

Elucidation of a telic infinitive¹

MATTHEW WHELPTON

University of Iceland

(Received 23 March 1999; revised 29 August 2000)

In this paper, I consider the semantics of a modifier infinitive in English, related to the more widely discussed Rationale Clause (see especially Faraci 1974, Jones 1991). I argue that the semantics of this infinitive (a Telic Clause) derives from the properties of the predicate which heads it (TELOS). I characterize TELOS, within a Davidsonian event semantics, as a pure relation between events and argue against the view that the word *only*, which often prefaces the Telic Clause, is in fact the head of the construction. I explore the conditions on reference which apply to TELOS. As well as offering an account of a little-discussed construction, therefore, this paper is intended as a contribution to our understanding of the place of argument structure in event semantics.

1. INTRODUCTION

In this paper, I will offer an account of the argument structure and semantics of an infinitive which occurs as a modifier of the verb in English and which expresses the outcome² of the event denoted by the modified verb. Examples of this infinitive are given in (1)–(6).

- (1) John hung his coat up, only to realize that he had to go out again.
- (2) It became cloudy during the morning, only to clear up again before the match.
- (3) Many people are surviving their illnesses, only to have had their livelihood taken away. (based on television advertisement)
- (4) She survived the Holocaust, to spend the rest of her life fighting against prejudice and discrimination. (based on television advertisement)
- (5) John worked on the research project all summer, to complete it within days of the deadline.

[1] I would like to thank the University of Oxford, the British Academy, the University of Iceland and the University of California, Irvine, for their support of various stages of this research; and for their comments, criticisms and insights, I would like to thank Jim Higginbotham, David Cram, Gillian Ramchand, Edwin Williams, Shalom Lappin, David Willis, David Adger, Joan Maling, Manfred Krifka, Ruth Carroll and the two anonymous *JL* referees of this paper. Needless to say, all imperfections, mistakes and confusions are mine solely.

[2] I use the term ‘outcome’ here in a colloquial sense by which the ‘outcome’ of an event is related to that original event by something stronger than mere temporal subsequence but by something weaker than proper causal consequence. The sense of ‘outcome’ that I intend will be discussed in some detail later in this section.

- (6) Blossoms fell from the tree, to collect in piles at the side of the street.

This construction has been recognized in the literature on traditional grammar: Quirk et al. (1985: 629, §8.132; 1078, §15.25) class it as one of ‘the somewhat vaguer “outcome” disjuncts’ alongside ‘result disjuncts’; Poutsma (1929: 779, §24.3) describes this infinitive as expressing ‘result, or attendant circumstances’. It has, however, been widely ignored in the generative literature (see Minkoff 1994 for one notable exception); it has often been confused with the Rationale Clause, a modifier infinitive which expresses agentive intention (see Faraci 1974: 45, fn. 3), examples of which are given in (7)–(8).

- (7) John hung up his coat (in order) to have his hands free.
 (8) John worked on the research project all summer (in order) to have it finished by the beginning of term.

I follow Whelpton’s (1995, 2000) terminology in referring to the infinitives in (1)–(6) as Telic Clauses. This term parallels the established labels for object-oriented infinitival modifiers of the verb, referred to collectively by Jones (1991) as Purpose Clauses, and for Agent-oriented infinitival modifiers of the verb, referred to by Faraci (1974) as Rationale Clauses. Examples of Purpose Clauses are given in (9)–(11) and examples of Rationale Clauses are given in (12)–(13).

- (9) Red blood cells₁ contain particles₂ of iron [for oxygen molecules to attach to e₂].
 (10) John₁ designed the stool₂ [for people with back problems to sit on e₂].
 (11) John₁ put his *Complete Works of Shakespeare*₂ on the floor [for his little nephew to sit on e₂].
 (12) Arnold₁ slapped the table₂ (in order) e₁ to get everyone’s attention.
 (13) Sally₁ closed the curtains₂ (in order) e₁ to talk to her friend in private.

Whelpton treats the Purpose Clause and the Rationale Clause as teleological constructions: Purpose Clauses express the ends for which objects have developed their natural structure, as in (9), the ends for which objects have been designed, as in (10), or the ends for which objects have been deployed by an intending agent, as in (11); Rationale Clauses express the ends for which particular actions are performed by an agent, as in (12)–(13). He claims that the Telic Clause is also a teleological construction, in the sense that it expresses the ends to which particular events tend: it supplies the main event with an outcome. Note that ‘telic’ in this sense refers to having an outcome in a general sense; ‘telic’ is not used in the aspectual sense of being delimited by a temporal end point. One might think of these two senses of

'telic' as being internal and external (compare with the notion of 'outer' and 'inner' relations in Minkoff 1994: 87ff.). Internal telicity (aspectual) defines the end of an event in terms of its internal structure – it is bounded. External telicity (teleological) defines the end of an event in terms of situation development: the chain of events set off by the event described by the main verb comes to a resolution in the outcome specified by the Telic Clause.

A referee of this paper observed that the notion of 'outcome' in this sense is an odd one because an outcome 'is a direct consequence of something whereas the effect of a telic infinitive is to specify an event that is simply subsequent to the event denoted by the main verb'. The point is well-taken but reflects a difference of intuition concerning the term 'outcome'. For me, the term falls between mere subsequence and full causal consequence. It is clearly not the case that the Telic Clause requires a relation of causal consequence between the two events: it is certainly not the case that clouds in the morning directly cause clearing up in the afternoon or even that survival of the Holocaust directly causes the fight against prejudice (one can imagine a number of other possible outcomes). But I would dispute the claim that the use of the Telic Clause simply expresses a temporal relation that the second event is subsequent to the first. In that view, the Telic Clause would be equivalent to a simple 'and/but then' construction expressing temporal subsequence. The use of 'and/but then' to link two situations is extremely productive; but the use of the Telic Clause to link two situations is extremely restrictive.³

- (14) Bill finished his essay and then he went for a haircut.
- (15) !!!Bill finished his essay, to go for a haircut. (factive reading only)
- (16) John felt full but then he ate a big icecream.
- (17) !!!John felt full, only to eat a big icecream.

The Telic Clause is only acceptable where the speaker conceives of the second event as being relevant to the first, not by causal necessity but by our understanding of how events in the world are associated into significant developments. This relation is not a necessary one and indeed there is no reason why we should treat some particular series of events as being a related development while others are not. Nevertheless, events are interpreted in this way.

