The Meaning of the *Tough*-Construction

Abstract. A formal semantic analysis of the *tough*-construction is provided building on the well known observation that *events* play a central role. A close look at the semantic characteristics of the class of *tough*-predicates and the syntactic and semantic properties of nonfinite clauses reveals the link between these pieces, expanding on recent advances in the semantics of clauses (Kratzer, 2006)/(Moulton, 2009). Building on Salzmann (2017), a formal semantic and syntactic analysis of prolepsis is provided to explain the antecedent-gap chain in the *tough*-construction. In total, the analysis explains i) the class of *tough*-predicates; ii) the properties of the nonfinite clauses that appear in the *tough*-construction; iii) why no other predicates or clauses are permitted in the construction; iv) the many pecularities of the antecedent-gap chain in the *tough*-construction; and v) the semantic contribution of "prolepsis."

1. Introduction

The *tough*-construction in (1) presents a number of persistent challenges to generative linguists.

(1)   a. It's difficult to read this article.

b. This article is difficult to read *e*.

The vast majority of previous work has focused on the syntactic properties of the *tough*-construction but despite the enormous amount of research, an analytical consensus remains elusive. The goal of this article is to flesh out some of the meaningful components of the *tough*-construction. In doing so, we discover a natural and internally-consistent explanation for many of the more mysterious properties of the *tough*-construction. In particular, I address, i) what defines the class of *tough*-predicates; ii) the properties of the nonfinite clauses that appear in the *tough*-construction and the relationship between *tough*-predicates and those clauses; and iii) the thematic and derivational status of the *tough*-subject, i.e., *this book* in (1b).

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The principle goal of this paper is to explain the *meaning* of the *tough*-construction, i.e., why the particular pieces can combine to create this particular meaning — and why no other pieces can do so. I start in section 2 by exploring which predicates may (not) participate in the alternation in (1), and formalize the class of *tough*-predicates as those adjectives which are "modal" event descriptions. In section 3 I examine the class of nonfinite clauses that appear in the *tough*-construction. Formally, I adopt a recent line of research from Kratzer (2006, 2013); Moulton (2009); Bogal-Albritten (2016) on finite clausal complements and illustrate how we can formally unify nonfinite clauses with finite clauses, while at the same time empirically distinguish the two types of clauses in both meaning and distribution. Crucially, adopting such an analysis of nonfinite clauses straightforwardly accounts for why only they can appear in the *tough*-construction.

The relationship between the *tough*-predicate and the nonfinite clause explored in section 4 sets the stage for the analysis of the antecedent-gap chain in (1b). The crucial point that will be leveraged is that there is a "link" connecting events across worlds, formalized as Hacquard's (2009) *Preservation of Event Description*. It is this link that provides the crux to understanding the role of the *tough*-subject, in particular how it appears to display a thematic displacement. In section 5 I explore the implications of the observation in Salzmann (2017) that the *tough*-construction involves a form of prolepsis. In section 6 I provide a formal analysis of prolepsis (as it applies in the *tough*-construction), which straightforwardly explains many of the peculiar properties of the *tough*-construction. In section 7, I explore some possible further consequences of the analysis and conclude.

This paper will appeal to syntacticians and semanticists who are generally familiar with the *tough*-construction and its basic characteristics. (A brief review is provided in section 5; space prevents a more thorough review.) The overall goal of this paper is not to entirely divorce the analysis of the *tough*-construction from syntactic theory, rather, it is to harness both syntax and semantics to explain what has until now simply been a point

of contention in numerous syntactic theories. I hope to show that a combination of insights from both syntax and semantics provides the best explanation yet of the *tough*-construction.

2. The class of *tough*-predicates

The class of *tough*-predicates includes at least the following adjectives (cf, Lasnik and Fiengo 1974).[1]

(2)   *difficult, easy, impossible, hard, simple, tough, unhealthy, nice, good, great, bad, terrible, amazing, surprising, depressing, stimulating, boring, interesting, entertaining, amusing, gratifying, important, harmful, damaging, illegal, crucial, required, necessary, rare, common, uncommon, unusual, crazy, disrespectful, (in)convenient*

There are two properties that define this list. That first is widely noted in some form or another: all *tough*-predicates describe events (Pesetsky, 1987; Jones, 1991; Hartman, 2012; Collins, 2013; Longenbaugh, 2015). Thus, all *tough*-predicates can be used to describe event denoting nouns, including gerunds and event nominals.

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[1] I will restrict discussion to adjectival *tough*-predicates, though everything I say below applies to non-adjectival *tough*-predicates as well, as discussed in Lasnik and Fiengo (1974); Gluckman (2019). Note that some of the predicates in (2) have non-adjectival variants, e.g., the psych-verbs. See Pesetsky (1987) for discussion of the relationship between psych-verbs and the *tough*-construction. Finally, there are many *tough*-predicates that exhibit significant interspeaker variation, e.g., the positive forms of *impossible, illegal*. Though traditionally believed not to participate in the *tough*-alternation, in fact speakers readily accept and produce them in such constructions, as a simple Google search illustrates, (i) and (ii).

(i) I didn't know attack gems were possible to get from the melded.

`https://www.reddit.com/r/MonsterHunterWorld/comments/9l9uaj/i_didnt_ know_attack_gems_were_possible_to_get/`

(ii) [A]nd just one more day of me wishing weed were legal to smoke wherever you want

`https://kiwifarms.net/threads/police-chase-and-kill-man-with- bulldozer-for-growing-weed.45559/`

I'll put aside the variation in this paper, focusing on the more canonical examples.

(3) a. Running the race was difficult/easy/impossible/…

b. Building the house was difficult/easy/impossible/…

c. The destruction of the city was difficult/easy/impossible/…

Besides being event-descriptions, the second property that distinguishes the adjectives in (2) is that they all involve *relative truth*. The truth of an assertion involving a *tough*-predicate is evaluated relative to a set of beliefs, varying depending on the relevant attitude holder. This manifests in different ways among the class of *tough*-predicates. The majority of *tough*-predicates like *difficult, easy, tough, hard* can all be classified as *judge-dependent*, diagnosable by the ability to license a judge argument,[2] embedability under *find* (4), and faultless disagreement (5) (cf Lasersohn 2005; Sæbø 2009 among others).

(4) It find it easy/difficult/tough/hard to read this book.

(5) a."It was easy/difficult/tough/hard to read this book."

b. "No it wasn't."

The majority of the less "canonical" *tough*-predicates involve relative truth in that they are evaluated against a set of belief worlds: *(il)legal, crucial, necessary* are not judge-dependent in the same way as *difficult, easy,* etc. For instance, they are generally not embedable under *find*.

(6) ??I find it (il)legal/crucial/necessary to walk on the grass.

Still, belonging to the class of modal adjectives, they are evaluated relative to a set of laws or circumstances which vary depending on context and/or speaker. Further sub-classes of *tough*-predicates include Fleisher's (2014) *rare*-class adjectives: *rare, (un)common, unusual* as *tough*-predicates. These involve relative in that they invoke genericity, i.e., comparison to what is normal or typical. Another class of *tough*-

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[2] In the syntax literature on the *tough*-construction, this argument is typically called "the experiencer."

predicates is the psych-predicates like *amazing, surprising, depressing*. These may not involve judge-dependence in the same way as *difficult, easy,* etc (Anand and Korotkova, 2018), but still involve some relation to relative truth and crucially can still function as *tough*-predicates.

Thus, the intersection of these two factors, eventivity and relative truth, uniquely pick out the class of *tough*-predicates. All predicates which describe events relative to a set of beliefs are *tough*-predicates. Event descriptions which are not "modal" in some way are not *tough*-predicates (e.g., *sudden, quick, long*). On the other hand, adjectives which involve relative truth but describe an individual are not *tough*-predicates, e.g., *pretty, ugly, tasty*.[3]

This paper will deal primarily with the canonical *tough*-predicates, and so the following denotation will reflect a semantics that models judge-dependence. I assume that a more thorough understanding of the relationship between judge-dependence and the other types of relative truth mentioned above may provide a way to unify all the sub-classes *tough*-predicates.

(7) $[[\textsc{ToughPred}]]^j = \lambda e\lambda w.\ \textsc{ToughPred}(e)(w)$ according to j

The denotation in (7) assumes a theory of judge-dependence that utilizes a *judge parameter* (Lasersohn, 2005), rather than as part of the lexical entry (e.g., Pearson 2013). This is not crucial; the claims below can be modeled under different assumptions.

There are two further complications. First, many *tough*-predicates have additional restrictions on the *tough*-subject. For instance, Fleisher (2014) points out the *rare*-class adjectves require kind-denoting subjects, even in their *tough*-use.

(8)   a. *John is rare to find *e* in the library.

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[3] This of course does not mean that such predicates lack an event argument, rather, the distinction is one of selection: non-*tough*-predicates select for an individual subject.

b. This kind of book is rare to find *e* in the library.

The observation here is that all predicates that describe "modal events" are *tough*-predicates, but there may be further ways to divvy up this class which I will not be able to address in this paper. Still, the observation that some predicates make further restrictions on their subjects is consistent with the analysis provided later that the subject is an argument of the *tough*-predicate (though see Fleisher 2014 for an alternative view).[4]

Finally, it is also worth noting that some *tough*-predicates admit individual-denoting subjects in addition to event-denoting subjects. For instance, *difficult* can be used to describe an event, or it can be used to describe an individual, say a toddler. (Progressive aspect facilitates this reading with *difficult*.)

(9)   My two-year is (being) difficult.

Importantly, not all *tough*-predicates admit individual-denoting subjects. Thus, (9) contrasts with examples like (10), which involve true *tough*-predicates.

(10)   a.??My two-year old is (being) harmful/easy/simple.
        b.??The car is (being) harmful/easy/simple.
        c.??The tree is (being) harmful/easy/simple.

To the extent that the examples in (10) are grammatical, they can only be interpreted

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[4] Tim Stowell (p.c.) points out that predicates like *kind, mean, brave, etc* may also describe events and involve relative truth, but do not easily participate in the *tough*-alternation, as (i) and (ii) illustrate. However, provides a grammatical instance of an antecedent-gap chain with such adjectives.
   (i) It was kind (of Mary) to talk to John
  (ii) *John was kind (of Mary) to talk to *e*.   6
  (iii) That was kind (of Mary) to say e.

