are divisive.

Since open scales are both cumulative and divisive, they are homogeneous.

Closed Scales Now consider the case of the closed scale of extent and the adjective *full*. As a measure function, *full* takes an individual and returns the degree of extent of that individual. For the scale structure of *full* to be cumulative, any two degrees of fullness must union to be a degree of fullness. For the scale structure of *full* to be divisive, any degree of fullness must have a proper part which also is a degree of fullness and the subtraction of any two degrees of fullness in which one is a proper part of the other must yield a degree which also falls under fullness.

Cumulative: Assume we have two individuals, the bottle *b* and the cup *c*, such that the examples in (68) are judged true.

- (68) a. The bottle is full. $\text{full}(b) = \mathbf{max}(\text{full})$
 b. The cup is full. $\text{full}(c) = \mathbf{max}(\text{full})$

Then there is a degree $d_b = \text{full}(b)$ and a degree $d_c = \text{full}(c)$, and $d_b = \mathbf{max}(\text{full})$ and $d_c = \mathbf{max}(\text{full})$. Note that since the scale of extent is (totally) closed, $S_{\text{extent}} = [0, 1]$, $d_b = d_c = [0, 1]$. Clearly then $d_b \cup d_c = [0, 1]$, which is the maximum degree, and closed scales are cumulative.

Divisive: Assume again that (68a) is true; that is, $d_b = \mathbf{max}(\text{full})$. Since $d_b = [0, 1]$, i.e. the maximum degree of extent, then there cannot be a degree d_a such that $d_a < d_b$ and

$d_a = \mathbf{max}(\text{full})$, as any proper part of d_b will fail to include the maximum point on the scale. As such, close scales fail to satisfying divisive's first conjunct and are not divisive.

Since closed scales are cumulative but not divisive, they are quantized.

Lower-, Upper-, or Totally Closed Scales Above, I did not distinguish between the three types of "closed" scales. The reason is that the classification of adjectives as opened or closed depends on the orientation of the adjective alongside the structure of the scale. When the adjective is oriented towards a closure then it behaves as closed; otherwise, it behaves as open. For instance, the scale of bentness has a lower-closure, and the adjective *straight* is oriented towards that closure and behaves as closed. The adjective *bent*; however, although it comes from a scale which has a lower closure, is not oriented towards that closure, and as such behaves as open. Similarly, the scale of purity has an upper-closure, and the adjective *pure* is oriented towards that closure and behaves as closed. The adjective *impure*; however, is not oriented towards that closure although it comes from a scale which has an upper closure, and thus behaves as open.

Interestingly then, *straight* and *pure* will fail divisive's first conjunct in the same way *full* does, and thus be quantized; they do not have a proper part that also falls under *straight/pure* in their positive forms. Conversely, *bent* and *impure* will be both cumulative and divisive, and thus be homogeneous.

4.3.2.2 Summary

Having provided straightforward definitions to apply part structure to scales, the hypothesis laid out in the Kennedy-Levin Extension in (63) that scale structure is a special type of part-structure which is sensitive to quantization is confirmed. Open scale adjectives are homogeneous and closed scale adjectives are quantized.

4.3.3 Scale Structure in States

I return now to the original question of how scale structure can affect the availability of existential interpretation of the subject and other relevant stage-level/individual-level behaviors. As in the case of verbal stative predicates where the quantization of the internal argument affected the availability of existential interpretations, here I will argue that for adjectival predicates, the quantization of their scale structure is the relevant aspect deriving the availability of existential interpretation.

To be addressed presently is the mechanism by which the quantization of scale structure comes to impact the behavior of states. Consider, in brief, the relationship that Kennedy and McNally (1999) propose concerning the relationship between scale structure and telicity. They observed that deverbal adjectives whose underlying verbs have incremental themes allow proportional modifiers, as in (70), while those that do not have incremental themes do not, as in (69). Since the acceptability of proportional modifiers is diagnostic of the scale structure of the adjective, they propose that the event structure of the underlying verbs derives the scale structure of their derived adjectival form.

(69) a.??a completely looked for/expected reaction

b.??a fully driven/pushed car

c.??a completely watched suspect

(70) a. a completely loaded wagon

b. a fully written novel

c. a partially eaten meal

Kennedy and McNally argue that the relationship between having an incremental theme and deriving a closed scale adjective comes about because the incremental theme of the underlying verb place a constraint on the scale structure that the deverbal adjective can realize. What is special about verbs with incremental themes is that they can establish a homomorphic relationship between the event and some property of their internal arguments. They

argue this homomorphic relationship is what derives the deverbal adjective's scalar behavior.

...it is precisely this homomorphism [between events and their incremental theme arguments] that is responsible for the scalar properties of the derived adjectives, because it provides a template for building a closed scale, specifically a scale with a lower endpoint that corresponds to the minimal (sub)event involving (a minimal part of) the incremental theme or the relevant measurable property, and an upper endpoint that corresponds to the maximal event involving (all of) the incremental theme/property.

With respect to the specific example in (70a), they state the following:

Since we can define a beginning point and endpoint for this event (corresponding to when the truck is empty and full, respectively), we can identify a lower bound and upper bound for the scale of "loadedness" of the truck.

(Kennedy and McNally, 1999)

Therefore, building the scale structure of deverbal adjectives requires mapping from the underlying event structure of the verbs. Those verbs with incremental themes allow for the identification of closures to their constructed scales because the minimal and maximal (sub)events are construed as being the minimum and maximum degrees on the constructed scale.¹³

¹³Importantly, having an incremental theme is not a sufficient condition to license telic interpretation; the properties of the internal argument also matter.

- (i) a. John wrote ??in a month.
- b. John wrote papers ??in a month.
- c. John wrote a paper in a month.

Given that these verbs require their internal argument to license telicity, how they delimit minimal/maximal (sub)events for their deverbal adjectives is not clear. Certainly, the head noun is not acting like an internal argument as the examples in (ii) are still acceptable with proportional modifiers even though the head nouns are all homogeneous.

Consider this analysis from the perspective of adjectival predicates whose scale structure is affecting the resulting structure of the state. Following Kennedy and McNally, if a mapping from scale structure to event structure is sensitive to the presence or absence of maximum or minimum degrees in a manner similar to the way a mapping from event structure to scale structure is sensitive to the incremental theme of the verb, then the properties of an eventuality resulting from a scale to event structure mapping may reflect the underlying quantization of the scale structure of the adjective, even in stative predicates.

4.3.3.1 Deriving Adjectival Predicates: Two Approaches

***pos_v* Mapping** A direct method to map scale structure onto the event structure of the emerging predicate is to encode the homomorphism between scale structure and eventualities on the *pos_v* morpheme, which takes the measure function of the adjective and derives a property of eventualities (Kennedy and Levin, 2008). This approach is similar to the propose made in Chapter 3 for the denotation of accusative case, following Kratzer (2004), in that *pos_v* encodes a mapping to events. The mapping in (71) imparts the part structure of the scale to the part structure of the eventuality.¹⁴

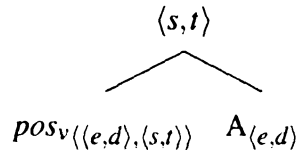
$$(71) \llbracket pos_v \rrbracket = \lambda g \in D_{m_\Delta} \lambda e \exists x [g(x)(e) \succeq \mathbf{stnd}(g) \ \& \ \forall d' [d' \leq g(x)(e) \ \& \ d' \succeq \mathbf{stnd}(g) \rightarrow \exists e' [e' < e \ \& \ g(x)(e') = d']]]$$

The resulting derivation is as follows. *pos_v* merges with adjectives, turning a measure function from individuals to degrees into a property of eventualities.