This understanding of the notion of outcome lies at the heart of the interpretation of the Telic Clause and it is the central claim of this paper that this interpretation is present because the Telic Clause is headed by a predicate, relating the infinitival VP to the modified VP, which has a

[3] As is the case with most Telic Clauses, the examples can be made to sound more acceptable in appropriate contexts; the significant point is that no such context is required to make the conjoined sentences sound acceptable. The semantic underpinnings of this contextual effect are explored in section 4.2.

standard argument structure and which is subject to specific conditions on reference. This paper therefore offers an ‘elucidation’ of the meaning of this telic predicate in terms of its argument structure and conditions on reference, along lines laid down for semantic analysis in general in Higginbotham (1989).

In section 2, I will outline the theory of argument structure I am adopting, posit an argument structure for the head of the Telic Clause, and defend that argument structure. In section 3, I will consider and reject the claim that the word *only* is in fact the head of the Telic Clause. In section 4, I will explore the conditions on reference introduced by the telic predicate.

2. THE ARGUMENT STRUCTURE OF TELOS

I assume here the theory of argument projection developed in Higginbotham (1985, 1989), following in the tradition of Davidson (1967). This contrasts in a number of important ways with work in the tradition of Montague (1974).

Davidsonian and Montagovian semantics differ in their ontological assumptions. Montagovians recognize only individuals and truth values as primitives of the universe of discourse; expressions which do not denote one or the other are treated as functions from one to the other. So an expression such as *John* denotes a particular individual and an expression such as *John left* denotes a truth value. The verb, *left*, itself is taken to be a function from individuals to truth values.

Davidsonians recognize not only individuals and truth values, but also events. Events are individuals of an abstract kind; they do not themselves express truth values. In a sentence such as (18), the subject is a gerund which denotes an event.

(18) Leaving is difficult.

The expression *leaving* is in itself neither true nor false. It merely denotes an abstract kind of individual, much as an abstract noun like *organisation* denotes an abstract kind of individual, as used in the phrase ‘a powerful organisation’ (see Schein 1993 for a more detailed discussion of events as abstract individuals). As well as individuals, truth values and events, Davidsonians make use of first-order predicates (equivalent to Montagovian first-order functions), and the quantifiers and conjunctions of standard logic. A verb is a predicate of events (and individuals). By adding finite tense to a verb, one derives a proposition which will have the value True or False. It is assumed that finite tense introduces quantification over the event variable (see Higginbotham 1983).

(19) John left.

(20) $\exists e$ leave (John, e)

‘There was an event, e: e is a leaving by John.’

The verb *leave* simply expresses a predicative relation between an event and an individual. The subject specifies the particular individual involved in this particular event; the finite tense binds the event variable and produces an assertion: ‘There was an event of John leaving’.

The meaning of a particular predicate or function is fixed in both approaches by some sort of condition of application (conditions on reference or semantic postulate). We might say that the predicate *leave* is true of an individual x if and only if x leaves; or that the function *leave* maps an individual x to True if and only if x leaves and to False if and only if x does not leave. The particular nature of the condition is established by cultural convention; if, for instance, it were to become culturally accepted that the verb *leave* is true of an individual x if and only if x leaves and never returns, that would be the meaning expressed by the condition on reference or semantic postulate.

An important difference emerges in the analysis of modifiers. Because Montagovians recognize only functions alongside individuals and truth values, then modifiers must be treated as functions. Modifiers can be functions from verbs (first order functions) to verbs of the same type (first order functions). Consider (21).

(21) John left at 5 p.m.

The temporal modifier phrase, *at 5 p.m.*, is a function which takes the one-place first-order function, *left*, and supplies a new one-place first-order function, *left-at-5 p.m.* Modifiers are therefore higher-order functions.

Davidsonians treat modifiers as predicates of events, just like verbs. The process of modification involves a modifier predicating itself of exactly the same event that the verb is predicated of. The two predicates are then conjoined as descriptions of the same event.

(22) John left at 5 p.m.

(23) leave (John, e) & at (e, 5 p.m.)

Modification is not a result of function-argument application; rather it involves the identification of variable values (the event variable of *at* comes to have the same value as the event variable of *leave*), followed by conjunction of the identified predicates.

What this means is that, in the Davidsonian approach, we can always characterize the meaning of the phrase resulting from modification without actually looking at the lexical meaning of the modifier itself: a phrase resulting from modification will have the meaning of the modifier and the meaning of the modifiee applied to the same individual or event. The situation is quite different in the Montagovian view. To work out what the meaning of the modified phrase is, we must look at the specific rule of

interpretation (postulate) that is provided with the modifier itself. The significance of this can be seen in Davidson's classic example.

(24) Jones buttered the toast at midnight.

If (24) is true, then (25)–(26) will also be true.

(25) Jones buttered the toast.

(26) Something happened at midnight.

It does not matter what toast-buttering involves or what it means for something to happen at a particular time (rather than before, during, or after that time), we know simply by how modification works that if (24) is true, then (25)–(26) will be true also. This follows directly from the Davidsonian translation of the sentence in (27).

(27) $\exists e$ butter (Jones, toast, e) & at (e, midnight)

It does not follow in the Montagovian view because the rule of interpretation for the higher-order function *at* must be consulted to discover what the new one-place first-order predicate *butter-the-toast-at-midnight* actually means.⁴

Within the Davidsonian framework developed by Higginbotham, then, modifiers have argument structures of the same kind as standard predicates such as verbs. An account of infinitives of result in this view, therefore, requires us to specify the argument structure of the modifying predicate and its conditions on reference. Say that the head of the Telic Clause is the predicate TELOS. As a first characterization I will adopt the argument structure in (28) for this predicate.

(28) TELOS ($\langle e^1, e^2 \rangle$) \leftrightarrow the remarkable outcome of e^1 is e^2

The predicate TELOS has two argument positions, each ranging over events, forming an ordered pair. The conditions on reference state that TELOS is true of its arguments if and only if the first event has as its remarkable outcome the second event. The purpose of this paper is to motivate this characterization of the argument grid of TELOS and to explore in more detail the notion

[4] It is worth emphasizing that the event analysis is not intended as an addition to the Montague view, simplifying its account of modification: the Davidsonian approach attempts a simplification and restriction of the semantic apparatus at all levels. In the Montague tradition we find the elaboration of higher-order functions and the introduction of type-shifting functions to guarantee compositionality. The Davidsonian tradition attempts to reduce the semantic apparatus to (first-order) predicate-argument application, ordinary quantification and truth functions, the core apparatus already required in the Montague approach. The Davidsonian approach, as a complete theory of natural language semantics, is therefore more restrictive than its Montagovian rival. This restrictiveness must, of course, be paid for in ontology: it is only by assuming events as primitives of the model that the other reductions are possible. Much work has, therefore, been spent on showing the naturalness and necessity of assuming events as primitives (see especially Higginbotham 1983, 1985, 1989; Parsons 1989, 1990; Schein 1993). This article may be seen as a contribution to the investigation of the role of events in natural language semantics.

of ‘remarkable outcome’. In doing so, I will also reject the hypothesis that *only* is in fact the head of this construction.