Again, it is likely there are further restrictions on what is allowed to be a subject for such predicates.

with respect to an implicit (or elided) event, like *. . . to talk to, . . . to start,* or *. . . to chop down,* respectively. That is, these predicates do not admit individual-denoting subjects.

We should conclude from this data that some *tough*-predicates are ambiguous. As a subjective event-description, a predicate is listed among the class of *tough*-predicates. As a description of an individual, a predicate is not a *tough*-predicates, whether it is subjective or not.[5] It is interesting to note that whether the predicate involves relative truth or not seems to correlate with whether an antecedent-gap chain is permitted in a nonfinite clause. Thus, the *pretty*-class of adjectives are (roughly) the subjective predicates which are descriptions of individuals (*pretty, ugly, tasty*). I will briefly discuss how the analysis below may extend to such predicates in section 7.

3. Nonfinite clauses in the *tough*-construction

As a rule, the gap in the *tough*-construction only ever occurs in a nonfinite clause. Thus, there is no predicate in English which permits the alternation in (11).

(11) a. It is PRED [$_{CP}$ that DP V DP]

b. DP is PRED [$_{CP}$ that DP v *e*]

Something about the nonfinite clause must aplay a crucial role in the ability to license an antecedent-gap cahin across a *tough*-predicate. The purpose of this section is to explore the semantics and distributional properties of nonfinite clauses in order to explain why only they may appear in the *tough*-construction. The conclusion we'll come to is that

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[5] Of course, some predicates are truly polysemous, e.g., *hard (wood)*.

these particular nonfinite clauses also describe events relative to a set of beliefs and so are uniquely suited to combine with *tough*-predicates.

First, I assume that the nonfinite clause that occurs in the *tough*-construction is a CP, where the complementizer has two allomorphs: *for* in the presence of an explicit subject and Ø in the presence of PRO.[6] I refer to such clauses as *for*-CPs.

For-CPs have three relevant properties which together explain why they uniquely suited for the *tough*-construction. The first is that they express propositional content; second, they distribute like event-denoting expressions; and third they are restricted to "modal" contexts.

First, *for*-CPs, like finite CPs, are propositional., i.e., they are standardly analyzed as denoting sets of possible worlds. On a simple analysis of, *John wants to ride a bike*, we say that the assertion is true if and only if all of John's bouletic alernatives are worlds in which John rides a bike. That is, we treat *PRO to ride a bike* as a full proposition, generally semantically equivalent to how we treat finite CPs, e.g., *(that) John rides a bike*.[7]

Second, though they are semantically formally identical, finite and nonfinite CPs have very different distributions, a fact which has, in part, been explained on selectional lines. However, a closer look at their respective distributions reveal that *for*-CPs pattern like

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[6] This is a controversial claim. Many authors have concluded that the nonfinite clause associated with the *tough*-construction must be *smaller* than a CP — at least when there's an antecedent-gap chain (Bresnan, 1971; Lasnik and Fiengo, 1974; Nanni, 1980; Longenbaugh, 2015). Evidence in favor of this view comes from cases where the noun after *for* cannot possibly be construed as an argument of the adjective, but the antecedent-gap chain is not permitted. The reasoning is that the presence of *for* in its role as C somehow leads to ungrammaticality. I will not rehash the debate here, but it suffices to show that there are clear examples where *for*-as-C is permitted.

(i) It was important for the tablecloth to cover the corners of the table.

(ii) The corners of the table were important for the tablecloth to cover *e*.

(iii) ?? Covering the corners of the table was important for the tablecloth

See footnote 29, as well as Levine and Hukari (2006) and Gluckman (2018) for additional evidence against such reduced clausal analyses.

[7] Note that even on more sophisticated analyses of PRO, the above treatment holds: once the PRO argument is saturated or its reference established, the resulting phrase is taken to be of type $<s,t>$.

elements which denote in the domain of events (Duffley, 2003) and that this is in contrast to finite CPs (hereafter, *that*-CPs), which have characteristics suggesting that they denote in the domain of individuals (Moulton, 2009).

For instance, *for*-CPs in subject position are anaphorically referred to using the nominal *event*. In contrast, a nominal like *fact* is used to refer back to subject *that*-CPs Hartman, 2012). Compare (12) and (13).

(12) a. i.For someone to open door right right now would startle me.
ii.Yes, that event/*fact would startle me, too.
b. i.For the magician to make the rabbit vanish would amaze me.
ii.Yes, that event/*fact would amaze me, too.
c. i.For the Cubs to win would excite Mary.
ii.Yes, that event/*fact would excite Mary, too.

(13) a. i. That the magician made the rabbit vanish amazed me.
ii. Yes that fact/*event amazed me, too
b. i. That the cubs won excited me.
ii. Yes that fact/*event excited me, too

In the same way, we can iterate the events that *for*-CPs describe, just like we can with gerunds (14) (15). This is not possible with finite CPs (16)

(14) a. (For John) to skip school was a frequent occurrence.
b. (For the magician) to make the rabbit vanish was a one-time occurrence.
c. (For the Cubs) to win was not a frequent occurrence.
(15) a. John's skipping school was a frequent occurrence.
b. The magician's making the rabbit disappear was a one-time occurrence.
c. The Cubs winning was not a frequent occurrence.
(16) a. *That John skipped school was a frequent occurrence.
b. *That the magician made the rabbit disappear was a one-time occurrence.
c. *That the cubs win is not a frequent occurrence.

Similarly, as we have already established that tough-predicates need eventive subjects, the fact that tough-adjectives can be predicated of a for-CP, and not a that-CP, is consistent with the overall distribution and meaning of for-CPs as event-denoting elements.[8]

(17)   a. (For John) to read this book was difficult/easy/impossible

          b.(For the tree) to grow new leaves was difficult/easy/impossible.

          c.(For the Cubs) to win the World Series was difficult/easy/impossible.

(18)   a. *That John read this book was difficult/easy/impossible.

          b. *That the tree grew new leaves was difficult/easy/impossible.

          c. *That the Cubs won the World Series was difficult/easy/impossible.

For-CPs can also be predicated of and equated with event-nominals (19) and (20), but may not occur in copular constructions with non-event denoting nominals (21) (Grimshaw, 1990; Pesetsky, 1991).

(19)   a.The examination of the students was [for the teacher to assess their potential]

          b.The battle was [for the country to determine its next ruler]

          c.The sit-in was [for the protestors to demonstrate their solidarity]

(20)   a.Their decision was [to paint the walls blue]

          b.The arrangement was [for them to leave at six]

          c.The plan was [for everyone to meet at the park]

(21)   a.*The rumor was for John to leave early.

          b.*The myth was for Mary to a Capricorn.

          c.*The story was for the students to hate the exam.

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[8] In section 7 I provide a brief discussion on differentiating different classes of clause-embedding adjectives. Briefly, the distribution is consistent with treating some predicates (*certain, sure*) as descriptions of "contentful" individuals, and some predicates as descriptions of "contentful" events (the *tough*-predicates). The distinction can be observed in which CPs they embed and also in which nominals they can be predicated of.

Note that the distinction between finite and nonfinite clauses blurs slightly here (see Grimshaw for discussion). Finite clauses are permitted in equational contexts (20), and with nouns like *rumorr, myth, story*, but crucially not as predicates in (19) with event-nouns like *examination, battle, sit-in*, i.e., *that*-CPs cannot describe a property of an event (but they can describe the "propositional content" associated with an event, a point I'll return to presently).

The third property that characterizes the meaning and distribution of *for*-CPs is that they are only licensed in the context of some modal element (Bresnan, 1972; Portner, 1997).[9]

(22)   a. *For him to eat cabbage means that he will be sick.

b. For him to eat cabbage would have meant that he was of low birth.

(Bresnan, 1972:18)

(23)   a. ??John loved for Mary to visit Chicago   (ok on generic reading)

b. John would love for Mary to visit Chicago.

In sum, *for*-CPs involve three apparently independent properties: i) *for*-CPs are associated with propositional meaning; ii) they distribute like they denote in the domain of events; and iii) they are restricted to contexts in which a modal operator is present.

The semantic and syntactic behavior of *for*-CPs can be uniformly explained by adopting a line of research from Kratzer (2006, 2013); Moulton (2009); Bogal-Albritten (2016). These authors propose to relocate modal meaning onto the head C (i.e., *that* and allomorphs for finite clause), rather than on the selecting predicate. In their view, finite CPs denote properties of "contentful individuals," i.e., individuals whose content is a proposition.

(24)   [[that John lied]] = $\lambda x \lambda w$. CONTENT$(x)(w)$ = { w': John lied-w'}

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[9] This fact is almost certainly related to the observation that *for*-CPs appear to independently involve modal quantification, as observed in their use with nonfinite relative clauses (Bhatt, 1999; Hackl and Nissenbaum, 2012). See also Jones (1991) for discussion of the syntax of such clauses.

(24) describes a particular kind of individual: a belief, story, rumor, fact, etc. In this way, *the belief that John lied* denotes the unique individual x such that x is a belief, and x consists of the proposition "John lied."[10]

(25)   a.
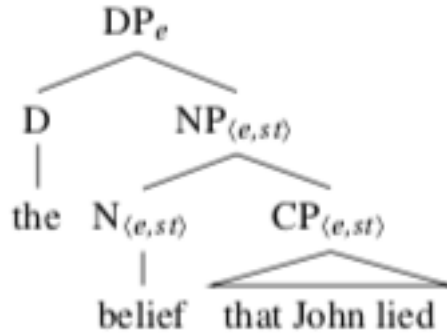
b. $[[(25a)]]^w = \iota x.\ \text{belief}(x)(w)\ \&\ \text{CONTENT}(x)(w) = \{\ w' : \text{John lied-}w'\ \}$

(adapted from Moulton 2015:9)

In this way, *that*-CPs are restricted to occurring in particular contexts: they can only appear when there is a contentful individual to saturate the open individual slot.

