

Aktionsart coercion

Nicole J. Barber

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Abstract

This study aimed to investigate English Aktionsart coercion, particularly *novel coercion*, through corpora-based research. Novel coercions are those which need some contextual support in order to make sense of or be grammatical. Due to the nature of the data, a necessary part of the study was the design of a program to help in the process of tagging corpora for Aktionsart.

This thesis starts with a discussion of five commonly accepted Aktionsarten: state, activity, achievement, accomplishment, and semelfactive. One significant contribution of the thesis is that it offers a comprehensive review and discussion of various theories that have been proposed to account for Aktionsart or aspectual coercion, as there is no such synthesis available in the literature.

Thus the thesis moves on to a review of many of the more prominent works in the area of Aktionsart coercion, including Moens and Steedman (1988), Pustejovsky (1995), and De Swart (1998). I also present a few theories drawn from less prominent studies by authors in the area who have different or interesting views on the topic, such as Bickel (1997), Krifka (1998), and Xiao and McEnery (2004).

In order to study the Aktionsart coercion of verbs in large corpora, examples of Aktionsart coercion needed to be collected. I aimed to design a computer program that could ideally perform a large portion of this task automatically. I present the methods I used in designing the program, as well as the process involved in using it to collect data. Some major steps in my research were the tagging of corpora, counting of coercion

frequency by type, and the selection of representative examples of different types of coercion for analysis and discussion.

All of the examples collected from the corpora, both by my Aktionsart-tagging program and manually, were conventional coercions. As such there was no opportunity for an analysis of novel coercions. I nevertheless discuss the examples of conventional coercion that I gathered from the corpora analysis, with particular reference to Moens and Steedman's (1988) theory.

Three dominant types of coercion were identified in the data: from activities into accomplishments, activities into states, and accomplishments into states. There were two main ways coercions taking place in the data: from activity to accomplishment through the addition of an endpoint, and from various Aktionsarten into state by coercing the event into being a property of someone/something.

Many of the Aktionsart coercion theories are supported at least in part by the data found in natural language. One of the most prominent coercions that is underrepresented in the data is from achievement to accomplishment through the addition of a preparatory process.

I conclude that while there are reasons for analysing Aktionsart at verb phrase or sentence level, this does not mean the possibility of analyses at the lexical level should be ignored.

Acknowledgements	7
Chapter 1 Introduction	8
1.1 Thesis outline	9
Chapter 2 Background Information: Aktionsart and Aspect	12
2.1 Definitions and terminology	12
2.2 Aspect.....	13
2.3 Tense	14
2.4 What elements contribute to Aktionsart?.....	16
2.4.1 Verkuyl.....	16
2.4.2 Chung and Timberlake.....	19
2.4.3 Neutral context.....	21
2.5 Defining the categories	22
2.5.1 State.....	24
2.5.2 Activity.....	32
2.5.3 Achievement	34
2.5.4 Accomplishment	36
2.5.5 Semelfactive.....	37
2.6 Ways of explaining non-complying events.....	39
2.6.1 Revision of features used to classify lexical items.....	39
2.6.2 Varying the number of Aktionsarten categories	40
2.6.3 No categories.....	44
2.6.4 Summary	44
Chapter 3 Coercion	47
3.1 Moens and Steedman	48
3.2 Verkuyl.....	54

3.3	Pustejovsky	57
3.4	Jackendoff	62
3.5	De Swart.....	69
3.6	Michaelis	72
3.7	Rothstein	75
3.8	Van Lambalgen and Hamm	76
3.9	Others	84
3.9.1	Bickel	85
3.9.2	Krifka	85
3.9.3	Piñango, Zurif, Jackendoff.....	86
3.9.4	Todorova, Straub, Badecker, Frank	88
3.9.5	Xiao and McEnery	88
3.10	Novel coercion	91
3.11	Summary	92
Chapter 4	Data Collection.....	94
4.1	Corpora-based coercion research	94
4.1.1	Base and instance Aktionsart	95
4.1.2	Corpora.....	96
4.2	Designing the program.....	98
4.3	Using the program.....	101
4.3.1	Problems encountered	107
4.4	Future recommendations.....	110
Chapter 5	Results	112
5.1	Polysemy	113
5.2	Progressive states	115
5.3	Frequency of coercions	116

5.4	Exemplifying conventional coercions.....	120
5.4.1	Into state	121
5.4.2	Into activity	123
5.4.3	Into achievement	127
5.4.4	Into accomplishment	129
5.4.5	Into semelfactive	130
5.5	Discussion of results	131
5.6	Summary	140
	References	143
Appendix A	Excerpt from the dictionary file	151
Appendix B	Example of a tagset file.....	153
Appendix C	Excerpt from an ‘exceptions’ file.....	154
Appendix D	Semantic Rules.....	156

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Chapter 1 Introduction

The purpose of the present research was to investigate Aktionsart coercion. My main goal was to test a model of coercion using naturally occurring data in order to find out whether there were novel forms of coercion that had not been reported in the literature and examine the frequency of different types of coercion, as well as discussing illustrative examples in terms of the transitions in the model.

Another goal was to provide a comprehensive literature review on coercion; this step was also important for justification of my choice of framework for coercion. The design and use of a computational program helped achieve the first goal of investigating novel coercions in naturally occurring data. The research was done on the English language, as that is the only language in which I am fluent.

Coercion is the forced change of the Aktionsart to which a verb belongs. Novel coercions are those which need some contextual support in order to make sense, or be grammatical. Example (1) is of the sort commonly used in aspectual literature to demonstrate how a verb's Aktionsart can restrict its natural contexts:

(1) I am loving her (more and more every day).

Love is a stative verb, and stative verbs are not generally used in the progressive.

Example (1), however, presents an instance where this rule is not followed. As a result, extra information (more and more every day) is needed to make sense of the statement.

Example (1) is therefore an example of novel coercion.

While the literature on coercion (both novel and conventional) is quite extensive, the examples presented are generally constructed by the various scholars rather than taken from naturally occurring data. Therefore, I was interested in investigating whether examples of novel coercions actually took place in natural or spontaneous language production. Not only do authors use constructed examples in the literature, their theories of coercion are generally based entirely on these constructed examples. It was also therefore of interest as to whether natural language coercions supported coercion models based on manufactured coercion examples.

Due to the requirement of naturally occurring data, the obvious course was to analyse corpora. Most corpora are not tagged for aspect or Aktionsart,¹ though most large corpora come pre-tagged for part-of-speech. In order to investigate Aktionsart coercion, it was therefore a necessary element of my research to tag some corpora for Aktionsart. Hand-tagging a corpus is a very time-consuming process, so I needed to design an automatic Aktionsart-tagging process to assist the research. While a completely automatic Aktionsart-tagger would have been ideal, I was prepared for the event that it was not possible for me to automate the entire process. My aim was therefore to design a program that would at least tag large portions of the data, with contributions from me when required.

1.1 Thesis outline

Chapter 2 describes and discusses relevant background information. The relationship between Aktionsart and both aspect and tense are briefly discussed. I review some

¹ Note that the process of tagging for Aktionsart does not result in an output of tagged corpora in the same way as other tagging processes such as for part-of-speech. I describe the program's function more fully in section 4.2.

different approaches taken by authors relating to the elements of a phrase that contribute to the Aktionsart of a verb or verb phrase. I also present the definitions and descriptions of the five commonly accepted Aktionsarten: state, activity, achievement, accomplishment, and semelfactive. Chapter 2 ends with a review of several different ways of dealing with the fact that verbs often appear to have a different Aktionsart in different contexts.

Chapter 3 is a review and discussion of coercion. I present the theories of many of the most prominent works in the area of Aktionsart and aspectual coercion, such as Moens and Steedman (1988), Pustejovsky (1995), and De Swart (1998). I also present a variety of theories of some less prominent studies by authors who have different or interesting views on the subject such as Bickel (1997), Krifka (1998), and Xiao and McEnery (2004). Chapter 3 concludes with a brief summary of the dichotomy in the theories presented by the coercion authors, and my own conclusions on the matter.

Chapter 4 describes the data collection process that was undertaken as part of my research. In order to study the Aktionsart of verbs in large corpora I designed a computer program that could perform a large portion of the task for me. Chapter 4 details the corpora that I used in the research, the terms that I used in my data collection, followed by a summary of how the program was designed. I also present the method for using the program, and some problems that I encountered during data collection.

Chapter 5 is a description and discussion of the results that I gathered from the analysis of the corpora – I found no novel coercions in the data. The results are presented according to the instance Aktionsart into which a verb was coerced. The arcs along Moens and Steedman's diagram are sufficient for most of the coercions found in the

data, although not all are used to the same extent. I also relate the finding of no novel coercions to other research by both Pawley and Syder (1983) and Lakoff (1993), who found few novel creations of other sorts in natural language. I conclude with a summary and limitations of the thesis, and some possibilities for future research.

Chapter 2 Background Information: Aktionsart and Aspect

The aim of this chapter is to provide some background to the discussion of coercion. It therefore addresses issues regarding definitions of Aktionsart classes, and problems arising when attempting to classify natural language verbs and expressions in different frameworks. The background presented here is a necessary preliminary to a discussion of coercion as it is important to understand differences in category attribution which changes according to whether one considers a verb on its own, a verb phrase, or a whole clause. I start this chapter with a brief section defining basic Aktionsarten and relevant terminology. Sections 2.2 and 2.3 provide brief reviews of tense and aspect respectively, as related to Aktionsart. Section 2.4 discusses the components of Aktionsart – some authors believe the verb alone can be classified, while others require an entire phrase to be considered. Section 2.5 is a detailed review of the widely accepted Aktionsarten that are briefly defined in section 2.1. I conclude the chapter with a discussion on the ways that different authors deal with eventualities that appear to belong to one Aktionsart but then appear in another, excluding the phenomenon of coercion.

2.1 Definitions and terminology

Within the field of semantics, an *eventuality* refers to a situation that occurs in the world, such as *draw a circle*, *win (a race)*, *love*, or *run*. The term *Aktionsart* refers to the inherent temporal structure of an eventuality. In one commonly held typology, situations can be categorised into one of five Aktionsarten (state, activity, accomplishment, achievement, and semelfactive) based on three features: change, duration, and telicity.

States involve no change – every moment of a state is identical to every other moment: *Fred loves Jane*. The other four Aktionsarten all involve change. Duration refers to whether the situation extends in time or occupies only a single moment (non-durative or punctual). Telicity refers to an inbuilt culmination point of a situation; before this point is reached the situation has not been completed, and after which the situation cannot continue. Activities are durative and atelic: *Fred ran*; accomplishments are durative and telic: *Fred read a book*; achievements are non-durative and telic: *Fred won the race*; semelfactives are non-durative and atelic: *Fred sneezed*. These categories are further discussed in section 2.5.

2.2 Aspect

Aktionsart and aspect both relate to the internal temporal composition of an eventuality. Aktionsart is widely regarded as an objective property of an eventuality, and is evaluated at the lexical level. Aspect is a subjective viewpoint of an eventuality; it is a property of linguistic objects, such as verbs or clauses, that describe an eventuality (Binnick 1991, Comrie 1976). Smith (1991) uses the terms *situation type* and *viewpoint* when referring to Aktionsart and aspect respectively. The main aspectual distinction is between perfectivity and imperfectivity. A situation presented in the perfective has no reference to the internal structure of the eventuality: the beginning, middle, and end-points are condensed such that the situation can only be viewed from the outside. An imperfective form is used if there is a desire to refer to the internal nature of the eventuality. For example,

- (2) John read the book.
- (3) John was reading the book (when Mary entered the room).

Example (2) is perfective, and example (3) is imperfective. Example (2) represents John's reading from the outside, as a whole event, whereas example (3) makes reference to the process of reading that was still happening when Mary entered the room. The perfective/imperfective difference is generally regarded as subjective since the form selected is based on the way in which a speaker wishes to convey the eventuality, rather than depending on what actually happened, including how much of the situation to profile. There are not many grammaticalised aspectual distinctions in English – the contrast between perfectivity and imperfectivity through the use of the progressive to represent imperfectivity is one of the few.

2.3 Tense

Tense is also said to interact with aspect and Aktionsart, and although this is not the focus of this thesis, I nonetheless present a few examples of these interactions.

Michaelis (2006) suggests that the use of present tense forces a stative reading of verbs, using Reichenbach's (1947) analysis of reference, speech, and event time. Speech time is self-explanatory – the time of utterance; event time refers to when the situation being described by the speaker took place; and reference time is the time about which a statement is being made. For example:

(4) Joan will have left by the time Sarah arrives.

The reference time is Sarah's arrival, the event time is Joan leaving, and speech time is current, so precedes them both.

A non-stative verb cannot be used to denote a situation that overlaps with reference time:

(5) Sue said that she won the race.

The winning is understood to have occurred in the past of the saying, which is itself in the past. In contrast, using a state creates an ambiguity as to whether the eventuality was ongoing at the reference time, or is understood to refer to as a past situation:

(6) Sue said that she loved Tom.

Sue may have meant that at some point in her past she did love Tom, or it may have meant that at that moment she loved Tom. Therefore, as only states give readings that overlap with reference time, any verbs that denote situations overlapping with reference time must be stative. Verbs in the present tense, even those such as *drink* which would normally be associated with events, attain a habitual reading:

(7) Sue drinks white wine.

Michaelis also discusses the English future-tense indicator ‘will’, which in English is also used as a modal. She presents the view that *will* functions as a stativiser since it can combine with present-tense time adverbials such as *now* and *at this moment*. As we have already seen that verbs in the present tense are interpreted as being stative, in order for verbs combined with *will* to function in the present tense they must also be interpreted as stative. Michaelis (2006: 18) proposes that they refer to the period preceding an event:

(8) My daughter will play the piano for you.

Example (8) combines easily with the present tense adverbial *now*, and refers to the daughter being in the state of preparedness to play the piano, or knowing that she will play the piano. Therefore while *will* indicates future intent, it also affects the Aktionsart of a situation.

2.4 What elements contribute to Aktionsart?

The main discussion of Aktionsarten will take place in section 2.5. However, before the allocation of verbs to an Aktionsarten can take place, a decision must first be made as to the elements (verb, verb phrase, and so on) that will be used in the process of allocation.

There are several points of view as to which elements actually need to be taken into account when deciding in which Aktionsart category a verb or phrase belongs. De Swart and Verkuyl (1999) require a phrasal analysis, including the verb as well as its arguments in the decision as to the Aktionsart. Chung and Timberlake (1985) provide an analysis of Aktionsart at several different levels, from the verb on its own through to a proposition and surrounding propositions. Xiao and McEnery (2004) discuss the analysis of a verb and the form – for example simple present tense – in which it should be presented when analysed for Aktionsart.

2.4.1 *Verkuyl*

Verkuyl (1993, 2001) and De Swart & Verkuyl (1999) have studied the possible domains of Aktionsart: verbs, verb phrases, or whole sentences. Verkuyl believes that Aktionsart should be judged at verb phrase or sentence level (De Swart and Verkuyl 1999: 22), rather than allowing verbs to be classified on their own. The aspectual² reading of a sentence takes into account the form of the verb as well as the arguments. Verbs in Verkuyl's theory can be classified based on a binary feature [ADD TO] which distinguishes between dynamic ([+ADD TO]) and stative ([-ADD TO]) verbs. The label [ADD TO] is used based on the reasoning that dynamic verbs have relatively distinct elements which can be 'added to' if desired. Extending situations associated with verbs

² Note that they refer to Aktionsarten features as 'aspectual', as Verkuyl in particular finds the distinction between aspect and Aktionsart rather blurred (Verkuyl 1993: 10-11).

that have a positive [ADD TO] feature results in one longer eventuality, whereas extending those with a negative [ADD TO] feature creates a sequence of distinct events. The verb *want* in example (9) has the feature [-ADD TO], whereas the verb *eat* in example (10) is [+ADD TO].

(9) Judith wanted a sandwich.

(10) Judith ate a sandwich.

In Verkuyl's theory noun phrases also contribute to the aspectual nature of a situation, represented using the binary feature [SQA] – 'Specified Quantity of A' – which refers to whether the objects in the noun phrase can be counted or measured easily. Count noun phrases, such as *three sandwiches* are [+SQA], whereas mass noun phrases, such as *sandwiches* are [-SQA]. In examples (11) to (14) the noun phrases *Judith*, *three sandwiches*, and *a sandwich* are [+SQA], while *nobody* and *sandwiches* are [-SQA].

(11) Judith ate three sandwiches.

(12) Judith ate sandwiches.

(13) Nobody ate a sandwich.

(14) Nobody ate sandwiches.

The combination of elements associated with [ADD TO] and [SQA] produce a sentence with an aspectual binary feature [T]; the sentence is labelled 'terminative' when [T] is positive, and 'durative' when [T] is negative. Examples (9), (12), (13), and (14) are all [-T]. Examples (10) and (11) are the only ones with all positive elements, and as such are the only sentences to be [+T].

Presumably Verkuyl uses ‘terminative’ and ‘durative’ as a reference to whether an endpoint is included as part of the situation and it therefore has a ‘termination’. He has in fact used the label ‘terminative’ interchangeably with ‘telic’³ (De Swart and Verkuyl 1999: 14-15); therefore ‘durative’, as the binary opposite, must refer to atelic sentences.

Verkuyl’s label ‘durative’ was perhaps chosen to reflect the lack of reference to an endpoint, where consequently the focus is on the situation continuing through time. However, the choice of ‘durative’ for referring to atelicity is somewhat confusing given the standard use of the term. Normally, it has its own opposition (‘punctual’) and is referring to whether or not an event occupies any significant length of time. In the usual interpretation, ‘durative’ is not related to whether or not a situation is telic (or atelic); in fact as demonstrated in section 2.5, durative events can be either telic or atelic. However, despite his difference in choice of terms, I will continue to use Verkuyl’s terminology while discussing his theory.

The clarity of such terms is debatable given the different interpretations that are assumed by authors throughout the literature. For example, Nicolas (2000) seems to confuse the notions of telicity and durativity, stating that if a verb extends in time then it is atelic:

... lexical aspect (Aktionsart) refers to the intrinsic notion of duration, or iteration, contained in the semantics of the lexical verb, irrelevant of the aspect of the clause itself.

Thus movement verbs such as ‘walk’, ‘run’, ‘swim’ are intrinsically atelic in the sense that they imply the process

³ Telicity is discussed further in section 2.5.3, but is generally described succinctly as an event that has an inbuilt culmination point (Smith 1997, Comrie 1976, Binnick 1991).

extends in time. On the other hand, verbs such as ‘hit’,
‘dive’, ‘put’ are intrinsically telic (p.160).

This is clearly very different from other definitions of telicity that make reference to a culmination point. Nicolas does refer to a feature *lexical valency* that she defines as “the existence or absence of a goal at the lexical level” (p.159), which is obviously similar to standard definitions of telicity. Durativity and telicity should be recognised as separate notions as they can be applied to a verb or verb phrase independently of each other. Section 2.5 gives examples that comply with the various telic/durative combinations that can be formed. For example, based on the Aktionsart classification discussed in section 2.5 – accomplishments are both telic and durative, and semelfactives are both atelic and punctual. If duration were the same as atelicity, these combinations would be impossible.

Verkuyl’s theory allows the aspectual meaning of a verb to be kept constant at all levels (verb, verb phrase, and sentence) rather than being manipulated into different aspectual categories at different levels of analysis.⁴ Verkuyl believes that his theory of aspectual analysis is simpler, and therefore should be more readily accepted (Verkuyl 2001: 207).

2.4.2 *Chung and Timberlake*

In contrast to De Swart and Verkuyl, Chung and Timberlake (1985) distinguish four levels of semantic structure at which the aspect of a verb can be analysed: a verb on its own as in example (15) with its own inherent aspectual properties which they label ‘verb’; a verb combined with its major syntactic arguments, termed ‘predicate,’(16); the predicate plus its relation to a time interval, labelled ‘proposition’ (17); and the

⁴ Verkuyl’s theory is further evaluated in section 3.2 as part of the discussion on coercion.

‘narrative’ – the current proposition in the context of other propositions (18) (Chung and Timberlake 1985: 214).

(15) Angry.

(16) John got angry at a stranger.

(17) John got angry at a stranger on the bus today.

(18) John got angry at a stranger on the bus today, and
then apologised.

Chung and Timberlake discuss aspectual classification at predicate level, using ‘closure’ and the commonly used feature of ‘dynamicity’ to distinguish between four types of situations: states, activities, achievements, and accomplishments. Dynamicity first divides verbs according to whether or not they involve change, and closure applies slightly differently to each. Applied to verbs with change, closure refers to telicity – accomplishments have closure whereas activities do not. When applied to states, closure seems to refer to and create the category of achievements. States necessarily begin and end their existence with a change of state; therefore when the end of one state is examined, that point is also the start of a new state.

(19) Be pregnant.

(20) Become pregnant.

Example (19) refers to a state, and example (20) refers to the point at the start of the state, while also being the end of the previous state (that of not being pregnant). As discussed below, the definition of a telic situation is often said to include a change of state. As an achievement is a punctual telic situation, it refers directly to a change of state. Therefore while described as ‘closure’ of a state, or ‘inception of state’ (to use

Chung and Timberlake's label), the verbs in this category are essentially achievements. Thus, while Chung and Timberlake recognise different levels of lexical aspect, their division of Aktionsart categories is done at predicate level.

2.4.3 *Neutral context*

In her discussion of situation types, Smith (1991, 1997) states that she uses examples for each aspectual category that represent simple, complete situations. This concept is presumably similar to Xiao and McEnery (2004)'s 'neutral context' which is obtained by excluding any unnecessary segments. For example, in English some verb arguments are deemed essential and others optional. Verbs such as *run*, despite being able to take an object at times, actually only require a subject, and are therefore inherently intransitive (21). Some verbs, like *hit*, are expected to also have an object (22), while others, such as *give*, are ditransitive (23).

(21) She ran.

(22) She hit the dog.

(23) She gave him the cheese.

Xiao and McEnery, following Lys and Mommer (1986), state that English neutral context is typically a simple clause in past tense. Any objects should be syntactically and semantically represented as a singular count noun, and the viewpoint aspect should be simple (Xiao and McEnery 2004: 338, Lys and Mommer 1986: 218). Lys and Mommer argue that the viewpoint aspect should be simple (as opposed to the progressive) because sentences in the progressive never include a reachable culmination point. A reason is not given for choosing singular count nouns above mass nouns or plural nouns, however in general singular count nouns (24) 'feel' the least modified when compared to mass nouns (25).

- (24) John discovered that quaint little village (*for years).
- (25) Tourists discovered that quaint little village for
years.

Past tense is selected as it avoids complications such as habitual readings which can arise in other tenses, and also English non-past forms have more variety in their interpretations (Lys and Mommer 1986: 19). De Swart (1998: 368) agrees that the English simple past is aspectually neutral.

2.5 Defining the categories

Despite various sources dating Aktionsart categorisation in some form as far back as Aristotle (for example Binnick 1991), Vendler's 1957 discussion of verbal categories is widely regarded as the starting point for modern analyses of aspect and Aktionsart. In his landmark study, Vendler divided verbs into categories based on three features: verbs that are permitted to occur in the progressive, the existence of a "terminal point" as part of the event, and duration. A terminal point of an event exists if such a point must be reached for the event to have taken place in its entirety. Up to this point the event is not complete, and after the point has been reached the event cannot continue. For example the event *draw a circle* has a terminal point: until the circle is drawn the event has not occurred – perhaps only a partial circle has been drawn; once the circle is complete, that particular circle can no longer be drawn.⁵

Vendler first segmented verbs into broad categories based on whether or not they can be used in the progressive ("continuous tenses" as Vendler called them). Verbs that can

⁵ More recent analyses such as those by Smith (1997), and Binnick (1991), refer to an event with a terminal point as a 'telic' event.

occur in the progressive were subsequently divided into those that have a terminal point, such as *draw a circle* – which he termed ‘accomplishments’ – and those which do not, such as *run*, – labelled as ‘activities’.

The verbs that do not easily occur in the progressive were classified according to their duration. Vendler differentiated between achievements and states through the duration of the eventuality: achievements are instantaneous and states are durative. Verbs that occur in a “single moment”, such as *realise*, were termed ‘achievements’; those which exist over some period of time, such as *love*, were labelled as ‘states’.

Telicity is generally described as an event including an inbuilt culmination point (Smith 1997, Comrie 1976, Binnick 1991, and others). After this point has been reached, the event in question can no longer continue. For example, in the sentence ‘John is making a chair’, once the chair is made John can no longer be in the process of making that particular chair. Smith (1997) and Moens (1987) add to this definition, including a change of state as part of the culmination. When the natural endpoint of a telic event is reached, a change of state occurs. For example, after John has finished making a chair, John becomes in the state of having made a chair and the event is then complete.

Comrie (1976) also asserted that the process leading up to the culmination point is a necessary part of a telic event, not just the culmination itself.

In his discussion of Aktionsarten, Comrie (1976) modified Vendler’s classification, using duration, telicity, and dynamicity to define his classes. Comrie also defined a new category ‘semelfactive’ for verbs such as *cough* that are punctual in a different manner to achievements. Despite recognising the differences between achievements and semelfactives, Comrie did not see the difference as due to telicity. Comrie did not view

achievements as telic, since his definition of telic requires a lead-up phase to the culmination point. For further discussion see the sections on Achievement and Semelfactive below.