Where necessary, I will highlight the significance of the choices I have made by contrasting the predicate that heads the Telic Clause with the predicate that heads the Rationale Clause, call it simply RATIONALE. The argument structure of RATIONALE is given in (29).

(29) RATIONALE ($x, e, \wedge p$) \leftrightarrow x brings about e with the intention that p

RATIONALE has three argument positions, one ranging over individuals, one ranging over events and one ranging over propositions. The conditions on reference state that the individual must bring about the event (i.e. be the ‘agent’ of the event) with the intention that the proposition come to be true. The significant similarity between the argument structures of the predicates RATIONALE and TELOS is that both require that the modified verb denote an event. The two significant differences are (1) that RATIONALE requires some individual to be related to the main event in a particular way (in fact as ‘agent’) where TELOS does not; (2) that RATIONALE requires that the infinitive denote a proposition where TELOS requires that the infinitive denote an event. I will now explore these issues in more detail.

2.1 *No individual argument*

First, notice that the Telic predicate has no position for a variable ranging over individuals (where the Rationale predicate does). This can be seen simply in the fact that the Telic Clause can occur with weather verbs and adjectives which have no individual arguments.

(30) It was sunny in the morning, only to rain later.

Assuming, following Parsons (1990), that verbs are interpreted semantically as classifiers of events, rather than relations, then the translation of (30) will simply be as in (31).

(31) $\exists e^1 \exists e^2$ sunny (e^1) & rainy (e^2) & TELOS ($\langle e^1, e^2 \rangle$)

This says that there are two events, a sunny event and a rainy event, and that the remarkable outcome of the sunny event is the rainy event. The fact that TELOS is straightforwardly compatible with weather verbs suggests that it expresses a pure relation between events, without reference to individual participants.

2.2 *The first event argument*

I am adopting the Davidsonian view here that modification involves event predication. Though there are problems with this approach for some modifiers (consider Lewis’ (1975) discussion of quantificational adverbs), the

Telic Clause itself, despite its complex structure, provides a clear illustration of Davidson's original point concerning entailments. It is a simple fact that any sentence modified by a Telic Clause entails the same sentence unmodified.

(32) If 'it was sunny in the morning, only to rain later' then 'it was sunny in the morning'.

This follows straightforwardly in the account given here: the translation given in (31) entails (33), as required.

(33) $\exists e^1$ sunny (e^1)

This entailment would not follow directly in a Montagovian analysis, because the interpretation rule for the telic modifier function would have to be consulted to see what the resulting structure meant.

As I adopt the Davidsonian approach to modification, I therefore assume an event position for modification.

2.3 *The second event argument*

The Telic predicate contrasts with the Rationale predicate in that the final argument of the Rationale predicate is a variable ranging over propositions (an opaque context), where the final argument of the Telic predicate is a variable ranging over events (a transparent context). There are two striking pieces of evidence that the second argument of the Telic predicate is indeed an event: the infinitive is interpreted factively; and the content of the infinitive is transparent in perceptual contexts.

2.3.1 *Factivity*

Unlike the Rationale infinitive which refers to the intention of an Agent, as in (34), the Telic infinitive always asserts the outcome of an event, as in (35).

(34) John went into the study (in order) to find incriminating evidence on the desk.

(35) John told the police that Bill was innocent, only to find incriminating evidence on the desk.

In (34) John intends that he himself will find the evidence, but he may not do so; in (35), however, the Telic infinitive precisely asserts that John finds the incriminating evidence.

(36) $\exists e^1 \exists e^2$ tell (e^1) ... & find (e^2) ... & TELOS ($\langle e^1, e^2 \rangle$)

(37) $\exists e^1$ go (e^1) ... & RATIONALE (John, e^1 , $\wedge \exists e^2$ find (e^2) ...)

Notice that in these two translations the context of the event variable of the infinitival verb (*find*) is different: with the Telic predicate, TELOS, it forms

part of the main proposition and it is therefore quantificationally bound with other matrix clause variables (including that of the main verb); with the Rationale predicate, it is embedded in the proposition which is the third argument of RATIONALE, and thus it is interpreted relative to the semantics of the Rationale predicate itself. Consequently, the infinitival event is asserted to happen in the Telic construction but not in the Rationale construction.

An anonymous referee of this paper also suggested that the Telic predicate in fact requires factive (extensional) verbs in the infinitive. They observe that if the predicate ‘find’ in (35) is replaced by ‘look for’, as in (38), then the result is unacceptable.

- (38) !!!John told the police that Bill was innocent, only to look for incriminating evidence on the desk.

However, the unacceptability here does not in fact reflect a selectional restriction excluding non-factive verbs from the infinitive. Notice that a Telic Clause containing ‘look for’ is acceptable if a different context is implied, as in (39).

- (39) John swore to the police during the interrogation that Bill was innocent, only to look for incriminating evidence against him when he got home.

The reason for the acceptability of (35) and (39) and for the unacceptability of (38) must therefore be something other than a selectional restriction requiring factive predicates in the Telic Clause.

I suggest that the contrast between (38) and (39) relates to the ease with which we can see John’s action in the main event being incompatible with his actions in the outcome event. In (39), John is said to assert Bill’s innocence in a way and in a context that makes his assertion appear sincere; his consequent actions are then directly incompatible with such apparent sincerity. In (38), however, there is nothing remarkable about John’s actions: he might believe that his friend could be guilty but not want to tell the police this until he has himself confirmed his suspicions: there is nothing in John’s actions in the main event that makes his subsequent actions particularly surprising or for that matter particularly predictable.⁵ I will argue later that the Telic Clause requires the main event to raise structured uncertainties that the outcome event resolves.

