Non-maximal telicity in English incremental theme predicates[1]

Fred WHIBLEY — *University of Edinburgh*

Abstract. Typically, incremental theme predicates give rise to telicity inferences in the case when the object is quantized and an incremental mapping holds between the object and the verb. Culmination inferences can have a strange characteristic, where their *default* maximal meaning can be rejected in favour of a non-maximal construal. In this paper, I will present an empirical pattern for English incremental theme predicates, situate them within the broader typology of partitive accomplishments, before providing an analysis of their context-sensitive compositional properties and the source of their defeasible maximality.

Keywords: non-culminating accomplishments, partitive accomplishments, defeasibility, telicity, lexical aspect, aktionsart, non-maximality, incremental theme verbs.

1. Introduction

Consider the context/sentence pairs in (1-4). Notice that these incremental theme predicates can be used in an incompletive context. Additionally, their default culmination inferences can be rejected without contradiction:

(1) **The Anxious Pianist**: John is a talented pianist at a conservatoire, but suffers from a severe panic disorder. His teacher is trying to increase his confidence, and so gets him to perform at their summer concert. However, he has a panic attack and exits the stage mid-way through his performance. Someone reports afterwards:
"*John performed the piano sonata (beautifully)*, but he didn't finish it."

(2) **Would-Be Movie Producer**: John is a movie director who had been working on a large movie until they ran out of budget, and had to scrap the movie before it could be finished and released. Someone reports afterwards:
"*John produced the movie*, but it was scrapped before he could finish it."

(3) **The Hoarse Singer**: John is chosen to sing the national anthem before the big game, despite having a sore throat and losing his voice intermittently. He gets through a certain amount of it before losing his voice again. Someone reports afterwards:
"*John sang the national anthem*, but couldn't finish it."

(4) **The Unhappy Filmgoer**: John typically goes to the cinema every week. This week he goes, but chooses a terrible movie that he ends up really disliking. During the movie, he gets up and leaves. Someone reports afterwards:
"John watched the movie at the cinema, but left before he finished it".

For each italicised predicate in (1-4), there is a lexically associated endpoint, or telos, at which the event culminates, provided by the direct object. For (1), the performance process culminates when the entire piano sonata is performed. For (2), the producing event culminates when the movie is entirely produced. For (3), the singing event culminates once the singer has fin-

[1]I would like to thank Dan Lassiter, Wataru Uegaki, and Rob Truswell for the discussion and comments. Thank you to all who gave their insight and feedback at SuB29. Thanks also to Alíz Owolabi and Ponrawee Prasertsom. All errors are my own.

 Non-maximal telicity in English incremental theme predicates. In: Federica Longo and Daniele Panizza (eds.) *Proceedings of Sinn und Bedeutung 29*, pp. 1698-1712. Noto: University of Messina, C.U.M.O.

ished the national anthem. For (4), the watching event culminates when the entire movie is watched. For each of the italicised predicates, there is a **default** telic inference. In out-of-the-blue contexts, it is implied these events culminate relative to their respective inherent lexical endpoints. This is along the lines of how Martin (2019: 2) describes a *lexical bias* towards the telic reading.

For each of these examples, there is a measuring-out relation or incremental relation between the verb and its direct object (Tenny, 1994; Krifka, 1998). In scalar-theoretic terms, these predicates are composed of non-gradable manner verbs and a direct object that provides the "extent" scale on which to measure the completion of the event (Rappaport Hovav, 2008; Kennedy, 2012). For instance with "watch the movie", the endpoint is provided by the possible (temporal) extent of the movie.

Rappaport Hovav (2008: 26-27) suggests that for VPs with multipoint scales (such as extent scales in incremental themes), part of the event is entailed, whereas maximality is *implied*. For (1-4), this pattern is evident since implied teloi are defeasible. Nevertheless, the event has culminated relative to a type of non-maximal endpoint. To illustrate, we can modify the contexts for less of the event to have proceeded, which significantly degrades the readings:

(5) **The Anxious Pianist**: John is a talented pianist at a conservatoire, but suffers from a severe panic disorder. His teacher is trying to increase his confidence, and so gets him to perform at their summer concert. However, he has a panic attack and exits the stage just after he starts his performance. Someone reports afterwards:
"??*John performed the piano sonata (beautifully)*, but he didn't finish it."

This gives evidence that for a *non-maximal* construal of the telic predicate, it remains necessary for at least a sufficient amount of the event to have proceeded in order to license the telic-defaulting predicate. On the surface, this is very similar to cases of non-culminating accomplishments (NCAs), an example of which can be taken from Arunachalam and Kothari (2011); Martin and Demirdache (2020):

(6) maayaa-ne biskuT-ko khaa-yaa par use puuraa nahiin khaa-yaa. [HINDI]
Maya-erg cookie-ACC eat-PFV but it-ACC finish not eat-PFV
'Maya ate the cookie, but did not finish eating it.