I propose to extend this idea to nonfinite clauses. We first adopt the notion of a contentful event from (Pietroski, 2000; Hacquard, 2006, 2009, 2011). Contentful events are "modalized" events, in that they are associated with a set of beliefs. This allows Hacquard to frame a standard attitude predicate like *believe* as a property of a contentful event: it describes a particular kind of even, one which has propositional content, i.e., there is a set of beliefs associated with this event. The finite clause that appears with

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[10] Kratzer (2006, 2013) in fact argues that *that*-CPs should be properties of *situations*, which then suggests that we should collapse any distinction between an individual-denoting CP and an event-denoting CP. In truth, I have no qualm with this, as long as we can still define an "individual/event" distinction at some level. The distributional differences between *for*-CPs and *that*-CP necessitate that such a dichotomy exist. See further discussion in section 7.

believe identifies the belief that is held at this event (as in (24)).[11]

By analogy to finite clauses, I propose that *for*-CPs are formally properties of contentful events. The complementizer C_{for} (which has allomorphs *for* and Ø) describes an event that has propositional content.

(26) $[[C_{for}]] = \lambda P_{v,st}\, \lambda e \lambda w.\ \text{CONTENT}(e)(w) = \{\, w' \mid P(w') = 1 \,\}$
   "For some proposition P, contentful event e, and world w, the content (i.e., object of belief) of e in w is the set of P-worlds accessible from w."

The complementizer returns a property of an event, thus it will distribute like an event-denoting element.[12] But crucially a *for*-CP must now be "anchored," i.e., there must a contentful event to saturate the open event variable. This effectively restricts *for*-CPs to modal contexts. In this way, we can explain the three characteristic properties of *for*-CPs. They are "propositional" in that they embed a proposition, just like a finite clause. They are eventive in that they are, formally, properties of events and so distribute distinctly from finite clauses. And they are restricted to modal contexts because they must be modally anchored to particular kinds of event. Such a restriction is satisfied by a range of contexts, including (but not limited to) judge-dependence, modals, psych-predicates, etc.[13]

Because both *tough*-predicates and *for*-CPs are of the same base type, they may combine via Predicate Modification (Heim and Kratzer, 1998).[14] The result describes an

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[11] Hacquard too uses a CONTENT function in her analysis, but she and Moulton are using slightly different versions of the CONTENT function. For Moulton, CONTENT identifies an individual with propositional content. For Hacquard, CONTENT is a function that identifies the propositions that are believed at an event. In truth, we actually need both CONTENT functions: we utilize Hacquard's CONTENT function to identify a set of alternatives (doxastic, circumstantial, etc), and then Kratzer/Moulton's CONTENT function asserts that the object of the belief is among those worlds. Above, *content* is modeled the Kratzer/Moulton version.

[12] I assume that properties of type *<v, st>* can be type-lifted into definite descriptions of events when needed.

[13] Note that there are other restrictions on the distribution of *for*-CPs, in particular the kind of modal base the *for*-CP needs (Portner, 1997). I discuss this presently

[14] The version of Predicate Modification that is assumed here includes a judge argument:
   (i) *Predicate Modification with a judge*   after Heim & Kratzer (1998:95)

event (relative to a set a judge) whose content is the set of worlds in which proposition P occurs.[15]

(27)   a.
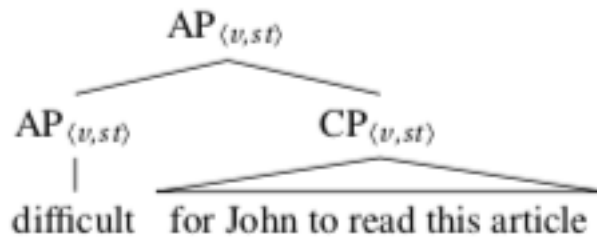
    b. $[[(27a)]]^j = \lambda e \lambda w.$ difficult$(e)(w)$ according to j & CONTENT$(e)(w)$
= { w' | John reads this article in w' }

This analysis (to be refined below) naturally explains the connection between *tough*-predicates and *for*-CPs. The *for*-CP is the only kind of clause than can appear in the *tough*-construction because it describes a contentful event, which is precisely what *tough*-predicates provide. Finite clauses are not properties of events, and so cannot combine with *tough*-predicates. And *for*-CPs cannot combine with non-subjective event descriptions (e.g., *sudden*) because the CP needs to be anchored by a set of beliefs.

If α is a branching node and {β, γ} the set of its daughters, then for any judge j, if $[[\beta]]^j$ and $[[\gamma]]$ are both functions of type $<v,st>$, then $[[\alpha]]^j = \lambda e \lambda w.[[\beta]]^j(e)(w)$ & $[[\gamma]]^j(e)(w)$.

[15] This is consistent with approaches to the *tough*-construction that involve complex predicate formation (Nanni 1980) and approaches that explicitly treat the CP as a modifier (Williams, 1983; Hornstein, 2001). While it shares many traits of the proposal in Keine and Poole (2017), the most notable difference is that the embedded clause is not selected by the *tough*-predicate. See Gluckman (2018) for arguments that the *for*-CP does not act as an argument of the *tough*-predicate.

I should note before continuing that nothing so far requires the *tough*-construction to involve a *for*-CP, and not say, a gerund: *It was difficult reading this book*. The fact that such sentences are possible is consistent with everything said so far; I assume that they are generated in the same way as outlined in (27), but lack the CP layer. As will become clear later, the presence of the CP is necessary in ruling out **This book was difficult reading,* due to the fact that gerundive phrases cannot host an operator, while CPs can.

4. Counting events

Notice that the meaning in (27) does not include that the reading event is a difficult event. This is both good and bad. It is good in that there are in fact two identifiably distinct events in the *tough*-construction: there's the contentful event in the actual world, and the event of the infinitive in the modal worlds. These can be empirically distinguished through modification tests.[16]

(29)   a. It was difficult for John to climb the mountain again.
        "There was a second difficulty in John's climbing the mountain."
        (In John's climbing the mountain once, there are two difficulties
        b."There was a difficulty in John's climbing the mountain for a second time."

        (On the second occurrence of John climbing the mountain, there is a single difficult.)

(27) correctly captures this fact because it does not directly predicate *read* of the event that is described by *difficult*.[17] But it fails to capture the fact that when I say *It was difficult to read this book*, I am at some level claiming that there is an event of reading which I

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[16] This distinguishes *for*-CPs from gerunds with *tough*-predicates. In (i) the climbing event and the difficult event are the same event.
    (i) It was difficult climbing the mountain.

found difficult. Indeed, on the denotation in (27), what prevents the reading events from being easy in the modal worlds? What we need is some way of connecting the property describing the contentful event to the events in the modal world described by the infinitive. We need to link these events such that the property of being difficult "survives" across modal worlds. Notice that this linking is enforced in all contexts, even in false belief scenarios. Consider (30).

(30) *John finds himself suddenly among a group of running people. He assumes that this must be the LA marathon, and John decides on the spot to join in the race, not knowing that in fact everyone is running from a monster attacking the city. Nevertheless, John runs under the impression that everyone is racing. Since he's out of shape, John finds running the race quite difficult.*

It was difficult for John to finish the race.

On one reading of (30), John has a *de dicto* belief about an event: he thinks of the running-from-the-monster event that it is a running the LA-marathon event.[17] Importantly, notice in (30) that even when John has a false belief about the event being a running-a-race-event, but he cannot have a false belief about the *difficulty* of the event. In John's belief worlds, whatever else he believes about the event, he still believes that it is a difficult event. So something "survives" across worlds --- even in false-belief scenarios. This is true across all *tough*-constructions. The property that holds of the event in the actual world must also hold of the event in the infinitival worlds.[18]

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[17] See Cable's (2011)'s *de re* reading under *think* and Hacquard (2006, 60) for discussion of *de re* readings of events.

[18] This observation explained a noted pattern concerning which infinitives are acceptable in the *tough*-construction: it has been observed that *tough*-predicates tend to prefer "volitional" verbs in the lower clause (Dalrymple and King, 2000; Nanni, 1978)

(i)?? It was tough for John to lack money.

The meaning in (27) captures that there are two identifiable events, but it does not capture that the events are linked in some way. To explain this linking, we will build on a few independent proposals and observations. First, Grano (2015) observes that *for*-CPs only ever occur in contexts that involve *root* modality. That is, *for*-CPs do not combine with *believe, think, know, certain, sure*, which utilize doxastic modal bases. *For*-CPs only combine with predicates like *want, plan, important*, which describe boutletic or circumstantial modal bases. These are grouped together as members of the class of root modals.

Taking an idea from Arregui (2007), Kratzer (2013) proposes that root modality (i.e., non-epistemic modality) use a specific kind of CONTENT function, namely a *factuality* content function, which provides circumstantial and bouletic modal bases. Since these modal bases are linked to the actual world more tightly than epistemic modal bases, the factuality content function is defined to make reference to counterparts for entities (of any kind) in the actual world:

(31)   For any world w and any a in w
        CONTENT$_{factuality}$ $(a)(w) = \{ w' : $ there is a counterpart a' of a in $w' \}$

<div align="right">adapted from (Kratzer, 2013:193)</div>

Thus, under the assumptions that, a) *for*-CPs always describe root modality (Grano, 2015), and b) root modality is associated with the factuality content function (Kratzer, 2013), then we can revise the definition of C$_{f\ or}$ to include existential quantification over

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(ii)?? It was easy for Mary to want that expensive dress.

(iii)?? It was hard for the teacher to prefer the hardcover edition.
<div align="right">adapted from Dalrymple and King 2000:14)</div>

How can John lack money in a tough way? Or Mary want that expensive dress easily? Or the teacher prefer the hardcover edition in a hard way? *Tough*-constructions are overall felicitous when the event of the *for*-CP is felicitous with the *tough*-predicate as a modifier, i.e., the event in the lower clause bears the property ascribed to the event in the main clause

events. That is, there must be a counterpart of the actual world event in the modal worlds.[19]

(32) $[[C_{for}]] = \lambda Pv,st\ \lambda e\lambda w.$ CONTENT$(e)(w) = \{\ w' |\ \exists e'$ in w' such that e' is
a counterpart of e and $P(e')(w') = 1\ \}$

However, saying that there's a counterpart does not solve the "linking" problem observed earlier; counterparts need not share properties across worlds. The last step requires another idea from Hacquard (2009), which confonts a similar problem in the analysis of actuality entailments. Hacquard addresses the fact that certain modal contexts require that the event described by the infinitive occur both in the modal worlds as well as in the actual world.