[5] It is worth noting that (38) becomes more acceptable if it is read after reading (39) several times. This is presumably because the reader is now focused on the context established by (39). Interpreted in that context, (38) becomes more acceptable. This is a clear illustration of the pragmatic evaluative quality of this construction to be discussed later, which relies on the addressee’s evaluation of the two events as being saliently compatible or incompatible.

I will, therefore, continue to assume that the factivity of the Telic Clause is a reflection of the presence of an event variable, existentially bound with other variables in the matrix.

2.3.2 *Perception contexts*

An even more striking piece of evidence in favour of the view that the second argument position of the Telic predicate is in fact an event rather than a proposition comes from perception contexts. The significance of the data can be seen most clearly in the light of Higginbotham's (1983) account of perception verbs. Consider (40) and (41).

- (40) John saw Brutus stab Caesar.
 (41) John saw that Brutus stabbed Caesar.

There are a number of important distinctions between the interpretations of (40) and (41). Notice in particular that the complement of *see* in (40) is referentially transparent whereas the complement of *see* in (41) is referentially opaque. (40) must be asserted where John actually witnesses the stabbing of Caesar by Brutus, although he may not realize that this is what he saw (he might think that Brutus merely stumbled and bumped into Caesar; or he might believe that the incident he has witnessed actually involved two entirely different individuals). (41) carries no implication that John actually witnessed the stabbing of Caesar by Brutus, merely that he perceives it to be true that that is what has happened: it is necessary to the content of his perception that he understand that the event is a stabbing and that Brutus is Brutus and Caesar is Caesar. Higginbotham (1983) argues in detail that these facts amongst others follow straightforwardly in a theory which includes both events and propositions as ontological primitives. In (40), John witnesses an event which is described in a particular way although we know nothing of his own perception of that event; in (41) John perceives a proposition to be true, in which case the content of the proposition forms the content of his belief. In Higginbotham's theory, sentences such as (40)–(41) receive translations as in (42)–(43).

- (42) $(\exists e^1) [\exists e^2: \text{kill}(\text{Brutus}, \text{Caesar}, e^2)] \text{see}(\text{John}, e^2, e^1)$
 (43) $(\exists e^1) \text{see}(\text{John}, \wedge[(\exists e^2) \text{kill}(\text{Brutus}, \text{Caesar}, e^2)], e^1)$

Now consider the interpretation of a Telic Clause occurring in a perception context, as in (44).

- (44) John saw Mary win one million pounds on the first spin of the wheel, only to lose it all on the second.

It is clear that (44) has the properties associated with the event reading rather than the propositional reading. If John saw Mary win one million pounds on

the first spin of the wheel only to lose it all on the second, then he actually witnesses those two events; he may be under the misapprehension that he is actually seeing Sally rather than Mary, but as long as it is actually Mary who is involved in the event, then (44) can be truthfully asserted. Significantly, Mary's losing the money does not constitute a part of John's beliefs about the situation.

- (45) John saw Mary win one million pounds on the first spin of the wheel, only to lose it all on the second – but as he is unfamiliar with the game he didn't realize the significance of what he had just witnessed.

It therefore appears in (44) that the second position of the telic predicate ranges over events (referentially transparent), which John can perceive in the way he can perceive any other event, rather than over propositions. I therefore assume that the correct translation for (44) is the one given in (46).

- (46) $(\exists e^1) [(\exists e^2 e^3): T(\langle e^2, e^3 \rangle) \& \text{win}(e^2) \& \text{lose}(e^3)] \text{see}(\text{John}, \langle e^2, e^3 \rangle, e^1)$

Arguments such as those offered above thus suggest that the argument structure of the Telic predicate comprises simply an ordered pair of events, where events are taken to be individuals of an abstract kind, to be distinguished from propositions which denote truth values.

There is thus good evidence for the argument structure that I have posited for the predicate *TELOS*. Before moving on to a discussion of the conditions on reference of this predicate, however, it is necessary to discuss an alternative view concerning the headedness of this construction.

3. THE FUNCTION OF *ONLY*

3.1 *Optionality of only*

Both referees of this paper pointed to the significance of the word *only* in the Telic Clause. Some examples of Telic Clauses, such as (30), repeated here as (47), are apparently ill-formed on the Telic reading without *only*, as seen in (48).

- (47) It was sunny in the morning, only to rain later.
 (48) *It was sunny in the morning, to rain later.

This suggests that *only* is in fact the head of the construction and that infinitives which are not prefaced by *only* are not Telic Clauses at all. I argue below that this is not the case and that a unified account of factive infinitives, with and without the *only* preface, is possible.

Examples (1)–(6) at the beginning of this paper show that factive infinitives expressing an actual outcome of an event need not be prefaced by *only*. This suggests that the factivity and the outcome-reading are not linked to the

presence of *only*. Significantly, these two properties are the ones that most clearly distinguish the Telic Clause from the Rationale Clause. Nevertheless, it is true that (1)–(3) describe outcomes which are contrary to our expectations in some way (what I call in section 4.2 ‘an adversative reading’), whereas (4)–(6) describe outcomes that in some sense satisfy our expectations (what I call in section 4.2 ‘a resolutive reading’). A natural suggestion on the basis of referees’ comments is that *only* is the head of an adversative construction, distinct from the resolutive construction. However, it turns out that *only* is not necessary even to an adversative reading of the Telic Clause.

Consider the interpretations of (49) and (50).

- (49) John came home, only to find that Mary had left already.
 (50) John came home, to find that Mary had left already.

Here the sentences with and without *only* both express an outcome to the main event which is judged to violate expectations (in this case, our expectations of what John was hoping for). The main function of *only* here is apparently to emphasize this reading. This suggests that the Telic Clause always has an adversative reading available, and that *only* can be selected to reinforce it.

(49) and (50) show that (47) and (48) do not represent a consistent pattern. To understand the unacceptability of (48), the interaction of the Telic Clause and the *only* preface needs to be considered in more detail. Compare (51) and (52).

- (51) John entered the room, to find his chauffeur waiting for him.
 (52) John entered the room, only to find his chauffeur waiting for him.

Once again the insertion of *only* does not produce unacceptability: now, however, it does produce a shift in interpretation. Where in (51) we might assume that John’s discovery of the chauffeur, though a surprise, is not unwelcome, in (52) we must assume that John was not wanting to see his chauffeur. In fact, (51) is compatible with either an adversative or a resolutive reading, depending on the broader context, whereas (52) must have an adversative reading. This suggests that Telic Clauses have both resolutive and adversative readings available, depending on context, but that the use of the preface *only* picks out the adversative reading.