Similar to (1-4), the default culmination inference (in this case, a completely eaten cookie) is *defeasible*. A clear crosslinguistic question could be asked, whether examples such as (6) are crosslinguistically identical to (1-4). In this paper, I eventually arrive at a treatment for the examples in (1-4), showing that they are not reducible to the type of NCA demonstrated in (6), due to crosslinguistic variability and that they differ from predictions made by the minimal part constraint (Martin and Demirdache, 2020).

The overall contribution of this paper lies in its treatment of *non-maximal* construals that are possible for some English incremental theme predicates. I will model this pattern in terms of an adapted measure-of-change function (Kennedy, 2012), which will allow predicates to be true for sufficiently large subparts. To establish this, I will first demonstrate that our examples in (1-4) are separate from atelic uses of accomplishments, indicating that an analysis based on variable telicity (Kennedy and Levin, 2008) is insufficient for the pattern at hand. In section 3, I will argue that (1-4) form a distinct subtype of partitive accomplishment and thus typical

approaches to NCAs, such as those that adapt Dowty's (1979) progressive semantics and the minimal part constraint are plausible but ultimately insufficient. I will conclude in Section 4, which will model the pattern in terms of a flexible measure-of-change function (Kennedy, 2012).

2. Telicity, scales, and quantization

Incremental predicates have structure-preserving mappings from parts of the nominal to parts of the event denoted in the verb. These subparts and subevents are mapped together through a set of incremental relations. For example, for a predicate such as "eat a sandwich", each part of that "eating" event has a corresponding "sandwich" part that it maps onto. Telicity emerges if the VP predicate is ***quantized***. To be quantized means that given a VP-denoted event, no subparts/subevents satisfy the VP expression. Therefore, "eat an apple" is telic, given that no subevent of "eat an apple" is itself the same thing as "eat an apple" (Krifka, 1998).[2]

On the other hand, atelicity is associated with a sub-interval property (Bennett and Partee, 2004). This means that for an expression like "drink water", any subpart of that event also satisfies the expression "drink water". Predicates of these forms are incrementally related but do not result in telicity in part due to their cumulativity. In the case of an event of drinking water, if you take some subpart of that event and combine it with another part, then the sum of those two subevents constitutes an event of drinking water.

Connecting to scalar-theoretic terms, we can also think about incremental relationships being measured on an extent scale (Rappaport Hovav, 2008) wherein the internal structure of the nominal provides the extent to which an event unfolds, for which the extent of the object provides the upper bound and delimits the event. In the case of our incremental theme predicates, a non-scalar manner verb like "perform" can be measured out or "instantiated" by the extent of the event-template (Piñón, 2008) that is being performed.

The challenge will be to explain a few key aspects of the empirical pattern at hand. Firstly, given that we are dealing with slack around what is possible to call completed, we need to somehow model a form of sufficiency in the discussion, and flexibility in how we count completed events. We also need to consider the predictions made by existing theories of telicity and see whether they account for the puzzles posed by (1-4).

2.1. The puzzle posed by (1-4)

First and foremost, I argue that (1-4) are immediately unexpected given an understanding of telicity based on notions of quantization. The situation should be strange, given a definition of quantization and telicity that suggests that given a telic expression P, no proper part of the denoted event can itself satisfy the expression.

Thinking about example (1) again, repeated here:

(7) **The Anxious Pianist**: John is a talented pianist at a conservatoire, but suffers from a severe panic disorder. His teacher is trying to increase his confidence, and so gets him to perform at their summer concert. However, he has a panic attack and exits the stage

[2]Krifka (1998) discusses cases in which the event itself is not quantized, but whose "minimal convex time" (i.e., runtime) is quantized. But we will not discuss these here.

mid-way through his performance. Someone reports afterwards:
"*John performed the piano sonata (beautifully)*, but he didn't finish it."

Suppose that a typical performance of the piano sonata lasts six minutes and that John performs around four minutes. The telic predicate "perform the piano sonata" would normally carry the inference that the entire six-minute event has elapsed. However, in this context, we observe that the four-minute subevent still satisfies the expression "performed the piano sonata". If a subevent of the conventionally whole event can truthfully satisfy the predicate, then (1) is flatly *a non-quantized expression*. A literally incomplete performance that forms part of a conventionally larger completed event is still described using the telic predicate. Thus, it is reasonable to suggest that (1), and by extension (2–4), represents an atelic usage of a predicate that is typically telic by default.