The binary features of duration and telicity can be used to distinguish the majority of Vendler/Comrie categories. The additional feature ‘change’ is required to distinguish states from other eventualities. States, activities, and accomplishments are durative, while semelfactives and achievements are punctual. Activities and semelfactives are atelic, accomplishments and achievements are telic. States are unique in that they involve no change, and have no stages, throughout their duration. Table 1 demonstrates this approach of Aktionsarten for English.⁶

		Involves Change		No Change
		- duration	+ duration	State
+ telic	Achievement	Accomplishment		
	<i>realise</i>	<i>drown</i>		
- telic	Semelfactive	Activity		
	<i>knock</i>	<i>walk</i>	<i>know</i>	

Table 1: English Aktionsart Categories.

2.5.1 State

States are generally defined as situations that are non-dynamic. Of course the existence of a stative situation can be brought about by a change into the current state, and its

⁶ See section 2.6.2 for variations of the number of Aktionsarten.

conclusion similarly would be marked by a change of state. However within the duration of the situation itself, there is no change.

Comrie (1976) defined states as eventualities that continue with no effort. That is, unless some outside force affects the situation, it will simply continue. For example:

(26) John knows the colour of grass.

He compares these to activities which by contrast require continual energy in order to continue.

(27) John is running.

Example (27) demonstrates a situation where effort is required on John's part to keep running (Comrie 1976: 49). This definition has been criticised using examples such as (28), where the planet requires no input or effort to continue falling despite generally be described as non-stative.

(28) The planet is falling through space.

A similar feature that is commonly used to define states is the absence of agency; for example compare (29) – non-agentive and (30) – agentive:

(29) John heard the bang.

(30) John listened to the radio.

Lack of agentivity explains why states do not appear in the imperative – as in (31) – and why they cannot be paired with adverbs such as *deliberately* – as in (32).

(31) *Know the answer!

(32) *John deliberately knew the answer.

However, agentivity does not solve the problem of planets falling through space. While states cannot have an agent, events may or may not have agents.

The classic test in English to distinguish between stative verbs and durative events is the progressive: activities and accomplishments are easily put into the progressive whereas stative verbs are not. Stative situations are homogeneous: every moment of (33) is identical to every other moment, whereas within (34) there are sequential stages involving lifting one foot up, moving it forward, and so on.

(33) John loves Mary.

(34) John is walking.

The progressive form generally refers, as the name suggests, to a situation that is ‘in progress’, indicating that some, but not all, of the situation has already happened, and more is yet to come. Given this definition, situations given in the progressive must be durative and comprised of stages, which excludes statives. Some further discussion of states that can be used in the progressive is given in section 2.5.1.1.

Defining states in terms of an incompatibility with the progressive leads to a problem with stance verbs: Comrie defined stance verbs such as *stand* or *lie (on the bed)* as stative, however verbs of this sort are easily used in the progressive (35) despite their stative nature.

(35) The socks are lying on the bed.

Carlson (1977) is generally recognised as being responsible for a distinction between individual-level and stage-level predicates. This distinction provides an explanation for why some states are more easily acceptable in the progressive than others. Individual-level predicates are properties of an individual and as such hold over an extended period

of time, such as *be tall*. Stage-level predicates only hold over a stage of an individual's existence and are recognised as being more temporary, such as *be angry*. Stage-level predicates are associated with change (even though stative predicates are used), as it is expected that the situation will cease to exist in the near future, and hence are more easily used in the progressive than individual-level predicates.

Croft's (2000) theory is similar to Carlson's, but divides states into three categories: point states, inherent states, and transitory states. Point states include phrases such as *be on time*, and *be five o'clock*; although they only hold for a moment in time, they describe a property, and therefore are stative. Inherent states are essentially individual-level predicates in that they are a property of someone or something throughout its entire existence. Inherent states can be acquired – for example citizenship – but once acquired they are expected to endure. Transitory states refer to those described by Carlson as stage-level predicates; they can exist over a period of time, but are not expected to continue forever. Croft allows for both durative and non-durative reference points for transitory states: (36) is durative, and (37) has a non-durative reference point, however the implication is that Jane was ill for longer than just that moment.

(36) Jane is ill.

(37) Jane was ill when I saw her at five o'clock.

Parsons (1990) uses the pseudo-cleft test to distinguish between states and all other eventualities: (38) is not grammatical, where (39), (40), and (41) are perfectly acceptable. Although Parsons does not mention them, *semelfactives*, as in example (42) are also acceptable in pseudo-cleft form.

(38) *What John did was know the answer. (state)

- (39) What John did was run. (activity)
- (40) What John did was make a birdbath.
(accomplishment)
- (41) What John did was win the race. (achievement)
- (42) What John did was knock on the door.
(semelfactive)

As discussed in the Tense section above, non-stative verbs (excluding ‘commentary’ interpretations) are read as habitual states when used in the simple present:

- (43) John walks to the shops.

Smith (1997) refers to habitual situations as ‘derived statives’. Derived statives refer to a bounded state – one that is true for a certain period of time – for example the time during which John habitually walks. The habitual reading can therefore be used as a test for stativity. Stative verbs, such as *love* in (33), need not give a forced habitual reading in the simple present as they can already exist in present tense.

2.5.1.1 Progressive States

In the literature there is common acceptance that stative verbs cannot be used in progressive form (for example, Katz 2003, Rothstein 2004). Indeed, this is one of the tests that even Vendler (1957) used to distinguish states and achievements from other types of verbs. Vendler’s logic was that continuous tenses (that is, progressives), are comprised of a series of successive phases in time, and states do not have successive phases. It has since been recognised by scholars such as Dowty (1979) that there are

circumstances in which some verbs that would generally be seen as stative can be used in the progressive.

There are various related theories as to how and why this can occur. Comrie (1976) noted that English is in fact a rare language in its allowance of stative verbs in the progressive. He believed that English allows stative verbs, such as *sit* and *lie*, to be used in the progressive in order to indicate temporariness – the event in question will not exist for long. For example, consider the sentence *the socks are lying on the bed*; this indicates to a reader that they will be moved before long. Note that *the Swan River is lying to the south of Perth* does not sound right; according to Comrie's theory this would be because the location of the Swan River in terms of Perth is not a temporary state but a more permanent one. This feature is recognised formally by Carlson (1977) in his split between individual-level and stage-level predicates. Comrie also noted that in English, progressive and non-progressive forms of a verb cannot generally be interchanged, but that this rule does not apply to states, something that Parsons (1990) also noted. This indicates that the allowance of states into progressives is somewhat idiosyncratic.

Dowty (1979) also subscribed to the temporariness theory of stative progressives. He indicated that stative verbs are generally only acceptable in the progressive if the subject refers to an object that either has recently moved, may move in the near future, or might have moved if the world's state of affairs had been slightly different (p.175). He also observed that the progressive form of a stative verb can be used if a related event is temporary which allows a temporary viewing of the event. For example, if a person walks into a park they may have been told 'a lake is lying on your right'; the position of the lake is not temporary, but its position relative to the movement of the person is.

Comrie proposed that stative verbs do not require any input to continue in time whereas for other verbs, such as activities, some energy input is required to keep the event going. Huovila (1999) also gave this as a property of states, and noted that states that are allowable in the progressive tend to be able to be seen as receiving some energy input. Huovila did also argue that a lack of ‘volitionality’ is not enough to classify a verbal statement as stative, something that Moens (1987) noted in his criticism of the energy-based stativity argument. Moens disagrees with the energy-based explanation of progressive states, giving examples such as (44), where the expression would tend to be seen as stative, and yet surely no energy is required to keep the statement true.

(44) John was lying on the bed.

Chung and Timberlake (1985) and Moens (1987) discuss coercive methods which allow the reading of stative verbs in the progressive. Chung and Timberlake start by reasserting the idea that states cannot be used in the progressive due to the observation that a progressive form indicates that “an event is dynamic over the event frame” (p.215), and by definition stative verbs are not dynamic. They attribute stative verbs being used in the progressive to coercion. They argue that states are more likely to be able to be read as activities if they are temporary or accidental, and have listed three methods of coercion, which Moens also gives, from a state to a process. The first is to create an element of change in a situation by focusing on different degrees or levels of the event; for example:

(45) I am understanding my problems more every day.

The second method of coercion is to perceive the subject of an event as an agent, for example (46) (as opposed to (47)).

(46) You are being rude.

(47) You are rude.

The third is to make the situation temporary – that is, to impose an interpretation which indicates that the situation will possibly not exist in the near future, for example:

(48) John is living with his parents at the moment.

Once a stative verb has been coerced into a process it can be used in the progressive. As discussed earlier, states can be seen as having stages more easily if they are temporary rather than permanent.

Parsons (1990) noted that on the occasions when a state is acceptable in progressive form, its reading is essentially the same as the non-progressive version. For example (49) means the same as (50). Contrast these to the pair (51) and (52).

(49) You will be wanting to turn right at the corner.

(50) You will want to turn right at the next corner.

(51) You will be drawing a circle when John arrives.

(52) You will draw a circle when John arrives.

In (51), John arrives in the middle of the circle-drawing; in (52), the drawing of the circle begins upon John's arrival. Parsons therefore concludes that the progressive test is still useful for distinguishing between states and events, recognising that a stative expression given in the progressive is essentially the same as the non-progressive version, where events give different readings between the progressive and the non-progressive.

Moens (1987) and Michaelis (2003, 2006) among others, assert that verbs in the progressive can be seen as stative due to various similarities such as their interpretations using the ‘when’ clause test: (53) gives the reading that Sally was hot surrounding the moment that John entered the room; (54) indicates that Sally started dancing after John entered the room.

(53) When John entered the room, Sally was hot.

(54) When John entered the room, Sally danced.

(55) When John entered the room, Sally was dancing.

The progressive form of *dance* gives an interpretation in line with states: see example (55) where John is interpreted as having entered the room in the middle of a period of Sally’s dancing.

As shown by the examples given in this section,⁷ states are sometimes presented in progressive form despite general recognition that this should not be the case. Several different explanations of the apparent coercions were required for the examples. Moens and Steedman, amongst others, classify progressives as states themselves, which would mean that, for examples such as those presented in the current section, states can be coerced into a form that allows the progressive (that is, a process), and then turned into another type of stative.

2.5.2 Activity

Like states, activities are durative and atelic. The difference between states and activities is change, as discussed in section 2.5.1. Change is the only feature activities

⁷ Examples of states appearing in the progressive that were taken from the data collected in this research are given in section 5.2.

share with achievements, which are punctual and telic. Although both activities and semelfactives are atelic, activities differ from semelfactives in durativity: activities extend over a period of time whereas semelfactives are punctual. This distinction is generally obvious, therefore the major distinction required in this section is between activities and accomplishments which are both durative but differ in telicity.

As demonstrated by Comrie (1976), one of the major tests to differentiate between activities and accomplishments is the progressive/perfect test. An atelic event given in the English present progressive entails the truth of the same event in the perfect. Thus the entailment in (56) holds, but (57) does not, as there is no guarantee that the culmination point of an interrupted telic event will be reached.

(56) John is singing → John has sung.

(57) John is building a chair NOT → John has built a chair.

Another common test to distinguish activities from accomplishments is the selection of an appropriate time adverbial. Activities require 'for' (58), whereas accomplishments require 'in' (59):

(58) He walked for an hour.

(59) He walked to the park in an hour.

The word chosen for concluding an event also helps determine whether the event would be an activity or an accomplishment. If an event 'stops' then it is an activity (60), whereas if the event 'finishes' (61), it is an accomplishment:

(60) He stopped walking.

(61) He finished drawing a circle.

(62) John stopped drawing a circle.

This is because *finish* indicates that something was completed, and as activities do not have a culmination point (they could effectively continue forever) they cannot be completed. On the other hand, *stop* indicates that the event was still in progress when severed. Activities comply with this feature, but accomplishments can only combine with *stop* if it is assumed that the event was not completed: (62) indicates the circle was left half-drawn hence stripping away the culmination point.

2.5.3 Achievement

Achievements are generally labelled as telic and punctual. However, Comrie (1976) stated that a telic event must have both a lead-up and a culmination point, and, due to their punctual nature, he categorised achievements as being atelic. At the same time, Comrie recognised that there are a number of punctual events that have a necessary preceding activity that is not actually part of the event. For example, to *reach the top* (of, for example, a mountain), there is a necessary climb beforehand, which can be contrasted with verbs like *recognise* which do not require any such preceding activity. Comrie did not actually attempt to redefine his categories to include punctual verbs with a preceding activity, he simply observed the problem.

Other linguists such as Binnick (1991), Smith (1991), and Rothstein (2004) do not make Comrie's division of achievement-style events, but classify them all as (telic) achievements. Many linguists (for example Smith 1997, Moens 1987, Rothstein 2004) require telic events to include a change of state at the culmination point, something that occurs with achievements but not semelfactives. It is also recognised that a telic event

used with the perfect is usually seen as more recent than a perfect atelic event. For example (63) usually means that John recently went out and is in fact still out, whereas without further context (64), where *hit* is a semelfactive, tends to mean that at some time in the past John hit Mary.⁸

(63) John has gone out.

(64) John has hit Mary.

Achievements are not generally used either in the progressive or with the 'in' time adverbial, since these both require duration. Achievements would instead normally combine with the 'at' adverbial (65) which focuses on a single moment. However, there are some situations where it is appropriate to allow use of the progressive (66) or 'in' (67). These two situations describe a period leading up to the achievement, rather than the achievement itself.

(65) John won the race at ten o'clock.

(66) John was winning the race.

(67) John recognised Mary in ten minutes.

Like accomplishments, an achievement presented in the progressive gives no guarantee that the culmination point was reached: (66) gives no indication of whether or not John actually won the race.

⁸ Fenn (1987) provides an interesting discussion on the different analyses of the perfect when combined with different verbs.

2.5.4 Accomplishment

Accomplishments are durative and telic, therefore sharing one property with each of activities and achievements. As discussed in section 2.5.2, accomplishments take the ‘in’ time adverbial (68), they ‘finish’ rather than ‘stop’ (69), and an accomplishment in the present progressive does not entail that the event was completed when used in the perfect: (70) does not entail (71).

(68) He drew the circle in an hour.

(69) He finished writing the letter.

(70) He was building a house.

(71) He has built a house.

An accomplishment that is presented in the progressive has a focus on the activity leading up to the culmination point, and the existence of the endpoint is somewhat irrelevant due to not knowing whether or not it would be reached. The progressive therefore manages to detach the durative portion of the accomplishment from the punctual endpoint. This is exemplified through the use of *search* and *find*:

(72) John is searching for his geography book.

(73) John found his geography book.

Search in example (72) is an activity with no reference to whether or not the book will be found. (73) implies that there was a search beforehand, but is only focussing on the achievement event of the actual finding of the book. In Mokilese, a Micronesian language, the same verb can be used in different forms in order to focus on different elements of the eventuality. For example *rapahki* (‘look for’) refers to the accomplishment event of both looking for and finding; it is used in the imperfective to

refer to the activity of searching (74). When the same verb is used in the perfective, the intended focus is the completion – the achievement of finding (75) (Harrison 1976).

(74) *Ngoah raprapahki ih me* - 'I'm looking for him
here.'

(75) *Ngoah rapahkihda ih me* - 'I found him here.'

In English, despite the fact that the two events denoted by 'look for' and 'find' are intrinsically related as the latter is the culmination of the former, we express these two events through the use of different verbs. Thus an event that is seen in one language as an accomplishment comprised of an activity and an achievement is easily divided into the separate events in another language where the focus is on one or the other. This division supports the analysis of accomplishments in the progressive focussing on the activity portion of the event.

Kearns (2003) terms verbs such as *notice* and *find* 'quasi-duel' since although they focus primarily on the culmination point, they do in fact require the preceding phase: they "appear to report two actions or events in one predicate" (p.595). Kearns also refers to verbs of this sort as 'durative achievements' – which by their nature would obviously be a meld of achievement and accomplishment.

2.5.5 *Semelfactive*

Semelfactive verbs are punctual and atelic. However, despite their punctual nature, they are often capable of being used in the progressive (which normally only combines with durative situations), as in example (76).

(76) He is knocking at the door.

This is possible due to the repetition of a single punctual knock into a series of knocks which naturally occurs over some duration. The progressive test can help differentiate achievements from semelfactives. Placing an achievement in the progressive usually requires a focus on a period leading up to the event, whereas placing a semelfactive in the progressive leads to an iterative reading.

As Comrie noted, semelfactives also differ from achievements by the nature of their punctuality. Both are said to be punctual despite recognition of the fact that to perform one knock, or one cough, does actually take some small amount of time. It is generally accepted that the amount of time required in normal life for the event to exist is negligible, and thus can be described as punctual. However, if time were slowed down, as for example in a slow motion replay of a video, a semelfactive event such as a single knock would indeed be durative, and (76) would no longer require a series of knocks to make sense.

Achievements, however, do not have this feature. If time were slowed down around John recognising Mary, there would still be a single moment that represents the change of John's mental state from not knowing to knowing Mary. Therefore, excluding narrative commentary which can be used to discuss almost any situation in the progressive, there would not be an occasion for (77) to represent the actual event of recognising (rather than the period leading up to the moment).

(77) *John is recognising Mary.

Like achievements, semelfactives generally combine with the time adverbial 'at' rather than 'in' or 'for':

(78) John knocked at 10am.

Once again repetition can be used, this time allowing semelfactives to combine with ‘for’:

(79) John knocked for ten minutes.

Example (79) indicates that John performed a series of knocks spanning ten minutes.

2.6 Ways of explaining non-complying events

2.6.1 Revision of features used to classify lexical items

There are various ways of dealing with ‘difficult’ examples of verbs or sentences that appear to defy the definition of the Aktionsart category into which a given lexical item would most naturally be placed. One method is the revision of the various category definitions to allow, restrict, or account for, the admission of certain types of verbs into a category. There are also many different methods of dividing verbs into different categories, even if the end results are the same.

An example of category amendment is the division of states. As seen in section 2.5.1, ‘stative’ stance verbs can be used in the progressive despite the traditional restriction on states against this use. This is a problem that Carlson (1977) attempted to resolve through the introduction of stage and individual level predicates which split states into those which are temporary and those which are permanent: stage-level (temporary) predicates are more easily used in the progressive than individual-level (permanent) predicates. Thus, all these predicates can be designated as states by most criteria, but their classification needs refinement when it comes to the progressive test.

Comrie dealt with the stance verbs issue by altering his definition of states, from involving no change (in comparison with activities which do involve change), to a definition where activities always involve change, but states may or may not involve change (the socks may lie on the bed today, but may not be there tomorrow).⁹

The definition of achievements has been amended by different linguists in order to allow for different interpretations based on whether or not they are telic. Comrie (1976) stated that a telic verb requires not only a culmination point, but also a process leading up to it, and hence instantaneous verbs cannot be telic. This definition differs from that of many other linguists such as Smith (1997) who make reference to a culmination point's change of state, and accounts for why (80) is not a violation of the constraint that prevents achievements from being used in the progressive.

(80) John is reaching the summit.

2.6.2 *Varying the number of Aktionsarten categories*

The number of categories defined differs between linguists; Vendler proposed the four categories of activity, achievement, accomplishment, and state. While the addition of the semelfactive category is one that has been adopted by many, there are a variety of other category divisions that have been discussed over the years.

Kenny (1963: 171-186) started his division of Aktionsarten in the same way as Vendler, distinguishing between verbs that can or cannot be used in the progressive. However, in contrast to Vendler who grouped both achievements and states together as being unacceptable in the progressive, Kenny only recognised states as having such a

⁹ Comrie's definition of states is subsequently altered again to that given in section 2.5.1.

restriction. Instead, Kenny combined achievements and accomplishments together as ‘performances’. Kenny differentiates between performances and activities using the present progressive: if performances are used in the present progressive then the event has not been completed. This property does not apply to activities: compare (81) and (82) (both are performances) to (83) (an activity). In the first two examples, John has not yet built the house nor decided whether to join the army, whereas (83) implies (84).

(81) John is building a house.

(82) John is deciding whether to join the army.

(83) John is giggling.

(84) John has giggled.

Kenny’s present progressive test is essentially another version of the telicity test commonly used to help differentiate between accomplishment and activity verbs but with the focus on the performances *not* being entailed in the present perfect, rather than the more common focus of activities *being* entailed. Note that Kenny classifies achievements as performances, shown by his example of John deciding. However, the focus is not on the moment of decision but rather the period leading up to it which, as discussed later, can be seen as an example of coercion. Kenny’s analysis is similar to that used later by Mourelatos (1981) who then further divides Kenny’s ‘performances’ into accomplishments and achievements.

Platzack (1979) uses features such as ‘extensional’ and ‘transitional’ to divide sentences into Aktionsarten as part of his analysis of Swedish; his division results in seven categories using four tiers of division. The first tier separates states from what he terms ‘changes’, the second tier divides both states and changes according to whether they are

seen as extensional or transitional (where extensional sentences are those which “never make essential reference to the passage of time” (p.109), and sentences which are not extensional are transitional). The third tier divides the transitional changes into durative or punctual, and the fourth tier divides both durative and punctual sentences into those which can or cannot take the progressive.¹⁰

Leech (1987) divides verbs into eight categories based on the way in which they respond to the progressive. Some categories correspond almost directly to the more well-known categories discussed above – for example ‘momentary verbs’, ‘transitional event verbs’, and ‘state verbs of having and being’ are essentially semelfactives, achievements, and states respectively. Leech differentiated between what he termed ‘activity’ and ‘process’ verbs, where activities are actor-focused verbs such as *drink*, *eat*, *read*, and *work*, and processes are undergoer-focused verbs including *change*, *widen*, *slow down*, and *grow*. Verbs of ‘inert perception’ (*hear*, *see*), ‘inert cognition’ (*forget*, *hope*), and ‘bodily sensation’ (*ache*, *feel*, *itch*) also have their own categories.

Parsons (1990) recognises the durative/non-durative difference between achievements and accomplishments, but prefers to group them together as ‘events’. His reasoning is that achievements so often have the build-up process beforehand that there is essentially no valid difference between them and accomplishments. Parsons contrasts ‘events’ with states and processes – not recognising semelfactives as a separate category.

Croft (2000: 6-16) describes 14 different aspectual types in English. He divides states into three categories – inherent, transitory, and point, as described in section 2.5.1.

Activities are divided into two categories – directed and undirected. Directed activities

¹⁰ For more detail see Platzack (1979) chapter four.

are essentially those which progress towards an endpoint or goal, but the endpoint is not part of the activity; for example *widen* in (85).

(85) The crack widened.

Undirected activities are those which do not have such a goal such as *walk* or *draw*.

Achievements can be directed or cyclic, where directed achievements have a result state that lasts for some period of time, and cyclic achievements have no such result state – cyclic achievements are essentially semelfactives. Directed achievements are divided into those which are reversible and those which are irreversible. Reversible achievements have transitory states as their result state – for example *open*; irreversible achievements have inherent states as their result state – for example *shatter*. Like achievements, accomplishments are divided into three categories: reversible directed (86), irreversible directed (87), and cyclic (88).

(86) I opened the door.

(87) I burned down the shed.

(88) Judith performed the dance in three minutes.

Croft also identifies three ‘runup achievements’. These are durative, but the process before the culmination point does not build towards the point. For example to *die* takes time, but in the process leading to death it is inappropriate to say (89) in the way one can say (90).

(89) He is half dead.

(90) She is half way through reading the book.

Runup achievements are divided into three categories: irreversible directed (for example *die*), reversible directed: (for example *fall asleep*), and cyclic: (for example *flash* (in the

sense that if the lighthouse is flashing it is possible to see the light coming before it actually flashes)).

Verkuyl's (1993, 2001) analysis of Aktionsart results in the same three categories as Kenny – states, activities, and achievements/accomplishments – although he uses different features to Kenny (as discussed in section 2.4.1). Verkuyl also requires a whole verb phrase or sentence, rather than just a verb, to be included in an analysis of Aktionsart.¹¹

2.6.3 *No categories*

As Rothstein (2004) noted, when presented with examples of verbs and sentences that give an aspectual reading different to that which may be expected, some linguists decide that there are actually no aspectual categories, at least at the verbal level. Verkuyl's theory, as discussed in section 2.4.1, is one of the most classic and well-known that advocates 'no categories', at least as far as the purely verbal level is concerned: "aspectuality should be treated on the basis of amalgamating the meanings of the verb and its arguments into larger units" (2001: 202). However, Verkuyl does classify verb phrases and sentences according to their aspectual nature.

2.6.4 *Summary*

While Aktionsart and aspect both refer to the internal temporal composition of an eventuality, they are usually understood as different phenomena. Aktionsart is analysed at the lexical level, whereas aspect is a viewpoint as determined by the structure chosen to describe an eventuality.

¹¹ Note that Verkuyl prefers the term *aspectual* in his discussion of Aktionsart.

Like aspect, tense is relevant to the theory of Aktionsart. There are several ways that tense can interact with Aktionsart. For example, a verb is read as stative – usually through a habitual reading – if given in the present tense.