If this is so, then contexts in which an adversative reading is anomalous will resist *only* insertion, and contexts in which an adversative reading is the only natural one will require *only* insertion. I will take each in turn.

- (53) She survived the Holocaust, to spend the rest of her life fighting against prejudice.
 (54) !She survived the Holocaust, only to spend the rest of her life fighting against prejudice.

(54) is in fact perfectly grammatical and perfectly interpretable but the interpretation that we are forced to is contextually inappropriate: we must assume that fighting against bigotry is not a natural desire after surviving the Holocaust, when of course we expect that it is. Our judgement of the relation between the main event (surviving the Holocaust) and the outcome event (fighting against prejudice) is one of such strong consistency that the use of *only*, to mark a ‘contrary’ or adversative reading, seems inappropriate. Hence only the Telic Clause without *only* is contextually acceptable.

The converse situation is the one mentioned by the referees of this paper – where *only* appears to be obligatory. I repeat the relevant examples here:

(55) It was sunny in the morning, *only* to rain later.

(56) *It was sunny in the morning, to rain later.

The relation between the main event and the outcome event is clear in (55), where *only* is included: the sunniness of the morning has as its outcome the raininess of the afternoon and that is an unwelcome outcome, contrary to our expectations (it was perhaps assumed that a sunny morning made for a glorious afternoon, not always the case, it must be admitted). What about (56), which does not include *only*?

The problem here appears to be that there isn’t any particularly salient relation between the main event and its outcome. There does not appear to be a particularly salient adversative reading: it is perhaps unfortunate that it rained in the afternoon, but such things happen. Nor does afternoon rain appear to be a particularly fitting and appropriate outcome of a sunny morning. Notice that if the afternoon provided a strong fulfillment of our hopes and expectations, the Telic Clause becomes acceptable.

(57) It was sunny in the morning, to become steadily warmer and more glorious as the day drew on.⁶

The important point seems to be that the Telic Clause does not simply supply any old outcome for an event (where the outcome event could be any event one would care to think of); rather it picks out outcomes to events which are remarkable and salient in some way, either because they violate our

[6] Minkoff (1994: 89, ex. (141’) and fn. 46) notes a similar contrast between contrariness and culmination:

- (i) The sun rose hot and bright, *only* to yield as much heat and light as expected. (= Minkoff’s (141’))
- (ii) The sun rose hot and bright, eventually to yield as much heat and light as expected. (= Minkoff’s (i), fn. 46)

expectations, or because they fulfill our expectations, or because they resolve specific kinds of uncertainties introduced by the main event (this will be discussed in detail in section 4.2). The problem with (56) is that there does not appear to be a strong enough relation between the main event and its outcome to warrant use of the Telic Clause. Inclusion of *only* changes matters because it makes it clear that the second event must be interpreted as contrary to the first event (rather than being in keeping with it) and it makes that contrariness salient. It therefore makes the outcome remarkable enough for description by a Telic Clause.

On the basis of these observations, I conclude that *only* is optional with the Telic Clause and that cases where it appears to be specifically excluded or specifically required relate to the interaction between the interpretation of the Telic predicate and of *only* itself. If this is the case then we require a specific analysis of the semantics of *only*. I will now argue that the properties of *only* in this construction are not in fact those of what I will call ‘focal *only*’.

3.2 *Focal properties of only*

In Rooth’s (1985) classic account of the semantics of *only*, *only* is treated as a focus operator. As von Stechow (1997:10) observes in his discussion of Rooth, this *only* can occur in a wide range of contexts.

- (58) [Only **John**] was awake in time for breakfast.
- (59) John [only **voted by proxy**].
- (60) John saw [only **three**] students.
- (61) John invited [only **a couple of old friends**].
- (62) John watches TV [only **during dinner**].
- (63) John solved the problem [only **after Mary gave him a tip**].

The focused element is in bold. Rooth characterizes *only* as a propositional operator which generates a set of propositions identical to the one in which it is embedded, except that the focus element has been replaced by expressions of the same syntactic and semantic type. There is therefore a base proposition associated with the sentence in which *only* is embedded and a set of alternative propositions. A sentence containing *only* is then taken to assert that the base proposition is true and none of the alternatives. So a sentence such as (58) might have a set of alternatives associated with it like those in (64)–(66).

- (64) **Bill** was awake in time for breakfast.
- (65) **Sally** was awake in time for breakfast.
- (66) **Lee** was awake in time for breakfast.; etc.

What (58) then asserts is that it was John who was awake in time for breakfast and not Bill or Sally or Lee, etc.

I have received two insightful suggestions on how this analysis of focal *only* might be applied to the Telic Clause. One referee of this paper suggested that the set of alternative propositions describe the events normally associated with or caused by the main event (I will call these ‘expected outcomes’) and that the function of *only* is to exclude those propositions and assert the actual occurrence of the unexpected outcome. Krifka (p.c.) suggests that the set of alternative propositions is the set of propositions describing agentive intentions and that focal *only* excludes those propositions and asserts the actual outcome of the main event. Both of these views pick up the notion of our expectations of the main event (whether related to the event itself or its agent) and suggest the appealing possibility of assimilating the semantics of the Telic Clause to the semantics of focal *only*.

Notice, however, that there is already a significant difference between both of these approaches and the semantics for *only* developed by Rooth. The set of alternative propositions in Rooth’s account are of exactly the same kind as the proposition associated with *only*. So the alternative to John as the individual who is awake are the individuals Bill, Sally, Lee, and so on. The set of alternative propositions in the two suggested accounts are different from the one associated with *only*: the proposition associated with *only* expresses the actual outcome of the main event; the set of alternative propositions is the set of propositions concerning expected outcomes (in the view of the anonymous reviewer) or the set of propositions concerning agentive intentions (in the view of Krifka). To accommodate such a view of the alternative set of propositions will lead to an unwelcome elaboration of Rooth’s theory of focal *only*. I will argue below that such an elaboration would be fruitless as the Telic Clause exhibits none of the properties associated with focal *only*.

The essential characteristics of Rooth’s analysis are that focal *only* generates a set of alternative propositions and that the interpretation of the focused phrase itself with respect to the rest of the sentence in which it occurs is entirely independent of the semantics of *only*, i.e. the fact that John in (58) is a subject of predication, assigned the property of being awake, follows from the rules of interpretation for the base sentence, quite independently of the semantics of *only* itself.