-
- (ii) a. fully written papers
 - b. completely loaded furniture
 - c. partially eaten applesauce

¹⁴Note that *pos_v* as defined here as type $\langle \langle e, d \rangle, \langle s, t \rangle \rangle$ preforms the usual function of a *pos* morpheme, type $\langle \langle e, d \rangle, \langle e, t \rangle \rangle$. Since states are, in a certain sense, properties of (stages of) individuals, the distinction between type $\langle s, t \rangle$ and type $\langle e, t \rangle$ is quite blurred, and we could perhaps argue that the denotation of adjectives is actually of type $\langle \alpha, d \rangle$ where α ranges over both (stages of) individuals and states. Indeed, there has been some discussion about deriving degrees and states from one another, but this project would take us too far afield.

(72)



Consider how this analysis works for open scale adjectives like (73a). The *pos_v* morpheme performs two tasks. First, as with Kennedy and Levin (2008), *pos_v* maps a measure function into a property of events. What the analysis here adds to this a type of mapping to events. For every subdegree which is still at or greater than the standard, the mapping to events proposes the existence of a substate such that the substate is a state of being equal to that degree. Since *brown* is open scale, there is always a (dense) set of subdegrees which are still at or above the standard for *brown*.¹⁵ Therefore, the mapping to events will assert the existence of a (dense) set of substates that are states of being equal to that degree of being brown. As such, the state itself is homogeneous.

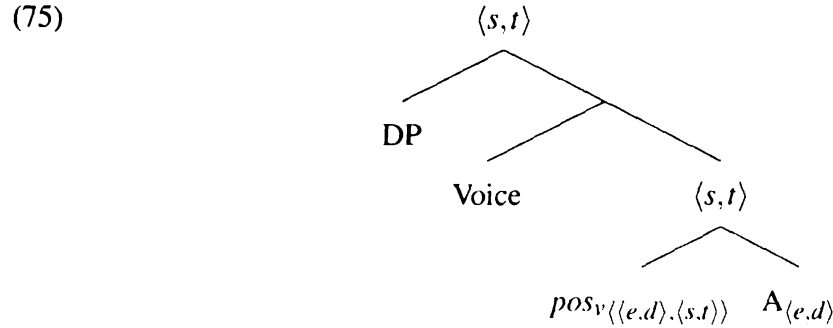
For closed scale adjectives like (73b), the *pos_v* morpheme also maps the measure function into a property of events with the addition of a mapping to events. Again, for every subdegree which is still at or greater than the standard, the mapping to events proposes the existence of a substate such that the substate is a state of being equal to that degree. Since *full* is closed scale, there is only one way to be full and that is to be the maximum degree on the scale. Therefore, the mapping to events will assert the existence of a substate which is also at the maximum degree on the scale, which is the state itself. As such, the state is quantized.

¹⁵Of course, it is logically possible that the subject may be precisely equal to the standard, such that the case of *John is tall* with the standard of height as 6'5" and John as 6'5"; however, I believe vagueness precludes this logical possibility. Indeed, from the uncertainty of measurement, the relative contextual standard of comparison, and even the grain size of the units alone, vagueness will creep into the verification of a statement like *John is tall*.

- (73) a. $\llbracket pos_v \text{ brown} \rrbracket = \lambda s \exists x [\text{brown}(x)(s) \succeq \mathbf{stnd}(\text{brown}) \ \& \ \forall d' [d' \leq \text{brown}(x)(s) \ \& \ d' \succeq \mathbf{stnd}(\text{brown}) \rightarrow \exists s' [s' < s \ \& \ \text{brown}(x)(s') = d']]]]$
- b. $\llbracket pos_v \text{ full} \rrbracket = \lambda s \exists x [\text{full}(x)(s) \succeq \mathbf{stnd}(\text{full}) \ \& \ \forall d' [d' \leq \text{full}(x)(s) \ \& \ d' \succeq \mathbf{stnd}(\text{full}) \rightarrow \exists s' [s' < s \ \& \ \text{full}(x)(s') = d']]]]$

Once we have a property of eventualities, we are in the same situation as we were when composing the stative VP of verbal predicates. In Section 3.4.2.3, I propose that the stative Voice head supplies the external argument and also maps the part structure of the state to the part structure of the individual. The denotation of Voice is repeated in (74), and its composition follows in (75).

(74) $\llbracket \text{Voice}_S \rrbracket = \lambda x \lambda e [\text{Holder}(x)(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists x' [x' \leq x \ \& \ \text{Holder}(x')(s')]]]$



The full derivation of examples (6a) and (5a) are given in (76a) and (76b) below. In both cases, the mapping to objects introduced by the stative Voice head asserts the existence of a stage, i.e. a part, of the subject for every substate. Since open scale adjectives compose with pos_v to create a (dense) set of substates, their subjects will also have a dense set of stages, as in (76a). Closed scale adjective, on the other hand, compose with pos_v to yield only a single state, and thus their subjects will be represented by only a single stage, as in (76b).

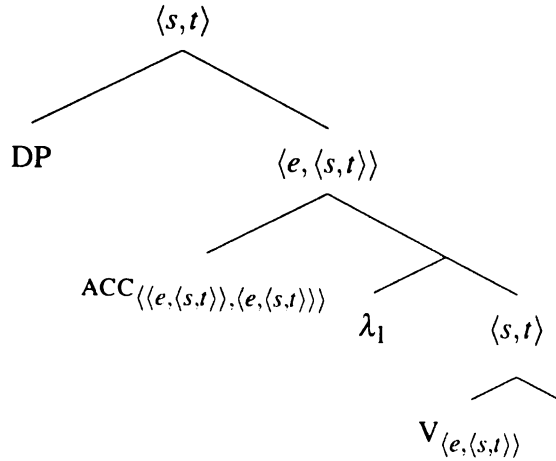
- (76) a. $\llbracket \text{Whiskey bottles are brown} \rrbracket = \lambda s [\text{Holder}(\text{whiskey-bottles})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists y' [y' \leq \text{whiskey-bottles} \ \& \ \text{Holder}(y')(s')]] \ \& \ \exists x [\text{brown}(x)(s) \succeq \text{stnd}(\text{brown}) \ \& \ \forall d' [d' \leq \text{brown}(x)(s) \ \& \ d' \succeq \text{stnd}(\text{brown}) \rightarrow \exists s' [s' < s \ \& \ \text{brown}(x)(s') = d']]]]$
- b. $\llbracket \text{Whiskey bottles are full} \rrbracket = \lambda s [\text{Holder}(\text{whiskey-bottles})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists y' [y' \leq \text{whiskey-bottles} \ \& \ \text{Holder}(y')(s')]] \ \& \ \exists x [\text{full}(x)(s) \succeq \text{stnd}(\text{full}) \ \& \ \forall d' [d' \leq \text{full}(x)(s) \ \& \ d' \succeq \text{stnd}(\text{full}) \rightarrow \exists s' [s' < s \ \& \ \text{full}(x)(s') = d']]]]$

On a brief note before I turn to a second way to derive scale structure effects on states, one way to understand the aspectual interpretation derived from open and closed scale adjectives is to return to the idea of temporal stability in Section 3.3.2 and analyzed in Section 3.4.2.5. Since there are many ways to satisfy *brown*, slight perturbations at different points in time are unlikely to change the truth of a statement like *Whiskey bottles are brown*. However, since there is only one way to satisfy *full*, even slight perturbations across time can easily change the truth of a statement like *Whiskey bottles are full*.