(33)   Jane a pu s'enfuir, #mais elle ne s'est pas enfuie.

Jane could-PFV escape, but she didn't escape.   (Hacquard, 2009:297)

Hacquard's (2009) solution utilizes the following constraint, which I've slightly modified by adding in explicit reference to the counterpart relation.

(34)   *Preservation of Event Description*   after Hacquard (2009:298)
For events e_1 in w_1 and e_2 in w_2 accessible from w_1, where e_2 is a
counterpart of e_1, if e_1 is a P-event in w_1, then e_2 is a P-event in w_2.

That is, if e has the property P in w, then for any w' accessible from w in which there is a counterpart e' for e, e' has the property P in w' as well. In Hacquard's system, the actuality entailment in (33) holds because the event of Jane's escaping occurs in all of the worlds quantified over in the modal base *as well as* in the actual world. Thus, it must be the case that Jane escaped in all relevant worlds, including the actual world, explaining the infelicity of the continuation. But such a link between events in modals worlds is only

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[19] I assume, for better and for worse, all the typical things about counterparts (Lewis, 1968, 1971, 1983): counterparts are functionally similarity relations via some acquaintance relation. In Lewis' terms, "The counterpart relation is a relation of similarity. So it is problematic in the way all relations of similarity are: it is the resultant of similarities and dissimilarities in a multitude of respects, weighted by the importances of the various respects and by the degrees of the similarities." (Lewis, 1968, 115).

possible if we have something like Preservation of Event Description.

Clearly, we need something like Preservation of Event Description in the *tough*-construction, too. We need some way of guaranteeing that the contentful event and the infinitival event are linked. With Preservation of Event Description in hand, a counterpart e' for an event e will have in w' the same properties ascribed to e in w. Empirically, Preservation of Event Description guarantees that when I say, "It's difficult to read this book," I am saying that the act of reading was difficult.

We should note that such preservation is "unidirectional" in that whatever property holds of the event in the actual world will be preserved in the modal worlds, but it is not the case that properties which are associated with the event in the modal worlds must be associated with the event in the actual world. That is, consider the following pair of sentences.

(35)　a. Jane a pu s'enfuir. Elle s'est enfuie par la fenêtre

　　　　　Jane could-PFV escape. She escaped through the window.

　　　　b. Jane a pu s'enfuir par la fenêtre. #Elle s'est enfuie par la porte.

　　　　　Jane could-PFV escape through the window. She escaped
through the door.　　　　　　　　　　　　　　(Hacquard, 2009, 298)

(35a) and (35b) illustrate that as long as the properties of the original event hold across all worlds, then things are fine—even if the event is further specified in some worlds. It cannot be the case, though, that a property of the event holds in the actual world which doesn't hold in the modal worlds. As it will be important later, I'll point out that this is true for thematic relations as well. If the original event has the property of Jane being an Agent, then this would also have to be true of the counterpart events in the modally quantified worlds as well.

With Preservation of Event Description, we are able to give a full derivation for at least one half of the *tough*-construction, when there is no antecedent-gap chain. I assume that the event of the main clause is provided via Event Closure, defined in (36).

(*e*)(*w*)©(*e'*)(*w'*) represents the counterpart relation such that, "*e'* in *w'* is a counterpart of *e* in *w*."[20]
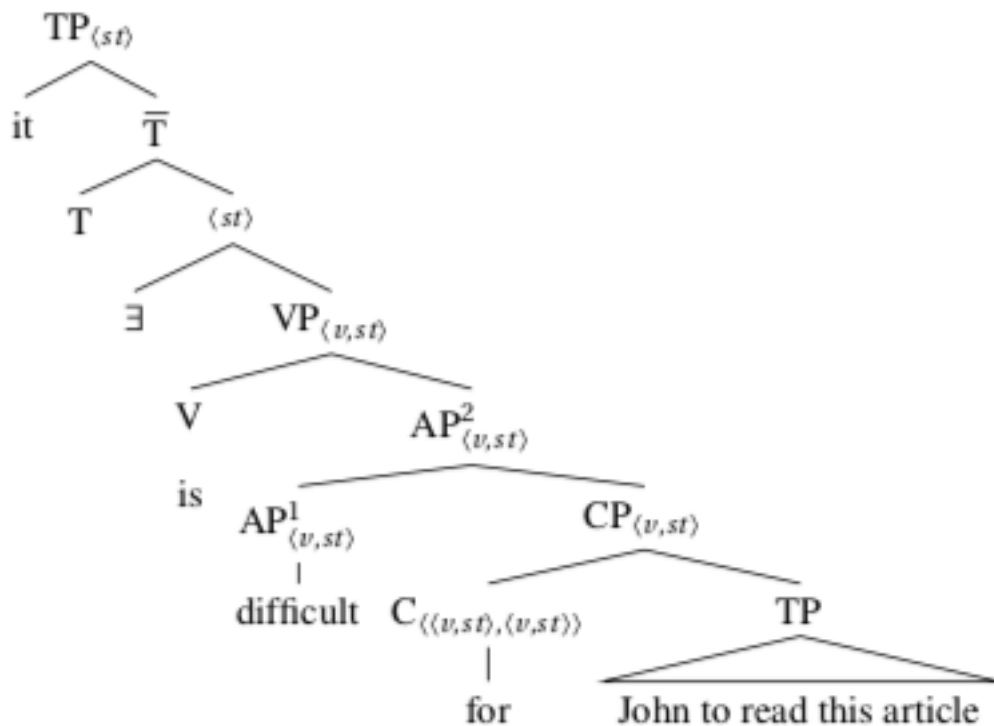
(36)   *Event Closure*   (Moulton, 2015, 25)

$[[\exists]] = \lambda P_{<v,st>}\lambda w. \exists e$ such that $P(e)(w) = 1$

(37)   a. It's difficult for John to read this article.

b.

TP$_{\langle st \rangle}$
- it
- T̄
  - T
  - $\langle st \rangle$
    - $\exists$
    - VP$_{\langle v,st \rangle}$
      - V
        - is
      - AP$^2_{\langle v,st \rangle}$
        - AP$^1_{\langle v,st \rangle}$
          - difficult
        - CP$_{\langle v,st \rangle}$
          - C$_{\langle\langle v,st \rangle,\langle v,st \rangle\rangle}$
            - for
          - TP
            - John to read this article

c. $[[CP]] = \lambda e\lambda w.$ CONTENT$(e)(w) = \{\, w' \mid \exists e'$ in w' such that

$(e)(w)$©$(e')(w')$ & read$(e')(w')$ & AGENT$(e')(w')$=John &

THEME$(e')(w')$=this article $\}$

d. $[[AP^2]]^j = \lambda e\lambda w.$ difficult$(e)(w)$ according to j & CONTENT$(e)(w) =$

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[20] For readability, I will leave out the interaction of Preservation of Event Description and the judge argument. Note that Preservation of Event Description probably has other (good) consequences, in particular with the tense specifications of the matrix and nonfinite clause. This may help explain the fact that *for*-CPs in the *tough*-construction are "tensed" nonfinite clauses (Stowell, 1982; Wurmbrand, 2014). This requires a more thorough investigation than can be given here.

$\{ \ w' \mid \exists e'$ in w' such that $(e)(w) \copyright (e')(w')$ & **difficult**$(e')(w')$ &

read$(e')(w')$ & AGENT$(e')(w')$=John & THEME$(e')(w')$=this article

e. $[[37b]]^{j}(w) = 1$ iff $\exists e$ such that difficult$(e)(w)$ according to j &

CONTENT$(e)(w) = \{ \ w' \mid \exists e'$ in w' such that $(e)(w) \copyright (e')(w')$ &

difficult$(e')(w')$ & read$(e')(w')$ & AGENT$(e')(w')$=John &

THEME$(e')(w')$=this article $\}$

Preservation of Event Description is doing important work, and I have bolded its contribution above. Since e is a difficult event, then any counterpart of e will also be a difficult event, in addition to any other properties that may describe the event. This is what provides the meaning that the reading event is difficult, even though *difficult* itself is not directly predicated of the reading event.

Of course, while Preservation of Event Description is itself a stipulation, there is a very real need for something that achieves this same effect, no matter what theory of intensionality is adopted.[21] Simply put, there needs to be a way of ensuring that the property ascribed to the event in the actual world carries over to the event in the modal worlds. This requirement turns out to be crucial in understanding the contribution of the *tough*-subject, which I turn to next.

5. Properties of the *tough*-subject

What has made the *tough*-construction interesting from a syntactic perspective is the possibility of the alternation in (38).

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[21] It is also independent of whether we adopt trans-world events or not. In a theory which permits trans-worlds events, we would still need Hacquard's Event Preservation. I will continue to use world-bound events simply because there is a need for multiple events, as the data in (29) demonstrate. We could also formulate this by expanding on the idea of an event having sub-events, which would be consistent with Hacquard's proposal. I see no strong reason to prefer one option over the other, so I will stick with what I believe is the simpler theory.

(38) a. It was difficult to read this article.

b. This article was difficult to read e.

The *tough*-subject, *this article* in (38b), appears to be *syntactically* an argument of the main clause adjective in that it is sitting in the subject-position of the main clause and triggers agreement on the main clause predicate. But *this article* is *thematically* an argument of the infinitive, illustrated by the fact that the following entailments do not go through (cf, (10)).[22]

(39) a. This article was easy to read *e* /⇒ ??This article was easy.

b. The car was difficult to start *e* /⇒ ??The car was difficult.

c. The mountain was tough to climb *e* /⇒ ??The mountain was tough.

—

Syntactically, the gap in the lower clause is known to display characteristic A'-properties in being unbounded, island sensitive, and able to license parasitic gaps (Chomsky, 1977). Again, from a syntactic perspective this is unusual because it appears to constitute a case of an A-chain headed by an element sitting in an A-position — a case of "improper movement" (cf Brody 1993; Hicks 2009).