The Rationale Clause can occur with focal *only*, interpreted in exactly the way that one would expect.

- (67) John bought a car [only **(in order) to impress his friends**].
- (68) John bought a car (in order) to please his mother.
- (69) John bought a car (in order) to get to school more easily.
- (70) John bought a car (in order) to make his sister jealous.

(67) asserts that John’s intention in buying a car was to impress his friends and not any other possible intention, such as those listed in (68)–(70). The set of alternatives can be excluded explicitly.

- (71) John bought a car [only (**in order**) to impress his friends] and not to please his mother or to get to school more easily or to make his sister jealous ...

Notice that the relation here between the infinitive and the modified verb is not given by *only*: the fact that the infinitive describes the intention with which the agent performed the action described by the main verb is an independent fact about the infinitive's interpretation in this construction (which in my view derives from the conditions on reference of the head of this infinitive, the RATIONALE predicate).

The independence in interpretation of a phrase focused by *only* suggests that a treatment of the semantics of the Telic Clause in terms of the semantics of *only* will be inadequate. To explain why it is that the Telic Clause provides the modified event with an outcome (and an outcome which actually occurs) we will need to show how the interpretation of the infinitive combines with the interpretation of the modified verb. But we have already seen that focal *only* is a propositional operator which does not itself express any relation between the focused phrase and the sentence in which it occurs.

Indeed, the *only* which (optionally) combines with the Telic Clause does not seem to express a focal reading at all. Compare again the sentences in (49)–(50), repeated here as (72)–(73).

- (72) John came home, only to find that Mary had left already.
 (73) John came home, to find that Mary had left already.

The difference between (72) and (73) is not the difference between a non-focus reading and a focus reading. (72) does not mean that (73) is true rather than any of the possible alternatives, such as those in (74)–(76).

- (74) John came home, to discover Mary with her lover.
 (75) John came home, to be arrested by waiting detectives.
 (76) John came home, to spend the rest of the evening fielding phone calls from the local gossip papers.

(72) simply indicates that the discovery was strongly contrary to our expectations. The fact that (72) does not involve a focus reading is confirmed by the fact that the Telic Clause does not allow the expression of alternatives.

- (77) *John came home, only to find that Mary had left already, not to discover Mary with her lover or to be arrested by waiting detectives or to spend the rest of the evening fielding phone calls from the local gossip papers ...

I conclude that the (optional) *only* in the Telic Clause is not focal *only*.

How, then, is the semantic contribution of *only* to be characterized? In my view the (optional) *only* that occurs with the Telic Clause is in fact an

instance of a connective, introducing what Quirk et al. (1985: 1103, §15.44) describe as a 'clause of exception':

(78) I would've asked you, only my mother told me not to.

Though Quirk et al. discuss the infinitive which I am calling a Telic Clause in a different section of their grammar (Quirk et al. 1985: 629, §8.132) and draw no parallel between the two instances, the semantics of this connective *only* is essentially the same as that of the Telic *only*, with the exception that the infinitive must refer to a subsequent event, where the finite clause need not.

- (79) John did apply for the post as Papal secretary, only he was an atheist.
 (80) *John did apply for the post as Papal secretary, only to be an atheist.
 (81) John did apply for the post as Papal secretary, only he was rejected as an atheist.
 (82) John did apply for the post as Papal secretary, only to be rejected as an atheist.

This temporal difference is in line with Stowell's (1982) observations about the future orientation of infinitives. One might therefore assume that the temporal difference is one introduced by the semantics of the infinitive itself, independently of the semantics of the connective *only*. This, however, is exactly what one would have to assume if the analysis of the Telic Clause being developed here is correct: the future orientation here follows naturally from the semantics of the Telic predicate, *TELOS*, which is the head of the infinitive. The connective *only* then contributes its own interpretation. Assume that for any propositions joined by *only*, as in (83), the interpretation can be paraphrased as in (84). This will give the paraphrases for (81) and (82) in (85) and (86).

- (83) p only q
 (84) p, however, contrary to expectation, q
 (85) John did apply for the post as Papal secretary, however, contrary to expectation, he was rejected as an atheist.
 (86) John did apply for the post as Papal secretary, however, contrary to expectation, the outcome of his applying was his rejection as an atheist.⁷

A Telic Clause preceded by *only* is always paraphrasable in this way because the *only* is in fact connective *only*. Connective *only* thus expresses relations

[7] Notice incidentally that John's being an atheist may be part of what was unexpected about the outcome. The Telic Clause sounds anomalous if this fact about John is stated in the main clause because then the outcome is very far from being unexpected!

(i) !John applied, as an atheist, for the post as Papal secretary, only to be rejected.

between clauses where the second clause is unexpected in light of the first clause. The Telic predicate expresses a relation between the event described by the main verb (the first clause) and the event described by the infinitival verb (the second clause). The two items (Telic predicate and connective *only*) will therefore be able to co-occur where the relation between the main event and its outcome is contrary to expectations; and indeed the connective *only* will often improve the acceptability of Telic Clauses by emphasizing the salient contrast between main event and its outcome. If, however, the outcome ascribed to the main event by the Telic Clause is not in fact one that runs contrary to our expectations, then the use of *only* as a connective will be excluded.

In characterizing the proper relation between the outcome reading of the Telic Clause and the semantics of *only*, I have therefore sketched a general view of the interpretation of TELOS which I am assuming will appear in the conditions on reference of that predicate. I will now turn to the issue of how this interpretation is best characterized.

4. CONDITIONS ON REFERENCE FOR TELOS

I have argued that the interpretation of all Telic Clauses is fixed by the head predicate TELOS (which interacts significantly in some examples with connective *only*). I have argued that the argument grid for TELOS contains an ordered pair of events. The conditions on reference for this predicate have, however, been characterized only in general terms. I therefore now turn to the conditions on reference for TELOS in more detail.

4.1 *No thematic or aspectual conditions*

It has been observed that Purpose Clauses may only modify verbs that lexically provide a significant substate such as a resultant state and that Rationale Clauses may only modify verbs whose external argument can be interpreted as a sentient 'agent' capable of manipulating the event in which it is involved (see Bach 1982, Farkas 1988, Jones 1991 for seminal discussions of these facts). It appears, however, that the Telic Clause is completely unrelated to both the thematic properties and the aspectual structure of the verbs it modifies.

If the Telic Clause contains a gap, that gap will be controlled by the sentential subject, regardless of thematic role. This is true in cases of A-movement, where NPs bearing different thematic roles of the same verb are moved to subject position, as we see in (87)–(89).