Case on Predicative Adjectives Assuming as we did in Section 3.4.2.1 that the mechanisms composing the VP are the same, we may pursue an analysis more similar to the one given to stative verbal predicates even though the adjectival predicates here have no internal argument. As a reminder, the derivation of a transitive VP involved an accusative head, repeated in (77), which mapped the part structure of the internal argument to the part structure of the eventuality argument. The derivation of a transitive stative is repeated in (78).

$$(77) \llbracket acc \rrbracket = \lambda R_{\langle e, \langle s, t \rangle \rangle} \lambda x \lambda e [R(x)(e) \ \& \ \exists f [\text{measure}(f) \ \& \ \forall x' [x' \leq f(x) \rightarrow \exists e' [e' \leq e \ \& \ R(x')(e')]]]]]$$

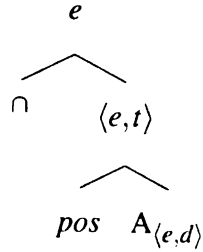
(78)



If we assume that the copula also expresses a relation similar to transitive stative verbs, the question then is whether adjectives themselves somehow fulfill the role that the internal argument does in transitive statives. Certainly, we cannot rely on adjectives alone, which represent measure functions. However, consider the following possibility: once combined with a *pos* morpheme, adjectives express a property of individuals, type $\langle e, t \rangle$. Following Chierchia (1984) and Partee (1987), type shifting operations such as *iota* (ι) or *nom* ($^{\cap}$) can apply to turn properties of individuals into individuals, i.e. $\langle e, t \rangle \rightarrow e$. *Iota* operators map a singleton set onto its unique member, and *nom* operators map properties of individuals onto their individual-correlates. *Iota* seems to be the wrong operator for our case here as we are not assuming a singleton set for every type-shifted adjective. Indeed, it is unclear what the unique individual of an adjective would be. However, as we have seen that states and the stages of individuals are very similar ontological creatures, the *nom* operator appears to supply an appropriate meaning, mapping properties of (stages of) individuals, type $\langle e, t \rangle$, to (stages of) individuals, type e . Being of type e , this denotation forms the right input for the denotation of accusative case. An example of the derivation this would require is given in (79).¹⁶

¹⁶Partee (1987) assumes that type-shifts do not enter into the syntax; however, I believe that requiring syntactic expression better constrains type-shifting operations, and as such introduce the *nom* operator into the syntactic derivation in (79).

(79)



Note that this approach requires an explanation of what the individual denoted by (79) could be. To understand the ontological commitment here, consider the meaning of (80a) and (80b), which are roughly the meaning of ‘brownness’ and ‘fullness’, respectively. First consider (80a). After application of *pos* to the measure function *brown*, the *nom* operator applies, producing all the possible ways an individual can be brown. Note that there are many, many ways to be brown (indeed any shade of brown will do); the individual must only equal or exceed the standard of brownness on the color scale. This is a large (and possibly dense) set. Now consider (80b). Again, after application of *pos* to the measure function *full*, the *nom* operator applies, producing all the ways an individual can be full. Note here that there is only one way to be full; the individual must equal the maximum degree on the extent scale. As such, this produces a single individual-correlate, which though abstract, is a singleton set.

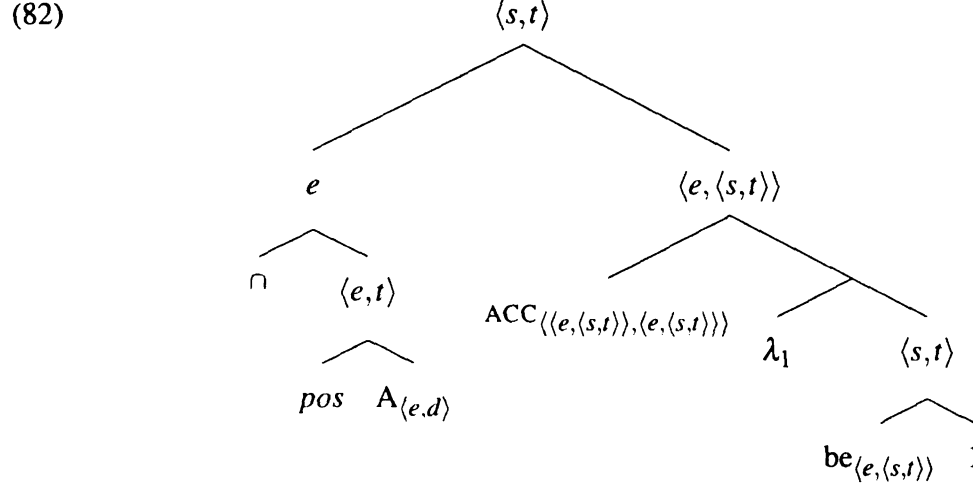
(80) a. $\llbracket \cap pos \text{ brown} \rrbracket = \cap \lambda x.x \succeq \mathbf{stnd}(\text{brown})$

b. $\llbracket \cap pos \text{ full} \rrbracket = \cap \lambda x.x \succeq \mathbf{stnd}(\text{full})$

The approach here then is similar to that found in Section 3.4.2.1 with the modification that the source of the quantization of the state is now the result of a mapping from the part structure the scale structure of the adjective (mediated by the *nom* operator) to the part structure of the state by ACC. Following Kratzer (2004) again, the composition of the adjectival scale structure with the state is achieved through the derivation given in (82). V is assumed to be the copula *be* with the denotation given in (81).¹⁷

¹⁷This denotation of *be* is somewhat non-standard as I am assuming that Kratzer’s (1996) sev-