Interestingly, the antecedent-gap chain in the *tough*-construction is only "weakly" unbounded. It can cross some clausal boundaries, but not all, which again, makes unusual as an instance of an A'-dependency. In general, an antecedent-gap chain is not possible in

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[22] Some authors have argued that the *tough*-subject *does* get a thematic role in the main clause, noting that (i) appears to comment on a salient property of the mountain with respect to walking up it, (ii) merely comments on the act of walking (Schachter, 1981; Bayer, 1990, Grover, 1995).
   (i) It is difficut to walk up this mountain.
   (ii) This mountain is difficult to walk up *e*.   (Hicks, 2009:539)
The difference between (i) and (ii) has been variously attributed to a) assigning a Cause thematic role to *this mountain*; b) attributing to *this mountain* a topic status (Řezáč, 2006; Longenbaugh, 2016); and c) pragmatics (Goh, 2000; Hicks, 2009). The present analysis covers these facts by attributing to the *tough*-subject an underspecified thematic role, and so sides with the aforementioned authors, but explains many of the topichood properties as an effect of the relation to prolepsis argued below.

the *tough*-construction with a finite clause. And there is a divide among nonfinite clauses whether the antecedent-gap chain is permitted.[23]

(40) a.*This article was difficult to say/believe/expect that John read *e*.

b.*This article was difficult to claim/expect/promise to read *e*

c.This article was difficult to start/try/manage to read *e*.

Syntactically, this array of properties has been stubbornly resistant to analysis precisely because it displays exceptions to otherwise exceptionless universals. There appears to be a violation of locality of selection. There also appears to be a violation of a general ban on "improper" movement chains. And though displaying a number of A'-properties, the chain is also "weak," in that it is not fully unbounded like other A'-chains.

Previous analyses accounting for the possibility of a *tough*-subject fall into two general camps, with a range of variation among accounts. In one campe is the movement analysis, where the *tough*-subject starts in the lower clause and moves (improperly) into its surface position (Postal, 1971; Bresnan, 1971; Brody, 1993; Hartman, 2011; Hicks, 2009; Longenbaugh, 2016). The main issue with such an analysis is the lack of evidence that the subject has ever been in the lower clause, i.e., connectivity effects (see Postal, 1974, Fleisher, 2013). For instance, movement accounts struggle to explain why, if the subject has moved, a quantified subject cannot be interpreted inside of the *for*-CP.

(41) Few girls would be difficult for Jim to talk to *e*.

=/= It would be difficult to talk to few girls.   (Postal, 1974:224)

The solution and general problem for movement approaches is they typically rely on

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[23] It's worth noting that this makes some of the island-tests (Complex-NP Constraint, *wh*-islands, etc) less than convincing, as there are independent restrictions on whether the chain can cross clausal boundaries. It's also worth noting that there are reported examples of the *tough*-construction crossing finite clausal boundaries. Many find (some) antecedent-gap chains acceptable with *believe*, accepting sentences likes (40a). This appears to be a particular property of only certain embedding predicates, and does not generalize --- even across sentences with those predicates, e.g., (i). See footnote 35 for a possible explanation.

(i) *Mary was difficult to believe that John met *e*.

stipulating that the *tough*-construction involves a "special" kind of movement chain which only ever occurs in this particular environment.

The alternative camp argues for a predication analysis, where the *tough*-subject starts in the main clause, and forms a predication relation with the lower clause (sometimes via a predication relation with the *tough*-adjective) (Lasnik and Fiengo, 1974; Chomsky, 1977; Williams, 1983; Browning, 1987; Jones, 1991; Heycock, 1994; Řezáč, 2006). The main difficulty for this line of analysis is that there must be a way to generate the *tough*-subject in a position that is non-local to where it is thematically interpreted. The solution generally involves a way of "passing" a theta-role along a syntactic chain. However, such mechanisms tend to overgenerate: on a predication analysis, it is not entirely clear how to constrain the *tough*-construction to nonfinite clauses, i.e., why is **This article was difficult that John read e* not possible?

Before moving on, I briefly note that there is interesting cross-linguistic variation with many of these properties (Comrie and Matthews, 1990). This paper will deal solely with the *tough*-construction in English, and put off a cross-linguistic study for future research.

5.1 *Tough*-subject and prolepsis

In recent work, Salzmann (2017) makes a key insight concerning the *tough*-construction: it is descriptively similar to *prolepsis*, i.e., cases in which an argument of one clause appears to be "displaced." In this section, I wish to explore the connection between the *tough*-construction and prolepsis by examining the underlined phrases in the following pairs.

(42)　　a. It was easy <u>with this book </u>to read to it.

　　　　b. <u>This book </u>was easy to read *e*.

(43)　　a. It's difficult <u>with children </u>to discipline them properly.

b. <u>Children</u> are difficult to discipline *e* properly.

(44) a. It's impossible <u>with Prof.</u> Smith to ignore him during lecture.

   b. <u>Prof. Smith</u> is impossible to ignore *e* during lecture.

 I will refer to the underlined nominals in prepositional phrases as *proleptic objects*, and continue to refer to the non-expletive subjects of the *tough*-construction as tough-*subjects*. Descriptively, I understand prolepsis as in (45) as a form of "promotion" (used in a non-technical sense) in which an argument acts syntactically as if it is part of a higher clause, but thematically as if it is part of the lower clause.

(45) John believes <u>of Mary</u> that she's at home.

The proleptic object typically appears in a prepositional phrase left adjacent to the clause.[24] Prolepsis is often characterized as an "aboutness" relation: the lower clause is "about" the proleptic object in some way (Davies, 2005; Landau, 2011; Salzmann, 2017). Prolepsis normally involves "binding" (again, used in a non-technically) a pronoun in the lower clause: : there must be some co-referential element in the lower clause — though as demonstrated in Heycock (1994), this is not always required.

 The observation made here is that proleptic objects (in the *tough*-construction) and *tough*-subjects parallel each other in a number of ways. Note that in the following, any claims about "prolepsis" apply only to prolepsis as it applies in the *tough*-construction; I make no claims about other cases of prolepsis, e.g., with finite clauses, as in (45).[25]

 I start with the fact that they are both dependencies which involve a "thematic dis-

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[24] We may trivially confirm that the proleptic objects in the *tough*-construction are arguments of the matrix clause, and not, say, a topicalized constituent of the *for*-CP by noting that they are not permitted with *for*-CPs in other contexts.
   (i) *With this book for John to read it surprised me.

[25] Many of the parallels discussed here are originally found in Salzmann (2017:325ff). See that work for a additional parallels and discussion. It seems that Salzmann is unaware that the *tough*-construction permits a "true" proleptic object in addition to the *tough*-subject; the discussion in Salzmann (2017) compares properties of the *tough*-subject to that of prolepsis in finite clauses. While there are indeed many shared properties, some, like being weakly bounded, are not shared across constructions.

placement." In both cases, there is an argument of a higher clause which is thematically interpreted in a different clause. That is, even though the proleptic objects are demonstrably sitting in the main clause in (42), they are thematically understood as being inside of the infinitival clause. Thus, with prolepsis, an elided or implicit nonfinite clause is still needed to understand the contribution of the added argument. Compare (46) to (39) above.

(46)   a. ??It was easy with this article.

           b. ??It's difficult with children.

           c. ??It's impossible with Prof. Smith.

This is of course precisely how we characterize the relationship between the *tough*-subject and the nonfinite clause: without the infinitive, the sentences in (39)/(46) are meaningless, because the *tough*-subject/proleptic object gets its thematic role in the lower clause.

Beyond this initial descriptive similarity, *tough*-subjects and proleptic objects display the following additional parallels. First, both lack connectivity effects. Neither can be interpreted for scope inside of the nonfinite clause (Postal, 1974; Epstein, 1989; Fleisher, 2013).

(47)   a. It's difficult with most children to raise them properly.

           =/= It's difficult to raise most children properly.

           b.Most children are difficult to raise *e* properly

           =/= It's difficult to raise most children properly.

(48)   a. It's easy with many articles to read them quickly.

           =/= It's easy to read many articles quickly.

           b.Many articles are easy to read *e* quickly.

           =/= It's easy to read many articles quickly.

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This extends to bound variables as well. A variable inside of the *tough*-

subject/proleptic object cannot be bound by a quantifier inside of the *for*-CP.[26]

(49)   a. It was hard for John to tell every farmer$_i$ the bad news about her$_i$ goat.

        b. *The bad news about her$_i$ goat was hard for John to tell every farmer *e*.

                                                            (Poole et al., 2017:2)

        c. *It was hard with the news about her$_i$ goat for John to tell every farmer it/that

Third, both have the property noted above of being "weakly" clause-bounded. In general, finite clauses act as barriers from both prolepsis and tough-subjects, and there is a divide among nonfinite clause.

(50)   a. *It's easy with this book to say/believe/expect that Mary read it.

        b. *This book is easy to say/believe/expect that Mary read *e*.

(51)   a. *It's easy with this book to claim/want/expect to read it.

        b. *This book is easy to claim/want/expect to want to read *e*.

(52)   a. It's easy with this book to start/try/manage to read it.

        b. This book is easy to start/try/manage to read *e*.

Fourth, relatedly, it is notable that prolepsis in the *tough*-construction is island-sensitive. These facts are particularly interesting for prolepsis because it (arguably) does not involve a movement dependency between the gap and the proleptic object (though see Salzmann 2017)

(53)   Complex-NP Constraint

        a. *It's easy with this article to hear the review that John wrote about it.

        b. *This article is easy to hear the review that John wrote about *e*.[27]

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[26] There are various reported cases of bound variable interpretations, but as Poole et al. (2017) point out (attributing the observation to a blog post by Benjamin Bruening), all such cases involve *picture*-NPs, and so are confounded by the well known logophoric properties of such nouns.

    (i) Pictures of himself$_i$ are hard for every photographer$_i$ to ignore.   (Hicks, 2009:552)
Controlling for this factor, the bound variable interpretations disappear. See Poole et al. (2017) for additional arguments against a low reading of the *tough*-subject.

(54) Wh-island constraint

    a. *It's impossible with John to wonder who married him.

    b.*John is impossible to wonder who married *e*.

(55) Adjunct-island constraint

    a. *It's difficult with this book to talk to Mary after reading it.

    b. *This book is difficult to talk to Mary after reading *e*.