- (87) Sigg₁ gave Svana₂ the CD₃, only e₁ to realize that she already had it.
 (88) Svana₂ was given the CD₃ by Sigg₁, only e₂ to realize that he wanted it for himself.

- (89) The CD₃ was given to Svana₂ by Sigggi₁, only e₃ to get damaged before she had a chance to play it.

It is also true of different classes of verbs which take different thematic roles as external arguments, as seen in (90)–(96).

- (90) John (Agent) burned the paper, only to realize that it contained important information.
 (91) The lake (Theme) froze over night, only to melt in the heat of the morning sun.
 (92) The manager (Goal) received a raise, only to be fired the next day.
 (93) The sun (Source) radiated heat to the surrounding planets, only to dim just as life began to develop.
 (94) The mother (Patient) suffered a series of painful examinations, only to learn that there was nothing wrong with her.
 (95) John (Experiencer) knew everything in the set book, only to forget the crucial formula during the examination.
 (96) The presence of bacteria in the home environment (Stimulus) worried large sections of the population, only to be proven necessary to the healthy development of the immune system.

The conditions on reference of the Telic predicate do not therefore express thematic restrictions of any sort.

Further, the Telic Clause appears to be insensitive to standard aspectual categories and whatever event substructure those categories might be associated with. Assuming the four Vendlerian categories of State, Activity, Achievement and Accomplishment (Vendler 1967), we would expect to find sixteen possible combinations of verb types for the main and infinitival clauses. The data in the Appendix shows that all sixteen possibilities are available. For reasons of space I will give here only the most striking and significant example, which is a combination of a stative main verb and a stative infinitival verb, as in (97).

- (97) Gudrun was away (State) in March, only to be home (State) when the FBI called.

The conditions on reference of the Telic predicate do not therefore express simple thematic or aspectual restrictions.⁸ The question is then how the conditions on reference are in fact to be adequately specified.

[8] The Telic Clause in fact turns out to be incompatible with individual level predicates. I will discuss this restriction in section 4.2, in the context of other restrictions on the interpretation of Telic Clauses.

4.2 *Exploring the Telic relation*

As we have seen, Telic Clauses split into two broad groups: those in (98)–(101) (usually with *only*) and those in (102)–(105) (always without *only*).

- (98) John hung his coat up, *only* to realize that he had to go out again.
- (99) It became cloudy during the morning, *only* to clear up again before the match.
- (100) Sally spent Christmas with her parents, *only* to learn after she left that they had not wanted her there.
- (101) Many people are surviving their illnesses, *only* to have had their livelihood taken away. (based on television advertisement)
- (102) Wilson raced down the pitch, to score in the final minute.
- (103) She survived the Holocaust, to spend the rest of her life fighting against prejudice and discrimination. (based on television advertisement)
- (104) John worked on the research project all summer, to complete it within days of the deadline.
- (105) Blossoms fell from the tree, to collect in piles at the side of the street.

In both cases, we are presented with an event by the main verb which arouses background expectations of some sort. These are then either violated, as in (98)–(101), or fulfilled, as in (102)–(105). In (98), we expect that, having hung up his coat, John has no intention of going out again, but he is then forced to do so; in (102) we expect that Wilson might now score a goal and this he does. Following Whelpton (1995), I refer to the reading involving violation as the ADVERSATIVE reading and the reading involving fulfilment as the RESOLUTIONAL reading. e^2 is an outcome of e^1 in the sense that it is the very event which definitively violates or realizes some set of expectations. But expectations of what sort?

Take first the resolutional Telic Clause. It is clear that not just any old expectations are sufficient to allow a resolutional Telic Clause. Take, for instance, predictable cultural expectations.

- (106) !!!Mary opened a new bank account, to receive her ATM card 10 days later.
- (107) !!!Sarah bought a winning lottery ticket, to be paid her cash prize.

It is part of our cultural knowledge that when you open a new bank account, an ATM card is posted to you and that when you buy a winning lottery ticket, you are entitled to your cash prize. These are background cultural expectations and in (106)–(107) they are fulfilled – yet the modification is anomalous.

Similarly, take cases where the expectations are not cultural but part of one's personal knowledge of local routines. Say we know that Billy normally

comes home, puts down his coat and briefcase, has dinner, watches TV, has a whiskey, and goes to bed. Then, we will have a set of background expectations associated with Billy's return home. However, these will not license modification by a resolutive Telic Clause (remember that only factive readings should be accessed; intentional readings are examples of Rationale Clauses).

(108) !!!Billy came home, to put down his coat and briefcase.

(109) !!!Billy came home, to watch TV.

(110) !!!Billy came home, to go to bed.

What these cultural and personal expectations have in common that sets them apart from acceptable examples of modification by a resolutive Telic Clause is that the sequence of events they comprise is entirely predictable. That, in fact, is the point of this sort of knowledge – it packages predictable sequences of events that recur in our lives. In (98)–(105), however, the second event is not certain to occur. Our cultural knowledge establishes the fact that the point of a football game is the scoring of goals and that the desired conclusion of an attacking run down the pitch is to score a goal, but the occurrence of that goal is not itself certain or predictable. Our cultural knowledge suggests that survival of the Holocaust is likely to instill a deep loathing of bigotry and prejudice, but that need not be the case. Even in the case of falling blossoms, although it is entirely predictable that blossoms blown from a tree will eventually fall to earth, there is nothing predictable about their falling in the immediate vicinity in perceptually salient groups.

There are therefore two conceptual elements involved in modification by a resolutive Telic Clause: a set of expectations about projected outcomes (goals in football, psychological reflexes of suffering, the effects of gravity, and so on); and the element of uncertainty or unpredictability about the specific event that will satisfy or answer those expectations. In this context, there is a slightly different set of examples of resolutive Telic Clauses that can be brought under the account.

(111) John left early in the morning, to return late at night.

(112) John left early in the morning, never to return.

(113) John entered the room, to find a policeman waiting.

(114) John entered the room, to find it empty.

In these cases we would not necessarily like to say that the Telic Clauses fulfil specific expectations associated with leaving or entering. Yet, there is a sense in which this is true. Both of these events raise uncertainties: If John leaves, will he return? If John enters the room, what will he find there? We may not have specific expectations about the answers to those questions, but that is not what matters. What matters is that the predicates in these cases raise specific uncertainties which the Telic Clauses can then resolve: we are told that John returns or does not return; we learn what it is that John finds, if

anything. The resolutive Telic Clauses thus resolve uncertainties which are raised in the context of our world knowledge by the event described by the main verb.