$$(81) \llbracket \text{be} \rrbracket = \lambda x \lambda e. \text{be}(x)(s)$$

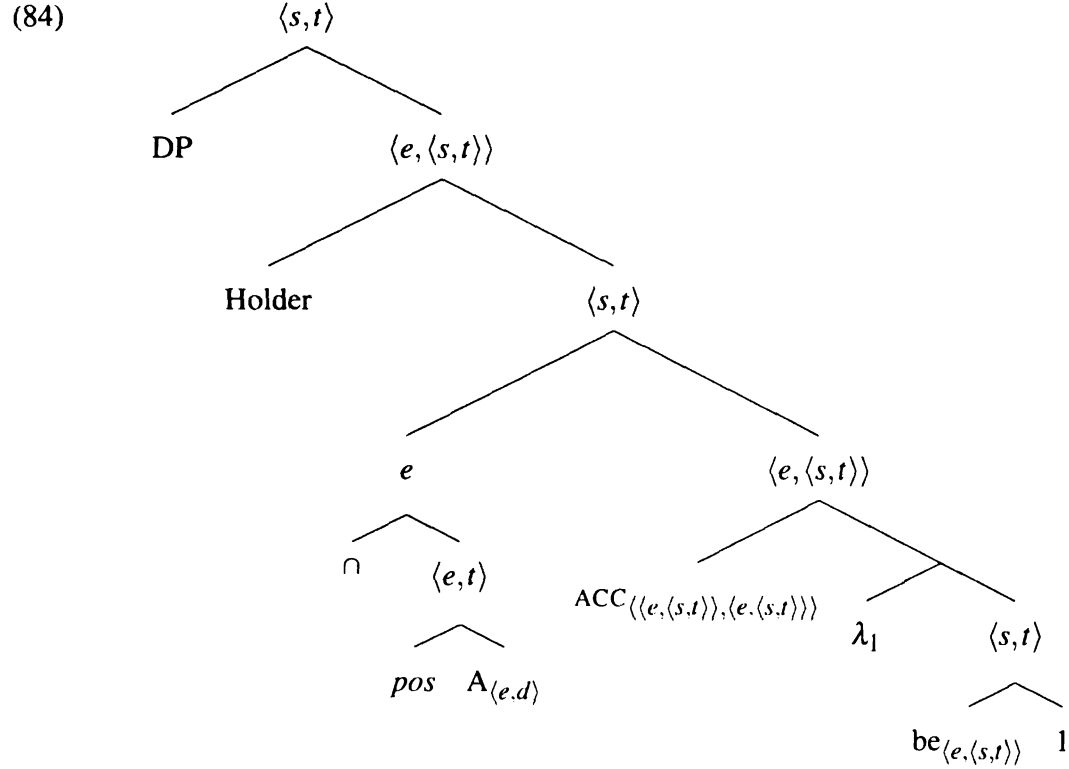


Examples for the predicates of (6a) and (5a) are given in (83a) and (83b) respectively, suppressing Kratzer's (2004) measure f (see Section 3.4.2.1 for further discussion on measure f). In (83a), the part structure of the state inherits the part structure of the individual-correlates of *brown* discussed above. Since *brown* is open scale, there is a (dense) part structure of all the shades of brown. For each of these parts, the mapping to events asserts the existence of a substate which is a state of being that shade of brown. In (83b), the part structure of the state inherits the part structure of the individual-correlates of *full* discussed above. Since *full* is closed scale, there is only a single individual-correlate, which is associated with the maximum degree on the extent scale. Since there is only one part of the individual-correlate of *full*, the mapping to events asserts the existence of only a single substate which is identical to the state of being full.

- (83) a. $\llbracket \text{be brown} \rrbracket = \lambda s. \text{be}(\cap \lambda x. x \succeq \mathbf{stnd}(\text{brown}))(s) \ \& \ \forall x' [x' \leq (\cap \lambda x. x \succeq \mathbf{stnd}(\text{brown})) \rightarrow \exists s' [s' \leq s \ \& \ \text{be}(x')(s')]]$
- b. $\llbracket \text{be full} \rrbracket = \lambda s. \text{be}(\cap \lambda x. x \succeq \mathbf{stnd}(\text{full}))(s) \ \& \ \forall x' [x' \leq (\cap \lambda x. x \succeq \mathbf{stnd}(\text{full})) \rightarrow \exists s' [s' \leq s \ \& \ \text{be}(x')(s')]]$

ering theory applies to copula verbs to remain as close to the analysis of verbal statives given in Chapter 3 as possible. The content of *be* introduces the state argument e and relates its internal argument x to a state e such that the resulting state e is a state of being x .

As in the previous analysis, once the VP is composed, the stative Voice head discussed above and in Section 3.4.2.3 introduces the external argument and maps the part structure of the state to the part structure of the individual.



- (85) a. $\llbracket \text{whiskey bottles are brown} \rrbracket = \lambda s. [\text{Holder}(\text{whiskey-bottles})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists y' [y' \leq \text{whiskey-bottles} \ \& \ \text{Holder}(y')(s')]] \ \& \ \text{be}(\cap \lambda x. x \succeq \text{stnd}(\text{brown}))(s) \ \& \ \forall x' [x' \leq (\cap \lambda x. x \succeq \text{stnd}(\text{brown})) \rightarrow \exists s' [s' \leq s \ \& \ \text{be}(x')(s')]]]$
- b. $\llbracket \text{whiskey bottles are full} \rrbracket = \lambda e. [\text{Holder}(\text{whiskey-bottles})(s) \ \& \ \forall s' [s' \leq s \rightarrow \exists y' [y' \leq \text{whiskey-bottles} \ \& \ \text{Holder}(y')(s')]] \ \& \ \text{be}(\cap \lambda x. x \succeq \text{stnd}(\text{full}))(s) \ \& \ \forall x' [x' \leq (\cap \lambda x. x \succeq \text{stnd}(\text{full})) \rightarrow \exists s' [s' \leq s \ \& \ \text{be}(x')(s')]]]$

4.3.3.2 A Note on Silent Locatives

I want to return briefly to theories which argue that the requirements of a topic for clauses drives the availability of an existential interpretation of subjects raised in Section 1.4.5 in

light of the current discussion of the theory developed here which links the availability of existential interpretation to the scale structure of the adjective.

For individual-level adjectival predicates, Jäger (2001) proposes that the existential interpretation of the subject is blocked because the subject of the adjectival predicate is the only possible argument around that can satisfy the topic requirement. The subject of stage-level adjectival predicates, however, can receive existential interpretation, suggesting that another argument must be present to satisfy the topic requirement. Jäger first argues that these are notthetic statements; that is, they do not report an event and therefore he cannot appeal to an event argument as the topic of stage-level adjectival predicates.¹⁸ Jäger proposes that adjectives like *available*, *visible*, and *present* have an implicit argument (i.e. available to *whom*, visible to *whom*, present *where*) that is anaphoric to the discourse and may be construed as topics. This is what allows the subject to receive existential interpretation, as it is not the topic. A similar proposal is also put forward in Kratzer and Selkirk (2007) who propose to represent these implicit arguments as silent locatives or temporal modifiers.

While the particular adjectives Jäger argues provide a strong intuition for their particular implicit arguments, it is unclear how other adjectives which also allow an existential interpretation of their subjects like *drunk* or *dead* can be handled through implicit arguments. Perhaps, like *present*, these adjectives have an implicit *where* argument, but it is unclear how, if we extend implicit *where* arguments to these adjectives what it is that pre-

¹⁸Jäger (2001) argues that (ia) and (ib) are distinguished in terms of categorical andthetic statements respectively. (ia) is a statement about the mountains (and the mountains have to already be introduced in the discourse). (ib) is a statement about a scene or event (and the mountains may or may not already be introduced in the discourse).

- (i) a. (weil) die Berge ja sichtbar sind
 (because) the mountains PRT visible are
 ‘(because) the mountains are visible’
- b. (weil) ja die Berge sichtbar sind
 (because) PRT the mountains visible are
 ‘(because) the mountains are visible’

vents us from extending them to adjectives like *altruistic* and *tall* as it seems to be the case that an individual is altruistic or tall at some place just as he can be drunk or dead at some place. What is needed for these cases is a better understanding of what implicit arguments are and how they can be constrained, a matter I will set aside here as another issue currently presses upon us: why should scale structure matter for the representation of topics?