At first blush, this is a plausible way to understand the cases in (1-4). For instance, we can see that the predicate in (1) can take a *for*-PP adverbial, which typically diagnoses atelicity. This suggests that "perform the piano sonata" is a predicate of variable telicity in the sense of Kennedy and Levin (2008) or a flexible accomplishment in the sense of Wright (2014):

(8) John performed the piano sonata for a few minutes, then left the stage.

If the predicate is simply an atelic use of an accomplishment predicate (certainly a possible way it could be used), I argue that what we see in (1) is very different from (8) by virtue of the *for*-PP adverbial. The use of an atelic PP-adverbial in (8) in effect coerces the pragmatic focus away from any notion of completion, and entirely onto the manner of the performance, with a reduced saliency of the culmination of the event itself. In this respect, the performance predicate can be used atelically. Atelic, in this sense, meaning that the predicate lacks any coherent encoding of the completion of the event.

On the other hand, with all the examples in (1-4), there is a real sense of *non-maximal completion*, not atelicity. A culmination reading would be unexpected if the predicates were simply atelic. Atelicity, by definition, would suggest *a lack* of telicity, or that telicity is unmarked (Filip, 2008; Kovalev, 2024). What we see is that a culmination is reached, but the degree to which it is achieved is simply less than what we would expect given a conventional lexically associated endpoint that would be arrived at *ceteris paribus* (Copley and Harley, 2015). Overall, the interpretation of the predicates in (7) and (8) are **not** identical, by virtue of the *for*-PP adverbial.

We can also think about the notion of *how much* of an event needs to proceed in the world in order for the predicate to be licensed, as another indication that the examples in (1-4) are not inherently atelic. We can do this through a more thorough examination of *sufficiency entailment*.

2.1.1. Sufficiency

Further evidence to distinguish (1-4) from atelic uses of accomplishments can be seen in the differences needed in the extent of the realisation of the VP-event to license both forms. How much of the event needs to be instantiated at reference time for the predicate to be true? In the case of the atelic form with a *for*-PP adverbial phrase, then the amount of VP that's instantiated is inherently less stringent than that of the cases in (1-4):

(9) **Context**: around 20 seconds of a five-minute sonata is played:
a. *John performed the piano sonata for 20 seconds / # John performed the piano sonata*
Context: John watches about three minutes of a feature film:
b. *John watched the movie for three minutes / #John watched the movie*

Effectively, if the event is far away from any culmination, then the *for-PP adverbial* is more or less compulsory, indicating that using a form that does not carry a culmination inference is necessary. The *lack* of the *for*-PP adverbial in the cases of (1-4) suggests that the endpoints are definitely semantically salient, but all the while non-maximally achieved. To this effect, it seems that a way to characterise this difference between minimally instantiated events in the case of (9) and closer-to-maximally-achieved events in (1-4) can be described in terms of a sufficiency entailment. (1-4) are all sufficiently completed in their respective contexts of utterance, and this part of the VP-event is non-defeasible.

To conclude, the overall aim of this section is to raise the problem of the flexibility of using default telic incremental theme predicates in non-maximal contexts. The fact that (1-4) are plausible suggests that a theory of telicity via quantization potentially under-generate the situations in which these incremental predicates can be used. Overall, quantization can be imprecise, but only to the degree where the event remains sufficiently completed. There seems to be a sense of divisibility to a sufficiency threshold, which is distinct from an atelic use of the predicate, and whose mechanisms remain to be elucidated. In the next section, I will explore some ideas relating to non-culminating accomplishments (NCAs) or partitive accomplishments (Martin, 2019; Martin and Demirdache, 2020), and ultimately demonstrate how these examples are not fully captured by those analyses either.

3. Partitive accomplishments and non-maximal manner verbs

In Martin and Demirdache (2020), partitive accomplishments consisting of non-culmination relative to a manner property are described as non-culminating relative to manner. Compare their examples from Hindi and Mandarin in (10) and (11) respectively to the adapted English examples in (12a) and (12b):

(10) maayaa-ne biskuT-ko khaa-yaa par use puuraa nahiin khaa-yaa.
Maya-erg cookie-ACC eat-PFV but it-ACC finish not eat-PFV
'Maya ate the cookie, but did not finish eating it.'

(11) Wǒ zuótiān xiě-le gěi Zhangsan de xìn (kěshì méi xiě wán).
I yesterday write-PFV to Zhangsan *de* letter but NEG.PFV write finish
'I wrote a letter to Zhangsan yesterday (but I didn't finish writing it).'