Viewing the interpretation of the Telic Clauses in this way allows us to see the resolutive and adversative Telic Clauses as sides of the same coin – because the adversative Telic Clauses also resolve our uncertainties about how the main event ‘turns out’, it simply indicates that the resolution was a negative one, one that does not fulfil our expectations. This is part of the reason why adversative Telic Clauses are easier to formulate. An adversative Telic Clause will be allowed with ‘predictable’ sequences of events, precisely because it violates the predictability of the sequence. All of the anomalous examples above can be turned into acceptable Telic Clauses, where the Telic Clause denies the occurrence of an event which is a predictable part of the package.

- (I15) Mary opened a new bank account, only to be denied an ATM card.
- (I16) Sarah bought a winning lottery ticket, only to have her cash prize withheld.
- (I17) Billy came home, only to go and sit on the balcony all evening. He was obviously worried.

Taking the phrase ‘remarkable outcome’ in the original formulation of the conditions on reference of the Telic predicate, we can now offer a more fine-grained definition.

- (I18) $TELOS(\langle e^1, e^2 \rangle) \leftrightarrow e^2$ supplies a resolution of expectations aroused by e^1 , where the resolution is not pre-determined by those expectations.

These conditions on reference face a challenge, however, from a restriction of a more familiar sort: a restriction concerning stage-level and individual-level predicates.

If you look back to (97), you will notice that the two States involve stage-level predication. In fact, the more ‘stage-like’ the predicate is, the better for the Telic Clause. Cases of modification where either the main event or the infinitival event is classified by an individual-level predicate are usually strongly ill-formed.

- (I19) *The new student was expected to be intelligent, only to be an idiot.
- (I20) ?*John was very intelligent, only to sign a legal document without reading it.

Even though these examples contain adversative Telic Clauses, which as we have seen are acceptable in a wide range of contexts, these sentences are ill-formed. Yet the second event in each case resolves an uncertainty in our

expectations by asserting that those expectations are ill-founded. It would therefore appear that the restriction against modification by individual-level predicates does not fall under the conditions on reference in (118).

As Joan Maling (p.c.) has pointed out to me, the Telic predicate seems to require some notion of 'transition'. As we have seen already, this transition cannot be an aspectual property of the events themselves; it is the transition between the two events as completed entities (i.e. regardless of internal structure). This relation of transition is precisely the one that the Telic predicate expresses: it is the transition of e^1 to its 'remarkable outcome', e^2 , where the remarkableness is defined as in (118). Why, then, can the Telic predicate not relate individual-level states (since it is not sensitive to event micro-structure)?

Consider an important difference between stage- and individual-level predicates. Individual-level predicates are true of individuals by their essential nature: they describe properties of the individual which are stable over time and context; stage-level predicates are true of states of individuals, states at a particular time in a particular context. There is, therefore, no way in which we can have a significant 'transition' between individual-level states because those states obtain by nature of the individual and regardless of other events and states in the universe of discourse. There can be a transition between two stage-level states, as in (97): Gudrun is out and then Gudrun is at home. But there can be no transition from or to intelligence. This suggests a final revision of the conditions on reference to those in (121).

(121) $TELOS \langle \langle e^1, e^2 \rangle \rangle \leftrightarrow$ there is a transition from e^1 to e^2 , where e^2 supplies a resolution of expectations aroused by e^1 and that resolution is not pre-determined by those expectations

Assuming that individual-level states obtain independent of their relations to other entities in the universe of discourse, they will be excluded by these conditions on reference because they will not be able to participate meaningfully in the relation of 'transition'.

5. CONCLUSION

In this paper I have offered an account of the argument structure and semantics of an infinitive in English which expresses the outcome of an event. In characterizing the construction I have argued in support of the view that modifiers are simple predicative constructions, whose interpretation is constrained by the conditions on reference of the head predicate. I have argued that the predicate in question, *TELOS*, is best characterized as a predicate of events in the tradition of Davidson and in fact that *TELOS* is a pure event relation. I have argued that the preface *only* is an instance of connective *only*, not focal *only*, and that it is an optional preface to the Telic Clause. In a wider context, this paper is, therefore, intended as a contribution

to the discussion of the place of events in natural language semantics and the appropriate characterization of argument structure in an event semantics.

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- Author's address: Department of English,
Faculty of Arts,
University of Iceland,
IS-101 Reykjavik,
Iceland.
E-mail: whelpton@hi.is*

APPENDIX

Here are the sixteen possible combinations predicted by a Vendlerian analysis of verb aspectual types.

1. Gudrun was away (State) in March, only to be home (State) when the FBI called.
2. Gudrun was rarely in the office (State) during the busy period, only to work steadily (Activity) through the quiet patch.
3. Gudrun was at conferences (State) in July, only to return (Achievement) during the building work in August.
4. Gudrun was unproductive (State) during most of her visit, only to write a paper (Accomplishment) within two days of her return home.
5. Gudrun travelled around the country (Activity) in May, only to be home (State) when the FBI called.
6. Gudrun lazed around at home (Activity) during the busy period, only to work steadily (Activity) through the quiet patch.
7. Gudrun travelled around conferences (Activity) in July, only to return (Achievement) during the building work in August.
8. Gudrun struggled (Activity) to produce work during most of her visit, only to write a paper (Accomplishment) within two days of her return home.
9. Gudrun arrived (Achievement) just in time for the broadcast, only to be in the kitchen (State) when her ten second appearance came on.
10. Gudrun arrived (Achievement) just in time for Siggi's broadcast, only to talk all the way through it (Activity).
11. Gudrun arrived (Achievement) just in time for the broadcast, only to leave (Achievement) before it ended.
12. Gudrun rejected the charity's request to use her spare room for meetings (Achievement), only to build a centre for them herself (Accomplishment).
13. Gudrun wrote an article (Accomplishment) for the New York Times, only to be abroad (State) when it was published.
14. Gudrun wrote her research paper (Accomplishment) just in time for Christmas, only to work (Activity) throughout the festive period on something else.
15. Gudrun made a clay vase (Accomplishment) for Siggi's birthday, only to break it (Achievement) as she was wrapping it.
16. Gudrun baked a cake (Accomplishment) for Siggi, only to eat it (Accomplishment) before he could have any.