Fifth, there are many restrictions on where the gap/pronoun can be in the lower clause. For instance, neither prolepsis nor a *tough*-subject can target raising-to-object/ECM positions (Chomsky, 1973; Postal, 1974; Runner, 2006).

(56) Raising-to-object/ECM

    a. *Bill is tough to believe [*t* to smoke cigars]   (Postal, 1974, 193)

    b. *It tough with Bill to believe [him to smoke cigars]

(57) a. *Smith was easy for John to expect *e* to recover.   (Postal, 1974, 193)

    b. *It was easy with Smith for John to expect him to recover.

This can be compared to (object) control, in which both *tough*-subjects and proleptic objects are permitted.

(58) a. Bill is tough to persuade *e* [PRO to smoke cigars]

    b. It's tough with Bill to persuade him [PRO to smoke cigars]

(59) a. It was easy with Prof. Smith to ask her [PRO to serve on the committee]

    b. Prof. Smith was easy to ask *e* [PRO to serve on the committee]

Sixth, in contrast to a ban on the raising-to-object/ECM position, both *can* target the subject of a small clause.

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[27] It's possible that the issue here is the finite clause, since the gap in general resists crossing many clausal boundaries. But even with nonfinite Complex-NPs, the sentences display islandhood.
    (i) *It's easy with this article to make a plan to read it
    (ii) *This article is easy to make a plan to read *e*

(60)   a. Melvin would be easy to prove *e* guilty.   (Postal, 1974, 194)

          b. It would be easy with Melvin to prove him guilty.

Seventh, neither can target the NP correlate in an existential construction.[28]

(61)   a. *It's important with a proctor for there to be one in the room during testing.

          b. *A proctor is important for there to be *e* in the room during testing.

(62)   a. *It's difficult with students for there to be 20 of them in the classroom.

          b.*Students are difficult for there to be twenty of *e* in the classroom.

Eighth, "predicates and amounts" are not permitted in either position (Řezáč 2006, Salzmann, 2017).

(63)   a. *It's difficult with an asshole for John to be one

          b. *An asshole is difficult for John to be e

(64)   a. *It's dfficult with two points for John to lose it.

          b. *Two pounds are difficult for John to lose e   (Salzmann, 2017:329)

Finally, there are more mysterious restrictions that the two share. For instance, consider the following pattern, which illustrates that the lower infinitive plays a role in the availability of a proleptic object/*tough*-subject.

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[28] Lasnik and Fiengo (1974) among others take such data to indicate that the antecedent-gap chain in the *tough*-construction cannot cross a CP boundary. The reasoning is that the expletive-*there* cannot be parsed as the "experiencer" argument of the adjective, and so must be the subject of the nonfinite clause, which in turn forces C to be present (for case-marking reasons). When there is no overt subject, no C layer is present. This argument is insufficient because in general antecedent-gap chains are infelicitous in the presence of a *there*-subject (i) vs. (ii). This suggests that the problem with such chains is not the presence of C, but rather the presence of *there*. A more plausible solution is that the bound variable counts as a strong NP, and therefore invokes a definiteness effect in expletive constructions, as argued in Řezáč (2006) following Heim (1987).

  (i) The pentagon is for the military leaders to meet at *e*.

  (ii) *The pentagon is for there to be meetings at *e*.

(65)   a. It's difficult with Mary to take a picture of her.

      b. Mary is difficult to take a picture of *e*

(66)   a. ??It's difficult with Mary to hang a picture of her.

      b. ??Mary is difficult to hang a picture of *e*.

Still, while they share many properties, *tough*-subjects and proleptic objects are not identical. There is of course a syntactic difference: one is a (syntactic) argument, while the other is an adjunct. Moreover, prolepsis is more liberal in where it permits a correlate. For instance, a subject pronoun is acceptable (though somewhat degraded) with a corresponding proleptic object, but a *tough*-subject can never target the subject position of the nonfinite clause.

(67)   a. ?It's difficult with this car for it to break down constantly.

      b.*This car is difficult *e* to break down constantly.

Indeed, there are cases where a pronoun is not even required in the lower clause with a proleptic argument, as long as the proleptic object is sufficiently implicated in the event of the nonfinite clause. In contrast, the *tough*-subject must always occur with a corresponding gap in the lower clause.

(68)   a. It was easy with this article to get lost.

      b. *This article was easy to get lost.

(69)   a. It's important with this car to turn the key slowly.

      b. *This car is important to turn the key slowly.

If the parallel between *tough*-subjects and prolepsis can be explained, then we must

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also explain why the parallelism breaks down in some places.[29]

6. Prolepsis as thematic underspecification

I propose to understand the function of the proleptic object/*tough*-subject as introducing an argument whose thematic role is "underspecified." All that is asserted about a proleptic object/*tough*-subject is that it is an event participant in the event of easiness, difficulty, etc, nothing further. That is, when a proleptic object/*tough*-subject is introduced, a property is added to this event such that the proleptic object/*tough*-subject is designated as an event participant of this event. If so, then it follows from the definitions of root modality and Preservation of Event Description that in the modal worlds the proleptic object (that is, its counterpart) is an event participant in the event described by the infitive; any thematic relation will satisfy this requirement.

Explicitly, starting with proleptic objects, I assume that *with* is an event modifier. The relation PARTICIPANT is the minimal thematic relation of "involvement," parallel to AGENT, INSTRUMENT, etc.

(70) $[[with]] = \lambda x \lambda P_{<v,st>} \lambda e \lambda w.$ PARTICIPANT$(e)(w)=x$ & $P(e)(w)$

Crucially, by adding the property PARTICIPANT to the event e in the actual world, we are forced to add this (or something that entails this) to the counterpart of e in the modal

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[29] I note in passing that some cases where prolepsis is possible but gaps are not are ruled out for independent reasons. For instance, as a rule, English does not allow possessor gaps, which is enough to rule out (ii), even when (i) is fine.

(i) It was difficult with Mary to take her picture. 3

(ii) *Mary was difficult to take e's picture.

Such examples may be taken as evidence against a movement analysis of prolepsis (as in Salzmann 2006, 2015).

worlds; this is the consequence of Preservation of Event Description. Note that technically, in the modal worlds, the event has the property of involving *a counterpart of x*. For readability I put this aside in the denotations.

(71)   a.
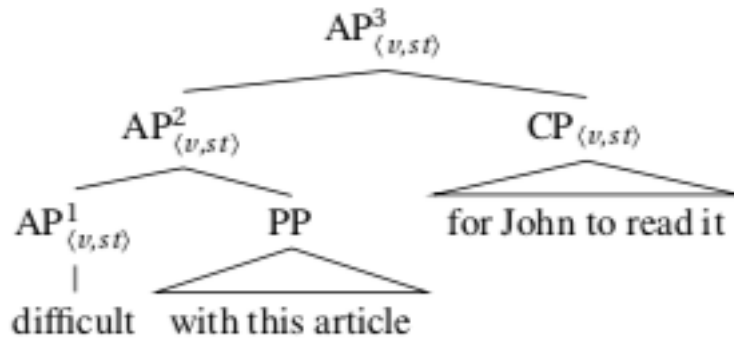
b. $[[AP^2]]^j = \lambda e \lambda w.$ difficult$(e)(w)$ according to j & PARTICIPANT$(e)(w)$=this article

c. $[[AP^3]]^j = \lambda e \lambda w.$ difficult$(e)(w)$ according to j &

PARTICIPANT$(e)(w)$=this article & CONTENT$(e)(w) = \{ w' \mid \exists e'$ in w'

such that $(e)(w)©(e')(w')$ & difficult$(e')(w')$ & read$(e')(w')$ &

AGENT$(e')(w')$=John & THEME$(e')(w')$=this article $\}$

Importantly, being a THEME of the reading event entails that the book is an event participant, thereby satisfying Preservation of Event Description. Indeed, because PARTICIPANT is completely underspecified, any further thematic relation satisfies the requirement that *this book* be involved in the event in the modal world, hence, *It was difficult with this article to burn it/like it/write it/loan it to Mary.* Crucially, though, there must be *some* relation between *this article* and the event described by the infinitive. Thus, **It was difficult with this article to go to New Jersey* is ungrammatical: *this article* is not a participant in the event of going to New Jersey.[3]

The *tough*-subject functions semantically in an identical fashion, but it is introduced

syntactically in a different projection. I assume that there are argument introducing heads whose function is to relate an argument to an event via a thematic relation (e.g., Voice, Appl) (Kratzer, 1996; Pylkkänen, 2008). I propose that among the argument introducing heads there is an underspecified version. That is, in additional to a head that introduces Agents, $\text{Voice}_{\text{Agent}}$, and one that introduces Causers, $\text{Voice}_{\text{Causer}}$, there is an underspecified version, $\text{Voice}_{\text{Participant}}$, which asserts that its specifier is merely an event participant, but does not state anything further about this thematic role.[30]
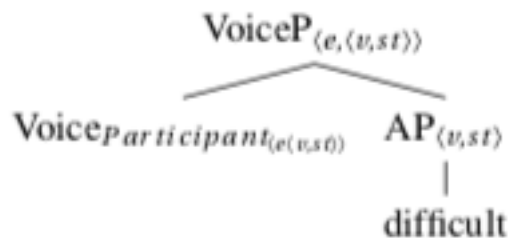
(72) $[[\text{Voice}_{\text{Participant}}]] = \lambda x \lambda e \lambda w . \text{PARTICIPANT}(e)(w) = x$

Because *tough*-predicates are properties of events, an argument introducing head like Voice may relate an argument to the event via Event Identification, i.e., we may add a subject to a *tough*-predicate.[31]

(73)   Event Identification   after Kratzer (1996)
        $<e, <v, st>>$ $<v, st> \rightarrow <e, <v, st>>$

(74)   a.

$$\text{VoiceP}_{\langle e, \langle v, st \rangle \rangle}$$

$$\text{Voice}_{Participant_{\langle e(v, st) \rangle}} \quad \text{AP}_{\langle v, st \rangle}$$

$$\mid$$

$$\text{difficult}$$

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[30] It is worth noting that there are other instances in which *with* alternates with Voice: instrumentals.

    (i) John opened the door with the key.
    (ii) The key opened the door.