Despite many common theories allowing the analysis of a verb's Aktionsart at lexical level, there are still differing views on the matter. Verkuyl believes that a verb phrase is the minimal level required for an 'aspectual' analysis. Chung and Timberlake analyse Aktionsart at several levels, from the verb on its own through to a proposition and its context. The form of the verb also affects Aktionsart. Xiao and McEnery proposed that Aktionsart should be analysed in neutral context. In English this is generally a simple clause in past tense, with simple viewpoint aspect, and with required objects represented as a singular count noun.

After Comrie, I am using five Aktionsarten in this study. They are *state*, *activity*, *achievement*, *accomplishment*, and *semelfactive*. The three features used to differentiate between the Aktionsarten are telicity, duration, and change. States are eventualities with no internal change. Activities are durative and atelic; achievements by contrast are punctual and telic. Accomplishments are durative and telic; semelfactives are punctual and atelic.

It can be difficult to decide on some verbs' Aktionsart, usually because of conflicting properties of the verb when compared to the standard definitions of the Aktionsarten. There are several ways to deal with these difficulties. Some authors, such as Carlson and Comrie, amend the definitions of the Aktionsarten to allow easier allocation of verbs. Many authors prefer to amend the number of Aktionsarten – for example Croft

and Leech create more categories, while Parsons merges some categories together.

Verkuyl deals with the problem of lexical Aktionsart conflicts by only analysing at the levels of verb phrase or higher. A further solution is that of coercion, which I discuss in the following chapter.

Chapter 3 Coercion

On the assumption that a lexical item has a basic or inherent Aktionsart, phrases or sentences can be constructed in such a way that the initial category needs to be re-interpreted as another in order for the sentence to be acceptable. One view is that the lexical item in question has been coerced from its inherent Aktionsart into a different one. The first linguists to use the term *coercion* were Moens (1987) and Moens and Steedman (1988), a concept which they adapted to the linguistic analysis of aspect and that had its basis in the phenomenon of type-coercion that occurs in programming languages (1988: 17).

When investigating coercion, it is important to recognise that not all those who use the term *coercion* seem to be using it in the same way. Not only do different authors focus on different kinds of coercion, they often do not analyse the actual process of coercion in the same way.

DeVelle (2004) makes a distinction between two methods of representing coercion: the first using conceptual structure, and the second using type shifting operations (p.32). The first is described as compositional, and is associated with Jackendoff (1997) and Pustejovsky (1995). The type shifting styles are associated with De Swart (1998) and Moens and Steedman (1987, 1988). DeVelle does note that it can be difficult to distinguish between the different methods of coercion. The difference appears to be at the level of analysis: conceptual structure analyses recognise thought processes at the cognitive level, and make reference to some extra aspectual meaning that is derived from the interaction of two or more components. Type shifting analyses, on the other

hand, focus on the phrases and sentences more at the syntactic level, with one sentential element causing the aspectual shift of another. Van Lambalgen and Hamm (2005) present an interesting different view of coercion as an intensional phenomenon.

Verkuyl (1993, 2001) is a prominent author who does not accept the existence of coercion, and gives an alternative view of Aktionsart being assigned at phrase or sentence level. On top of his approach as described above, Verkuyl (2005) makes further arguments against the case for coercion. In this recent work, Verkuyl aligns the perfect with the perfective, and therefore moves typically aspectual information into the realm of tense. Verkuyl concludes that as a consequence, there is no need for aspectual coercion (p.168).

This chapter presents a review of some of the different views on coercion. The more prominent theories in the literature are presented first, and chronologically. The reason for this order is that authors tend to build on the previous work of others, even when their conclusions about coercion differ. It would therefore be difficult to break the descriptions of different authors' views on coercion into sections based on their theories. After the main author summaries, there are brief descriptions of some lesser-known theories which nonetheless are valuable contributions to the coercion literature. The chapter concludes with the rationale for choosing to accept that coercion exists.

3.1 Moens and Steedman

Moens (1987) and Moens and Steedman (1987, 1988) were the first linguists to propose a framework that explains Aktionsart coercion. They discussed coercion using type shifting mechanisms and the concept of a 'nucleus' which allows each eventuality to be coerced from one Aktionsart into another.

For Moens and Steedman each eventuality can be described using a nucleus which is comprised of a preparatory process, a culmination, and a consequent state, as shown in Figure 1 below:

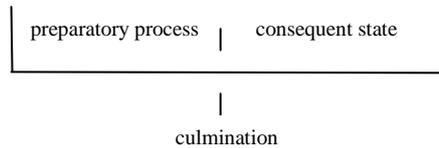


Figure 1: Moens and Steedman's nucleus.

The different aspectual categories focus on different parts of the nucleus: an activity focuses only on the preparatory process, an achievement focuses on the culmination and consequent state, a semelfactive focuses only on the culmination, an accomplishment refers to the whole nucleus, and a consequent state refers only to the consequent state part of the nucleus. Moens (1987) only makes reference to consequent states in his description of the nucleus, despite his 'state' category being comprised of several types of states.

Describing each eventuality using the nucleus allows for easy transitions along the coercion pathways as different elements of the nucleus move in and out of focus. The arrows in Figure 2 (Moens 1987: 45) represent the coercions Moens and Steedman believe to be possible:

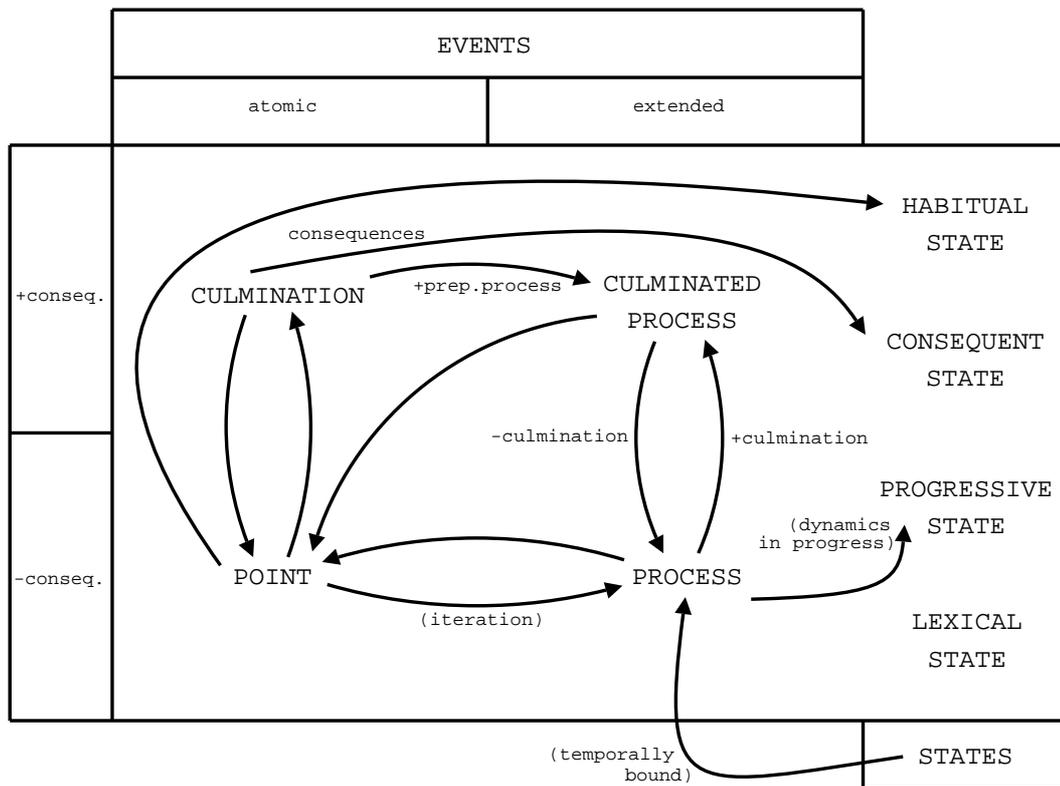


Figure 2: Moens and Steedman's Coercion Paths.

Note that Moens and Steedman's terminology is slightly different to that of scholars previously discussed in section 2.5. They use the 'consequence' feature to represent telicity, and 'extended'/'atomic' to represent Comrie's +/- durative feature. The aspectual categories are also labelled differently, although the categories themselves are essentially the same: 'culminations' represent 'achievements'; 'culminated processes' represent 'accomplishments'; and 'processes' are 'activities'. One difference is that their description of 'point' is more general than semelfactive, in fact it is rather like that of a perfective:

A point is an event (not necessarily an instantaneous one) that is viewed as an indivisible whole and whose consequences are not at issue in the discourse (Moens and Steedman 1988: 16).

However, despite this definition, ‘point’ is shown in their diagrams as being ‘atomic’ in opposition with ‘extended’. Also, Moens (1987) describes points as “atomic events without consequences”, making reference to “non-conclusive, punctual events” as described by Quirk in 1985 (Moens 1987: 43).

The pathways or arcs that Moens and Steedman recognise are the only transitions between categories that they believe possible in English. If a coercion is required from, say, a process to a culmination, there must be an intermediate stage where the eventuality resembles a point; the coercion cannot go straight from process directly to culmination.

Moens and Steedman divide states into several different categories, recognising a difference between ‘habitual states’ (91), ‘consequent states’ (92), ‘progressive states’ (93), and ‘lexical states’ (94).

- (91) Alice plays tiddlywinks for Scotland.
- (92) Max has reached the top of the mountain.
- (93) John is working in the garden.¹²
- (94) John loves Mary.

Moens and Steedman described many common methods of coercion which are based on adding an “extra layer of meaning” to a verb’s original category. Their reference to a verb having an original category is interesting given that Moens and Steedman also state that aspectual classification should not be based solely on verbs, but on sentences as a

¹² Moens and Steedman assert that progressives are stative due to their sharing a number of features with stative expressions; progressives and states were discussed in section 2.5.1.1.

whole (1987: 44). Often these coercions are based on extra-linguistic knowledge required by the speakers, such as how long a sermon takes to deliver, or the expected duration of a sonata. Some of these instances are discussed below.

To move from a process to a culminated process, the extra layer of meaning is, not surprisingly, a culmination point: *run* is a process when on its own, but can be easily coerced into a culminated process by adding a culmination. Example (95) adds the limit of ‘a mile’ to John’s running.

(95) John ran a mile.

Accomplishments can be coerced into activities (culminated processes into processes) in several primary ways. The accomplishment in (96) can be coerced into an activity by adding the adverbial ‘for’ as shown in (97).

(96) Harry delivered a sermon.

(97) Harry delivered a sermon for four years.

This coercion requires a reading of repetition. Harry delivered the same sermon over and over again throughout a four year period. Moens and Steedman actually give this coercion using pathways that do not always seem intuitive. The path goes from accomplishment to activity via their point category, stating that each sermon-reading is compressed down to a semelfactive (point) that is subsequently iterated into a process. Interestingly, (97) as a whole requires an accomplishment reading, as the repeated reading of the sermon must continue until the end of the four year period.

A more direct method of coercing accomplishments into activities given Moens and Steedman’s pathways is to remove the culmination point. For example, again involving

the ‘for’ adverbial, (98) indicates that John did not finish playing the sonata, but was interrupted part-way through and therefore the sonata is stripped of its endpoint.

(98) John played the sonata for a few minutes.

In this type of coercion, according to Moens and Steedman, a layer of meaning was in a sense removed (rather than added). However Moens and Steedman point out that this removal is not complete as the sonata-playing was still building towards the completion of the sonata and it is merely that the focus changed from the culmination point layer to other layers of meaning.

Another coercion commonly recognised in English (for example, Moens 1987, Smith 1997, Rothstein 2004) is from achievement into accomplishment (culmination into culminated process). This is achieved through the recognition of, and focus on, a period which leads up to the culmination point: (99) is an achievement, whereas when combined with the ‘in’ adverbial (100), it is an accomplishment. In example (100) the focus is on the climbing rather than the point of reaching the top.

(99) The mountaineer reached the top.

(100) The mountaineer reached the top in less than five
hours.

Speakers may alter the Aktionsart of verbs by exploiting unspoken shared knowledge; this sort of coercion usually requires more explanation and context than those described in examples such as (98) and (100). For example ‘run’ is an activity when on its own, and therefore would not normally combine with the ‘in’ adverbial, since activities have no telic point:

(101) ?John ran in four minutes.

For this phrase to be coherent requires that both the speaker and listener knew of a particular bounded running activity that John often participates in – thus adding a culmination point – and that in this instance he completed it in four minutes.¹³

3.2 Verkuyl

As discussed earlier, Verkuyl (1993, 2001) proposed a theory that a verb on its own does not carry complete aspectual information, but rather it contributes an element to the aspectual reading of larger constituents such as the verb phrase or sentence. One of Verkuyl's primary reasons for rejecting the proposition that verbs have a basic Aktionsart is that he believes the resulting theory is ultimately more complicated, with the verb taking on slightly different meanings when coerced into any new aspectual category.

Verkuyl describes this overly complex model as follows: a verb has a basic aspectual category – such as *walk* being an activity – and if it is required to combine with bounded items – such as *three miles* – then an operator coerces the activity *walk* into being an accomplishment *walk*. Thus the meaning of the verb itself has been modified to fit into the different contexts in which it is given.

Verkuyl certainly manages to make coercion sound rather complicated, describing the process where a verb's basic aspectual nature is modified to fit with a different aspectual requirement (for example *walk* needing to move from being atelic to being telic as in *walk three miles*) with the following formulae:

¹³ Another possible reading of the sentence is that after four minutes John began to run.

Suppose that a certain verb V has a basic meaning X selecting a meaning Y of its complement while not being able to select meaning Y'. Transfer adherents let an operation O apply to X changing the meaning X of V into a verb meaning O(X) that may take Y' into the VP-meaning [O(X)](Y'). In this way one ends up with X(Y), exemplified in (5b) and [O(X)](Y') exemplified in (5a). (2001: 206)

Verkuyl's example (5a) is shown here as example (102) and his (5b) is example (103):

(102) Mary walked three miles.

(103) Mary walked miles.

Verkuyl then compares the view summarised above to his own theory where the verb has a constant meaning which it contributes to the aspectual meaning of the verb phrase or sentence, along with other elements such as noun phrases:

The alternative way is to say, as I do, that X may take both meanings Y and Y' so that at the level of VP one obtains X(Y) and X(Y'). In that case, the difference at the VP-level is explained in terms of the difference of the verbal complement. (2001: 206)

Verkuyl concludes his comparison of his own theory and the proposal involving coercion with the following statement:

I fail to see why the simple solution of keeping the verb meaning constant in aspectual composition is so difficult to accept. (2001: 207)

Verkuyl's theory is indeed simpler than the notion of coercion. One problem I have with Verkuyl's analysis is that many linguists are able to decide into which aspectual category a verb *on its own* would fall. This is the case even if the same verb has the ability to be used in many different Aktionsarten in a verb phrase or sentence. For example, *walk* can be used as an accomplishment in example (104), and an activity in (105). On its own though, *walk* will always be listed as an activity.

(104) Walk to the park.

(105) Walk along the road.

Therefore, from the range of Aktionsarten available to a verb in more complex environments, one category can still be associated with the verb alone. In the majority of cases there is general agreement as to which aspectual class the verb belongs. It is true that in the literature the examples given as accomplishments are generally verb phrases, but this does not need to be the case; *drown*, for example, is an accomplishment. I would argue that a verb therefore does have some features, or some sense about it, that allow it to be classified aspectually without additional arguments or other sentential context.

Verkuyl (2005) alters his focus to the tense and aspect difference, but still comes to the conclusion that coercion need not exist (p.168). Verkuyl argues that the perfect indicates completion, and that the imperfect indicates an 'incompleted' event. The main premise for this argument is that the notions of *imperfect past* and *perfect present* are flawed. Verkuyl questions how an event that occurred in the past can be incomplete. Similarly,

he questions how an event that is occurring in the present moment can be complete. Verkuyl demonstrates his theory with examples (106) to (109). Examples (106) and (108) are imperfect past, whereas examples (107) and (109) are given in the present perfect. Examples (106) and (107) are [-T], and examples (108) and (109) are [+T].

(106) She ate.

(107) She has eaten.

(108) She ate a sandwich.

(109) She has eaten a sandwich.

Verkuyl argues that the perfect indicates completion regardless of terminativity/telicity, and those examples that are given as imperfects are therefore incomplete. Thus, the perfect relates to the perfective, crossing the boundary between tense and aspect.

3.3 Pustejovsky

Pustejovsky (1995) uses the term ‘coercion’ to refer to type shifting, which he defines as:

A semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error. (1995: 111)

Type shifting is the means by which an expression may change its type depending on the context. In this theory every expression has a default type, and each expression is allowed particular type shiftings, both well-defined and undefined (p.106). For example, the verb *consider* takes by default a predicative phrase (type <e,t>) as one of its complements:

(110) John considers Mary to be a fool.

However, it can also be used with a noun phrase complement (type $\langle\langle e,t\rangle,t\rangle$), in which case the noun phrase must be type shifted from type $\langle\langle e,t\rangle,t\rangle$ to type $\langle e,t\rangle$:

(111) John considers Mary a fool.

Pustejovsky models the above process of converting a noun phrase to the type of a predicative phrase using lambda abstraction (1995: 107). Pustejovsky contrasts his analysis of (110) and (111) to Dowty (1979), who decided that in cases such as (110) and (111) above, the verb is ambiguous and the different interpretations are listed as separate, but related, entries in the lexicon (Dowty 1979: 269).

Pustejovsky's examples of type shifting are clearly a different sort of coercion to that discussed in relation to Aktionsart. The ambiguities that Pustejovsky discusses involve syntactic rather than semantic distinctions, as the essential meaning has not changed between the two sentences above; it is just the complement's syntactic category that has changed. This is in contrast with Aktionsart coercion which involves change in the semantics of the verb itself.

Pustejovsky also discusses verbs with different, but categorially identical, complements such as *want*:

(112) Bill wants a sandwich (to eat).

(113) Bill wants a cigarette (to smoke).

Type shifting cannot account for the differences in these interpretations of *want*, as no type shifting operator could be both general enough to cover all type instances that require shifting, and yet at the same time be specific enough to deal with the individual cases (Pustejovsky 1995: 110).

Pustejovsky rejects the type shifting theory using the semantics of the complements. A type shifting theory creates new semantic categories for the different complement types that are combined with the verb. Pustejovsky believes that the essential meaning of the verb does not change when combined with different complement types. Instead, he attributes the difference in meaning to the “selectional properties on the verb’s complement” (p.110). Presumably Pustejovsky is referring to different complements selecting or focussing on different elements of the same verb.

The complements associated with the different lexical interpretations of the verbs do themselves contribute towards the different meanings in a systematic manner: consider examples (114) to (117):

(114) Bill wants a sandwich (to eat).

(115) Bill wants a cigarette (to smoke).

(116) Bill likes sandwiches (to eat).

(117) Bill likes cigarettes (to smoke).

The complements of the sentences affect both *want* and *like* in the same way. The inclusion of *sandwich* in both examples (114) and (116) generates the interpretation of *eat* as the “missing” or invisible verb, whereas the use of *cigarette* in examples (115) and (117) gives the reading of *smoke* as the missing verb. As the arguments make a systematic contribution to the sentences’ interpretations, the ability of some verbs to have different interpretations should not be described as being as basic as verbal ambiguity nor allocated to a powerful meaning postulate that does not capture the systematic polysemy of the complements.

Pustejovsky observes that Dowty (1985) discusses examples such as (112) and (113), concluding that the context in which each instance of the verb is given allows pragmatics to determine which version of the verb is intended, and the individual lexical items are related using meaning postulates. One of the main reasons Dowty gives for his conclusion is that the different uses of a verb requires subtle differences in verbal meaning that must be listed somewhere, and the lexicon is the most reasonable and obvious ‘choice’ (Dowty 1985: 312, Pustejovsky 1995: 110).

Dowty (1985: 296) also discusses the observation that sentences such as (118) to (122), which are similar to examples (114) to (117) above, have a “missing” or invisible verb that we nonetheless read and understand as part of the sentences. *Solve* is missing from example (118); *eat* is missing from (119); *read* or *write* are missing from (120); *drink* from (121); and *give* from (122).

(118) John attempted the problem.

(119) John wants an apple.

(120) John finished the book.

(121) John refused the drink.

(122) John promised Mary a book.

Pustejovsky criticises theories in which verbs such as *want* are analysed as ambiguous. First, it is not only the features of the verbs that account for their ability to have different – related – interpretations. The behaviour of the verbs is, in fact, also related to the verb’s complements. Second, Pustejovsky criticises the suggestion that meaning postulates be used to relate the different lexical entries of (essentially) the same verb to each other. If this were the case then meaning postulates would seem “arbitrarily powerful and unconstrained” (1995: 110). Creating or using a powerful abstract notion

to account for some concrete phenomena is not necessarily a good solution, but rather a transfer of accountability.

After rejecting accounts based on both ambiguity and verb type shifting, Pustejovsky proposes that what is modified via type shifting is just the logical type of the complement. This leads Pustejovsky to define coercion as the semantic operation that changes the complement, as opposed to the verb:

...a semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error. (1995: 111)

Pustejovsky also uses the term coercion when describing ‘subtype coercion’ (p.113) and ‘true complement coercion’ (p.115), which are particular classes of operations within the general category of type coercion operations. Subtype coercion refers to the selection of a complement that is a subtype of the type of complement that is expected by a verb. For example, the verb *drive* expects a complement that is a vehicle, but may be paired with *a Honda*, as in example (123). The coercion is type shifting, and exists within the hierarchy from subtype *Honda*, to *car*, to *vehicle*.

(123) Mary drives a Honda to work.

While Pustejovsky considers both subtype coercion and true complement coercion as type shifting, subtype coercion uses a single “type lattice”, whereas true complement coercion makes reference to “multiple types lattices” (1995: 115). True complement coercion actually involves a shift from one type to another (whereas subtype coercion merely shifts within the one hierarchy), and the original type is still a part of the resulting type – it does not get ‘lost’ in the transfer. For example, *a book* in (124) is

coerced into *reading a book* in (125). This coercion takes place due to *begin* requiring an ‘event’ complement, which *a book* does not satisfy.

(124) John began a book.

(125) John began reading a book.

Although Pustejovsky’s formal definition of type coercion refers to coercion as a semantic function, his description of the same operation refers to the changing of a complement’s syntactic properties. Pustejovsky’s style of analysis is actually quite similar to Jackendoff’s, as described in section 3.4 below, which uses enriched composition to explain the phenomena.

3.4 Jackendoff

Jackendoff (1997) uses the term *enriched composition* to describe situations where the conceptual structure¹⁴ of a sentence is derived by including some non-lexically-based material, rather than a simple combination of the individual elements. If this non-lexically-based material is included in the conceptual structure in order to achieve well-formedness, then Jackendoff refers to the process as coercion (1997, 2005). He uses ‘coercion’ to cover a fairly wide variety of phenomena: aspectual coercions in the form of both verb and mass-count coercions, as well as various reference transfer functions, are all encompassed within the broad spectrum of coercion.

Verbal aspectual coercion is essentially Aktionsart coercion as used for the present study. Jackendoff gives two examples of such verb coercion:

¹⁴ Conceptual structure is essentially a decompositional analysis of word and sentence meaning, where a set of type-sensitive functions are applied to typed semantic constants.

(126) Bill kept crossing the street.

(127) The light flashed until dawn.

Example (127) is a coercion generating repetition which comes about due to an aspectual incompatibility between *flash* and *until*: *until* provides a boundary to an ongoing process, but *flash* is not an ongoing process. Similarly, the aspectual auxiliary *kept* is used with an ongoing process, which *cross the street* is not. The aspectual coercion results in an ambiguity for Jackendoff as to whether Bill crosses the street repeatedly, or keeps attempting to cross the street. There are two ways of resolving the incompatibility of *kept* and *cross the street*. One method is to “zoom in”, as Jackendoff puts it, on the first part of the action – Bill’s attempt to cross the street. *Cross the street* is an accomplishment; by zooming in, the endpoint is left off, leaving an activity.

The second method of resolving this incompatibility is to zoom out and view the entire street-crossing as an indivisible whole, leaving a semelfactive. We can now envisage repetition in a similar manner to *flash* above. Jackendoff notes that this ambiguity must come about through the interaction of the different elements within the sentence, as none of the lexical items are themselves ambiguous (1997: 51). As Jackendoff points out, the need for coercion can only be determined after the composition of the sentence as it is based on the interaction between different elements; therefore, coercion cannot be based on lexical polysemy.

Jackendoff also discusses a “parallel” form of coercion that exists in noun phrases, focussing on mass-count coercions: (128) coerced from (129).

(128) I’ll have a coffee.

(129) I’ll have a cup of coffee.

In (128), the mass noun *coffee* appears in a count noun phrase, with the (individuating) determiner *a* rather than some mass determiner like *some*. Jackendoff believes this is a fairly specialised function within noun phrases, restricted to just a small conventionalised set of consumption situations, as endorsed by the implications of (130).

(130) *There's some vitamin pill on the counter.

Knowledge of the language and culture is essential in working out whether or not a mass-count coercion is possible. However, like verb coercion, Jackendoff believes mass-count coercion is not an example of lexical polysemy as the coercion is a general phenomenon even though it is within a very restricted environment (1997: 53).