Unlike the an analysis with internal arguments of verbal predicates, what is unclear concerning a topic-based analysis of stage-level/individual-level predicates is why a closed scale adjective would lead to an existential interpretation of a subject. Certainly, Jäger's approach addresses the verbal predicate alternations because he allows for non-subject arguments to be topics (though see Section 3.2.3). But why should having an endpoint on a scale change the topichood of sentences?

Of course, it should be pointed out that one of the unifying features all of these adjectives share is that they are all closed scale.

(86) completely/half available/visible/present/drunk/dead

Under the present analysis, these adjectives allow for existential interpretation of subjects because they are quantized. To rescue a topic-based account of this effect, one would have to claim in some way that the end point of a scale is (or is related to) the topic. Perhaps there is a way of capturing this by claiming that maximum/minimum degree can be topic, but such an approach would be highly speculative, and lacks the support of currently better understood properties like quantization which have been independently proposed.

4.4 Arguments in Adjectival Predicates

In the previous sections I observed that the scale structure of predicative adjectives affects the interpretation of their subjects. In all of these cases, the predicative adjective has only one argument, the subject itself. However, as has been observed in verbal predicates, other arguments can play a role in the interpretation of subjects, and there are cases where pred-

icative adjectives take what appear to be multiple arguments. The prediction is that these arguments also shape the behavior of the predicate in a manner similar to that found with verbal predicates. Here we explore the properties of adjectival arguments and their effect on the stage-level/individual-level distinction.

4.4.1 Adjectival Arguments and Alternations

My starting point concerning the arguments of adjectival predicates is the alternation found in evaluative adjectives discussed in Cinque (1990), Stowell (1991), Bennis (2000, 2004) and Landau (2006, 2009). Examples (87) to (89) are taken from Landau (2009) who notes the following characteristics of the alternations: the external argument of the (a) examples appears as an optional PP (*of*-DP) in the (b) examples of (87) and (88), the internal argument of the (a) examples cannot appear in the (b) examples, and the external argument of the (a) examples supports either a stage-level or individual-level interpretation while the (b) examples are necessarily stage-level with respect to the external argument.

- (87) a. John was very generous (to Mary).
 b. That tribute was very generous (of John) (*to Mary).
- (88) a. John was very irritating (to Mary).
 b. That comment was very irritating (of John (*to Mary)).
- (89) a. John was very confused (about Mary).
 b. John's manner was very confused (*about Mary).

In particular, I will focus on a claim first made in Stowell (1991) that the (a) examples are stage-level/individual-level, whereas the (b) examples are stage-level only. I will call the alternation found in (87) and (88) the object expression alternation since the object of the generosity (the tribute) and the object of the irritation (the comment) are expressed overtly in the (b) examples.¹⁹ I will call the alternation found in (89) the manner alternation

¹⁹The difference between these two examples is whether the *to*-DP can be expressed when the

since it is John's confusing manner, for instance, which is expressed in the (b) examples. Following Landau (2009) I will call the (a) examples the basic evaluative adjectives and the (b) examples the derived evaluative adjectives.

Note first that the (a) examples are those which allow for what appears to be an internal argument. Example (90) demonstrates that this internal argument can effect the existential interpretation of subjects. Without the internal argument, the bare plural receives a generic interpretation, as in (90a). However, when an internal argument is present, the type of the argument matters. When the internal argument is a bare plural as in (90b), the subject fails to have an existential interpretation. However, a demonstrative argument can trigger an existential interpretation for the subject as in (90c). These examples bare the same striking similarity to the alternation of telicity I observed in Section 1.3.1 for transitive verbal statives and the resulting discussion which followed in Chapter 3.

- (90) a. Tycoons are very generous. (generic only)
 b. Tycoons are very generous to others. (generic only)
 c. Tycoons are very generous to this bank. (existential possible)

Stowell and others may have expected this kind of alternation in the availability of existential interpretation for the (a) examples, which are claimed to be stage-level or individual-level. However, the claim about the (b) examples is that they are all stage-level, and thus should only have existential interpretations of their subjects. Beginning with the object expression alternations, we can see that the subjects of the (b) examples all have overt determiners, which would obfuscate the availability of an existential interpretation. Replacing these subjects with bare plural subjects allows us to detect the availability of an existential interpretation in these predicates.

external argument is expressed through an *of*-DP phrase. In example (87) the two arguments are not related to one another – the *to*-DP phrase cannot be expressed. In example (88) the two arguments are related more closely to one another. If the *of*-DP is expressed, then the *to*-DP cannot be. However, if the *of*-DP is not expressed, the *to*-DP can be expressed.

- (91) a. Donations are very generous (of tycoons). (generic only)
 b. Comments are very irritating (of reviewers). (generic only)

The (b) example of manner expression alternation displays a similar pattern.

- (92) Tycoons' manners are very confusing (to people). (generic only)

In each of these cases, the subject, now a bare plural which contrasts in its interpretation in stage-level and individual-level predicates, fails to be interpreted existentially. It seems that the non-subject arguments themselves trigger stage-level or individual-level behavior and these particular alternations are not linked to stage-level or individual-level behavior, contra Stowell and others.

4.4.2 What about Scale Structure?

The theory being proposed in this chapter has argued that the scale structure of adjectives affects the stage-level/individual-level status of the predicate. What, then, is the scalar structure of evaluative adjectives? Landau (2009) given the following list of evaluative adjectives.

- (93) Evaluative adjectives in English

rude, mean, clever, smart, nice, kind, silly, imprudent, impolite, generous, courteous, cruel, mad, mischievous, considerate, humane, pretentious, humble, modest, sadistic, masochistic, intelligent, stupid, dumb, idiotic, noble, cowardly, cunning, farsighted, skillful, selfish, crazy, foolish

These adjectives all resist proportional modification, as seen in (94). Evaluative adjectives, then, are open scale adjectives. Having a homogeneous scale structure, these adjectives are predicted to fail to license existential interpretation, as was seen in (90a), (91), and (92).

(94)??completely/half rude/mean/clever/smart/...

Since evaluative adjectives are all open scale, we cannot observe the interaction between scale structure and objects. If closed scale adjectives behave in stative predicates as they do in degree achievements, we expect the role of the object to be dominant in determining the stage-level/individual-level behavior of the predicate: in the presence of a homogeneous object, they will fail to license an existential interpretation of their subject. Certainly there is a difference in that the predicative adjective constructions we have been studying so far have had only a single argument; whereas, degree achievements are transitive. Therefore, fully exploring this hypothesis will have to await further research; however, the contrast between (95a) and (95b) using the adjective *full*, a closed-scale adjective, suggests that this is on the right track.

- (95) a. Cans are full of beans. (generic only)
b. Cans are full of these beans. (existential possible)

Note, briefly, that the discovery that internal arguments override the effects of scale structure on the availability of an existential interpretation would also lend support for the second analysis given in Section 4.3.3.1. In that analysis, the adjective acts as the internal argument of the copula verb, raising to the same position as the internal argument of a transitive verbal stative predicate, as given in Section 3.4.2.1. One way to capture the blocking of scale structure effects by an internal argument would be to claim that both the internal argument and the adjective are competing for the same position. Given a mechanism in which raising targets the internal argument over the adjective, blocking effects would be expected for transitive adjectival predicates as the adjective never forms the proper configuration to affect the quantization of the state.