(12) a. John produced the movie, but it was scrapped before he could finish it.
b. John sang the national anthem, but couldn't finish it.

The similarity is superficially obvious. A default telic accomplishment consisting of a manner verb and incremental theme has its telos rejected in a continuation phrase without a contradiction. Nevertheless, (10) and (11) are distinct from examples (1-4) for several reasons.

Firstly, there is the matter of sufficiency thresholds again. The question is, how much of an event needs to be instantiated in the world to license the expression that carries the default culmination inference? One answer could be found with what has been described as the *minimal*

part constraint (Martin and Demirdache, 2020: 1202). Although it is never given an explicit definition, we can adapt (Martin and Demirdache, 2020: 1202) to motivate the following:

Minimal Part Constraint (MPC):
Perfective non-culminating accomplishments are satisfied by *part* of the VP-denoting event being realised in the world.

The MPC seems to be a general constraint over VP-events. This is also the type of prediction that is carried by analyses of NCAs that utilise or adapt progressive semantics such as those in Dowty (1979) and Landman (1992). In general, these accounts of the *non-entailment* of event endpoints are based on operations that displace a telos from the semantics of the telic predicate through the means of: *inertia worlds* or some equivalent (Bar-el et al., 2005; Tatevosov, 2008; Altshuler, 2014); causal models manipulating sufficient and necessary conditions (Nadathur and Siegal, 2022), or force-theoretic ideas (Copley and Harley, 2015). The key prediction that links all of these ideas is similar to that which would predict atelic or progressive forms in English. Typically, given that a process is instantiated in the world that leads to culmination, this itself seems sufficient to license a predicate that carries a default culmination inference.

An analysis that utilises progressive semantics or something like the MPC suggests for manner verbs with direct objects that provide an extent scale, *some* instantiation of that verb-denoted event in the world should be sufficient for licensing the VP that expresses a telic reading. These predictions are borne out in languages that have NCAs. For instance from data from Thai, which is known to have NCA-type phenomena (Koenig and Muansuwan, 2000):

(13) **Damaged DVD**: John has an old copy of a DVD, which is scratched and worn out. He puts it on, but after three minutes of trying to watch the film he gave up because the DVD was too damaged.

a. ??John watched the movie, but didn't finish it.[3]

b. jon doo năng dtàe doo mâi jòp
John watch movie but watch not finish
'John watched the movie but did not finish it.'[4]

The crosslinguistic difference from this example is pretty clear. The form in (13a) seems far more degraded than (13b). I take this as evidence to suggest that the English examples in (1-4) are not necessarily the same thing as non-culminating manner/incremental predicates in other languages, and therefore cannot be given an analysis that is directly lifted from existing theories in the NCA and imperfective paradox literature. It further suggests that there is some inherent crosslinguistic variation in the type of semantic phenomenon that occurs to provide superficially similar effects.

3.1. Non-maximal accomplishments (NMAs)

The fact that the culmination in (1-4) is not *maximally* entailed is also intuitively similar to cases that have been described as "non-maximal accomplishments" (NMAs). However, examples

[3]Personal variation here could mean this is felicitous for others. For my English at least, it's incredibly degraded.
[4]This is an elicited form of the culminating expression.

such as (1-4), are not NMAs in the same sense as Martin and Demirdache (2020). To illustrate this, let's compare a prototypical English example to an adapted version of (1):

(14) a. John cleaned his flat, but it wasn't fully clean. NMA
b. John performed the piano sonata, but couldn't finish it.

The immediate thing to notice between (14a) and (14b) is the type of scale that is measuring out the events. For (14a), the completion is being measured relative to some *property* scale (Rappaport Hovav, 2008), whereas (14b) is an incremental theme predicate, a manner verb delimited by its internal argument which provides an extent scale.

These different scales give rise to differences in interpretation in these non-maximal cases. For (14a), the question isn't about the amount of completion denoted by the manner verb, but rather the granularity that you are measuring the affected objects' change-of-state on. It is clean *to John* on granularity G, but not necessarily to someone else on granularity G_p, as is pointed out in Martin and Demirdache (2020). (14b) on the other hand isn't involving gradable changes-of-state in some property dimension as (14a) is. Therefore, when we think about granularity shifting, we are not necessarily able to impose an analysis directly onto (14b), for which the event's completion is not measured relative to a property scale but an extent scale. I argue that it is important to distinguish between these non-maximal cases in (14a), and the type of non-maximality that we see in (14b).