Therefore, like aspectual coercion, Jackendoff believes the mass-count noun phrase coercion to be an element of enriched composition within (syntactic) conceptual structure.

Reference transfers are another sort of coercion, according to Jackendoff. The classic example of a reference transfer is:

(131) The ham sandwich wants another coffee.

The referent of *ham sandwich* is roughly interpreted as *the person contextually associated with a ham sandwich* (Jackendoff 1997: 54) based on the context in which it was uttered. As Jackendoff noted, the relation between a ham sandwich and a person clearly cannot be attributed to lexical polysemy. There are two other possible explanations for the reference transfer. The first is pragmatics (occurring after the semantic composition). The second is that the subject of the sentence has some phonologically null syntactic elements that can be interpreted as “person contextually associated with” (p.54). Jackendoff argues against the pragmatics post-sentence-

construction explanation using non-coreferential reflexives and by making reference to the opera 'Nixon in China':

(132) Nixon was horrified to watch himself sing a foolish aria to Chou En-lai.

(133) *After singing his aria to Chou En-lai, Nixon was horrified to see himself get up and leave the opera house.

In (132), *himself* has a reference transfer to the character onstage, however (133) does not make sense as the shifted referent is given as antecedent for the anaphor that refers to the real person. The contrast between (132) and (133) cannot be determined until the original reading and transferred reading have been differentiated. Therefore, as binding is an element of grammatical composition, the reference transfer – despite being pragmatic – must actually be recognised as relevant during the semantic composition of the sentence (p.55).

Jackendoff also dismisses the idea of the null syntactic element that can be interpreted using a general convention based on the fact that reference transfers are not general; rather, they occur only in very restricted semantic classes. Three examples that Jackendoff discusses are personal resemblances, cars, and the ham sandwich example. Reference transfer can easily occur when involving pictures, statues, and acting (see example (134)) as well as the first Nixon example in (132).

(134) Look! There's King OGPU hanging on the wall/standing on top of the parliament building.

However, reference transfer cannot occur so easily in story-telling (excluding very specific situations such as a Beatles sound-alike competition):

(135) ?Harry gave us [an account of] Ringo.

A contrast between drawing and verbalising using the same lexical item (sketching) is given between:

(136) Bill was doing (charcoal) sketches of the Beatles,
and to my delight he gave me Ringo.

(137) *Bill was giving us (quick verbal) sketches of the
new employees, and to my surprise he gave us
Harry. (p.56)

Therefore, even within the general genre of personal resemblances, the acceptability of reference transfer is restricted.

Jackendoff provides further examples of restrictions on reference transfer using expressions for modes of transport. At the same time he demonstrates that cultural and language knowledge is essential in determining when reference transfers are allowed. In these examples the reference transfer is between a person and their mode of transport. Jackendoff states that the reference shift is only possible when the person is in control of the vehicle (p.56). However, I think that actual control is not necessary; rather, being within the vehicle is enough to allow reference transfer: (138) and (140) are acceptable, whereas (139) is not.

(138) A truck hit Bill in the fender when he was
momentarily distracted by a motorcycle.

(139) *A truck hit Bill in the fender two days after he died.

(140) Bill was sitting in the back seat of his car reading
when he was hit by a truck.

The use of reference transfer is not acceptable as the target of a discourse pronoun:

- (141) *Hey, that's Ringo parked over there! Isn't he
beautifully painted! (p.57)

The reference shift also does not work when the vehicle is a horse:

- (142) #Ringo suffered smashed hooves in the accident.

A reference shift cannot occur if the sentence would be interpreted felicitously without a reference transfer. In the transport examples, the vehicle must not be living for the reference transfer to work; in (142) Ringo would most likely be read as the horse, rather than the intended interpretation using reference transfer of being the rider.

There are also restrictions on reference transfer examples of the ham sandwich type.

One such restriction is that the source of the transfer must be some salient property:

- (143) The ham sandwich/the big hat/the foreign accent in
the corner wants another coffee. (p.57)

As mentioned with regards to the vehicles, the reference transfer does not "go through" if the given noun phrase is acceptable as the subject of the sentence without reference transfer:

- (144) #The blonde lady over there in the corner wants a
hamburger (when referring to the man with the
blonde lady).

Also, the noncoreferential reflexive does not work in these scenarios:

- (145) *I gave the ham sandwich to itself (that is, to the
person who ordered it).

Because reference transfer is so restricted, even within the general areas in which they are permitted, Jackendoff concludes that a speaker must have learned some principles of enriched composition for their language. These principles direct which instances allow reference transfer and which do not. As enriched composition is Jackendoff's way of describing coercion, Jackendoff includes reference transfers as examples of coercion (p.58).

The term coercion is also used by Jackendoff to describe some cases of the modification of a head noun by an adjective. The adjective *wooden* is commonly used in combination with a noun to generate the meaning that the object denoted by the noun is made of wood: *wooden spoon*. However, *wooden* can also be combined with living objects such as *turtle* which results in an interpretation that the wooden object is a replica of a turtle (whereas the spoon in the above example is not a replica of a spoon). Jackendoff believes this difference to be another version of reference transfer; therefore modifications of head nouns by an adjective are also labelled coercions.

Jackendoff demonstrates the use of coercing functions with verbs such as *ask* and *intend* to amend the verb's complement to make it conceptually compatible with the verb's argument structure (p.60). When verbs like *ask* are combined with a noun phrase, such as *the time*, which then forms an indirect question, the noun phrase is reinterpreted as *what the time is*. When verbs like *intend* are combined with a 'that'-subjunctive complement, such as *that Sue come*, the phrase is reinterpreted as a voluntary action that brings about the event of Sue coming: *to bring about that Sue come*. According to Jackendoff, these reinterpretations are able to exist due to specialised rules that "paste" coercing functions around the reading of the complement (p.60).

Jackendoff uses the term ‘coercion’ to refer to a variety of different phenomena. De Swart (1998), like Jackendoff, accepts the use of coercion with reference to parts-of-speech other than verbs, and mentions clashes between a functor and its arguments that result in ungrammaticality. However, she doesn’t go into further detail concerning such cases in her paper, but focuses on aspectual coercion.

3.5 De Swart

De Swart (1998) defines coercion as a “contextual reinterpretation process” (p.359), which is triggered by a conflict between an eventuality description’s Aktionsart (which De Swart refers to as aspectual class) and the Aktionsart of other contextual elements (p.360). She states that linguistic context and knowledge of the world are essential when evaluating whether or not a coercion is felicitous.

De Swart compares coercion to grammatical operators, observing that coercion is not “visible” in the same way that grammatical operators are: the progressive in English is marked by the ‘-ing’ suffix which is easily identifiable, whereas coercion resolves aspectual conflicts based on lexical and contextual or world knowledge and is not represented by any explicit markers.

Grammatical aspect is, according to De Swart, a mapping from one type of eventuality to another (1998: 352). For example, the progressive generally only combines with non-stative eventualities. According to De Swart (and others such as Moens and Steedman (1988), and Michaelis (2003)), phrases that are in the progressive are read as stative. Hence, one of the functions of the progressive is to transform non-stative expressions into stative ones. De Swart uses Moens and Steedman’s analysis of coercion to describe how the progressive performs the transformation of an accomplishment. The

progressive strips the dynamic eventuality of its culmination point, then picks out a part of the process (without a culmination point, the accomplishment can be seen as a process) which, even if it “does not continue in the real world, has a reasonable chance of continuing in some other possible world...” (p.355).

Like grammatical aspectual operators, ‘for’ time adverbials transform states and processes into events, and ‘in’ adverbials require events as both input and output. De Swart later (pp. 368-369) describes phrases such as those beginning with ‘for’ and ‘in’ time adverbials as being ‘aspectually-sensitive’. If a phrase being paired with an aspectually-sensitive element does not fit the required specifications then coercion comes into play giving rise to special interpretations.

De Swart defines coercion as being syntactically and morphologically invisible. It is not specific to certain eventuality types in the way grammatical operators are (p.360). In a similar manner to the way Jackendoff pastes special ‘coercing functions’ around the necessary elements, De Swart believes that the need for coercion is triggered by an aspectually-sensitive word or phrase, but that this phrase does not actually perform the coercion. Rather, the coercion – once triggered – is performed by a more abstract ‘coercion operator’.

De Swart introduces three coercion operators: C_{eh} (a coercion from an event¹⁵ to a state or process), C_{he} (a state or process to an event), and C_{sd} (a state to a process or event). These are used when an eventuality description is paired with an otherwise incompatible aspectually-sensitive phrase. For example, (146) is an event, and so would not normally

¹⁵ De Swart uses an ontology of states, processes, and events.

be suitable input for the aspectually-sensitive phrase *for a few minutes* which requires a state or process as input.

(146) John walked to the park.

(147) John walked to the park for a few minutes.

As a result, (147) requires the use of coercion operator C_{eh} . With the inclusion of this operator, the event phrase is coerced into a process, which is suitable input for phrases beginning with the 'for' adverbial. The coercion operators perform type shifting in accordance with those described by Moens and Steedman's analysis to bring about the coercions.

De Swart's interpretation allows for a compact analysis of individual aspectually-sensitive phrases such as 'for', in that each phrase has only one function – such as taking a state or process and giving an event. This is contrasted with analyses that also allow for the time adverbials to be responsible for coercions when required. However, De Swart's interpretation requires the introduction of several coercion operators which can be applied to various different phrases. I cannot see a significant practical difference between suggesting that an aspectually-sensitive phrase triggers the inclusion of a separate coercion operator, and suggesting that the aspectually-sensitive phrase performs the coercion itself when required. De Swart's analysis simply adds another extra-linguistic feature which she has created to do the extra 'work', and make the function of aspectually-sensitive phrases rather neater. This extra-linguistic feature of coercion operators could draw similar criticisms as those brought against meaning postulates by Pustejovsky.

Both De Swart and Moens and Steedman agree that coercion is essentially a type shifting function. However, their interpretations of this function differ, with Moens and Steedman attributing coercion to phrases that are described by De Swart as aspectually-sensitive, and De Swart introducing a separate coercion operator. Despite the neat analysis of aspectually-sensitive phrases that is generated by De Swart's theory, I prefer Moens and Steedman's which does not use an extra – syntactically invisible – operator to perform the coercions required by some combinations of phrases. There is little evidence for De Swart's coercion operators; they simply provide a slightly neater analysis.

3.6 Michaelis

Michaelis (2003) defines coercion as “an inferential process through which operator-argument conflicts are resolved in favour of the meaning of the operator” (p.1). She gives example (148) – where ‘in’ forces an inchoative reading on the predicate *was* that is normally a state.

(148) The ambulance was there in a few minutes.

Like De Swart, Michaelis sees coercion as a type shifting mechanism. She also differentiates between (De Swart's) coercion operators and ‘aspectual operators’ (Michaelis 2003: 4). Coercion operators are, as discussed in section 3.5, “syntactically and morphologically invisible” (De Swart 1998: 360), and occur in situations with a need to resolve an aspectual conflict. By contrast, aspectual operators (such as adverbials like ‘in’) are visible even if the process of coercion that they bring about remains hidden.

Another difference between coercion operators and aspectual operators is that coercion operators are “macro” operators in that they perform a range of different coercions within their scope (which may be to convert, say, either a state or a process to an event). Aspectual operators, on the other hand, generally affect a feature of a situation’s aspect – such as the telicity – which of course affects the general aspectual interpretation of the situation.

Interestingly, while using similar terms and notions to De Swart, Michaelis seems to attribute the act of coercion to the aspectual operators:

...the type-shifting Progressive operator coerces a
dynamic reading of the stative situation radical *I live-on*
Pearl Street. (Michaelis 2003: 3)

By contrast, De Swart postulates separate coercion operators to perform the coercion when required to do so by the aspectual operators.

Michaelis details two types of aspectual operators that she terms *type-shifting* and *type-sensitive* operators. Type-shifting operators are similar to De Swart’s grammatical aspectual operators in that they have an input of one aspectual class and an output of a different aspectual class. For example, the English progressive has activity input (149), and stative output (150) (obviously following the theory that progressive sentences are stative).

(149) John ran.

(150) John was running.

A type-sensitive operator's input type is the same as its output type. Like De Swart's aspectually-sensitive elements, the input must be of a specific type – if the input does not initially comply, it is coerced into the required type. For example, *in an hour* is a type-sensitive operator which requires a telic phrase such as (151) as input, and also gives a telic phrase such as (152) as output.

(151) John walked to the shops.

(152) John walked to the shops in an hour.

If a phrase is atelic to start with (153) and it is combined with *in an hour*, then it is coerced into a telic reading so that it can fit with the operator's requirements; for example, we may interpret (154) as (155).

(153) John walked.

(154) John walked in an hour.

(155) John walked (his usual route) in an hour.

As both type-sensitive and type-shifting operators require specific types of input, they are both sometimes called upon to perform coercions.

Michaelis and De Swart's theories of type-shifting and type-sensitive aspectual operators have the same basic principles. The major difference is that Michaelis assumes that the aspectual operators are performing any required coercions themselves, and De Swart's analysis utilises some other abstract element to perform the coercion when required by the aspectual operator.

3.7 Rothstein

Rothstein (2004) has a more restricted view of coercion. She differentiates between “natural aspectual shift operations” and coercion. Natural aspectual shift operations preserve the structure of the shifted lexical predicate, whereas coercions restructure the original lexical predicate. Examples of preserved lexical predicates are *arrive* (156) and *enter* (157). Examples of restructured lexical predicates are *spot*, *notice*, and *realise* (examples (158), (159), and (160) respectively).

- (156) Mary is arriving at the station.
- (157) Now she is entering the train.
- (158) Mary is spotting her arch enemy across the room.
- (159) The critic is noticing the new picture.
- (160) Dafna is realising her mother has come to pick her up from kindergarten.

For achievement-in-the-progressive natural aspectual shift operations, the moment normally associated with the achievement is shifted into the culmination point attached to an activity – thus the operation preserves the form of the original predicate. For example, *arrive at the station* may be shifted to the end of a series of events associated with arriving at a station (such as getting out of a taxi, collecting suitcases, and so on). The coerced achievement-progressive examples shift the achievement into an activity reading by drawing out the normally punctual event – thus the form of the predicate has been changed by the operation.

The difference between natural aspectual shift operations and coercions can be demonstrated using the imperfective paradox in ‘slow motion’ reading. To get a slow motion reading of an achievement in the progressive, imagine a film of the scenario that

is slowed right down. The imperfective paradox does not seem to exist with the coerced predicates (161). However, it does still apply to the predicates with natural shift (162). Example (162) can be seen as felicitous because *arrive* in the progressive generates a preceding activity for the culmination point. This activity becomes the focus of the first half of example (162), but the second half *he hasn't arrived yet* still refers to the culmination point at the end.

(161) *Mary is spotting her arch enemy across the room
but she hasn't yet spotted her.

(162) John is arriving at the station, but he hasn't arrived
yet.

Note that the difference between natural aspectual shift operations and Rothstein's coercion can be seen using Moens and Steedman's diagram (see Figure 2): the method of turning *arrive* from an achievement into an accomplishment can be followed using the arrows, adding a preparatory process. However *realise* moves from an achievement straight into an activity through the 'slowed down' method, which isn't possible on Moens and Steedman's diagram. Therefore, Moens and Steedman's diagram, which aims to map the acceptable coercions, perhaps maps natural aspectual shift operations, but not the more unusual examples that Rothstein has termed coercions.

3.8 Van Lambalgen and Hamm

Van Lambalgen and Hamm (2005) refer to intension as they draw a parallel between coercion and the traditionally philosophical terms *sense* and *reference*. They also designed their own way of analysing an eventuality, which is similar to Moens and Steedman's nucleus.

An eventuality “quadruple” can involve up to four elements (f_1, f_2, e, f_3) :

- f_1 : a fluent which represents an activity, something which exerts a force;
- f_2 : a parameterized fluent, representing a parameterized object or state, which is driven by the force f_1 ;
- e : the culminating event, representing a canonical goal;
- f_3 : a fluent which represents the state of having achieved the goal.

By comparison to Moens and Steedman: f_1 corresponds to Moens and Steedman’s preparatory process; e is the culmination; and f_3 is Moens and Steedman’s consequent state. Van Lambalgen and Hamm introduced f_2 which they claim assists when discussing accomplishments and progressive eventualities (p.84).

Van Lambalgen and Hamm use the term *scenario* to refer to eventualities written in an event calculus. The basics of the calculus are as follows: the symbol f represents fluents,¹⁶ e refers to events, and t to time points. Formulae such as (163) to (166) can then be generated to show that events initiate and terminate fluents, and that a fluent was true at a particular time (p.38).

(163) Initially(f)

(164) Happens(e, t)

(165) Initiates(e, f, t)

(166) Terminates(e, f, t)

A *scenario* is a conjunction of statements similar to (163) to (166) above.

¹⁶ *Fluents* are time-dependent properties, such as the movement of ball A only occurring before time t .

When using their quadruple to exemplify the different Aktionsarten (Table 2), Van Lambalgen and Hamm split activities into *wide* and *strict* activities. Wide activities, such as *push a cart*, include an incremental theme¹⁷ referring to the changing position of the cart. Strict activities, such as *push*, do not have this theme. The pluses or minuses refer to whether or not the Aktionsart includes the phase corresponding to (f_1, f_2, e, f_3) .

State	(-, -, -, +)
Activity (strict)	(+, -, -, -)
Activity (wide)	(+, +, -, -)
Accomplishment	(+, +, +, +)
Achievement	(-, -, +, +)
Point	(-, -, +, -)

Table 2: Van Lambalgen and Hamm's Aktionsarten.

Van Lambalgen and Hamm recognise several different styles of aspectual coercion, which, as a whole, they define as:

The potential of grammatical constructions, such as the progressive, to 'move' a verb or verb phrase from one aspectual category to another (p.170).

In spite of their use of 'grammatical constructions' in the definition of coercion, Van Lambalgen and Hamm recognise that there are instances of coercion which cannot be attributed to a linguistic element of the sentence (p.170). Although they, unlike Verkuyl, acknowledge the existence of coercion, Van Lambalgen and Hamm, this time in line with Verkuyl, do not subscribe to the view that a verb has a lexically-based

¹⁷ The terminology is attributed to Dowty.

Aktionsart, due to the ability of noun phrases to affect the Aktionsart of a verb phrase or sentence (p.169).

Interestingly, despite their conviction that Aktionsart “of verbs cannot be lexical properties of these verbs alone” (p.169), Van Lambalgen and Hamm allow that *resemble* is “conceived of as a state” (p.173).

Van Lambalgen and Hamm divide coercion into three main types: additive, subtractive, and cross-coercion. They also discuss coercion using temporal adverbials. They list two additive coercions: the first is from activity to accomplishment – see examples (167) and (168) – through the addition of an object that generates a culminating event. The second additive coercion is from achievement to accomplishment – see examples (169) and (170) – through the addition of their f_1 – the preparatory phase.

(167) Build. (activity)

(168) Build a house. (accomplishment)

(169) Reach the top. (achievement)

(170) They were reaching the top when a blizzard forced
them to go back. (accomplishment)

Obviously the common theme is the addition of some meaning to the eventuality (“elaborating a scenario” p.171). This occurs in rather a similar manner to Moens and Steedman, although the terminology and formulaic methods of Van Lambalgen and Hamm differ somewhat.¹⁸

¹⁸ See Van Lambalgen and Hamm (2005) pp. 171-172 for more detail.

Subtractive coercion, fairly obviously, involves the removal of elements of a scenario.

Van Lambalgen and Hamm give the example of accomplishment to activity, as in examples (171) and (172).

(171) Drink a glass of wine. (accomplishment)

(172) Drink wine. (activity – wide)

Taking away “a glass of” removes the culmination point, turning the accomplishment into an activity.

Cross-coercion seems to be the “too hard basket”, containing cases of coercion that are not able to be directly placed into additive or subtractive coercion. Van Lambalgen and Hamm prefer to regard coercion as a whole, despite some coercions being possible through several addition or subtraction procedures. The progressive that coerces a state (of type (-,-,-,+)) into an activity (+,+,-,-) is one such example. Van Lambalgen and Hamm assume that coercion in these examples is in fact more than just a combination of other coercions. This assumption contrasts with Moens and Steedman, who allow a series of related coercions.

The first example of cross-coercion given by Van Lambalgen and Hamm is from state to activity, as in the use of *resemble* in example (173). Van Lambalgen and Hamm claim that the coercion is due to a unification of *resemble* with their f_1 parameter that forces the state to become an activity (p.174).

(173) She is resembling her mother more and more every
day.

Van Lambalgen and Hamm have labelled the second example of cross-coercion the “structural versus phenomenal distinction”, referring to some other examples of traditionally stative verbs that can be used in the progressive. In this section Van Lambalgen and Hamm discuss Carlson’s stage-level predicates, although they do not make reference to them by that name. The examples given are (174) and (175):

(174) The Sphinx stands by the Nile.

(175) Mr Smith is standing by the Nile.

The coercion comes about through *stand* being initially without parameters, but with the addition of *Mr Smith*, parameters are added through the recognition that Mr Smith’s position will change. Since it now needs some energy input, the state is coerced into an activity reading (p.175).

The third example of cross-coercion is from a point to an activity: the coercion is therefore from quadruple (-,-,+,-) to (+,-,-,-) or (+,+,-,-), as in examples (176) and (177).

(176) The light flashed.

(177) The light was flashing all night.

In these instances the coercion process requires a punctual event (also known as an *event type*) to be reinterpreted as a durative one (and therefore a fluent). Once the event is a fluent instead of an event type, the preparatory process can be unified with an activity (or mechanism) that drives the eventuality, and the fluent can be unified with the f_2 state.¹⁹

¹⁹ For more detail see Van Lambalgen and Hamm (2005) pp.175-176.

The final example of cross-coercion described by Van Lambalgen and Hamm is from activity or accomplishment to state. They recognise two different ways of performing this coercion. The first is negation, where a negated activity is seen as a state. Van Lambalgen and Hamm describe this phenomenon in terms of fluents: an activity is a fluent for the actual eventuality but also a parameterised state. The state changes only when the activity is happening, otherwise it is static. Therefore when the activity is not actually happening, it is represented by the stative element (p.176).

The passive is their second method of coercing an accomplishment or activity into a (consequent) state. Consider example (178); one reading of these sentences is that once the shed is built, the neighbours are unhappy (for example it blocks their view).²⁰

(178) A shed is built in John's garden. This causes his
neighbours much distress.

Van Lambalgen and Hamm attribute this reading to coercion which involves interpreting the noun phrase *a shed* as a real object (when it is not necessarily the case), which can then take an adjective. *Built* is then seen as an adjective, which enables the consequent state interpretation of (178) (p.177).

Van Lambalgen and Hamm also recognise the coercive potential of the temporal adverbials *for* and *in*. Their analysis of the coercions performed by the adverbials is essentially the same as authors such as Moens and Steedman and Michaelis: the adverbial *in* performs coercion when used with achievements, as it measures the duration before the start of the eventuality, rather than the duration of the activity-

²⁰ The other reading is that the neighbours get upset while John is building the shed, perhaps due to the noise he makes while building it.

section as it does with accomplishments. The adverbial *for* can coerce an iterative reading of an accomplishment as in example (179).

(179) Pollini played Opus 111 for two weeks.

Van Lambalgen and Hamm give other examples of coercions performed by the temporal adverbials, such as from activities into accomplishments, which are fairly standard across the literature.

Van Lambalgen and Hamm primarily describe their analysis of temporal adverbial coercion using fluents. They do also, however, recognise the more ‘standard’ descriptions of the coercion process, such as iterativity. It is therefore feasible that the other areas of coercion (addition, subtraction, and cross-coercion) described by Van Lambalgen and Hamm could just as easily be described by more common coercion terms as used by other authors rather than in terms of their somewhat unique ‘fluents’.

One of the more unusual elements of Van Lambalgen and Hamm’s discussion of coercion is their use of reference to intensionality. In their analysis of aspectual coercion, some constructions override a verb’s Aktionsart, as aspect imposes temporal structure on events (p.182). Therefore it is possible to relate the traditionally philosophical terms *sense* and *reference* to aspect: *sense* refers to the way in which we view an eventuality, and *reference* refers to the full aspectual construction – the actual value in the world. When a coercion takes place, it demonstrates that sense has primacy over reference.

The achievement *reach the top* naturally focuses on the culmination point and the consequent state. The same expression can easily be used in the progressive, which shifts the focus onto the activity immediately preceding the culmination point. Van

Lambalgen and Hamm suggest that the fact that native English speakers perform this focus transformation automatically and consistently indicates an “algorithmic reinterpretation process” where the sense of the expression is constantly modified based on the incoming data (p.182).

My interpretation of their description of intensionality and coercion is that a lexical item (or an expression) has a sense associated with it which includes the set of all possible interpretations of the lexical item’s Aktionsart. Reference refers to the specific form (and Aktionsart) of the lexical item that is actually used, selected from those associated with the sense. For example *build* includes both activity and accomplishment as part of its sense, which can be realised as (180) and (181) respectively.

(180) John is building.

(181) John is building a house.