4.5 Chapter Summary

In this chapter, I returned to an observation made in Chapter 1 that the availability of existential interpretation is conditioned by the scale structure of the adjective in predicative adjectives. I then reviewed an approach to scale structure in which adjectives represent measure functions which require degree morphology to be interpreted as a property of individuals. I then turned to previous research on the relationship between scale structure and telicity for degree achievements, which are argued to be derived from an underlying adjective. As with the relationship between objects and telicity, this suggested that scale structure may be a special case of quantization. I showed that, indeed, open scales are homogeneous, and closed scales are quantized as they fail divisive requirements. I then proposed two mechanisms which create a mapping between scale structure and eventuality structure, noting that we can stay close to the analysis proposed in Chapter 3. Finally, I turned to those adjectives which take non-subject arguments, which I observed have the same affect on the availability of existential interpretation as their verbal counter parts. Quantized objects license an existential interpretation of their subjects while homogeneous objects fail to do so. This suggests that statives in general, whether introduced by verbal or adjectival predicates are subject to the same effects, with quantization forming a core explanation of their behavior.

Chapter 5

CONCLUSIONS AND SPECULATIONS

Throughout this dissertation, I have ultimately been concerned with the aspectual characterization of states. How are the subtypes of states, i.e. stage-level and individual-level (following Fernald's Generalization), represented and why do they manifest the aspectual interpretations they do? To address questions like these, I have been pursuing an analogy between telicity in events and the availability of existential interpretation for subjects in states. What has emerged is a unified theory of aktionsart in which quantization plays a critical role in determining the aspectual behavior of states.

5.1 Recap of the Dissertation

Guided by the classic arguments put forth in Verkuyl (1972), I argued in Chapter 2 that stage-level/individual-level states are not represented by the verb (or any other morpheme for that matter). Instead, states are, as Verkuyl (1972) claims for events, a "configurational category" which are compositionally determined. For evidence of this position, I recalled Fernald's (1994) observations on the effect objects have on the availability of an existential interpretation of their subjects, a property distinguishing stage-level and individual-level states. In addition, I noted that the kinds of objects which trigger an alternation of existential interpretation are also argued to be actively involved in the configuration of telicity. This structural analogy between events and states invited a proposal for a unified theory of aktionsart: states and events are composed by the same mechanisms. I first pursued this analogy within the domain of verbs in search for the stative analogues of verbs whose predicates are insensitive to objects. This investigation failed to find such stative verbs, as all stative verbs under scrutiny alternated in the availability of existential interpretations.

Surprisingly, unlike eventive verbs, stative verbs behave regularly concerning their composition with objects.

The composition of verbs with their objects became the core focus of Chapter 3. I investigated a range of object types to distinguish between the emerging theory of *aktionsart*, which at its core is a theory of the expression of quantization, and the theory in the literature which argues that Fernald's (1994) observations of object effects in stative predicates were due to the information structure of the clause. This investigation found that, indeed, quantization properly characterizes which objects trigger the availability of existential interpretations. Given this result, I further observed that the temporal interpretation of stative predicates is also effected by objects and proposed that the availability of an existential interpretation of a subject is an aspectual property based on the representation of stages of individuals. Given this close correspondence with other aspectual phenomenon, I analyzed the composition of stative predicates on par with eventive predicates, following Kratzer (2004), and further arguing that the mapping of the part structure of the state to its subject was controlled by Voice, expanding on Kratzer's (1996) proposal for the representation of external arguments.

Chapter 4 returned to predicative heads and focused on predicative adjectives in light of the emerging theory of *aktionsart* as unified by quantization. There, I proposed that the scale structure of adjectives may not be part of an adjective's lexical representation and further, in line with research on the relationship between scale structure and telicity, that scale structure itself is a special case of quantization. As such, the behavior of states introduced by predicative adjectives are regulated by their scale structure, which ultimately is an expression of quantization. I argue that this can be seen as a result of the same compositional mechanisms operating over adjectives as I argued to operate over verbs. I further observed that, when present, the objects of predicative adjectives also affect the availability of existential interpretations. Thus verbal and adjectival stative predicates not only follow the same compositional mechanisms, but are affected by the same argument

configurations.

Taken together, a unified theory of aktionsart has emerged with quantization as its core. The aspectual behavior of both states and events can be characterized by quantization and the quantization of other expressions compositionally affects this aspectual behavior.

5.2 Why Quantization?

Given its unifying character, we might ask what quantization is doing in natural language. Why do quantized/homogeneous representations give rise to different interpretations for a variety of language expressions, given in Table 5.1?^{1,2}

Table 5.1: Quantized Structures

	Homogeneous	Quantized
Events	atelic	telic
Nominals	unspecified quantity	specified quantity
Scales	open scale	closed scale
States	individual-level	stage-level

Fundamentally, I take quantization to be about whether an expression supports a representation with the ability to individuate and count. Quantization is a condition for individuation. Interestingly, when looking at nominal expressions where intuitions are often somewhat clear, we find many arguments that individuation is not a function of plural morphology. Borer (2005a) notes that the atelic predicates in (1) with bare plural (homogeneous) objects do not have to implicate atomic individuals for their interpretation. While compatible with such an interpretation, these predicates do not have to affect atomic individuals. In (1a), no individual atomic apple need have been fully eaten – a single bite could

¹I have said very little about the role of prepositions and their phrases in this dissertation. However, given work by Zwarts (2005) and others demonstrating the interaction between different types of prepositional phrases and telicity, and discussion of their ‘aspect’, one could make the argument that quantization is also operative in this domain – a view expected under the emerging theory here.

²One final reminder that I have adopted definitions from Borer (2005a,b) for quantization, but using the terms quantized to refer to those expressions which Borer would call quantity and the term quantization to refer to the quantized/homogeneous distinction.

have been taken out of each apple, for instance. Telic predicates with quantized objects, however, do affect the whole object in some way. A whole individual atomic apple must be affected in (2a).

- (1) a. Kim ate apples this afternoon *in an hour
- b. Pat built houses *in three months.
- c. My kid sister drew circles *in half an hour.
- (2) a. Kim ate the apple this afternoon in an hour
- b. Pat built several houses in three months.
- c. My kid sister drew two circles in half an hour.

Individuals, an intuitively useful representation, seem to come about through quantized expressions. But what about other domains? Are quantized events individuated? What about quantized states? It seems, based at least on their aspectual interpretation, that the individuation of eventualities is related to quantization. Certainly in the literature on telicity, telic events have held a privileged status as those which can combine with modifiers which delimit their temporal extent. The boundaries for *eat an apple* events can be individuated and counted on account of their quantized object. *Eat apples* events are much less clear. Similarly, stage-level states also seem capable of individuating and delimiting particular stages of an individual; whereas, individual-level states require abstracting over often a few stages of an individual and making a generalization about the individual itself. The representations of each of these quantized expressions individuate because they have quantifiable divisions.

And what of quantized scales? Certainly to say that they somehow individuate at first blush may seem strange, but consider the following scenarios. If there are two glasses on a table, and I ask you to hand me the tall glass, you will probably comply by grabbing the taller of the two glasses. But, if there are two glasses brimming with water sitting on a table, and I ask you to hand me the full glass, you would consider my request infelicitous. Since both glasses, regardless of their shape or size count as full, you have no way to select

one of the glasses. An expression like *the tall glass* requires comparison – it cannot pick out a glass by itself. An expression like *the full glass*, however, seems to individuate each glass with respect to itself. Either the glass is full or it is not, and no other glass will inform this decision.