Furthermore, recent work from Kasher and Hacohen (2023) on Russian perfectives allowing for incompletive construals with a non-contradictory cancellation phrase, seems to pattern more with (14b) and not (14a), purely based on the type of scale that measures the event. Their data demonstrates a case where a Russian perfective verb followed by a cancellation phrase is as licit as the imperfective verb form to describe incomplete, but mostly developed situations. They demonstrate this with the verb "draw" and a quantized object, "the star" (Kasher and Hacohen, 2023: 5):

(15) Malčik narisoval zvezdu, no odnovo lučika ne xvataet.
boy PFV-drew star-ACC but one ray not sufficient
'The boy drew a/the star, but one point is missing.'

Very similar to (1-4), this non-maximal kind of reading for incremental theme predicates seems to suggest that a type of sufficiency entailment exists, that is distinct from the conventionalised default *maximally telic* reading. This suggests that (1-4) as well as (15) form a distinct type of partitive accomplishment, one categorised in terms of inherent *flexibility* in how endpoints are measured. It seems clearly distinct from NMAs and the types of NCA, such as (10), (11), and (13b), which seem to conform to the predictions of analyses using progressive semantics and the MPC, where smaller VP-events seem sufficient to license an expression that confers a culmination inference.

3.2. What type of partitive accomplishment?

Taking stock of the similarities and differences of our non-maximal examples in (1-4) to non-culminating relative to manner examples and NMAs, we can generally compare their empirical properties in the following ways:

- (1-4) are derived from *manner verbs* and are measured out by incremental themes, like

non-culminating relative to manner examples (Martin and Demirdache, 2020: 1207).

- (1-4) entail completion relative to *some* amount, but imply it relative to another, like NMAs (Martin and Demirdache, 2020: 1202).

However:

- (1-4) have *sufficiency* entailments, where non-culminating relative to manner examples seem not to.
- (1-4) are not measured on property scales, making granularity shifting in the same way as an NMA improbable.

Overall, the examples in (1-4), as well as Kasher and Hacohen's example in (15), demonstrate a type of partitive accomplishment which I will call a *non-maximal manner accomplishment* (NMMA), defined as follows:

- P_{tel} is a NON-MAXIMAL MANNER ACCOMPLISHMENT iff it pragmatically implies culmination at MAX(P), but semantically entails it for some *sufficiently large* subpart of P.

For the cases where what is *sufficiently large* is the same as MAX(P), and contextually these two event parts are literally impossible to separate, then it seems fairly clear that what is entailed at a *sufficiently large* subpart for P will just be MAX(P)[5]. The question for Section 4 will be: what are the possible ways we can talk about and measure these sufficient subparts?

In discussing "sufficiently large" and "completed enough", the discussion engages in Lasersohn's (1999) style of slack and pragmatic halos. It is clear that what I have classified as a non-maximal manner accomplishment is a telic incremental theme predicate, that is typically adaptable and flexible enough to be used as a defeasibly maximal predicate in non-maximally complete contexts. There will inevitably be differing predictions between context-sensitive approaches to composing incremental theme predicates and a general pragmatic halo analysis. However, I won't address that here, and how that applies to our crosslinguistic data points. For our current purposes, I will argue that part of the desiderata for a theory that explains the possible non-maximal construals of telic incremental theme predicates requires an analysis that captures slack in what counts as an instantiation of the object nominal.

To summarise this section and foreshadow what comes next, we have suggested that for some English incremental theme predicates, their endpoints have a defeasible inference of maximality. I have argued that this is distinct from an atelic use of the accomplishment and canonical NCAs or NMAs. The key aspect of the construal is around this idea of *sufficient completion* being less than what is conventionally maximal. The challenge now is to model this behaviour formally: how do we account for this flexibility? How can we model this sufficiency constraint? To do so, I will propose a refinement of Kennedy's 2012 measure function approach that ensures that completion inferences are licensed only above a certain determined threshold.

[5]This could be the case for VPs headed by "prove" or "solve", or typically what Tatevosov and Ivanov (2009) dubbed Mapping to Maximal Final Part predicates.

4. Formal treatment

Incremental theme verbs do not lexicalise scales themselves, and thus the scalar structure is provided by the direct object itself (Rappaport Hovav, 2008; Kennedy, 2012). In the outlined cases of (1-4), a default telic reading associated with the maximum point of an extent scale, can be defeasibly implied. These defeasible cases are non-maximal rather than atelic. Overall, they differ from typical manner NCAs in that they have a sufficiency inference that differs from predictions of an analysis using an underlying progressive semantics, and a generalised MPC. I argue that these cases of NMMAs denote slack-like behaviour, specifically in the granularity that objects are measured.