Therefore what may traditionally be seen as a coercion from activity to accomplishment can be seen as an intensional phenomenon because the coercion is a difference in selection of reference from those in the lexical item’s sense.

Van Lambalgen and Hamm provide another, rather different, way of discussing coercion through the use of fluents, quadruples, and intensionality. Despite these differences they still appear to be discussing the same Aktionsart coercion as authors such as Moens and Steedman and Michaelis.

3.9 Others

The above section outlined the views and uses of the term coercion of several of the most well-known authors in the area of aspectual semantics. The current section covers

more briefly the views of other authors who have some valuable contribution towards the compilation of different ways of viewing coercion.

3.9.1 *Bickel*

Bickel (1997) describes coercion rather differently, using Grice's maxims to explain the reasoning behind a speaker's use of a sentence requiring coercion. Example (182) would not be felicitous without repetition, which involves coercion, as it is generally accepted that the progressive cannot generally combine with a punctual event.

(182) The light was flashing.

Bickel's reasoning behind the understanding of a statement as requiring coercion is as follows: taken literally (without coercion), the sentence in example (182) is not felicitous. Grice's maxim regarding the cooperative principle includes the notion that a speaker will not deliberately generate an ill-formed sentence, as they should intend their listener to understand what they are saying (Grice 1975: 55). The progressive needs an event with duration in order to be applied felicitously. Using Grice's Quality maxim that you should not say what you believe to be false, the speaker must therefore have thought that the event occurred over a period of time. If the speaker had intended repetition to be involved in the light's flashing, then the event would indeed have occurred over some period of time. Therefore the interpretation of repeated flashing is what the hearer understands from the speaker's utterance of the sentence (Bickel 1997: 118).

3.9.2 *Krifka*

Krifka (1998) discusses coercion with reference to "measure adverbials" such as *for an hour*. Measure adverbials have presuppositions that must be satisfied for them to be

grammatical: *for an hour* requires an atelic predicate. If the presupposition is not satisfied, then the predicate is coerced into an appropriate form. Krifka states that the form of a predicate combined with *for an hour* must not be telic (p.16) and that, if coercion is therefore needed, the predicate will have an imperfective or an iterative interpretation (p.16). Presumably the coercion from a telic into a suitable imperfective reading occurs through the removal of the endpoint in a manner similar to that described by Moens and Steedman, and likewise for the iterative interpretation.

3.9.3 Piñango, Zurif, Jackendoff

Following on from his research discussed above, Jackendoff discusses coercion in a paper co-authored with Piñango and Zurif (1999). Examples requiring coercion such as (183) are termed those with “enriched semantic composition”, which contrast with “syntactically transparent semantic composition” examples such as (184).

(183) The girl jumped until dawn.

(184) The girl slept until dawn.

Sleep is temporally unbounded, and so combines easily with *until*, as it places a time boundary on an unbounded situation. *Jump*, by contrast, is a bounded event which should therefore be incompatible with *until*. However example (183) is completely grammatical, due to the interpretation of repeated jumping. This is enriched semantic composition as the iteration comes neither from the verb *jump* on its own, nor from the boundary *until* by itself, but from the use of both at once.

They define aspectual (situational) coercion as an operation that introduces a “repetition function” either as logical polysemy and type shifting, or as a generative operation in

the semantic structure of the sentence. The purpose of coercion is to “achieve aspectual compatibility between the verbal head and its temporal modifier” (p.398).

The repetition function refers to an element of the semantic representation of the verb phrase that changes the meaning of the verb from being a “point-action activity”, or semelfactive, into a repeated activity. Presumably this is then extended to represent other aspectual verbal changes in similar scenarios. The logical polysemy theory views the coercion as a type-shift from the non-iterative to the iterative sense of the verb.

Piñango et al. give four restrictions on the use of aspectual coercion. First, the sentence being coerced would only be semantically coherent if the coercion took place. For example, without coercion, example (183) would mean that the girl took one big long jump until dawn, which is incoherent. Second, the coercion is not related to the syntactic elements of the sentence, but is a semantic element that occurs when required by the combination of several parts of the sentence. Third, the coercion does not introduce extra lexical information that the verb (and its complements) could not contribute. For example, the verb *walk* does not intrinsically include many smaller broken-up walking activities that start and stop throughout any walking phase. Therefore, any coerced version of *walk* (such as *walk a mile*) would also not be broken up by necessity into multitudes of smaller activities. Fourth, the verb must be able to be “iteratable and agentive”, meaning that the one event must be able to be iterated using the same agent. *Die* does not fit these specifications, as the same person cannot die repeatedly:

(185) *The man died until dawn.

3.9.4 Todorova, Straub, Badecker, Frank

Like many others, Todorova, Straub, Badecker, and Frank (2000) make reference to Moens and Steedman in their definition of aspectual coercion: that the aspectual properties of a predicate are modified when and as required by a verbal modifier, brought about by an incompatibility of the two.

Todorova et al. note that English coercion does not have an “overt morphological reflex”. Therefore, coercion can be seen as wholly semantic rather than having some corresponding syntactic element. Their view is that the incompatibility between modifier and predicate results in the predicate receiving a new specific aspectual interpretation that differs from its default aspectual reading (p.1).

3.9.5 Xiao and McEnery

Xiao and McEnery (2004) do not focus on coercion, but seem to adopt type shifting when coercion is discussed, albeit with a slightly different method. They use a two-level approach to aspectual analyses, in which they describe not only the definition of verbs classes at the lexical level and situation types at the sentential level, but also some rules for mapping between the two levels.²¹ They recognise three syntactic levels for the sentential element of their analysis, which they term *nucleus*, *core*, and *clause*. The nucleus refers to the predicate on its own, the core to the predicate plus arguments, and the clause to the core plus non-arguments.

Xiao and McEnery initially state that their analysis of situation aspect (that is, Aktionsart) occurs at both lexical and sentential level (p.326), and they do in fact

²¹ These rules are not described here as the interaction between the two levels is not relevant to the current study.

classify verbs into the aspectual categories of achievements, accomplishments, semelfactives, activities, individual-level states, and stage-level states (pp.338-341). However, in their review of Vendler, Xiao and McEnery claim that situation aspect is a sentence-level phenomenon (pp. 327-328).

Xiao and McEnery’s classification system for both lexical and sentential levels use five binary features: *bounded* and *result* as well as the “usual” telic, durative, and dynamic. However, in their verb class feature matrix – replicated as Table 3 – they do not use these extra features to create any additional aspectual categories. This, in my view, makes the features rather redundant. Xiao and McEnery use the same features to classify their sentences, and use *bounded* and *result* to exemplify the difference between “basic” and “derived” sentential situation aspect, so perhaps they simply did not want to alter their feature classification model between the lexical and sentential levels.

	dynamic	durative	bounded	telic	result
Activity	+	+	-	-	-
Semelfactive	+	-	+/-	-	-
Accomplishment	+	+	+	+	-
Achievement	+	-	+	+	+
Individual Level States	-	+	-	-	-
Stage Level States	+/-	+	-	-	-

Table 3: Xiao and McEnery’s Verb Classes Feature Matrix.

Xiao and McEnery give a feature matrix – shown here as Table 4 – for the sentential level aspect in both basic and derived form.²² The derived form comes from the composition of the lexical aspect of the verb and other components at the lower

²² Note that accomplishment does not have a derived form given, as the features of the basic and derived forms are the same (Xiao and McEnery p.358).

syntactic levels, and resembles Verkuyl’s aspectual analysis in that the binary values of the different components contribute towards the binary values of the sentence as a whole. Presumably the situation aspect of these derived forms would change depending on their components, but Xiao and McEnery have given the feature matrix as if there is only one derived form for each aspectual class. In their derived forms, states and activities are given a temporal bound, and semelfactives and achievements are derived iteratively.

	dynamic	durative	bounded	telic	result
Individual Level States - basic	-	+	-	-	-
Individual Level States - derived	-	+	+	-	-
Stage Level States - basic	+/-	+	-	-	-
Stage Level States - derived	+/-	+	+	-	-
Accomplishment	+	+	+	+	-
Activity – basic	+	+	-	-	-
Activity - derived	+	+	+/-	-	-
Semelfactive - basic	+	-	+/-	-	-
Semelfactive - derived	+	+	+/-	-	-
Achievement - basic	+	-	+	+	+
Achievement - derived	+	+	+	+	+

Table 4: Xiao and McEnery’s Situation Type Feature Matrix.

Derived forms of situation types are essentially examples of coercion. The dominant examples of coercion given in Xiao and McEnery’s paper take place at clause (that is, sentential) level. In particular, they mention the adverbial ‘for’ and the progressive as coercion instigators. If ‘for’ is paired with a telic situation, the adverbial coerces the situation into an atelic one by “delimiting” the telic event. The progressive (if required to do so by an aspectual mismatch) triggers a type shift at clause level and coerces a telic situation into an activity (p.355). The progressive performs this coercion by

excluding the endpoint of an accomplishment, making the endpoint unavailable at the clause level. Their description of how the progressive performs the coercion suggests that they conform to Moens and Steedman's analysis of type shifting coercion.

3.10 Novel coercion

Within discussions of coercion, there are two different genres of coercion: novel and conventional. Conventional coercions are used frequently, and they are one reason Verkuyl moved away from the theory of coercion. The difference between (186) and (187) is the simple addition of an argument, yet would be recognised as a conventional coercion.

(186) She walked.

(187) She walked to the park.

The nature of the verb has barely changed, yet the Aktionsart has been coerced. As discussed in section 3.2, Verkuyl prefers to analyse Aktionsart at the phrasal level for reasons such as these.

The literature gives examples such as (188) to describe coercions that sound somewhat unnatural or need context (in this case *more and more every day*). Such coercions are termed novel.

(188) I am loving her (more and more every day).

As discussed in section 3.7, Rothstein (2004) differentiates between "natural aspectual shift operations" and coercion: natural aspectual shift operations preserve the structure of the lexical predicate, whereas coercions restructure the original lexical predicate.

Generally, the examples that Rothstein would see as coercion are novel coercions, and those which she terms 'natural aspectual shift' operations are conventional coercions.

Rothstein gave examples such as (189) as natural aspectual shift, and (190) as coercion.

(189) Mary is arriving at the station.

(190) Mary is spotting her arch enemy across the room.

The difference between novel and conventional coercions can also be seen using Moens and Steedman's diagram (see Figure 2 above). Conventional coercions can be traced on their diagram by following various appropriate arcs, whereas novel coercions attempt to follow pathways that do not exist, such as from achievement directly to activity.

3.11 Summary

There are several pathways one can choose to follow in the field of coercion. The first is to decide that coercion does not exist – as per Verkuyl – and that Aktionsart is assigned at phrase or sentence level. If, however, one accepts that coercion does exist, there is a further choice between those who discuss coercion as a more abstract notion – such as Pustejovsky, Jackendoff, and De Swart – and those who find coercion to be more grounded in the phrase or sentence itself – such as Moens and Steedman, and Michaelis.

If one believes that Aktionsart can be assigned at the lexical level, then due to the fact that the Aktionsart can differ when additional items are included to form a phrase or sentence, one must then also believe in some form of Aktionsart coercion. I believe that Aktionsart can indeed be assigned at the lexical level. My primary reason for this view is that the majority of linguists would be able to determine, without any extra information, that the single lexical item *walk* is an activity, and similarly, that *love* is a state. If Aktionsart is not associated with individual lexical items, how would this be possible?

I was interested in exploring the mainstream theories of Aktionsart coercion, as well as the ways speakers use verbs to produce coercions in naturally occurring data. Therefore, the adoption of coercion as an appropriate theory was essential to my research topic.

Given the stance that Aktionsart coercion does exist, I chose to follow the pathway and theories associated with Moens and Steedman, where coercion is not an additional abstract notion on top of the phrase or sentence construction. I chose to base my research on the grounded, traditional theories. The research carried out in this project investigated the reasons and methods evident behind coercion as exemplified in corpora. The more abstract theories would have been much harder to resolve within the data than Moens and Steedman's analysis, which has evidence within the corpus itself. My research therefore assumes that coercion exists, and that the source is visible within the phrase or sentence.

Chapter 4 Data Collection

This chapter describes the data collection process used as part of the current research. It begins with a justification for using corpora for coercion research, followed by some terminology and background information about the corpora research that was performed. The following sections describe the process of designing and then using a computer program for the corpora research. This chapter concludes with a discussion of some problems that were encountered during data collection.

4.1 Corpora-based coercion research

Given the premise that coercion exists, one main question is, to what extent does coercion actually occur in natural language: do people actually compose novel coercions, and what types of conventional coercions take place? I was also particularly interested in novel coercions at the start of my research. I was interested in whether or not people use verbs in ways that result in novel coercions.

To investigate common natural language, corpora are useful. Xiao and McEnery (2004) used corpora in their aspectual studies (albeit with a different aim), and they quoted Meyer (2002: 11) as stating that “linguistic analysis will benefit if it is based on real language used in real contexts”. Xiao and McEnery also noted that:

... previous studies of aspect have largely been conducted without recourse to attested language data. They have, rather, been based on a handful of confected examples which, if not intuitively unacceptable, are atypical of attested language use. (Xiao and McEnery 2004: 332)

I designed a program which parses corpora to help me investigate the way verbs are “actually” used as opposed to the way they “should” be used according to the literature.

4.1.1 *Base and instance Aktionsart*

I used two levels of analysis in my research: *base* Aktionsart, and *instance* Aktionsart.

The analysis and classification of a verb as a particular Aktionsart – at both levels – was based on criteria as discussed in section 2.5.

The first of the two levels of analysis – *base Aktionsart* – is similar to Xiao and McEnery’s neutral context in that the analysis involved stripping the verb and its context down to the bare essentials. In allocating a verb’s base Aktionsart I made the verb as simple as it could be, by using simple present tense and as few arguments as possible. Generally, I attempted to classify the verb on its own, such as *run* (which has a base Aktionsart of activity), or *love* (which has a base Aktionsart of state). While intuition is useful, the base Aktionsart of a verb was predominantly allocated using various linguistic tests as described in section 2.5.

The second level I used was for corpora analysis, and was essentially Chung and Timberlake’s (1985) proposition level. I termed the Aktionsart at this level *instance Aktionsart*, as the Aktionsart may vary between different instances of the same verb. I included any modifiers, such as time adverbials, and extra arguments that were relevant to the verb (as opposed to being part of the next proposition). With reference to corpora, this generally corresponded to analysing an entire sentence, although not all elements of the sentence actually contributed to a verb’s Aktionsart. For example, in analysing the Aktionsart of *get* in example (191), there are many words (such as *yet*) that do not directly contribute to the classification.

(191) No he hasn't quite picked up all the subtleties of the
game go fetch yet, he's **getting** there. (Narratives
corpus)

Any of the words in a sentence have the potential to affect the instance Aktionsart, which is why an entire sentence was analysed for each consideration of a verb's instance Aktionsart. In some cases more than one verb in a sentence was analysed. For example in (191), the verbs *pick* and *get* have the potential to be analysed. Each verb in a sentence was analysed separately when such situations arose.

4.1.2 Corpora

I studied a variety of data from several corpora in my research. The British National Corpus (BNC), the American National Corpus (ANC), and the International Computer Archive of Modern and Medieval English (ICAME), are large collections of corpora which are readily available for purchase.²³ I also used data from a 'Narratives' corpus which was compiled by Ritz and Engel.

The specific corpora that contributed to my research were:

- ANC: Berlitz
- ANC: NY Times
- ANC: OUP
- BNC: Spoken A
- BNC: Spoken D
- ICAME: COLT
- Narratives

²³ I used copies that belong to Linguistics, University of Western Australia.

Although I ran my program on more corpora than these, the time constraints were such that the actual data examined came only from the specific corpora listed above.

The ANC was the first version, released in 2003, with approximately 11 million words. The New York Times (NY Times) component is a compilation of articles printed in the New York Times on odd-numbered days in July 2002. The Berlitz component was derived from Berlitz travel guides, contributed by Langenscheidt Publishers. The data for the OUP portion of the ANC came from various non-fiction texts that were authored by Americans, and published by the Oxford University Press. All of these three ANC corpora are written corpora.

The data for the BNC corpora was primarily collected during the period 1984-1994, and contains just over 100 million orthographic words. The BNC collected data from a wide variety of ages – they list age groups from 0-14 years, through to age 60+. The data in ‘spoken A’ was classified as ‘miscellanea’ in the domain of social science. Despite ‘spoken A’ being classified as a spoken corpus, it appears to also contain data from fact sheets and newsletters. There were several sub-corpora within the ‘spoken D’ category, which I combined into one large file. The data in the combined ‘spoken D’ was generated from various meetings, such as a Museum Society meeting and a Pensioners’ and Trades Union Association meeting.

The ICAME: COLT is the Corpus of London Teenage language. COLT is an informal spoken corpus, and was collected in 1993. The majority of data (approximately 85%) within the COLT corpus comes from London teenagers aged 10 to 19 years.

The Narratives corpus is a spoken corpus consisting of narratives from radio chat-show programs in Australia. It was collected between the years 2000 and 2002 by Ritz and Engel, for research into the use of present perfects in Australian English. As a result it contains many examples of the present perfect being used in a ‘hot news’ or historical/narrative style, as in example (192).

(192) and I had to go and, and the owner was going ‘put it down, put it down’ and **we’ve grabbed him** and it had all slobber and there’s a big great dane mark in my berkenstock now.

The narratives corpus is significantly smaller than the others used in the current project, with less than 20,000 words.

4.2 Designing the program

As mentioned in section 4.1, a significant portion of my research was dedicated towards designing a program to allocate instance Aktionsart in the corpora. The program was intended to alleviate the huge amounts of time that hand-tagging instance Aktionsart would have taken. The actual implementation of the program was done by a software engineer, to my specifications.

The first stage of creating my program was to design a computational algorithm to parse the corpora with the aim of helping me assign instance Aktionsart. The base Aktionsart of a verb was not taken into account when an instance reading was analysed.

The most important part of the design was the creation of ‘rules’ which were often based on common tests for Aktionsart assignment as discussed in section 2.5. For

example, if a verb was followed closely (that is, within the next two or three words) by the words “*for* [some time period]”, then that verb was assigned an instance Aktionsart of ‘activity’. Rules were designed to examine elements such as previous or next word, previous or next tag,²⁴ and the structure of the word itself. The structure of the word allowed reference to the tense or grammatical aspect of the verb, which can affect instance Aktionsart. For example, ‘simple present’, and ‘progressive’ are both relevant structures when assigning instance Aktionsart.

The simple present is relevant for instance Aktionsart due to the assertion that if a verb is being used in the simple present then it is being used statively (see section 2.3).

Similarly, according to Michaelis (2006: 4), while the English perfect has in the past been analysed both as a tense and an aspect, it too forces a stative reading of a non-stative verb. Therefore, if a verb is being used with a perfect, then the instance Aktionsart is that of a state. The widely accepted interpretation of the perfect is that it is used with a past event that is relevant to the present. Therefore, the existence of the past event is a property of the subject, which is a stative concept.

(193) John has kissed Mary.

For example, (193) refers to one of John’s properties – that he at some point kissed Mary – and as such is an individual-level predicate, and the verb has an instance Aktionsart of state.

Another of the rules in my program relates to the grammatical aspect of the verb: the program assigns any verbs that are used in the progressive as having an ‘activity’ instance Aktionsart. While some prominent authors (such as Moens 1987 and Michaelis

²⁴ Usually a part-of-speech label such as ‘verb’ or ‘noun’.

2006) describe the progressive as having a stative output, others (such as Chung and Timberlake (1985: 215)) believe that a verb in the progressive is an activity. I found the arguments for the progressive as an activity more convincing, and therefore for the purposes of the program, I allocated situations in the progressive as activities. The primary novel coercions into progressive form have a base Aktionsart of state. Any existence of these would therefore have been missed by the program if I had also allocated the instance Aktionsart of progressives as states. When applying the coercion model, the label itself is not really the important issue. This is shown by the results section where I point out the pathways that would be used by Moens and Steedman: coercions that involve the progressive would include the move into progressive stative. Appendix D lists the rules that I used in the program.

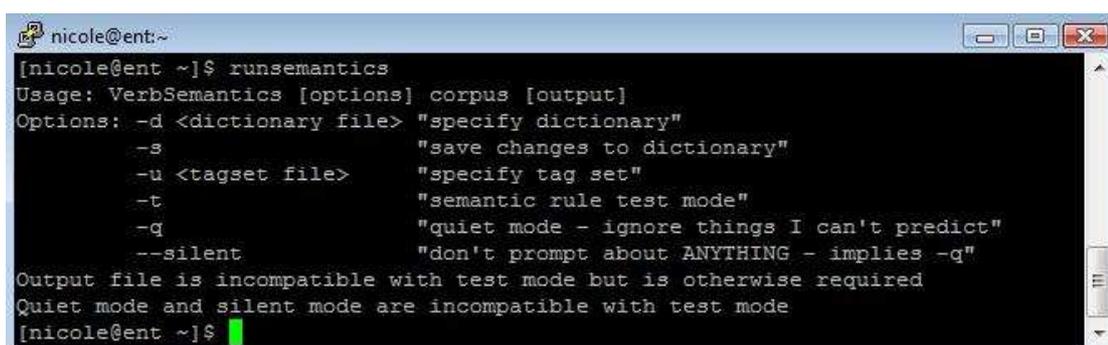
In addition to writing rules based on common Aktionsart tests, rules were also designed based on observations and patterns. For example, one rule was based on the observation that if the word immediately following a verb is *away*, then the verb in question has an instance Aktionsart of activity. Part of my program design method was to run the algorithm on a corpus to see how well the rules classified the verbs, and adapt the rules as necessary. While examining the output of a test-run of the program for errors (and thereby needed adapting), I also looked for verbs to which the algorithm had failed to assign an instance Aktionsart. I then attempted to create a generalisation across several sentences which assisted further categorisation, and then wrote this generalisation as a rule. Once I had written these extra rules I ran the algorithm again to test their validity.

Not all rules correctly allocated instance Aktionsart. There were verbs that ‘slipped through the net’ for various reasons (see section 4.3.1), and, less commonly, those that were assigned an incorrect instance Aktionsart. It was rarer for an incorrect assignment

of instance Aktionsart because the program was designed to suit my preference for a rule that skipped some verbs rather than allocating the wrong Aktionsart. These skipped verbs would not be automatically assigned an instance Aktionsart. Rather, they required user input, which is further discussed in the following section. This meant more hand-tagging of instance Aktionsart, but if a verb had been assigned an incorrect instance Aktionsart I may never have identified the error, and therefore would not have had the opportunity to correct it (a description of how to use the program follows, in section 4.3).

4.3 Using the program

The corpora-processing algorithm scans in one sentence at a time from a corpus that has been tagged for part-of-speech. The corpus being scanned needs to be in a format with only one sentence per line, which can be easily achieved by using punctuation such as full-stops when formatting the corpus. There are several command options that can be chosen when initialising the program, as shown in Figure 3.



```
nicole@ent:~  
[nicole@ent ~]$ runsemantics  
Usage: VerbSemantics [options] corpus [output]  
Options: -d <dictionary file> "specify dictionary"  
        -s "save changes to dictionary"  
        -u <tagset file> "specify tag set"  
        -t "semantic rule test mode"  
        -q "quiet mode - ignore things I can't predict"  
        --silent "don't prompt about ANYTHING - implies -q"  
Output file is incompatible with test mode but is otherwise required  
Quiet mode and silent mode are incompatible with test mode  
[nicole@ent ~]$
```

Figure 3: The initial 'runsemantics' command.

Two of these require reference to external files that will be used by the program while it runs. One of these external files is a 'dictionary' file (see Appendix A for an excerpt from the dictionary file). The dictionary file is used to store information about each

lexeme: any derivations associated with it (the lexeme itself is also listed as a derivation), as well as the base Aktionsart for that lexeme. The other external file required by the program is a ‘tagset’ file (Appendix B) that lists the abbreviations used for several parts-of-speech, such as *noun*, and *verb*. The reason for this file is that the corpora are often pre-tagged, but using different tagsets (abbreviations for the part-of-speech tags). Rather than re-tagging all the corpora to fit one specified model, I judged it to be simpler to list approximately four key tags in the external file for the program to use. The dictionary and tagset files are both xml documents which are easily edited by a user (in the current research I was the user) if required. The dictionary file would require editing if a user desires to change a dictionary entry’s associated lexeme or base Aktionsart. The tagset file needs to be revised for each corpus to ensure that the tags listed in it match those used within the corpus that will be scanned by the program. The command as shown in Figure 4 is an appropriate one for initiating the program when analysing the narratives corpus.

```
[nicole@ent ~]$ runsemantics -d dictionary.xml -s -u tagset.xml narratives_tagged.txt narratives.xml
```

Figure 4: The command used when initiating the program.