[31] I make the standard assumption that the distribution of each Voice head is subject to lexical semantic considerations. For example, *murder* allows $\text{Voice}_{\text{Agent}}$ but not $\text{Voice}_{\text{Cause}}$, while *kill* allows either. *Tough*-predicates impose no thematic restrictions on their subjects, but they may impose other restrictions, cf Fleisher's (2014) *rare*-class predicates discussed earlier. In truth, the argument introducing head may be better categorized as an Applicative head, though the difference is not important here. Note that the specific issue of thematic role disappears in a theory that eschews the ontological status of thematic roles in general e.g., Brody (1993), but the principles behind the analysis remain, i.e., that the *tough*-subject/proleptic object is an event participant and that this relation must hold across modal worlds

b. $[[\text{VoiceP}]]^{j} = \lambda x \lambda e \lambda w.$ difficult$(e)(w)$ according to j & PARTICIPANT$(e)(w)=x$

VoiceP is a relation between an individual and an event. The end result of adding Voice is semantically the same as prolepsis, except that now there is an open individual variable.

For-CPs are also allowed to be type-shifted to describe properties of individuals by abstracting over individuals (i.e., merging an operator in the sense of Heycock 1994; Landau 2011).

(75) a. This computer is [λx for the students to use x]
       b. The park is [λx for the children to play in x]

Such predicate abstraction is syntactically restricted to occurring only with full CP clauses (76a), accounting for the fact that gerunds, though event-denoting, are not possible in the *tough*-construction (76b,c) (see discussion in section 3).

(76) a. *This book was [λx reading x]
       b. It was difficult [reading this book]
       c. *This book was difficult [λx reading x]

Given the availability of such shifts for both the *tough*-predicate and the *for*-CP, they may combine again via predicate modification.

(77) a.

3

VoiceP$_{\langle v,st\rangle}$

DP$_e$ Voice$'_{\langle e,\langle v,st\rangle\rangle}$

this article   Voice$'_{\langle e,\langle v,st\rangle\rangle}$ CP$_{\langle e,\langle v,st\rangle\rangle}$

Voice$_{Participant}$ AP λx for John to read x
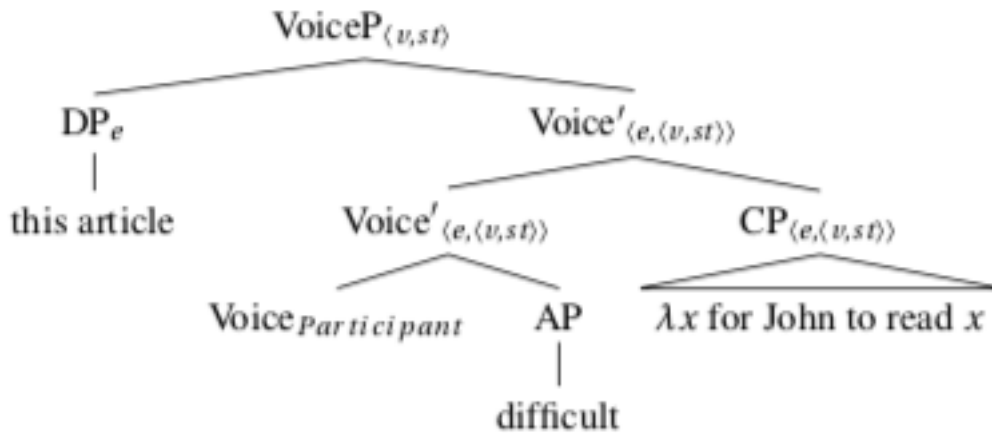
difficult

b. $[[\text{Voice}]]^j$ = $\lambda e\lambda w.$ difficult$(e)(w)$ according to j and PARTICIPANT$(e)(w)$=this article & CONTENT$(e)(w)$ = { w' | $\exists e'$ in w' such that $(e)(w)$©$(e')(w')$ & difficult$(e')(w')$ & read$(e')(w')$ & AGENT$(e')(w')$=John & THEME$(e')(w')$=this article }

The analysis explains the connection between *tough*-subjects and proleptic objects: both are syntactic mechanisms for adding arguments to events, and both introduce a thematically underspecified relation between individuals and events. The individual is involved in the event, but there is no assertion about *how* the individual is involved. This explains why in the absence of a some implicit/elided event, both *tough*-subjects and proleptic objects feel "incomplete," i.e., (39) and (46). Such examples are simply uninformative about what role the *tough*-subject/proleptic-object plays as an event participant.

More importantly, the analysis naturally explains many of the various peculiar properties associated with the *tough*-construction in general. First, it explains why the choice of predicate in the lower clause affects the grammaticality of the *tough*-construction, i.e., the contrast between (65) and (66). (65) is felicitous because taking a picture of Mary is an

action that necessarily involves Mary, but hanging a picture does not.[32]

Second, the analysis solves the problem of "thematic displacement" for both *tough*-subjects and proleptic objects. In short, there is no displacement *per se*, i.e., no violation of locality of selection. Both arguments are thematically licensed in their relevant clauses, but one thematic relation entails the other, in a sense obscuring the contribution of PARTICIPANT. Note that like other predication analyses, we may straightforwardly explain the lack of connectivity effects of the *tough*-subject/proleptic object: neither has displaced from inside of the lower clause.

Third, the analysis correctly predicts that we should never see a *tough*-subject/proleptic object with a finite clause:

(78)   a. It's certain that John read this article.

        b. *It's certain with this article that John read it.

        c. *This article is certain that John read *e*.

Here, the problem is that *certain* does not describe a property of events, and so it is not possible to introduce an argument using *with* or Voice.

Fourth, we also predict that the correlate site in the nonfinite clause (whether a pronoun or gap) must bear a thematic relation *to the highest infinitive*. This is an effect of Preservation of Event Description. Whatever properties hold of the actual world event *e* must hold of the event which is the counterpart to *e*. This in effect rules out unbounded

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[32] Note that this extends to cases of prolepsis which cannot otherwise be gapped for independent reasons, like possessives. (ii) is infelicitous because mailing a picture of Mary is an event that does not (necessarily) involve Mary, while taking a picture of her does

    (i) ?? It was difficult with Mary to mail her picture.

    (ii) It was difficult with Mary to take her picture.[3]

 Of course, (i) does have a meaning as long a Mary can be understood to be involved in the event of mailing, like she is doing something to hinder the speaker's ability to mail her picture. I discuss this more in section 6.1

dependencies as in (50)–(52).[33]

Of course, there are exceptions, as noted above, but the exceptions prove the rule. The instances of unbounded dependencies that are productively permitted are with the class of restructuring predicates. (See Kayne (1989); Rizzi (1982) for a similar observation in French and Italian.)[34] Assuming that restructuring involve a clause union, where there is "event-sharing" at some level (Wurmbrand, 2001; Grano, 2015), then these facts follow.

Fifth, we also correctly predict that a gap in the lower clause requires there to be a Voice projection in the higher clause. This rules out cases where the proleptic object binds a gap.

(79)   *It was difficult with this book to read *e*.

The ungrammaticality of (79) follows from a simple type mismatch: the for-CP is of the wrong type to connect with the main clause (cf Keine and Poole, 2017).

On the other hand, as discussed above, if a proleptic object/*tough*-subject has been introduced in the main clause, then Preservation of Event Description requires that there must be a correlate in the nonfinite clause. While this prediction is borne out with the *tough*-subject, we have also seen cases in which a proleptic object does not need a co-vary with a pronoun. This is the difference again illustrated in (80) (cf, (68) and (69)). I turn to this in the next section.

(80)   a. It's easy with this article to get lost.

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[33] Cases of unbounded *tough*-constructions with finite clauses, discussed in footnote 25 may be analyzed as instances in which the *tough*-subject is understood essentially as a proleptic object of the highest infinitive. For example, (i) may be analyzed as the counterpart to (ii) (where % indicates speaker variation in the judgement).

  (i) %This book is easy to believe that Mary read *e*
  (ii) It is easy with this book to believe about it that Mary read it.

Recall though that such unbounded dependencies do not generalize across predicates, and so a more stipulative solutions may be required to account for such cases. In any case, I do not deal with finite prolepsis here and so cannot fully address this possibility.

[34] Kayne 1989:251): "In both Italian and French, the 'easy-to-please' construction is possible with two levels of embedding only if the highest infinitive is of the class of verbs compatible with a CP complement having an empty head bound from without [=a restructuring predicate]."

b. *This article is easy to get lost.

Whether the analysis explains the difference between raising-to-object/ECM, small clauses, and object control is subject to what the correct analyses of such constructions should be. In terms of object control, the account offered here probably covers such cases, since the gap is, by definition, at an argument position of the control predicate. The grammaticality of small clauses may similarly be explained if the small clause does not introduce a new event argument. More controversially, the ungrammaticality of raising-to-object/ECM may be explained if the raised-to/ECM position is not a thematic position. This is of course controversial and the issue cannot be fully addressed here.[35]

6.1 Core and peripheral event relations

The purpose of this section is to provide more detail on what exactly it means for an event description to "involve" an argument, i.e., what does PARTICIPANT mean? We can think of many ways arguments can be event participants. If John goes downtown, John is clearly an event participant; he's an AGENT in this event. But we can also think of the train that John takes to be involved in this event, or of the road that John drives on as part of this event. Similarly the air he breathes, the people he passes, etc. In these latter cases, the intuition is that the train, road, air, people involve a somewhat "weaker" participation relation than participants like the AGENT of traveling. The idea explored below attempts to capitalize on this difference between "weak" and "strong" event participation in accounting for the difference between *tough*-subjects and proleptic objects.

Terminologically, I will refer to the weak/strong distinction to as the *core/peripheral*

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[35] Similarly more discussion should be given to whether the analysis may cover the fact that amounts and predicates are not permitted (in (63) and (64)). It seems the predicates are correctly ruled out: how can a predicate be an event participant? It's less clear to me whether amounts are similarly excluded in the same way.

distinction, adopting terminology from Dixon and Aikhenvald (2000).[36]

> "It is useful to distinguish between core and peripheral arguments. The number and nature of the core arguments is determined by the choice of which verb (or other word) is predicate head. The core arguments must be stated — or else be understood — for the clause to be acceptable and to have sense. Peripheral arguments (sometimes called 'adjuncts') are less dependent on the nature of the verb; they may optionally be included to indicate place, time, cause, purpose and the like.' (Dixon and Aikhenvald, 2000:2)

Core participants are participants *sine qua non*. They play some essential function in the event described by the predicate. A peripheral event participant is an element that isn't (grammatically or semantically) required in the event description of the predicate, i.e., it is less constrained by the lexical semantics of the predicate.