Of course more should and probably will be said about individuation in natural language, but I want to turn briefly to the role of quantization in other cognitive systems and think about a question raised as early as Chomsky (1957, 93): “How are the syntactic devices available in a given language put to work in the actual use of this language”; that is, how might quantized/homogeneous expressions be put to use in cognition more generally?

5.3 Quantization and Other Cognitive Systems

One way to think about the role of quantization is to ask basic questions about what quantized and homogeneous expressions mean. Going “beyond the truth conditions” for quantized/homogeneous expression and following discussion in Pietroski et al. (2009), we can ask how quantized and homogeneous expressions are verified by speakers; that is, how speakers understand and represent quantized and homogeneous expressions and how those representations relate to extra-linguistic cognition. Unfortunately, eventualities and scales are perhaps too difficult to deal with directly. However, quantization is also operative in the nominal domain and there is now a large body of research on how physical object, the possible referents of nominals, behave in other cognitive systems. As such, I will limit my focus here to the quantization of nominals.

Understanding how the quantization of nominals might be implicated in extra-linguistic systems will require some theory of reference, a rather difficult and controversial notion. To simplify a bit, consider the following situations. Suppose for instance that a speaker says *Apples are on the table*. Taking for granted the identification of the table and sticking with visual information only, verification of this expression requires directing one’s gaze to the table and allowing visual perception to perceive some group of apples (of possibly any

number) on the table top. Now suppose a speaker says *Three apples are on the table*. At first glance, a similar verification process is in order: one's gaze is directed to the table and visual perception is deployed to perceive some group of three apples on the table top. But consider again what must take place in the second example. Not only is visual perception required, but some way to count. This suggests that quantized expressions may engage particular cognitive systems for verification not used for homogeneous expressions. But what are these systems and how do they interface with linguistic representations? Questions like these take us to the boarder of what is understood about the link between the meanings of sentences and the way the cognitive system makes use of these meaning representations – issues reaching far beyond this dissertation. Here, I want to provide a sketch of how quantized/homogeneous representations may be used by the visual system.

5.3.1 Nominal Reference and the Visual System

A recent discussion by Levine (2010) provides an initial starting point. He discusses demonstrative thoughts, akin to linguistic demonstratives, as points where thought makes contact with the world, saying “there have to be links with the world that do not employ the contents of other representations... if thought is to make contact with the world at all” (174). Reference, then, seems to necessarily rely on non-intentional processes, i.e. mental processes whose inputs are not mental representations, but whose outputs are mental representations. He considers the following: in the context of having a fly buzzing around the room, how does the thought *That fly is annoying*, and in particular *that fly*, make contact with the fly. Also restricting himself to visual perception, he proposes that *that fly* makes contact with the fly through a combination of visual perception, attention, and “mental pointing”. Levine argues that the non-intentional process involved in mental demonstratives is arrived at through the percept, the thought *that fly* “gets to be about the fly because it points to a percept selected by attention, and that percept is about the fly” (182)

But how, then, is a percept created? Exploring this question to any reasonable degree

would take us far afield, but below I briefly review one theory and point suggestively where I think this theory makes contact with the quantized/homogeneous representations of nominals.

Pursuing one line of research, Pylyshyn (2001, 2003, 2007) argues that the visual system makes contact with the external world through FINGers of INSTantiation (FINSTs).³ FINSTs are a visual mechanism – a small number of indices which allows percepts to acquire their referents without appeal to cognition. Visual objects are taken to be collections of spatio-temporally distributed features, such as color, shape, motion, etc. Pylyshyn proposes that when a visual object is detected, by virtue of it possessing the right kind of spatio-temporal feature distributions,⁴ a FINST is automatically deployed and attached to that object. Attention may then act on FINSTs to select them for further cognitive processes about the object which the FINST is attached to, perhaps causing the construction of an object file representation (Kahneman et al., 1992, and many others).

One reason Pylyshyn pursues FINST theory is because FINSTs provide an operation that connects physical objects to their mental representations. Cognition cannot reach out into the world and select an object, say a fly, by means of applying *fly* to it. Instead, the object instantiating a proper collection of spatio-temporal features causes a FINST to be deployed to refer to that collection of features. Although the object is the referent of that FINST, none of the feature information which caused the FINST to be deployed is represented by the FINST itself. Once an object, again say a fly, has a FINST attached to it, cognition can be applied to it, say by applying the predicate *fly* to it. The causal path which starts with a physical object and ends with the deployment of a FINST is not intentional. No

³Certainly, FINSTs theory is currently being debated in the literature and several alternative mechanisms have been proposed to account for the kinds of behavior which FINSTs are proposed to account for. I will, however, adopt FINSTs here as I find them to be a particularly clear example of a kind of referential mechanism which both satisfies Levine's (2010) non-intentional requirement and appears to be sensitive to (some types of) quantized/homogenous representation.

⁴Pylyshyn argues that what counts as the right kind of spatio-temporal feature distribution may not be a natural class and empirical investigation will be required to uncover exactly what configurations can and cannot capture a FINST.

representation mediates it and all of the processes are pre-attentive.