To account for the flexibility and slack that we see in counting the incremental theme argument, we can look at natural units (Krifka, 1989), via Kennedy (2012) for a place to innovate. The reason for using Kennedy's model for incremental theme predicates is that he places the entire explanation of telicity onto the nominal reference of an incremental theme argument.

Working with this assumption, Kennedy hypothesises that denotations of incremental theme nominals include basic measure functions. The measure functions are equivalent in type to typical gradable adjectives, but return a degree in terms of natural units. Thus, incremental theme arguments have two parts: the first part is a characteristic function over some amount of stuff denoted by the nominal. The second is a measure function that takes this stuff, a situation, and returns a degree of how many natural units (NUs) of stuff there are relative to the specific situation. The form of the nominal is defined as follows:

(16) $[\![\text{piano sonata}]\!] = \lambda d \lambda x \lambda s.$ **piano-sonata(x)** $\wedge$ NU(piano-sonata)(x)(s) = d

(16) includes in its denotation a measure function, which takes some amount of symphony-stuff x and a situation s, and outputs a degree d, measured on how many natural units (NUs) of x exist relative to situation s. For our purposes with "piano sonata", the boldface part of the expression is the characteristic function over the "stuff" that intuitively makes up any amount of piano sonata; for instance, specific notes, bars, etc[6]. This is then measured by the NU measure function. A single NU for a sonata will just consist of the conventionally maximal idea of what counts as a single sonata, relative to the situation (i.e., the complete sonata).

The key part of the *incremental* meaning comes when this measure function is converted into a measure-of-change function, denoted as NU_Δ.

(17) $[\![\text{piano sonata}_{\,inc}]\!] = \lambda d \lambda x \lambda e.$ piano-sonata(x) $\wedge$ NU_Δ(piano-sonata)(x)(e) = d

The denotation of the incremental nominal in (17) includes a measure-of-change function, which is a specific *difference function* where a comparison is drawn from how many NUs of x-stuff are realised at the end of the event *fin(e)*, compared to the start of the event *init(e).* This then composes with the manner verb through event composition (Kratzer, 1996), which existentially closes the individual argument[7]:

[6]Piñón (2008) gives an account that specifically in the case of *perform* and other performance predicates, there is an instantiation of an event-template which suggests that part of the "stuff" includes instructions to realise an event.

[7]This assumes that the singular definite determiner will define a degree argument as 1 by default.

(18) $[\![_{VP}$ perform the piano sonata$]\!] = \lambda e.\exists$x[perform(e) $\wedge$ piano-sonata(x) $\wedge$ NU_{Δ}(piano-sonata)(x)(e) = 1]

In effect (18) says that an event is true just in case the amount of incremental object stuff is instantiated *one natural-unit* worth over the course of the event. This is predicted to be telic since the predicate refers just to a specific instantiation of a single natural unit of piano sonata. This follows general principles of quantization; given a single natural unit of stuff then it is predicted not to be applicable to any subpart of the object that is being measured as a natural unit. Its atelic counterpart can be seen as the following:

(19) $[\![_{VP}$ perform piano sonatas$]\!] = \lambda e.\exists$x[perform(e) $\wedge$ piano-sonata(x) $\wedge$ NU_{Δ}(piano-sonata)(x)(e) $\succ$ 0]

(19) is true of any event of performing *some* amount of a piano sonata. Similarly, we can capture this in terms of cumulativity, given that *some* amount of a sonata is performed, if more is performed then there is just more sonata being performed.

Now, by itself, this model is not sufficient to account for the examples in (1-4), much for the same reasons as Krifka (1998) discussed in Section 2. For our "perform a sonata" example, we have seen that there can be some *subpart* of a maximally performed event, that is sufficient in satisfying the incremental theme VP. Quite simply, we need to be able to account for a type of violation of quantization, that continues to project a culmination inference.

Given that the incremental theme object provides the extent-scale for the non-scalar manner verb, we can start to think about these non-maximal readings present in (1-4) as the consequence of inherent *flexibility* in how NUs are counted relative to the event. In our cases, flexibility is just the notion of slack formalised into the way that we understand the measure functions included in the incremental theme argument.