When running, the program scans each word’s part-of-speech tag with the aim of finding each verb. When it finds a verb, the program examines the dictionary file to see if the current word is listed as a derivation. If it cannot find the derivation, the algorithm prompts the user, requesting the lexeme associated with the current word as shown in Figure 5.

```

nicole@ent:~
I/P got/V a/AT card/N particularly/RB if/CS you/P '/TO re/IN Jeff/N Kennet/N ,/,
the/AT former/AP premier/N of/IN Victoria/N ,/, he/P decided/V ,/, '/QL well/UH ,
/, I/P could/MD just/QL maybe/RB take/V maybe/RB some/DTI papers/N or/CC somethin
g/P like/CS that/CS ,/, or/CC I/P could/MD take/V a/AT vase/N or/CC a/AT pot/N pl
ant/N or/CC I/P could/MD take/V home/N a/AT painting/V of/IN former/AP premier/N
Sir/N Henry/N Bolty/N which/WDT belongs/V to/IN the/AT national/JJ gallery/N that
/WPS '/: s/AT worth/JJ 50/CD thousand/CD dollars/N '/CS he/P '/CD s/AT just/RB go
ne/V '/IN mmm/WRB I/P like/CS that/DT painting/V ,/, no/RB it/P doesn/V '/CD t/P
really/RB belong/V to/IN me/P ,/, I/P don/V '/CD t/P think/V anyone/P '/CD s/AT g
onna/V notice/N '/: Steven/V from/IN Coburg/N in/IN Victoria/N ,/, he/P '/CD s/AT
got/V a/AT bit/N of/IN a/AT story/N about/RB ,/, he/P went/V to/TO Dreamworld/V
and/CC he/P '/CD s/AT got/V a/AT friend/N mark/N who/WPS is/BEZ a/AT bit/N of/IN
a/AT tightarse/N and/CC he/P '/CD s/AT just/RB lagging/V him/P right/QL in/RP ./

Unknown derivation: take
Lexeme: █

```

Figure 5: A new derivation.

The user must input the associated lexeme for that derivation. If the lexeme is already in the dictionary, then the current word is added to that lexeme as a new derivation. If the lexeme is not in the dictionary, the user is once again prompted, requiring a decision about the lexeme's base Aktionsart (see Figure 6). Once the user has provided the information, a new lexeme entry is created in the dictionary file with the current word listed as a derivation and the base Aktionsart as given by the user.

```

nicole@ent:~
I/P got/V a/AT card/N particularly/RB if/CS you/P '/TO re/IN Jeff/N Kennet/N ,/,
the/AT former/AP premier/N of/IN Victoria/N ,/, he/P decided/V ,/, '/QL well/UH ,
/, I/P could/MD just/QL maybe/RB take/V maybe/RB some/DTI papers/N or/CC somethin
g/P like/CS that/CS ,/, or/CC I/P could/MD take/V a/AT vase/N or/CC a/AT pot/N pl
ant/N or/CC I/P could/MD take/V home/N a/AT painting/V of/IN former/AP premier/N
Sir/N Henry/N Bolty/N which/WDT belongs/V to/IN the/AT national/JJ gallery/N that
/WPS '/: s/AT worth/JJ 50/CD thousand/CD dollars/N '/CS he/P '/CD s/AT just/RB go
ne/V '/IN mmm/WRB I/P like/CS that/DT painting/V ,/, no/RB it/P doesn/V '/CD t/P
really/RB belong/V to/IN me/P ,/, I/P don/V '/CD t/P think/V anyone/P '/CD s/AT g
onna/V notice/N '/: Steven/V from/IN Coburg/N in/IN Victoria/N ,/, he/P '/CD s/AT
got/V a/AT bit/N of/IN a/AT story/N about/RB ,/, he/P went/V to/TO Dreamworld/V
and/CC he/P '/CD s/AT got/V a/AT friend/N mark/N who/WPS is/BEZ a/AT bit/N of/IN
a/AT tightarse/N and/CC he/P '/CD s/AT just/RB lagging/V him/P right/QL in/RP ./

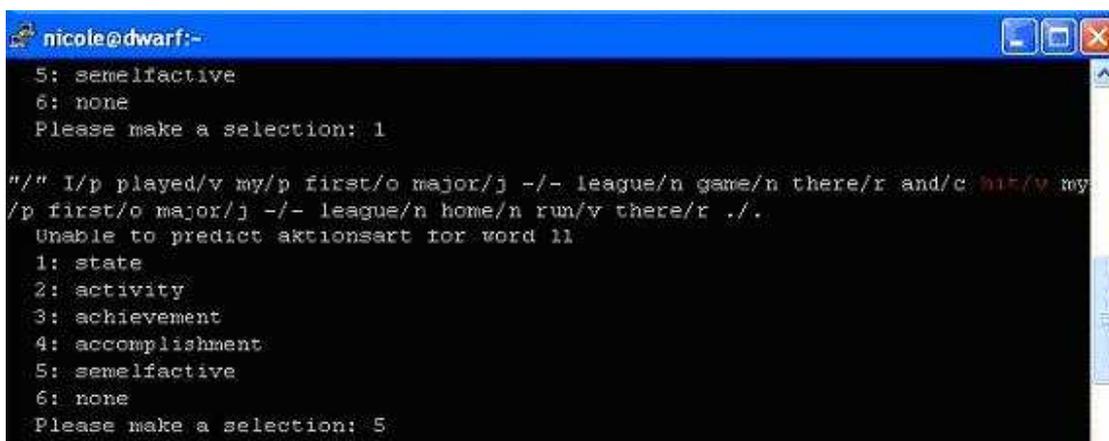
Unknown derivation: decided
Lexeme: decide
Base aktionsart for decide:
1: state
2: activity
3: achievement
4: accomplishment
5: semelfactive
6: none
Please make a selection: █

```

Figure 6: A new lexeme needs to be added to the dictionary.

Once the algorithm is able to find the lexeme in the dictionary, it attempts to derive the instance Aktionsart of the verb automatically, by applying the rules discussed in section 4.2 to the current sentence (see Appendix D for a list of the rules used). If all applicable rules give the same instance Aktionsart, then the verb in question is automatically assigned the instance Aktionsart as designated by the rule(s).

If no rules apply to the verb in question, or if the applicable rules give conflicting outcomes, the program prompts the user by displaying the current sentence with the verb in question highlighted, as shown in Figure 7. The user must select and input the appropriate Aktionsart.



```
nicole@dwarf:~$
5: semelfactive
6: none
Please make a selection: 1

"/" I/p played/v my/p first/o major/j -- league/n game/n there/r and/c his/v my
/p first/o major/j -- league/n home/n run/v there/r ./
Unable to predict aktionsart for word 11
1: state
2: activity
3: achievement
4: accomplishment
5: semelfactive
6: none
Please make a selection: 5
```

Figure 7: The program requiring user input.

In circumstances of user intervention, the *intended* meaning of a sentence, rather than the *literal* meaning, was used. For an extreme example, if I came across (194), I would interpret the sentence as referring to someone speaking metaphorically, and therefore being unable to accomplish a task (such as explaining a concept to someone) despite trying repeatedly, instead of assuming a literal iteration of physically painful head-against-wall banging. In fact, in a situation as extreme as (194) there would be no

coercion, as there would be no applicable base Aktionsart due to the metaphorical and idiomatic nature of the sentence.

(194) I've been hitting my head against a brick wall all
morning.

(195) He smashed the ball up high.

For a less 'removed' example, (195) would be interpreted as *he hit the ball*, and therefore analysed as semelfactive.

When the algorithm has selected the instance Aktionsart – either assigned automatically or through user input – it compares this to the base Aktionsart associated with the lexeme. If these Aktionsarten differ, the entire sentence is exported to an 'exceptions' file for later examination, with information that states which word had the instance-base Aktionsart conflict (see Appendix C). The algorithm then moves on to analyse the next verb in the corpus.

Sometimes (as further discussed in section 4.3.1 below), the program finds words that are incorrectly tagged as verbs, such as *swimming*, in *swimming pool*.²⁵ If the program requires user input for the lexeme assignment of these words, I allocate them the lexeme *noverb* which is a 'garbage' lexeme for the purpose of dealing with any incorrectly tagged words, or words that are too difficult to deal with (again, see section 4.3.1). If a word has been incorrectly tagged in one instance, but has the future possibility of being used as a verb, such as *swimming* in the *swimming pool* example, I associate the derivation with the appropriate lexeme – in this case *swim* – and allocate the word an instance Aktionsart of *none*.

²⁵ Even accurate part-of-speech taggers only achieve approximately 95% accuracy (Barber 2003) which obviously results in some incorrect tags.

As an additional option when using the program, there are three ‘modes’ for the actual running of the algorithm. The slowest, most commonly used in the current research, and that which collects the most data, is termed *normal* mode. In this mode the algorithm operates, and requests user input, as described in the passages above. The fastest mode, but that which collects the least data, is termed *silent* mode. In silent mode, the program ignores (skips over) any verbs if the derivation is not already listed in the dictionary file, and also ignores any verbs to which it cannot automatically assign an instance Aktionsart. Silent mode therefore requires no user input. The intermediate mode is termed *quiet*, where the algorithm requests user input if the derivation is not listed in the dictionary, but skips any verbs for which instance Aktionsart cannot be automatically assigned. The faster modes were designed to speed up the exception collection process, since there were still many verbs for which instance Aktionsart could not be automatically assigned by the program’s rules. Intermediate mode was intended as a way to keep expanding the dictionary while still speeding up the data collection process.

The algorithm was run in normal mode first on each corpus, until at least 100 sentences had been parsed. Then quiet mode was run, until at least another 150 sentences had been parsed. Finally silent mode was run –until either the algorithm had an error (which may occur for reasons such as an incorrectly formatted corpus), the end of the corpus was reached, or the user manually stopped the process. When it came to the data analysis phase, the combination of the large number of conventional coercions found in the corpora and the time restraints on the research meant that only the exceptions found in normal mode were actually examined. However, this limitation was not obvious at the start of the research, and as such data was collected using all three modes.

About mid-way through the data collection process, I used a lemma file to expand the dictionary.²⁶ The lemma file is an extensive list of words and their associated derivations. However, since other speech categories – not just verbs – are listed in the file, it was not practical to simply import the entire volume of data from the lemma file into the dictionary file. The method employed was to scan the lemma file for the existence of each lexeme in the dictionary, and added any extra derivations from the lemma file as derivations in the dictionary file. This, like the extra collection modes, was employed as a time-saver.

4.3.1 Problems encountered

One of the main problems was the design of efficient rules for automatic assignment of instance Aktionsart. This proved to be quite difficult due to the very nature of my target language – English. English contains many ‘strong’ verbs, such as *run*, which do not follow general patterns for grammatical features such as tense. This made writing rules that cover all, or even most, verbs rather difficult. The ‘solution’ to this problem was simply to write rules aimed at catching all or most ‘weak’ verbs (which follow generalised patterns), and to make allowance for strong verbs during data collection. Of course, this means there will have been some errors in the use of the program – some Aktionsart coercions may have been missed due to the verb being a strong verb. However, I could not see a viable way around this problem, and I assumed that most verbs would either be caught by the rules or allocated based on user input.

A technical difficulty I came across was that a verb with one spelling can sometimes be used in more than one way. This caused difficulties for the assignment of both base and

²⁶ Thank you to Daniel Midgley for the notification that such a file exists.

instance Aktionsart. The best example is *get*, which can be used in myriad ways in English.²⁷ In the circumstance of *get*, I decided that there are too many interpretations of the word for it to be of use to my research and, given the time constraints, I decided to ignore it altogether. In the case of other words such as *see*²⁸ which have only a few different interpretations, I selected as the base form the use of the word which stood out as more common. If this was at all debatable, I looked in a dictionary²⁹ and used the definition that was listed first. This affected the results somewhat, in that many exceptions that were picked up by the program were invalid – the exceptions were results of the different readings of the verb.

Other issues arose that were corpora-related, such as the incorrect assignment of part-of-speech. There were many examples of words incorrectly tagged as verbs.³⁰ I dealt with this in two ways. If the word would not, in normal circumstances, ever actually be used as a verb, for example *mathematics*, then I instructed the program that the word was a derivation of the *noverb* lexeme. This removed the possibility of the word being incorrectly picked up by the program again. If the word was simply being used as, say, a noun, in the current circumstances, but a word with the same spelling could easily be conceived as being used as a verb in other circumstances,³¹ then I ignored the current incorrect use by selecting the *none* option for the instance Aktionsart category. If the word needed to be added to the dictionary, I analysed the word as though it was actually being used correctly while entering in the dictionary data.

²⁷ For example, *get* can be used as: *receive*, *possess*, *understand*, and *collect*, to name but a few.

²⁸ This can be used, for example, as *recognise* or when one literally uses their eyes to sense something in the world.

²⁹ I used both the *Concise Oxford Dictionary* (1990) and the *Oxford English Dictionary Online*.

³⁰ For example, *swimming in the swimming pool* was often tagged as a verb when it was in fact being used as an adjective.

³¹ For example *here is a **present*** (noun), and *I **present** you with this award* (verb).

One of the rules in my program designated as states the instance Aktionsart of any verbs directly following an occurrence of the perfect marker *have*. This was due to the common acknowledgement that verbs used with the perfect are being presented or used as states (for example, see De Swart 1998, Moens and Steedman 1988). There were many examples of coercion picked up by my program due to the presence of the perfect marker, particularly from the Narratives corpus. This was not very surprising given the purpose for which the corpus was collected (see section 4.1.2). In the examples taken from the narratives corpus, the perfect was often being used in an unusual fashion, presenting scenarios as ‘hot news’ when they would not normally be viewed as such. An example of this perfect use is (196), as also mentioned in section 4.1.2.

(196) and I had to go and, and the owner was going ‘put it down, put it down’ and **we’ve grabbed him** and it had all slobber and there’s a big great dane mark in my berkenstock now.

As examples such as (196) are not actually examples of coercion, I did not include them in my analyses.

Speech act verbs, such as *apologise*, are difficult to classify based on Aktionsart. A speech act is sometimes seen as an interval, during which point some durative speech event took place. The actual process of saying *I apologise* takes time, but perhaps the reference should be to the point at which the apology is intended. A speech act can also be seen as a point.³² For example, in (197), John’s declining could be a speech such as “thank you for your offer, but I do not need to borrow your truck”.

(197) John declined to take the truck.

³² Johnson and Fillmore (2000) made reference to the different possibilities of representing a speech-act verb using FrameNet theory.

However, he could also have said a simple “no”, or even shaken his head. For a longer speech act, is it the entire speech that contributes towards the decline, or is it one point within the phrase – such as *not* – that gives a listener the recognition that a decline is taking place? Given the difficulties associated with assigning speech act verbs a base Aktionsart, I placed them in the dictionary under the *noverb* lexeme, and did not take them into account in my research. Speech act verbs that I ignored include *apologise*, *introduce*, and *decline*.

There were some instances where a speech act verb also has a different meaning. For example, *patronise* means both the act of putting someone down, or making them feel bad, and also to visit or give custom to, such as *patronise a hotel*. In cases such as these, I assigned the verb a base Aktionsart based on the non-speech-act interpretation. If any examples of the speech act interpretation were picked up by the program, I assigned them an appropriate instance Aktionsart if the context made the Aktionsart clear, or an instance Aktionsart of *none*, if the composition of the verb was still unclear.

4.4 Future recommendations

The main recommendation for the improvement of the program used in the current research is the writing of a greater number of applicable and succinct rules. This would enable faster and more accurate tagging of instance Aktionsart. I am sure that the rules at this stage are sub-optimal, and that there are scholars from various fields such as syntax who would be able to assist in the design of efficient, general, and accurate, rules based on elements such as syntax or part-of-speech that would result in more accurate findings.

If it were possible to run the program on corpora that are tagged more accurately for part-of-speech, then that too would generate more accurate results. A corpus that had been hand-tagged for instance Aktionsart would obviously be ideal for this type of research, as the instance Aktionsart would be very accurate, and could easily be compared to the base form. Further refinement of my program may result in an almost-automatic instance Aktionsart tagger, which would be very useful when researching the field and theories of Aktionsart.

The program was designed to comply with the theory of coercion, with a base and instance Aktionsart. At this stage it is therefore dependent on the assumption of a verb's basic lexical class. The program could be adapted to suit theories that do not accept coercion, leaving out the base Aktionsart. Rather, a collection of verbs with their instance Aktionsart could be gathered and used for study. The dictionary would still be useful as it links together different conjugations of the one verb.

Having access to a larger dictionary file that contained lexemes with base Aktionsarten and many derivations would also be a useful asset for running my program, and hence research in the field of Aktionsart.

Chapter 5 Results

This chapter discusses the results that were obtained by applying the program as described in sections 4.2 and 4.3 to the various corpora. The results are divided into sections based on the instance Aktionsart of each coercion discussed. The chapter begins with some examples of polysemy in section 5.1, and section 5.2 presents examples of the coercion of stative eventualities into activities through the use of the progressive. Section 5.3 details the frequency of coercion based on both instance and base Aktionsart. Section 5.4 discusses various unique instances of coercions that were found in the corpora, and section 5.5 discusses conclusions based on the results and relates the results to coercion as discussed in the literature. Finally, section 5.6 provides a summary of the thesis.

Once I had run my program on the various corpora, I had many files that listed what I termed ‘exceptions’ – examples of a conflict between base and instance Aktionsart. I termed them exceptions as opposed to coercions, because many of the differences were based on reasons other than coercion. I manually examined the files that contained exceptions in an attempt to discover novel coercions. I did not find any. Despite looking through data from both spoken and written, and both formal and informal corpora, the only coercions that were found by my program were conventional.

The program itself may have biased the results away from finding novel coercions. It was designed to recognise patterns and common formats, so it may have fitted any novel coercions that it located into these formats, rather than marking them as

exceptions. Hand-tagging large amounts of data was not possible in this project, but may prove a valuable resource if accomplished as part of future work in this area.

5.1 Polysemy

Within the data gathered in this research numerous examples that were allocated as coercions by the program would actually be most easily described as some form of polysemy.³³ Therefore, they are not actually examples of coercion. In assigning a verb's base Aktionsart, only one definition of an orthographic word can be chosen to be associated with the verb's dictionary lexeme entry.

In the collected examples of polysemy, the base Aktionsart is assigned to one meaning of the verb, and the context in which the instance Aktionsart is being assigned brings out an entirely different meaning of the verb. If the same definition had been chosen for the dictionary's lexeme as was found in the examples, the word would have been assigned the same instance Aktionsart. The reason that these examples were labelled as coercion by the program is that it was impossible for the program to tell which reading of an orthographic word is intended in any specific instance.

I have listed three examples of polysemy that were found by the program and incorrectly labelled as coercion. One is from state to activity, one from activity to state, and one from achievement to state.

³³ Approximately 35 out of 150 examples of coercion could be attributed to polysemy.

Have has a base Aktionsart of state, as it is generally a reference to a property of an object. In example (198) it is being used, as an activity, to mean *host* or *throw*, as in *host a party*.

- (198) If you want somewhere to **have** a party or to take your family, then this is a good place. (ANC: Berlitz)

In example (199), *mix* (with a base Aktionsart of activity) is being used as a state – shown by the use of the simple present. In this example, *mix* is being used metaphorically, and is actually interpreted as *has elements of* rather than a literal mixing event. To *have elements* of some feature(s) is certainly a state.

- (199) Graceful, elegant, and refurbished for the new century, the venerable Kahala artfully **mixes** Hawaiian, Asian, and international touches. (ANC: Berlitz)

Example (200) was listed as demonstrating an instance of coercion from achievement to state. *Guess* has a base Aktionsart of achievement, but is being used to mean *suppose*, or even *believe*, in example (200), which is a state.

- (200) “I **guess** it's expected and they have the right to service their own team and pump up their own players,” Colborn said. (ANC: NY Times)

I did not include examples of polysemy in the coercion frequency analyses presented in section 5.3 below.

5.2 Progressive states

The following data was extracted from the *ANC: Berlitz* corpus using the algorithm discussed in Chapter 4, and refers to situations which would possibly be seen as stative, yet the verb is being used in the with the –ing suffix:

(201) This large, smart beachside fish restaurant, **servicing** generous portions of fish and seafood, is located next to a marina.

(202) Arguably the best and perhaps the most historic hotel in town, with parts **dating** from the 17th century.

(203) St Andrew Hospice occupies a great location **overlooking** the Old City, not far from the Khan Theatre and the Cinematheque.

(204) Israel finest French restaurant, **boasting** the country largest wine cellar.

(205) Ask for a bedroom **facing** the Old City walls.

Examples (201) and (204) are fairly easily coerced from states into activities through temporariness of the situation itself; examples (203) and (205) can be seen as temporary given the perspective of the tourist, who overlooks/faces the view for only a short time. Example (202) is more difficult to explain; the assignment of stages is the most easily readable coercion, where the parts have been added or recorded at various points throughout history rather than simply existing the entire time. However, it should also

be pointed out that all of these examples use the progressive without the copula; indeed reading the sentences with the addition of the copula in most of these examples would not sound right. Take (206), from example (202); we would generally say (207) instead, using simple present tense.

(206) ?Arguably the best and perhaps the most historic
hotel in town, with parts **that are dating** from the
17th century.

(207) Arguably the best and perhaps the most historic
hotel in town, with parts **that date** from the 17th
century.

This indicates that the progressive is being used more adjectivally, which makes the examples somewhat irrelevant to my research as they are not reflections of aspect or Aktionsart. There were no legitimate coercions from states into a form using the progressive in the data. Therefore, I did not include any examples of progressive states in the coercion frequency analyses in section 5.3 below.

5.3 Frequency of coercions

The division of coercions is shown in Table 5. Table 5 also lists the numbers of each base Aktionsart found per instance Aktionsart. As shown by Table 5, the most frequent coercion was into an instance Aktionsart of state, followed by accomplishment and activity. The highest frequency of base Aktionsart being coerced was, by far, activity, followed by accomplishment and achievement.

Base Akt.	Instance Aktionsart					Total
	Acc.	Ach.	Act.	Sem.	Sta.	
Acc.		1	3	0	18	22
Ach.	0		6	0	7	13
Act.	35	1		1	31	68
Sem.	0	0	1		1	2
Sta.	0	0	0	0		0
Total	35	2	10	1	57	105

Table 5: Frequency of coercions.

Type of Coercion	Base to Instance Type	Freq.
Added endpoint	Act. → Acc.	35
Removed endpoint	Acc. → Act.	1
Habitual	Act./Acc. → Sta.	13
Repetition	Ach./Acc./Sem. → Act.	3
Perfect	Ach./Acc./Act./Sem. → Sta.	10
Focus on period after point	Ach. → Act	2
Property	Ach./Acc./Act. → Sta.	34
Added and focussed on p.p.	Ach./Sem. → Act.	4
Reduced to culminated point	Acc./Act. → Ach.	2
Affected by verb argument	Act. → Sem.	1
Total:		105

Table 6: Types and frequency of coercions.

Table 6 lists the different ways in which the coercions were performed, the base and instance Aktionsarten associated with each type of coercion, and the relative frequency. The aim was to generalise the main methods of coercion across the data.

Added endpoint and *Removed endpoint* refer to the addition or removal respectively of an endpoint to an eventuality. These are reflected on Moens and Steedman's diagram as coercion between process and culminated process through the addition or subtraction of a culmination point.

Habitual refers to the coercion of an event into a state, by making the event a habitual event. *Perfect* refers to coercions into state that occur through the event being presented in perfect form. *Property* refers to coercions into state that occur due to transforming an event into being a property of a person or object.

Repetition refers to coercions into activity that occur through the repetition of an event. *Focus on period after point* refer to coercions into activity that occur due to a focus on or profiling of a period that exists after a culmination point. *Added and focussed on preparatory process* refers to coercions into activity from a punctual event. These coercions require the addition of a preparatory process that then becomes the focus of the event.

Reduced to culmination point refers to a coercion into achievement which compresses the event to a single culminated moment. Finally, *affected by verb argument* refers to coercions that occur due to the composition of their complements. This occurs when a second verb exists in the complement that takes precedence over the main verb and affects its Aktionsart.

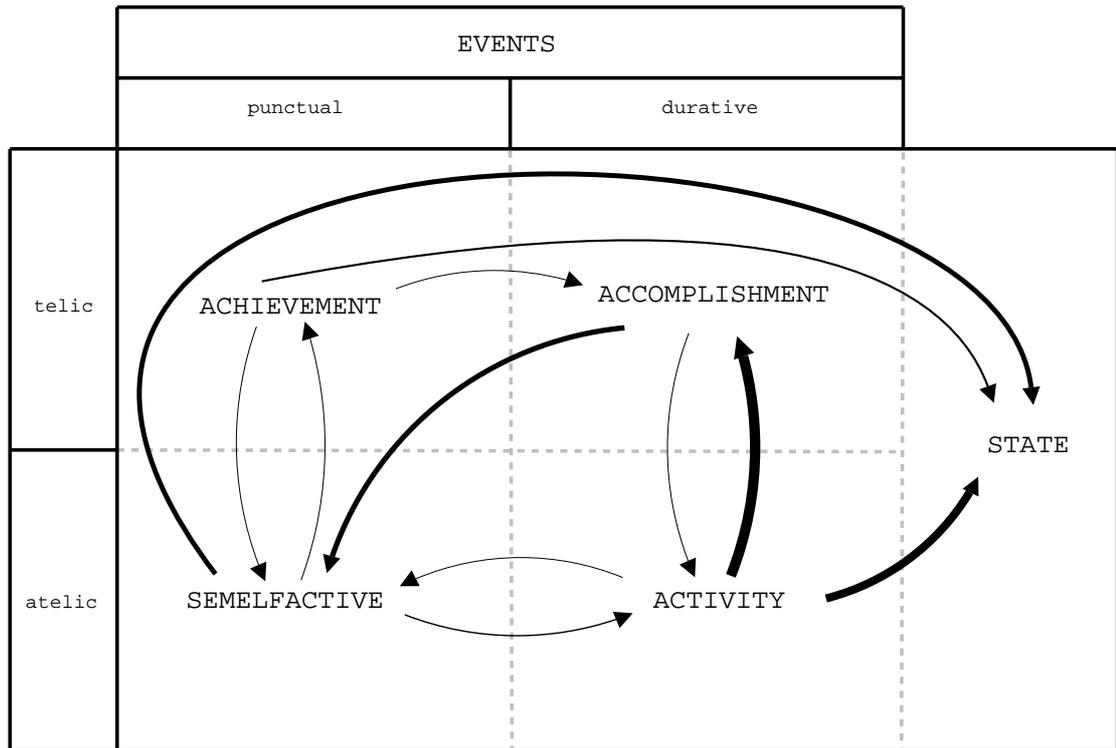


Figure 8: Frequency of coercions.