For instance, the core/peripheral distinction differentiates the nominal phrases in (78).

(78) John went to town on his bike.

The core arguments are *town* and *John*. There must be an AGENT (someone who does the going), and a LOCATION (somewhere for the AGENT to go). *His bike* has the status of peripheral argument in that it may further elaborate the event description, but it is not required to make the sentence grammatical. We need not assert the means by which the going took place, though the bike is nonetheless an event participant.

Generally, the core/peripheral distinction correlates with the argument/adjunct (or argument/modifier) distinction, and is highly sensitive to lexical semantics. Thematic arguments that are directly projected into the syntax are, in general, core participants, while thematic arguments that are modifiers/adjuncts are, in general, peripheral participants. Note that in theory, any thematic relation can be either core or peripheral, though certain

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[36] It's possible that the ideas explored in this section parallel what is argued in Truswell (2011). Concisely, Truswell proposes that patterns of extraction asymmetries out of (weak) islands can be explained if we look at the relationship between the events described by the predicates in clause. Those that are more tightly linked may be extracted out of, while those which have a weaker relationship may not be. I believe that the explanation offered here may be reformulated along these lines, though I leave this for future work

predicates and/or constructions may impose different constraints. For instance, grammatical transformations may "promote" or "demote" particular grammatical relations from core to peripheral and vice versa. Thus, Dixon and Aikhenvald (2000) argue that in the passive transformation, the demoted AGENT plays a more peripheral role. Conversely the antipassive transformation may demote an object (THEME/PATIENT/etc) from a core to a peripheral role. Similarly, Dixon and Aikhenvald suggest that in applicative constructions, applied arguments may be either peripheral or core depending on how they are introduced, e.g., *John sang Mary a song* (core) vs. *John sang a song for Mary* (peripheral).

I propose that the difference between *tough*-subjects and proleptic objects is that the former are core event participants, while the latter are peripheral. More generally, elements introduced in the specifier of Voice (i.e., as syntactic arguments) are core event participants. They bear the relation PARTICIPANT, and they are listed among the set of core event participants, i.e., those arguments which bear a "strong" connection to the event. I abbreviate these two (independent) properties as PARTICIPANT$_{Core}$. Because of Preservation of Event Description, the event described by the infinitive now must also have these two properties: the *tough*-subject must be included among the core event participants of the modal events which are counterparts to the actual world event. This in effect restricts the gap to an argument position, and so rules out cases where there is no corresponding gap in the lower clause (79a) and also correctly predicts that non-core positions cannot be targeted by a *tough*-subject (79b).

(79)   a. *This article was easy to get lost.

       b. *His bike was difficult for John to go to town on *e*

       c. cf, Town was difficult for John to go to *e* on his bike.

What rules out the examples in (79a) and (79b) is that the *tough*-subject in each case is not a *core* event participant in the lower clause, though it is nevertheless an event par-

ticipant. Importantly, we also correctly predict that the gap should be able to occur in positions which are reserved for those elements introduced in prepositional phrases, but are still understood as core arguments, i.e., thematic arguments whose involvement is entailed or enforced by the lexical semantics of the infinitival verb.[37]

(80)   a. This knife is easy to cut with *e*.

   b. This axe was difficult to chop with *e*.

   c. Mary was tough to send a letter to *e*.

This also correctly predicts that event participants which have been "demoted" to a peripheral role should not be targetable by a *tough*-subject. Thus, passive *by*-phrases and prepositional benefactives do not permit gaps in the *tough*-construction.[38]

(81)   a. *Prof. Smith was difficult to be taught by *e.*

   b. *John was easy for Mary to sing a song for *e.*

In (81), though the *tough*-subject binds a gap in the lower clause, and is an event participant in the event described by the infinitive, it is not included among the core event participants, and so the sentences are ruled out.

In contrast, the proleptic object does not bear the property of being a core event participant; it is a peripheral event participant, PARTICIPANT$_{\text{Peripheral}}$, which represents the properties of being an event participant, but not being listed among the set of core event participants.[39] Because of this looser relationship, the correlate pronoun in the nonfinite

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[37] I assume that pronouns in argument positions (i.e., *The knife was easy to cut with it*) are ruled out due to standard economy principles (e.g., Avoid Pronoun Chomsky 1981). When possible, gaps are preferred over pronouns.

[38] Applicative benefactives are als<u>o</u> ruled out in the *tough*-construction, but this is due to the fact that indirect objects in general cannot be A-extracted.

   (i) *John was difficult to sing *e* a song.

   (ii) *Who(m) was sung t_{wh} a song?

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[39] This can be thought of in two ways. On one hand, we can think of peripheral arguments as bearing two properties: that of being an event participant, and being listed among the peripheral arguments. This option

clause is not confined to an argument position. Indeed, as a peripheral argument, it need not even be explicit, as long as the proleptic object can be viewed as being involved in the event described by the lower clause. This correctly permits the pronounless examples above, because peripheral arguments need not be explicit, and it also correctly explains why proleptic objects are permitted to correlate with pronouns that cannot be gapped (82), including passive *by*-phrases (82b) and prepositional benefactives (82c).[40]

(82)   a. It was difficult with this bike for John to go to town on it.

b. ?It was fun with Prof. Smith to be taught by him.

c. It was easy with John for Mary to sing a sing for him.

Still, I should emphasize that the core/peripheral distinction is likely not a strict dichotomy. The concept of "event participation" may be gradable or coercable in some cases. For instance, the examples in (83) do not grammatically involve the *tough*-subject as a core-event participant of the lower event on Dixon and Aikhenvald's view.

(83)   a. The park will be difficult to meet in *e*.

b. Mary is difficult for John to stand next to *e*.

c. This bed was difficult to sleep in *e*.

I am hopeful that a closer examination of the distinction between "core" and "peripheral" — or however this distinction is characterized and formally defined — will lead to a more refined explanation of the differences between *tough*-subjects and proleptic objects.

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is feasible as long as we further define an entailment relationship between peripheral and core such that core arguments are a subset of peripheral arguments. Alternatively, peripheral arguments may simply lack any specification about whether they are core or peripheral. I believe the second option is more appealing, but I leave the issue open for now.

[40] Note that proleptic objects can in principle target core positions, too, because such positions only admit event participants. Thus, *It was difficult with this article to read it* is grammatical because being "strongly" involved in the event entails being "weakly" involved in the event.

7. Conclusion: comparisons and implictions

A more detailed look at the meaningful components of the *tough*-construction augments previous syntactic work and solves many of the analytical difficulties introduced by the construction. In particular, a more complete understanding of the intuition that the *tough*-construction is, fundamentally, an assertion about an event leads to a number of positive consequences. To reiterate the core observation: there must a way to link the event described by the *tough*-predicate with the event described by the infinitive. This link provides a natural explanation for a range of peculiarities associated with the construction.

The proposal offered here compares favorably to previous solutions in three ways. Foremost, it offers the first explanation for why the *tough*-construction exists, i.e., which predicates are (not) *tough*-predicates, which clauses can(not) participate in the *tough*-construction, and how their meanings combine. Second, the analysis doesn't over- or undergeneralize. One of the core critiques of previous (syntactic) solutions is that they fail to properly constrain whatever (often stipulative) mechanism that is invoked to explain the relationship between (1a) and (1b). For instance, many analyses that rely on purely syntactic mechanisms for deriving the relationship between the antecedent and the gap must propose further mechanisms that restrict over-application to cases where the embedded clause is finite, e.g, *This book is important that John read*, or a gerund, e.g., *This book is important reading e*. Such cases are naturally explained as a product of the constituent pieces. For finite clauses, there is a type-mismatch; for gerunds, the gerund cannot host an operator.

Finally, the analysis offered above can be shown to derive from truly independent principles and a minimal amount of well-motivated assumptions. Again, the core insight is that there is a "link" between two events, the event of difficulty and the event of reading

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Finally, the analysis offered above can be shown to derive from truly independent principles and a minimal amount of well-motivated assumptions. Again, the core insight is that there is a "link" between two events, the event of difficulty and the event of reading

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this article, and that this connects the events across modal worlds. Acknowledging this link provides a natural explanation for why the *tough*-construction has otherwise quite peculiar properties, for instance, why the antecedent-gap chain is an A'-movement that only crosses particular clausal boundaries.

Looking beyond the *tough*-construction, we can begin to explain a number of further classes. For instance, *pretty*-class adjectives (*This painting was pretty to look at*) may be analyzed similarly: they are the case that a judge-dependent predicate obligatorily selects for a (core) event participant — though it must be explained what it means for the event of looking to bear the property of being pretty. Similarly, *eager*-class adjectives (*John is eager to leave*) might be analyzed as cases where the thematic role of the (selected) subject is as the attitude holder, in which case it obligatorily must be coindexed with the PRO subject. Further avenues of investigation should include the various sub-types of *tough*-predicates, e.g., the *rare*-class, the *kind*-class, which impose further restrictions on their *tough*-subjects.

Further support for the analysis may come from looking more closely at the different classes of clauses that take finite and nonfinite complements. For instance, (epistemic) predicates like *certain, sure, believable* may only occur with finite clauses, but they are also precisely the predicates that can be predicated of contentful nouns like *fact, story, belief*. In contrast, "pure" *tough*-predicates may only ever occur with nonfinite clauses (*easy, difficult, simple*) and similarly may also only ever be predicated of contentful *events* like *plan, arrangement*. And then there are predicates like *important, crucial* that can embed any type of clause or occur with any (contentful) nominal subject. These correlations suggest that the type distinction between finite and nonfinite clauses in terms of contentful nouns and events is on the right track.

Finally, I am hopeful that this first step at defining semantically the contribution of prolepsis and proleptic arguments may prove fruitful in a number of further constructions, including canonical cases of prolepsis and related phenomena.

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