We can think about the inherent flexibility in the measure function in terms of parts and wholes. In the case of a piano sonata, since we know that part of the event of performing a piano sonata can satisfy the VP-expression, that would suggest that the measure function of natural units of piano sonata stuff could therefore be flexible in what it counts as a natural unit of piano sonata. I suggest that there is an additional interpretive mechanism, which measures a natural unit of stuff relative to a proper part. Therefore, we can capture a flexible measure of a piano sonata in the following way:

(20) **Flexible measure of a piano sonata**:
$[\![$piano sonata$]\!] = \lambda d\lambda s\lambda x.\exists y$[piano-sonata(x) $\wedge$ y $\sqsubset$ x $\wedge$ NU(piano-sonata)(y)(s) = d]

This flexible measure function is like the strict measure function, in that it counts an amount of stuff in degrees of natural units. In this case, I argue that under a flexible interpretation of "piano sonata", there is existential closure over some proper part of x stuff, which a natural unit of piano sonata stuff can be counted against given a relevant situation. If this is in principle possible, then when this flexible measure function undergoes event composition, and the object-stuff is existentially quantified over, then we can straightforwardly compose an incremental VP, where measures-of-change in the natural units of piano sonata are measured relative to this proper part y:

(21) **Flexible measure-of-change function**:
$[\![_{VP}$ perform the piano sonata$]\!] = \lambda e.\exists x, y$[perform(e) $\wedge$ piano-sonata(x) $\wedge$ y $\sqsubset$ x $\wedge$ NU_{Δ}(piano-sonata)(y)(e) = 1]

This would then read as a truth condition, that the given event holds when a subpart of a piano sonata is counted as a single instance of an instantiated piano sonata over the course of the event. The subtle difference is in the fact that we represent an instance in which a single natural unit of piano sonata stuff has been performed. However, this natural unit is counted relative to a proper part of the piano sonata stuff. This predicts that telicity is preserved since the event still reaches a threshold of completion, which in these cases does not necessarily need to be maximal relative to the maximal extent of the internal argument.

If we allow a measure-of-change function to apply to a proper part y of x, we ensure that a sufficiently large event realisation may still satisfy the predicate, if the event allows it. This provides the flexibility required to allow for a non-maximal reading, while still retaining the culmination inference.

Given that the measures-of-change in natural units are measured relative to this proper part of the whole x, then any part of the object that is greater than y is inherently not required for the predicate to be true under the flexible interpretation. Essentially by having a more flexible measure function, we collapse anything that happens after y as having crossed a threshold, after which it will just be a more "completed" event. Any x afterwards will just be mapped onto this same completed degree.

Conceptually, this would amount to having two different scales on which we measure the extent of the incremental object. On the one hand, the strict interpretation of the scale would be where the top-closure refers to the whole extent of the object, the other where it is closed by the proper part of x. However, in the case of non-maximal construals, we can just formalise a type of property that allows a flexible scale to be used as the measure-of-change function, if the strict measure-of-change function fails in a relevant context.

In terms of our other examples, if we take (4) repeated here:

(22) **The Unhappy Filmgoer**: John typically goes to the cinema every week. This week he goes, but chooses a terrible film that he ends up really disliking. During the film, he gets up and leaves. Someone reports afterwards:
"*John watched the movie* at the cinema, but left before he finished it".

Then intuitively the italicised incremental VP can denote a flexible measure function. In this particular context of utterance, some part of the movie y is sufficient to count the event as a completed event:

(23) $[\![_{VP}$ watch the movie$]\!] = \lambda e.\exists x, y$[watch(e) $\wedge$ movie(x) $\wedge$ y $\sqsubset$ x $\wedge$ NU_{Δ}(movie)(y)(e) = 1]

This predicate holds of an event if there is an amount of movie stuff, with a proper part relative to which a natural unit of movie stuff is counted as being "watched" over the course of the event.

A question still remains about where this flexible measure-of-change unit is predicted to oc-

cur. Because the predicate lexicalises a top-closed scale, we can follow Nederveen (2024) in appealing to interpretive economy (Kennedy, 2007: 36) to explain the source of the default maximality inference:

Interpretive Economy (IE):
Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions

Given that the predicates lexicalise a top-closed scale given by the full extent of the object, IE will trigger a default culmination inference relative to the strict scale. This measures change relative to the strict interpretation of NU_{Δ} of the object that provides the scalar structure to the non-scalar manner verb. But, given that the natural unit can be flexible, then the non-maximality follows as a consequence of the measure function counting wholes in a non-strict manner. If the strict measure function is not necessary given a certain context, then the flexible measure-of-change can still generate a maximally complete instantiation of an object, but up to that sufficient proper part.

Furthermore, this model would predict that incremental theme predicates with numerically quantified incremental theme objects (i.e., "three sonatas") should also receive a non-maximal reading, relative to each object. And I would argue that this prediction is borne out:

(24) John performed three piano sonatas, but couldn't finish a single one of them.

(25) John sang three songs at karaoke last night, but couldn't get through a single one because he was too drunk!

(26) John ate three apples, but each one had a worm in it so he threw them all away before finishing them.