Figure 8 diagrammatically displays the coercions that occurred in the data. The diagram has been adapted from Moens and Steedman’s diagram to reflect the Aktionsart that I used in this study. In Figure 8, if a coercion goes from accomplishment to state through the semelfactive category, then both arcs (accomplishment to state and semelfactive to state) are weighted with that coercion.

Figure 9 also represents the weighted existence of coercions in the data. In this figure an indirect coercion such as accomplishment to state via semelfactive is marked separately, and coded by colour. The black arrows are direct coercions, and the coloured arrows represent more complex transitions such as accomplishment to achievement via semelfactive.

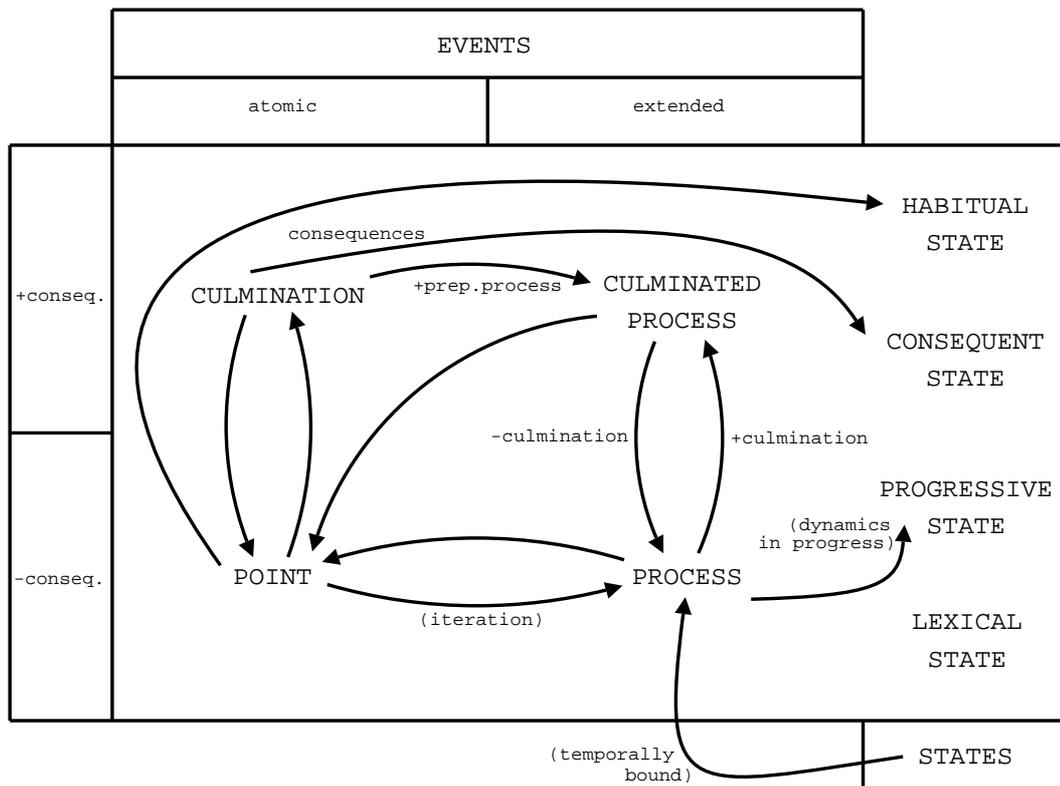


Figure 10: Moens and Steedman's Coercion Paths.

5.4.1 Into state

Work has a base Aktionsart of activity, but is used in example (208) with an instance Aktionsart of state. This is due to the sentence being interpreted as a habitual event. The volunteers regularly work as part of a team. Therefore, it is a property of the volunteers that they work as part of a team, which can be used in a stative fashion.

(208) ACET volunteers **work** as part of a team and provide help in many different ways to ensure that people don't spend time in hospital unnecessarily.

(BNC: Spoken A)

Moens and Steedman only list one possible method of coercion into a habitual state in their diagram, and that is from the point category. However, as discussed in section 3.1, their formal definition of 'point' includes any event that is viewed as an unanalysed

whole. Therefore, *work* in example (208) would be said by Moens and Steedman to be first coerced into a point, and then into the habitual state. This is an example of coercion in the *habitual* category in Table 6.

Become has a base Aktionsart of achievement, but has an instance Aktionsart of state in example (209). This occurs due to the use of the perfect that encourages a focus on the consequent state that follows the culmination that is the achievement.

(209) By the eighteen twenties perhaps the congress had
become somewhat er divisive. (BNC: Spoken D)

Example (209) is represented on Moens and Steedman's diagram as a coercion from culmination to consequent state via the arc labelled "consequences". This is an example of *Perfect* in Table 6.

Dodge has a base Aktionsart of semelfactive, but has an instance Aktionsart of state in example (210).

(210) Teams appear to have **dodged** the expected
implementation of a luxury tax this summer. (ANC:
NYTimes)

Interestingly, this is not a habitual state – which is the direct arc from the point category to a state category on Moens and Steedman's diagram, but instead is a consequent state, as shown by the use of the perfect. Following the arcs on Moens and Steedman's diagram, the event would presumably be coerced into a culmination and then into the category consequent state. The complement "the expected implementation of a luxury tax this summer" provides the culmination point in this scenario. This comes about through providing an understanding that this act of dodging has a consequent state

rather than allowing the possibility of simple iteration in the fashion of semelfactives.

This is another example of coercion in the category *Perfect* in Table 6.

Example (211) demonstrates a coercion from a base Aktionsart of accomplishment to an instance Aktionsart of state.

- (211) All units are **equipped** with kitchens and ceiling fans (no air-conditioning, TVs, or phones). (ANC: Berlitz)

The coercion is brought about by presenting the verb in a manner that makes the verb phrase a property of the subject. The category in Moens and Steedman's diagram that most accommodates *equip* as a property would be consequent state. Accomplishments can be compressed into a point, and then, like example (210), would be coerced into a culmination and then a consequent state. One problem with this transition pathway is that the difference between *have been equipped* and *are equipped* is not represented, but I cannot see a viable alternative pathway for the coercion. Example (211) demonstrates coercion in the category *Property* in Table 6.

5.4.2 *Into activity*

Specialise has a base Aktionsart of state, and is presented in example (212) in the progressive. As discussed in section 5.2, verbs presented with the –ing suffix, but without the copula are being used more adjectivally.

- (212) This restaurant provides a good menu of Middle Eastern meat dishes, **specialising** in lamb. (ANC: Berlitz)

- (213) This restaurant **is specialising** in lamb.

One could argue for the temporary nature of the event - the menu currently specialises in lamb, but the specialisation may change to another food substance at some stage. However, the addition of the copula to the sentence (as in example (213)) does sound rather odd. There were six examples of coercion from state to activity collected from the data, but all were in a similar format, and thus were not used in the frequency analysis of coercion.

Example (214) uses iteration as part of the coercion. *Throw* has a base Aktionsart of accomplishment,³⁴ but is used in example (214) as an activity, shown by the use of *around*, as well as the use of the progressive. The coercion is brought about by the reference to multiple throwing events over an extended period of time.

- (214) but we were off throwing away, **throwing** the ball
around and I went over in my sandals and I've got
this new game where I chase it with Champy
y'know, cos I'm getting a bit big around the gut and
I thought, I might do a little bit of exercise so we're
both running after the ball and stuff like that and in
the meantime a bloody great dane's come and
nicked off with my berkenstock. (Narratives)

The iteration of an accomplishment is not shown as a direct arc on Moens and Steedman's diagram, but could be explained by compressing the throwing event into a point, and then iterating the point as the coercion into a process. This is an example from the *Repetition* category in Table 6.

³⁴ Consider a throwing event as comprised of the arm movement and preparation required for a throw, as well as the release of the object being thrown.

Leave has a base Aktionsart of achievement, which involves a preceding process of heading towards an exit, then culminates with the actual passing through such that the person has gone. In example (215) *leave* has an instance Aktionsart of activity. This coercion has taken place through the profiling of the activity preceding the culmination point – it actually seems to also include the preceding game that resulted in the loss. However, if I picture a team leaving a stadium, it is specifically the procession toward the exit that I see in my mind. The particular use of the verb in example (215) places a listener or reader in the middle of the *leaving* event.

(215) Sunday night, Trachsel and the Mets were
pummeled, **leaving** Yankee Stadium with an 8 - 0
loss, dropping two of the three games in the series.

(ANC: NY Times)

The coercion in example (215) can be easily read off Moens and Steedman's diagram. The transition is from culmination to culminated process via the arc labelled "+ prep. process", then to the process category via the arc labelled "-culmination". This is an example of the category *Added and Focussed on Preparatory Process* in Table 6.

Fill has a base Aktionsart of accomplishment, but in example (216) it has an instance Aktionsart of activity, shown through the use of the progressive. This is an interesting example because the culmination point is actually still there, given by *up*. The use of the progressive focuses on the continuing (seemingly everlasting) activity of filling. The endpoint is represented by *up* but the implication is that the endpoint is far away, and therefore currently irrelevant.

(216) I'm going to bed cos I'm actually knackered and I
don't why I've been sitting here talking you're

probably bored out – your brain but I suppose it’s

filling up your tape. (ICAME: COLT)

Moens and Steedman represent the progressive as a state (“progressive state”). The coercion of example (216) would follow the arcs from culminated process to activity through the removal of the culmination point, and then to progressive state. This is an example of *Removed Endpoint* in Table 6.

Example (217) demonstrates coercion from an achievement into an activity through the focus on the phase leading up to the actual achievement. Example (217) is obviously talking about the same scenario as example (209). Both are coercions of *become*, but example (217) is from achievement to activity rather than to state.

(217) I'm suggesting that by perhaps the eighteen twenties
the congress system was **becoming** somewhat
divisive. (BNC: Spoken D)

This is another coercion easily represented by Moens and Steedman’s coercion pathways diagram. Examples such as (217) are represented by the transition from culmination to culminated process via the arc labelled “+prep.process”, then from culminated process to process via the arc labelled “-culmination”. As noted for the previous example, Moens and Steedman would then move along an arc to progressive state. This is another example of the category *Added and Focussed on Preparatory Process* in Table 6.

Sue has a base Aktionsart of achievement. This is because the actual point at which one party sues another is punctual, and it is the inception point to a period of activity, where the parties are suing each other.

(218) “When you hear the owners are **suing** each other, and the stuff that went on unfortunately with Tony and Mark, and Roger and Roberto, there’s all the papers in our locker room and people start reading about all that stuff and wondering, ‘Geez, what’s going on’ instead of concentrating on what we’re really here for, which is trying to win” said Franco, a major presence in the clubhouse despite having season-ending elbow surgery. (ANC: NY Times)

It is the activity period that is the focus of example (218), presented in the progressive, indicating an instance Aktionsart of activity. This transition is not easily represented by Moens and Steedman’s diagram, as the only movements from the achievement category go either straight to consequent state, or to accomplishment through the addition of a preparatory phase. This is an example of *Focus on period after point* in Table 6.

5.4.3 *Into achievement*

Very few examples of coercion into an instance Aktionsart of achievement were found in the current research. Example (219) is one of the few. *Go* has a base Aktionsart of activity, but is used in example (219) as an achievement. This seems to have occurred through the recognition of a consequent state (in example (219), that things are strange) that could only come about following a culmination point. The interpretation of *went* is somewhat debatable, in that one could say “things gradually went a bit strange”, but also “at ten o’clock, things went a bit strange for Doug”. I decided on the latter, based primarily on intuition of the scenario in question.

(219) yes and poor old Doug, things **went** a bit strange,
and then of course he tried to set up the
transcendental meditation theme park on niagra falls,
the 1.5 billion thing, that didn't quite work out.

(Narratives)

This coercion would be represented on Moens and Steedman's diagram via several arcs. The first moves the event from being a process into being a point, by recognising the event in a more perfective manner (compressing the event into one moment which is similar to representing an event as an unanalysed whole). The event is then coerced into being a culmination, as the event has a consequent state of things being a bit strange, even though this state is not profiled in the example. This is an example of *Reduced to culmination point* in Table 6.

Go is itself a somewhat interesting verb, particularly when used in a spoken context – as in the narratives corpus – because it can be quite polysemous. *Go* can be used as *say*, *start*, and *become*, to name a few. The example in (219) could possibly be seen as polysemy with *become*. However, in my opinion, it does not have quite the same feel about it. For example, *go* in example (219) expresses a more gradual process than would be understood by a culmination such as *become*.

Example (220) was the only other example of coercion into achievement that was found in the data. The base Aktionsart of *open* is accomplishment, although verbs like *open* and *harden* are somewhat difficult to categorise.

(220) Hit hard by Hurrricane Iniki, this lavish resort finally
reopened, retaining its informal feel, its fine golf
courses, its lagoons with exotic animals on the isles,

and some of the best hotel pools and swimming
beaches in Hawaii. (ANC: Berlitz)

In example (220), the event of opening a resort has been compressed to a single moment when the resort was reopened. This example, like the previous one, could possibly be seen as polysemy, since *open* on its own refers to an event such as the opening of a door, whereas to *open a hotel* refers to a more symbolic event such as the cutting of a ribbon. However, the two events are very closely related, so the coercion could arguably also be read as the compression of an event into a single moment. On Moens and Steedman's diagram, the event could be compressed into the point category, then into the culmination category. This is another example of *Reduced to culmination point* in Table 6.

5.4.4 *Into accomplishment*

Chase has a base Aktionsart of activity, but is used in example (221) as an accomplishment. This coercion comes about through the simple addition of an endpoint (the NBC executive's room) to the chase.

(221) Yes, but sometimes things didn't go exactly as
planned, cos he thought it was far more amazing to
pull a bengal tiger out of a hat than a rabbit, apart
from the time that the tiger escaped and **chased** an
nbc executive into his room. (Narratives)

A slightly different way of adding a culmination point is to refer to an event specified by quotation marks, such as example (222). *Say* has a base Aktionsart of activity, but example (222) makes reference to a specific quote that is said by Carroll Dawson, and

as such the event is not finished until the entire quote has been spoken. Therefore, in cases such as these, the instance Aktionsart is an accomplishment.

- (222) “You kind of take care of your own people first,”
Rockets general manager Carroll Dawson **said**.
(ANC: Berlitz)

Both examples (221) and (222) are transitions shown easily by Moens and Steedman’s coercion pathways diagram via the arc labelled “+culmination” between process and culminated process. Both are examples of *Added endpoint* in Table 6.

5.4.5 *Into semelfactive*

There was only one example of real (conventional) coercion found in the current research:

- (223) Alfonso Soriano, the next batter, looked at a
curveball for a strike, before Trachsel **tried** slipping
an 89-mile-an-hour fastball past him. (ANC: NY
Times)

Try has a base Aktionsart of activity, but in example (223), has an instance Aktionsart of semelfactive. This is due to the combination of the verb with the object argument *slipping an 89-mile-an-hour fastball past him*. In essence Trachsel apparently tried to throw a ball very fast. The action of releasing a fast ball is a semelfactive, therefore when Trachsel attempted this action, the event was also a semelfactive. The coercion in example (223) represents the arc on Moens and Steedman’s diagram from a process to a point. This is an example of *Affected by verb argument* in Table 6.

The definition of the point category that is given by Moens and Steedman is similar to that of the perfective (see section 3.1), and is therefore a wider category than the semelfactive. Given the initial (Moens 1987: 43) similarities between the definition of the ‘point’ category and semelfactives, I have compared coercions into semelfactive with those into Moens and Steedman’s point category.

There are many possible coercions into points according to their theory: culminations, culminated processes, and processes are all shown as being able to be coerced into points. Coercions were found that used these arcs as part of a larger, more complex transition, but only the coercion from activity to semelfactive was found as comprising an entire transition. As discussed in section 2.2, the representation of a lexical verb as a perfective is an interaction between aspect and Aktionsart, rather than Aktionsart coercion. The program used in the current research was not designed to recognise perfective scenarios. Therefore, while there may be examples in the data of ‘coercions’ from culminated processes or culminations to points (in the perfective sense) that support Moens and Steedman’s arcs, the program was not designed to find them.

5.5 Discussion of results

The coercions found in this research can represent movements along the arcs of Moens and Steedman’s diagram. The arcs were not all used to the same frequency. The two most common coercions found in the corpora were from activity into accomplishment, and activity into state. Interestingly, both of these coercions have direct, labelled, pathways on Moens and Steedman’s diagram. This pattern does not follow all the way down, however. I did not find any examples of coercion from accomplishment into semelfactive, which is also an arc listed on Moens and Steedman’s diagram, but this does not lead to the conclusion that they do not exist in natural language.

Following the activity coercions already mentioned, the next highest frequency of coercion in this research was from accomplishment into state, which does not have a direct arc on Moens and Steedman's diagram, but must take place via their 'point' category, and/or activity (the coercion can go straight from accomplishment to activity, or it can go through the point category to activity), before reaching the state (either progressive or habitual) category.

It is interesting that there were no examples of coercion from achievement into accomplishment found in the data. This is a labelled arc on Moens and Steedman's diagram (+prep.process), and is the sort of coercion commonly cited in the literature. This arc was used in some of the coercions (see example (217)) as a transitional arc, but not for the sole purpose of coercing an achievement into an accomplishment.

There were also no direct coercions from achievement to semelfactive, thus the pathway listed for that coercion on Moens and Steedman's diagram was not used either. This can be attributed to the small number of verbs in the corpora that were coerced from having a base Aktionsart of achievement. As shown in Table 5, there were only 14 verbs collected with a base Aktionsart of achievement that were coerced into another Aktionsart.

There was only one coercion from semelfactive into state (210), however this was into consequent state, rather than habitual state. A coercion into consequent state requires an extra transition via the culmination category whereas any coercions into habitual states have a direct arc from point. It is therefore interesting that the only example of coercion that was found from semelfactive into a stative reading was via other aspectual

categories rather than along the arc that would possibly have been expected to be used for a transition into a state using Moens and Steedman's diagram.

While there were no novel coercions found by my program using the various corpora, it is highly likely that they do exist in natural language occasionally. Researchers that have more time and/or more money to invest in both examining corpora for instance Aktionsart and analysing collected data may be more likely to find any novel coercions that do exist in the corpora.

As can be seen from Table 5 and Table 6 above, all of the examples of coercion from activity into accomplishment were brought about by adding an endpoint, examples of which are (221) and (222) in section 5.4.4.

The majority of coercions into states were brought about by making a verb into a property of someone or something, rather like forcing the event into being a stage-level predicate. For example in (211), the units are viewed as being equipped in the same manner that a person can be viewed as being angry.

The other relatively frequent coercions into an instance Aktionsart of state took place through a habitual reading (see example (208)) and through the use of the perfect – as shown in example (210). There were only two examples of coercion into a state through the focus on a consequent state, both from an achievement (see example (209)). There were, however, two examples of coercion into an activity from an achievement, where the activity was presented in the progressive (see example (218)). Normally, a coercion from achievement into activity would be expected to occur through the focus on a preceding phase. As previously noted, some authors view the progressive as being

stative. The ability of verbs such as that in example (218) to focus on an achievement's resulting phase in the progressive supports this view, despite my early decision to label progressives as activities.

There were few coercions found in the data that moved a verb from accomplishment into activity by removing or defocusing the culmination point (see example (215)). Nor were there many examples of coercion into activity through repetition. Both of these types of coercion are frequently cited in the literature as methods of coercion, so it was surprising to find so few examples in the data. There were, however, three examples of coercion from achievement into activity which were brought about by a focus on the phase preceding the culmination point, as demonstrated in examples (216) and (217).

There were two examples of coercion in the data that compressed the event in question into a single point associated with a consequent state. These were therefore coercions into an achievement; one was from a base Aktionsart of accomplishment, the other was from activity. The coercion from activity to achievement was discussed in section 5.4.3, where doubt was cast on whether it was in fact an example of polysemy instead of coercion. The example from an accomplishment to achievement could also possibly be seen as polysemy, but is more likely to be accepted as coercion. The coercion shown in example (220) is more easily analysed as the representation of an accomplishment as a single moment. The final coercion listed in Table 6 was discussed in section 5.4.5. The coercion was from a base Aktionsart of activity into an instance Aktionsart of semelfactive. This was brought about by the choice of argument combination that induced a punctual reading.

The data collected does not provide clear support for or against the theory that verbs have an intrinsic lexical Aktionsart. My research used the notion of base Aktionsart in collecting the coercion examples, but for researchers who believe that coercion and lexical Aktionsart does not exist, this element would become redundant. Instance Aktionsart was analysed using the surrounding context, which would also be the case for those who do not follow the theory of coercion.

The model of coercion that was chosen as a base for the current research was that represented by Moens and Steedman's transitionary arcs. The data was not examined with the purpose of finding examples that support all the various definitions and descriptions of coercion that are used by authors such as Jackendoff and Pustejovsky.

The coercions found in the current research also do not provide support for or against the abstract as opposed to the grounded theories of Aktionsart coercion. De Swart's coercion operators may be being used in the examples described in the results section: the operator from event to state or process is represented by examples such as (209) and (214), and the operator from state or process to event is represented by examples such as (220) and (221). The operator from state to process or event is not represented by examples from the data, as no coercions were found from a base Aktionsart of state. However, example (208) is a coercion from activity to state, which is a coercion that has no applicable operator in De Swart's theory.

Phrases that Michaelis describe as type-shifting and type-sensitive were certainly used in deciding the instance Aktionsart of a verb. The progressive was described by Michaelis as selecting for activity inputs and giving stative outputs. Coercion would apply if the situation were not already an activity, so that the progressive can be used.

This coercion into activity by a progressive was represented by many examples in the data. The output label as state or activity is, as discussed earlier, rather irrelevant. Michaelis gave the time adverbials *in* and *for* as examples of type-sensitive elements. Both of these adverbials were used in the rules of my program for assigning instance Aktionsart (see Appendix D).

As no novel coercions were found, the difference between Rothstein's natural aspectual shift operations and coercion could not be investigated using the data. However, examples given by Rothstein as coercion were not found in the data, which supports the theory that Rothstein's natural aspectual shift operations represent those I termed conventional coercions and Rothstein's coercions are my novel coercions.

Van Lambalgen and Hamm divided coercion into several categories. The first was additive coercion, which was comprised of either activities into accomplishments, or achievements into accomplishments. Activities into accomplishments were supported by examples such as (221). There were, however, no examples found of achievements into accomplishments, a fact that I noted above as odd given the abundance of references to these coercions in the literature.

The second of Van Lambalgen and Hamm's coercion categories was subtractive coercion, with the example of accomplishment into activity. Example (216) would represent this category, with the endpoint removed from the accomplishment, resulting in an activity.

Van Lambalgen and Hamm's third category was cross-coercion, which has several subcategories. There were no structural versus phenomenal coercions, nor state to

activity coercions. While there were some examples of activity and accomplishments being coerced into states, none were through the use of negatives or passives, as demonstrated as the third subsection of Van Lambalgen and Hamm's cross-coercion category. The only subcategory of cross-coercion that was represented by the data was from semelfactive to activity through repetition.

Van Lambalgen and Hamm also recognise the coercive nature of temporal adverbials, which, as discussed above, were certainly used in the current study.

It appears that many of the different theories of coercion are supported at least in part by the data found in natural language. Some of the more detailed analyses of Aktionsart coercion, such as Moens and Steedman, and Van Lambalgen and Hamm, have similar elements of their theories under-represented. As previously discussed, one of the most prominent of these coercions is achievement to accomplishment through the addition of a preparatory process.

When starting the current project, I was interested in investigating the extent to which coercion occurs in natural language, particularly the existence of novel coercions, and the types of conventional coercions that take place. My research produced no examples of novel coercions, but an abundance of conventional ones. Table 5 and Table 6 provide details of the types of conventional coercions that were found in the data, and how they were performed. There were three dominant types of coercion that took place in the data: from activities into accomplishments, activities into states, and accomplishments into states. There were two main ways of bringing about coercions: from activity to accomplishment through the addition of an endpoint, and from various Aktionsarten into state by coercing the event into being a property of someone/something.