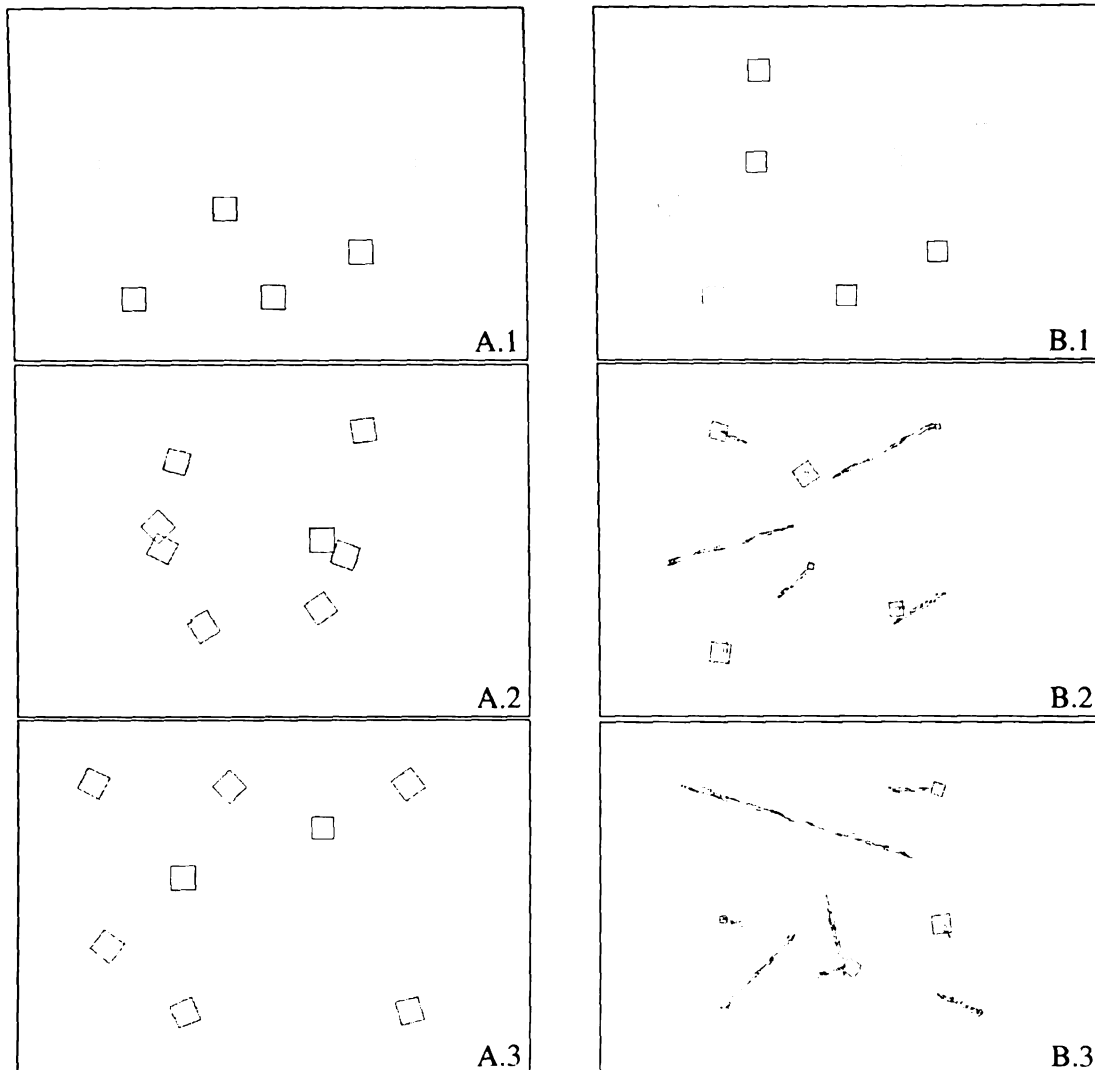
One source of evidence for FINSTs comes from a series of studies involving multiple object tracking. In these experiments, subjects are presented with a large number of objects on a computer screen. After appearing on the screen, a subset of those objects are cued and the subject is told to attend to these objects, track their movement, and to identify these objects when everything stops moving. After being cued, all the objects on the screen move around for some period of time. A typical display drawn from these experiments is given in Figure 5.1 A.1 to A.3. Interestingly, subjects are very good at tracking and identifying, on average, up to four objects, but when the number of objects cued is more than four, subjects become unable to track and identify the set of objects. Pylyshyn argues that this is because the visual system only supplies us with four FINSTs. Once exhausted, the visual system becomes unable to index all the cued objects, and the system, for lack of a better term, crashes.⁵

FINSTs impose other limits on what the visual system may treat as an object. In particular, a physical object must continue to behave like a physical object, for instance, maintaining rigidity and cohesion across time and space. Using multiple object tracking, van Marle and Scholl (2003), for instance, find that subjects fail to be able to track “substances” – objects which seem to pour from place to place instead of moving rigidly. Screen shots from an example trial are given in Figure 5.1 B.1 to B.3. Mitroff et al. (2004, 2005) also observes that objects must persist as being objects for the visual system to continue treating them as objects. When a single object splits into two, the information contained in that object is disrupted. Similarly, when two objects in motion merge together, the information contained in one of those objects is lost.⁶

⁵Interestingly, this is also the limit to the number of objects which can be visually subitized, that is quickly counted. When presented with short presentations of an unknown number of objects, subject perform at ceiling as long as there are only four or fewer objects present. Performance drops off at numbers greater than four. If FINSTs are implicated in identifying and counting objects, then this set of findings converges with the same limits found in multiple object tracking.

⁶Object splitting and merger may also relate to quantized/homogeneous representations. The ability to split into two objects is similar to being divisive, whereas the ability to merge into a single

Figure 5.1: Examples of Multiple Object Tracking



Consider for a moment what the linguistic descriptions of these different types of multiple object tracking (Figure 5.1 A vs. 5.1 B) could be, abstracting somewhat from possible interfering factors and focusing only on the types of nominals.⁷ When presented with a display like the one given in Figure 5.1 A and cued by four or fewer blinking squares, subjects' object is similar to being cumulative.

⁷In particular, subjects seem to be able to create object files for collections of similar objects and exceed the four object limit. Halberda et al. (2006) observes that subjects can select and separate large groups of circles by their color feature. A. Treisman (p.c.) proposes that object files themselves can be created for similar objects, with "summary statistics" such as average shape and size and approximate number encoded in them.

could truthfully report the event as (3a). Importantly, the reports in (3b) and (3c) would be infelicitous. Now, if subjects were presented with the same screen, but cued by six or seven blinking squares, they would not report the event by saying (3a). Instead, a report like (3b) seems more likely, especially if the total number of squares on the screen was extremely large.⁸ Finally, if subjects were presented with a display like the one given in Figure 5.1 B, regardless of the number of initially cued squares, they could truthfully report (3c), and given the manner of the “pouring” movement, (3a) and (3b) seem somewhat false as no square really moved.

- (3) a. Those four squares moved about the screen.
 b. Squares moved around the screen.
 c. Stuff moved around the screen.

In light of the possible relationship between the linguistic expressions in (3) and the discussion of the constraints on how the visual system deploys FINSTs, consider the following. The events in which subjects are able to successfully track objects, i.e. deploy FINSTs, are those events when they are able to truthfully use quantized expressions. When subjects fail to be able to track objects, either because the number required exceeds the number of FINSTs available to the system or because the objects fail to behave like physical objects which prevents FINSTs from indexing them, homogeneous expressions become much more likely. What quantized nominals may do then is inform the cognitive system that the object is “FINSTable”; that is, the visual system should be able to deploy a FINST for the object. This relationship is summarized in Table 5.2

Table 5.2: Quantization of Nominals and FINSTs

	Homogeneous	Quantized
Nominals	unspecified quantity	specified quantity
Visual Objects	No FINST	Grab FINSTs

⁸Of course subjects could say *A bunch of squares*. . . , though here they are possibly relying on a collective object file or similar representation to support the “truth” of the nominal.

Extending this kind of verificational strategy to other cognitive domains is not simple, but there is evidence that in event perception, subjects segment events by mentally represented boundaries, often based on certain kinds of motion information (Zacks and Tversky, 2001; Zacks et al., 2007). If such boundaries act to delimit events in certain ways, we might expect different kinds of event descriptions to be reported which change based on the presence or absence of the proper boundary.

5.4 Final Thoughts

States are not a uniform aspectual type. Instead, like events, they have different internal temporal constitutions. Also like events, the arguments related to states affect the kind of aspectual interpretation that results. In all cases, the underlying representational distinction is one of quantization, suggesting that the theory of aktionsart is unified by quantization.

Quantization also plays a wider role in the grammar. While it is well known that nominal expressions can be divided into those that are quantized and those that are homogeneous, the scale structure of adjectives also seems to be a case of quantization. While this can be independently demonstrated in each domain, both the quantization of nominals and scale structure affect the aspectual interpretation of states and events, suggesting that quantized/homogeneous representations interact with one another in a compositional way. Given its far reaching and interactive role in grammar, quantization appears to be part of the core of linguistic representation.

Indeed, if quantization is core to the linguistic system, we may expect it to play a significant role in the realm of other cognition systems. While only the briefest of sketches was outlined above, pursuing links between linguistic and extra-linguistic domains of cognition may provide us with ways to better understand language and its role in cognition more generally.

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