Comparing base and instance Aktionsart helps give a picture of what speakers are attempting to accomplish by manipulating verbs in the ways that they do. The lack of novel coercions in the data meant that this level of analysis was not necessary, because the conventional coercions that were found do not require such effort in manipulation by speakers. The methods and pathways used for the specific coercions as discussed in section 5.4 provide reasons for the coercions.

The lack of novel coercions found in the data supports Pawley and Syder's (1983) argument that chunks of language data are memorised or lexicalised. They demonstrated that native-like selection and fluency can be attributed to whole clauses or sentences being stored, either entirely complete, or with some allowance for differences. This could explain why, in standard language, there were few novel coercions. If language is stored in such a way that it will be recalled and used as "standard wholes" or by selecting from a given range of options, then this can also be applied to the Aktionsart selection.

If a phrase is stored with only small portions subject to variation, and those variations are restricted within a native speaker's memory or lexicon, then the aspect and Aktionsart of a verb within that phrase will generally fit the requirements of the lexicon. Therefore, the chosen Aktionsart may result in a conventional coercion such as *walk* (activity) to *walk to the park* (accomplishment), but only rarely a novel coercion. Most of the examples in the corpora are of at least somewhat pre-prepared language, whether written or spoken, and are conventional coercions. It is entirely possible that novel coercions are more likely to be created "on the fly" or in storytelling, than in pre-prepared language.

Note also a similar observation by Lakoff (1993) about novel metaphors:

“metaphor resides for the most part in this huge, highly structured, fixed system. This system is anything but *dead*. Because it is conventional, it is used constantly and automatically, with neither effort nor awareness. Novel metaphor uses this system, and builds on it, but only rarely occurs independently of it.” (1993: 228)

Metaphors that are actually completely novel are very rare, and perhaps the same can be said of completely novel coercions.

The corpora that I used in the study contain examples of fairly standard language, although the narratives corpus does give unusual uses of the perfect. Perhaps in more specific environments, unusual coercions would be evident that relate to those scenarios. For example, perhaps at a lively party of young adults, someone may spontaneously generate a phrase such as (224), which contains an unusual coercion of *recognise*.

(224) It’s coming, it’s coming, I’m **recognising** her, just
give me a few more minutes...

There are certainly valid reasons for analysing Aktionsart at verb phrase or sentence level, since the extra elements affect the reading of Aktionsart at those levels, but this does not mean the possibility of analyses at the lexical level should be ignored.

5.6 Summary

In this thesis I have discussed the definitions and descriptions of Aktionsarten and other relevant background information. Aktionsart is the analysis of internal temporal constituency at the lexical level, whereas aspect is a way of selecting how to view an eventuality. Tense has some interaction with Aktionsart. For example, the present tense causing a verb to be read as stative. The five categories of Aktionsart that I have used in this study are *state*, *activity*, *achievement*, *accomplishment*, and *semelfactive*.

In Chapter 3 I summarised and compared different scholars' views on the phenomenon of coercion, from Verkuyl who does not believe coercion exists, to Moens and Steedman who detail acceptable coercions between Aktionsarten, to Jackendoff who applies the term coercion to various different phenomena. I recognise a distinction between those authors who view coercion as a more abstract notion, such as De Swart, and those who view coercion as more grounded in the form of the lexical items, such as Moens and Steedman.

Chapter 4 described the rationale behind corpora-based research, as well as the process and method that I followed when designing and using the program that assisted the data collection process. I also discussed problems that I had with data collection, such as incorrect part-of-speech tagging, and the problem of finding rules general enough to be useful in classifying verbs by Aktionsart.

In Chapter 5 I presented the results, sorted according to instance Aktionsart. I related some results that were attained from the corpora analysis to Moens and Steedman's description of allowable coercions. I also presented coercion frequency, and the pathways that the coercions followed. Finally, I discussed conclusions I was able to

draw from the data and noted where my data supported, or varied from, previous research.

The research is valuable because it provides a compilation and comparison of several prominent scholars' theories in the field of Aktionsart, as well as the basic design for an Aktionsart-tagger that can be further developed in the future. This research is also valuable as it provides samples of coercion from naturally occurring data, when most examples of coercion in the literature have been constructed. This data can be used to provide support for theories of Aktionsart coercion.

My research was limited by time constraints, which in turn constrained the amount of data that I could collect and analyse within the framework of a Masters degree.

With greater resources, a future project expanding this research might involve research assistants and more corpora. Further development of the computer program would probably provide more comprehensive data and the resulting data could be more fully explored. I anticipate that this would lead to some novel coercions being identified, which would enable interesting analyses.

Hand-tagging a corpus for Aktionsart would be most useful, as it would then enable faster collection of relevant coercions, as well as more accurate allocations of instance Aktionsart. A hand-tagged Aktionsart corpus would also enable an Aktionsart tagger to be trained in a similar manner to a more traditional part-of-speech tagger. This could result in a program that was able to tag for Aktionsart more accurately. Even without a training corpus, further development of the program such as including more rules to enable more accurate and efficient Aktionsart tagging would be useful.

For the purposes of further research, it would also be interesting to investigate similar ideas in languages other than English, particularly as English is relatively limited in grammatical marking for aspect when compared to Slavic languages which are commonly used in aspectual analyses.

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Appendix A Excerpt from the dictionary file

```
<dictionary>
  <lexeme name="call" aktionsart="activity">
    <derivation>call</derivation>
    <derivation>called</derivation>
  </lexeme>
  <lexeme name="threaten" aktionsart="activity">
    <derivation>threaten</derivation>
  </lexeme>
  <lexeme name="punch" aktionsart="semelfactive">
    <derivation>punch</derivation>
  </lexeme>
  <lexeme name="let" aktionsart="activity">
    <derivation>let</derivation>
  </lexeme>
  <lexeme name="soothe" aktionsart="activity">
    <derivation>soothe</derivation>
  </lexeme>
  <lexeme name="develop" aktionsart="activity">
    <derivation>developing</derivation>
    <derivation>developed</derivation>
  </lexeme>
  <lexeme name="merit" aktionsart="activity">
    <derivation>merits</derivation>
  </lexeme>
  <lexeme name="install" aktionsart="accomplishment">
    <derivation>install</derivation>
  </lexeme>
  <lexeme name="sustain" aktionsart="state">
    <derivation>sustain</derivation>
```

```
</lexeme>
<lexeme name="refer" aktionsart="state">
  <derivation>refers</derivation>
</lexeme>
<lexeme name="expect" aktionsart="state">
  <derivation>expect</derivation>
  <derivation>expected</derivation>
  <derivation>Expect</derivation>
</lexeme>
<lexeme name="bleach" aktionsart="activity">
  <derivation>bleach</derivation>
</lexeme>
<lexeme name="wind" aktionsart="activity">
  <derivation>wind</derivation>
</lexeme>
<lexeme name="open" aktionsart="accomplishment">
  <derivation>opened</derivation>
  <derivation>open</derivation>
</lexeme>
<lexeme name="remind" aktionsart="accomplishment">
  <derivation>remind</derivation>
</lexeme>
<lexeme name="enter" aktionsart="achievement">
  <derivation>enter</derivation>
</lexeme>
```

Appendix B Example of a tagset file

```
<?xml version="1.0" encoding="UTF-8"?>  
  
<tagset>  
  <tag symbol="N" name="Noun" />  
  <tag symbol="V" name="Verb" />  
  <tag symbol="CD" name="Count" />  
  <tag symbol="P" name="Pronoun" />  
</tagset>
```

Appendix C Excerpt from an 'exceptions' file

```
<lexeme name="plan" aktionsart="accomplishment">
  <sentence index="22" aktionsart="state">Intense/j competition/n
among/i the/a middle/j -/- range/n hotels/n means/n that/t you/p can/m
often/r bargain/n for/i a/a lower/j rate/n ,/, especially/r if/c you/p
plan/v to/t stay/v for/i more/r than/i two/c nights/n ./.</sentence>
</lexeme>

<lexeme name="appoint" aktionsart="achievement">
  <sentence index="7" aktionsart="state">Lanai/n upcountry/n ,/,
very/q upscale/v resort/n is/v appointed/v like/i an/a Old/j English/j
estate/n ,/, with/i writing/x desks/n ,/, four/c -/- poster/n beds/n
,/, library/n ,/, music/n room/n ./.</sentence>
</lexeme>

<lexeme name="decorate" aktionsart="activity">
  <sentence index="2" aktionsart="state">Rooms/n are/v decorated/v
in/i either/d traditional/j or/c modern/j styles/n ./.</sentence>
</lexeme>

<lexeme name="say" aktionsart="activity">
  <sentence index="4" aktionsart="state">Maui/n ultimate/j fantasy/n
resort/n said/v to/t be/v the/a most/q expensive/j resort/n ever/r
built/v is/v a/a favorite/n with/i families/n ./.</sentence>
  <sentence index="14" aktionsart="state">This/d small/j ,/,
stylish/j restaurant/n in/i an/a atmospheric/j ,/, century/n -/- old/j
house/n is/v said/v to/t serve/v the/a best/j fish/n and/c shellfish/j
in/i Jerusalem/n ./.</sentence>
</lexeme>

<lexeme name="use" aktionsart="activity">
  <sentence index="6" aktionsart="state">This/d new/j 4/c -/-
storey/n hotel/n uses/v local/j furnishings/n ,/, fabrics/n ,/, and/c
stone/n in/i a/a successful/j attempt/n to/t create/v a/a
```

sympathetic/j harmony/n with/i its/p stunning/j natural/j setting/n
 ./.</sentence>

</lexeme>

<lexeme name="splash" aktionsart="semelfactive">

<sentence index="0" aktionsart="achievement">Splash/v out/r with/i
 fish/n baked/v in/i the/a taboon/n ,/, or/c bouillabaisse/n
 ./.</sentence>

</lexeme>

<lexeme name="come" aktionsart="accomplishment">

<sentence index="26" aktionsart="state">Nearly/r at/i the/a end/n
 of/i a/a winding/j road/n to/i the/a Na/x Pali/n Coast/n ,/, these/d
 condominium/n units/n are/v beginning/v to/t show/v their/p age/n ,/,
 but/c they/p come/v with/i complete/j kitchens/n ,/, a/a white/j -/-
 sand/n beach/n with/i tide/n pools/n ,/, and/c looming/v mountain/n
 peaks/n out/r of/i Bali/n Hai/n ./.</sentence>

<sentence index="23" aktionsart="state">The/a establishments/n
 listed/v below/r offer/n a/a cross/j -/- section/n of/i local/j
 restaurants/n ,/, and/c should/m convince/v you/p that/c not/x
 everything/p on/i the/a island/n comes/v with/i chips/n ((french/j
 fries/n)) ./.</sentence>

<sentence index="3" aktionsart="state">These/d modern/j cabins/n
 come/v with/i kitchen/n ,/, bathroom/n ,/, and/c air/n -/-
 conditioning/n ,/, are/v set/v on/i the/a Sea/n of/i Gali/n lee/n ,/,
 and/c make/v ideal/j family/n holiday/n homes/n ./.</sentence>

</lexeme>

Appendix D Semantic Rules

```
//Verbs ending in "ing" are activities
new Rule("activity", "Verbs ending in 'ing' are activities") {
    public boolean isApplicable(Sentence context, int index) {
        //extra caution is required when the root form ends
with "ing"
        if(context.getWord(index).endsWith("inging") ||
            (context.getWord(index).endsWith("ing") &&
!dictionary.getLexeme(context.getWord(index)).endsWith("ing"))) {
            //if there is a next word, make sure it is not a
noun
            //if it is a plural noun, it is OK
            if(index + 1 < context.length()) {
                //if the next tag is not a noun, return true.
if the
                //next tag is a noun, return true iff the next
word ends
                //with an "s"
                return !context.getTag(index +
1).equals(tagset.getTag("noun")) ||
                    context.getWord(index +
1).endsWith("s");
            }
            else
                return true;
        }
        else
            return false;
    }
}
```

```

    }
},
//Verbs followed by adverbial "for" are activities
new Rule("activity", "Verbs followed by adverbial 'for' are
activities") {
    public boolean isApplicable(Sentence context, int index) {
        //check to see if word following 'for' is a numeral eg
'seven'

        //or a determiner, followed by a time eg 'hour'
        if(index + 3 < context.length() &&
            context.getWord(index + 1).equalsIgnoreCase("for")
&&
            (context.getTag(index +
2).equals(tagset.getTag("count")) ||
            context.getWord(index + 2).equalsIgnoreCase("a") ||
            context.getWord(index + 2).equalsIgnoreCase("an"))
&&
            isTime(context.getWord(index + 3)))
            return true;
        else
            return false;
    }
},
//Verbs followed by adverbial "in" are accomplishments
new Rule("accomplishment", "Verbs followed by adverbial 'in'
are accomplishments") {
    public boolean isApplicable(Sentence context, int index) {
        //check to see if word following 'in' is a numeral eg
'seven'

        //or a determiner, followed by a time eg 'hour'
        if(index + 3 < context.length() &&
            context.getWord(index + 1).equalsIgnoreCase("in") &&

```

```

        (context.getTag(index +
2).equals(tagset.getTag("count")) ||
        context.getWord(index + 2).equalsIgnoreCase("a") ||
        context.getWord(index + 2).equalsIgnoreCase("an"))
&&
        isTime(context.getWord(index + 3)))
        return true;
    else
        return false;
    }
},
//If the previous word is finish(ed), then the verb is an
accomplishment
    new Rule("accomplishment", "If the previous word is
finish(ed), then the verb is an accomplishment") {
        public boolean isApplicable(Sentence context, int index) {
            if(index - 1 >= 0 &&
                (context.getWord(index -
1).equalsIgnoreCase("finished") ||
                context.getWord(index -
1).equalsIgnoreCase("finish")))
                return true;
            else
                return false;
        }
},
//If the previous word is stopp(ed), then the verb is an
activity
    new Rule("activity", "If the previous word is stopp(ed), then
the verb is an activity") {
        public boolean isApplicable(Sentence context, int index) {
            if(index - 1 >= 0 &&

```

```

        (context.getWord(index -
1).equalsIgnoreCase("stopped") ||
        context.getWord(index -
1).equalsIgnoreCase("stop")))
        return true;
    else
        return false;
    }
},
//If the verb is used with a perfect, it is a state
new Rule("state", "If the verb is used with a perfect, it is a
state") {
    public boolean isApplicable(Sentence context, int index) {
        if(index - 2 >= 0) {
            String lexeme =
dictionary.getLexeme(context.getWord(index - 2));
            if(lexeme != null &&
                lexeme.equals("have") &&
                !context.getTag(index -
1).equals(tagset.getTag("verb"))) {
                return true;
            }
        }
        if(index - 1 >= 0) {
            String lexeme =
dictionary.getLexeme(context.getWord(index - 1));
            return lexeme != null && lexeme.equals("have");
        }
        else
            return false;
    }
},

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```

//If the following word is "along", then it is an activity
new Rule("activity", "If the following word is 'along', then
it is an activity") {
    public boolean isApplicable(Sentence context, int index) {
        if(index + 1 < context.length() &&
            context.getWord(index +
1).equalsIgnoreCase("along"))
            return true;
        else
            return false;
    }
},
//If the following word is "on", then it is an activity
/*new Rule("activity", "If the following word is 'on', then it
is an activity") {
    public boolean isApplicable(Sentence context, int index) {
        if(index + 1 < context.length() &&
            context.getWord(index + 1).equalsIgnoreCase("on"))
            return true;
        else
            return false;
    }
},*/
//If the following word is "away", then it is an activity
new Rule("activity", "If the following word is 'away', then it
is an activity") {
    public boolean isApplicable(Sentence context, int index) {
        if(index + 1 < context.length() &&
            context.getWord(index +
1).equalsIgnoreCase("away"))
            return true;
        else

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        return false;
    }
},
//If the verb is a form of "to be", it is a state
new Rule("state", "If the verb is a form of 'to be', it is a
state") {
    public boolean isApplicable(Sentence context, int index) {
        return
dictionary.getLexeme(context.getWord(index)).equals("be");
    }
},
//If the verb is used in simple present form, it is a state
new Rule("state", "If the verb is used in simple present form,
it is a state") {
    public boolean isApplicable(Sentence context, int index) {
        String lexeme =
dictionary.getLexeme(context.getWord(index));
        if(context.getWord(index).equalsIgnoreCase(lexeme +
"s") ||
        context.getWord(index).equalsIgnoreCase(lexeme +
"es")) {
            return true;
        }
//first rule didn't work, try previous word.
//this is for plurals & those combined with personal
prounouns
        else if(index - 1 >= 0) {
            return (context.getWord(index - 1).endsWith("s")
||
            context.getWord(index - 1).equalsIgnoreCase("I")
||

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        context.getWord(index -
1).equalsIgnoreCase("we") ||
        context.getWord(index -
1).equalsIgnoreCase("they") ||
        context.getWord(index -
1).equalsIgnoreCase("you")) &&
        context.getWord(index).equalsIgnoreCase(lexeme);
    }
    else
        return false;
    }
},
//If the lexeme is noverb, it will never be used as a verb
new Rule("none", "If the word is noverb, it will never be used
as a verb") {
    public boolean isApplicable(Sentence context, int index) {
        String lexeme =
dictionary.getLexeme(context.getWord(index));
        return lexeme.equalsIgnoreCase("noverb");
    }
},
//If the previous or next word is a hyphen, then the word is
not being
//used as a verb.
//This is a work-around for a poorly tagged corpus
new Rule("none", "If the previous or next word is a hyphen,
then the word is not a verb") {
    public boolean isApplicable(Sentence context, int index) {
        if(index - 1 >= 0 &&
            context.getWord(index - 1).equals("-"))
            return true;
        else if(index + 1 < context.length() &&

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        context.getWord(index + 1).equals("-"))
            return true;
        else
            return false;
    }
},
//If the word is a perfect, it is not being used as a verb
new Rule("none", "If the word is a perfect, it is not being
used as a verb") {
    public boolean isApplicable(Sentence context, int index) {
        if(index + 2 < context.length() &&
dictionary.getLexeme(context.getWord(index)).equals("have") &&
            (context.getTag(index +
1).equals(tagset.getTag("verb")) ||
            context.getTag(index +
2).equals(tagset.getTag("verb"))))
                return true;
            else
                return false;
        }
},
//If the previous word is finally, then the verb is an
achievement
new Rule("achievement", "If the previous word is finally, then
the verb is an achievement") {
    public boolean isApplicable(Sentence context, int index) {
        if(index - 1 >= 0 &&
            context.getWord(index -
1).equalsIgnoreCase("finally"))
                return true;
            else

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        return false;
    }
},
//Verbs followed by 'to be' are being used as states
new Rule("state", "Verbs followed by 'to be' are being used as
states") {
    public boolean isApplicable(Sentence context, int index) {
        if(index + 2 < context.length() &&
            context.getWord(index + 1).equalsIgnoreCase("to")
&&
            context.getWord(index +
2).equalsIgnoreCase("be"))
            return true;
        else
            return false;
    }
},
//Nouns ending in "ing" tagged as verbs are none
new Rule("none", "Nouns ending in 'ing' tagged as verbs are
none") {
    public boolean isApplicable(Sentence context, int index) {
        //extra caution is required when the root form ends
with "ing"
        if(context.getWord(index).endsWith("inging") ||
            (context.getWord(index).endsWith("ing") &&
!dictionary.getLexeme(context.getWord(index)).endsWith("ing"))) {
            //if there is a next word, make sure it is a
singular noun
            if(index + 1 < context.length()) {
                //if next tag is a noun, return true iff the
next word

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        //doesn't end with an "s"
        return context.getTag(index +
1).equals(tagset.getTag("noun")) &&
            !context.getWord(index +
1).endsWith("s");
    }
    else
        return true;
}
else
    return false;
}
},
//If the verb is a form of "have", it is a state
new Rule("state", "If the verb is a form of 'have', it is a
state") {
    public boolean isApplicable(Sentence context, int index) {

if(dictionary.getLexeme(context.getWord(index)).equals("have")) {
        for(int i = index+1; i <= index + 2 && i <
context.length(); i++) {

if(context.getTag(i).equals(tagset.getTag("verb")))
            return false;
        }
        return true;
    }
    else
        return false;
}
},

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        //If the previous word is 'to', then the verb can be ignored
as it is

        //being used in the base form.

        new Rule("none", "If the previous word is 'to', then the verb
is being used in the base form.") {

            public boolean isApplicable(Sentence context, int index) {

                if(index - 1 >= 0 &&

                    context.getWord(index - 1).equalsIgnoreCase("to"))

                    return true;

                else

                    return false;

            }

        },

        //Verbs in simple past are being used in same way as base form
so can be

        //ignored. Note that this only catches weak verbs.

        new Rule("none", "Verbs in simple past are being used in same
way as base form.") {

            public boolean isApplicable(Sentence context, int index) {

                String lexeme =

dictionary.getLexeme(context.getWord(index));

                if(index - 1 >= 0 &&

                    (context.getTag(index -

1).equals(tagset.getTag("noun")) ||

                    context.getTag(index -

1).equals(tagset.getTag("pronoun"))) &&

                    (context.getWord(index).equalsIgnoreCase(lexeme +

"ed") ||

                    context.getWord(index).equalsIgnoreCase(lexeme +

"d")))

                    return true;

                else

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        return false;
    }
},
//If verb is used with a deontic modal, then the verb is
infinitival.
new Rule("none", "If the previous word is a deontic modal,
then the verb is infinitival.") {
    public boolean isApplicable(Sentence context, int index) {
        if(index - 1 >= 0 &&
            isModal(context.getWord(index - 1)))
            return true;
        else if (index - 2 >= 0 &&
            isModal(context.getWord(index - 2)) &&
            !context.getTag(index -
1).equals(tagset.getTag("verb")))
            return true;
        else
            return false;
    }
},
//Catching 'do' used as auxiliary
new Rule("none", "If 'do' is being used as an auxiliary, it is
not being used as a verb.") {
    public boolean isApplicable(Sentence context, int index) {
        if(index + 2 < context.length() &&
dictionary.getLexeme(context.getWord(index)).equals("do") &&
            (context.getTag(index +
1).equals(tagset.getTag("verb")) ||
            context.getTag(index +
2).equals(tagset.getTag("verb"))))
            return true;
    }
}

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        else
            return false;
    }
},

    //verbs used with auxiliary 'do' that aren't taking
inflections aren't interesting

    //do we need to check if the previous words are in the
dictionary, or is that part of getLexeme()?

    new Rule("none", "Verbs used with auxiliary 'do' that aren't
taking inflections aren't interesting.") {

        public boolean isApplicable(Sentence context, int index) {

            if(index - 2 >= 0 &&

dictionary.getLexeme(context.getWord(index)).equals(context.getWord(in
dex)) &&

("do".equals(dictionary.getLexeme(context.getWord(index - 1))) ||

"do".equals(dictionary.getLexeme(context.getWord(index - 2))))

            return true;

            else

            return false;

        }

    },

    //Imperatives in initial position in base form are not
interesting, unless stative.

    new Rule("none", "Imperatives in inital position in base form
are not interesting, unless stative.") {

        public boolean isApplicable(Sentence context, int index) {

            String lexeme =

dictionary.getLexeme(context.getWord(index));

            if(index == 0 &&

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        lexeme.equals(context.getWord(index)) &&
        !dictionary.getAktionsart(lexeme).equals("state"))
        return true;
    else
        return false;
    }
},
    //verbs ending in 'ed' followed by noun are actually being
used as adjectives
    new Rule("none", "Verbs ending in 'ed' followed by noun are
actually being used as adjectives.") {
        public boolean isApplicable(Sentence context, int index) {
            String lexeme =
dictionary.getLexeme(context.getWord(index));
            if(index + 1 < context.length() &&
                (context.getWord(index).equals(lexeme + "ed") ||
                 context.getWord(index).equals(lexeme + "d")) &&
                context.getTag(index +
1).equals(tagset.getTag("noun")))
                return true;
            else
                return false;
        }
},
    //verbs following possessives are not being used as verbs
    new Rule("none", "Verbs following possessives are not being
used as verbs.") {
        public boolean isApplicable(Sentence context, int index) {
            String lexeme =
dictionary.getLexeme(context.getWord(index));
            if(index - 1 >= 0) {

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        return context.getWord(index -
1).equalsIgnoreCase("his") ||
        context.getWord(index -
1).equalsIgnoreCase("her") ||
        context.getWord(index -
1).equalsIgnoreCase("our") ||
        context.getWord(index -
1).equalsIgnoreCase("your") ||
        context.getWord(index -
1).equalsIgnoreCase("their") ||
        context.getWord(index -
1).equalsIgnoreCase("my");
    }
    else
        return false;
}
},
//specific quotes are accomplishments
new Rule("accomplishment", "specific quotes make 'said' an
accomplishment") {
    public boolean isApplicable(Sentence context, int index) {
        String lexeme =
dictionary.getLexeme(context.getWord(index));
        if(index - 2 >= 0 && index + 1 < context.length() &&
lexeme.equals("say")) {
            return context.getWord(index - 1).equals("\"") ||
                context.getWord(index +
1).equalsIgnoreCase("\"") ||
                context.getWord(index -
2).equalsIgnoreCase("\"");
        }
        else

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        return false;
    }
}
};
```