To conclude this section, we have seen a specific mechanism for the composition of incremental theme predicates that situates the measure-of-change function directly onto the nominal. This presumes a specific definition of natural unit which we can adapt to account for non-maximally completed events, by modelling a flexible measure function that measures natural units of relevant subparts. We can still appeal to notions of IE to account for the *default* culmination on the strict top-closed scale. However, we are also capturing this idea of partitivity that is restricted to sufficiently completed contexts.

A question that remains here is *where* this subpart is measured, or indeed which subpart can be considered the sufficiency threshold. This model has a clear shortcoming in that the literal position of the threshold remains open. However, crucially it models that subparts of objects can plausibly be counted as wholes in a relevant event, which initially captures the type of defeasibility that we are looking at. Plausibly, the next stage of an investigation into non-maximality and non-culmination in the domain of events could be to see how contextual constraints over events impose variable thresholds. Potentially, plausible directions of travel are an adapted measure-of-change function that can work within models that take into account decision-theoretic approaches and speaker goals à la Malamud (2012), or QUD-induced constraints. I intend to explore this in future work, and broadly extend it out towards other languages.

5. Concluding thoughts

To conclude, this paper has looked at examples such as the following:

(27) **The anxious pianist**: John is a talented pianist at a conservatoire, but suffers from a severe panic disorder. His teacher is trying to increase his confidence, and so gets him to perform at their summer concert. However, he has a panic attack and exits the stage mid-way through his performance. Someone reports afterwards:
"*John performed the piano sonata (beautifully)*, but he didn't finish it."

I have outlined a formal model to account for non-maximal/defeasibly maximal construals for these predicates. In doing so, I have motivated an analysis that puts the locus of non-maximality in an inherent flexibility of a measure function, which can measure sufficiently large subparts of incremental theme objects as entire natural units that are affected during the event. By adapting the model proposed by Kennedy (2012), we can account for the fact that the root of the scalar interpretation and inherent flexibility is in the nominal semantics of the incremental object.

The overall proposal suggests that in contexts where a proper part of an incremental argument can be counted as a natural unit with which to measure change, then the strict scale is inherently not needed for the predicate to be true. In these cases, the natural unit of an object can be measured in a flexible way. Through appealing to IE we predict two things: (i) that the default inference for an incremental VP will be maximal, given the strict measure function; (ii) that when the flexible scale is used the event will be maximal relative to the proper part of the object. We can capture the existing culmination inferences but can model them flexibly.

The motivation for this mechanism arises from analysing these non-maximal examples as demonstrating predicates that violate quantization, but still project a culmination inference and therefore remain *telic*. We model culmination inferences as a sufficiency threshold, represented in non-maximal cases as a proper part of x that functions as a whole NU within a flexible measure-of-change function. I further demonstrated that this is a distinct property from typical non-culminating accomplishments that have incremental theme arguments, (i.e., *non-culminating relative to manner*) due to the presence of this sufficiency entailment, which is not inherently a prediction of the MPC or an analysis that is based on the semantics of the progressive.

Furthermore, it has been demonstrated that by virtue of the scales on which change is measured, it is not sufficient to call these examples "non-maximal accomplishments". NMAs denote granularity shifting on the amount of change that an object undergoes during the event, where these cases demonstrate flexibility in the measure of the incremental theme object. Therefore, it seems that the most natural characterisation of these examples is in terms of a *non-maximal manner accomplishment*, which is not specific to English and seems to be present in recent data from Russian (Kasher and Hacohen, 2023). As a result, this adds an additional type of partitive accomplishment to those currently analysed e.g., in Martin and Demirdache (2020).

A consequence of this model is the broader question it asks about contextual parameters in the interpretation of telicity/atelicity. The model suggests that events have more nuanced endpoints than a generalised maximised endpoint and that context dependence may be modelled using flexible measure functions and measure-of-change functions. More broadly, through motivating a semantic characterisation of the non-maximal construals found here, questions of *where*

contextual variables may trigger a sufficiency threshold to be lowered could lead to interesting analyses that focus on more pragmatic ideas such as prior discourse, speaker expectations, speaker goals, QUD, etc. These questions remain open for future work.

References

Altshuler, D. (2014). A typology of partitive aspectual operators. *Natural Language & Linguistic Theory 32*, 735–775.

Arunachalam, S. and A. Kothari (2011). An experimental study of Hindi and English perfective interpretation. *Journal of South Asian Linguistics 4*(1), 27–42.

Bar-el, L. A., H. Davis, and L. Matthewson (2005). On non-culminating accomplishments. In L. Bateman and C. Ussery (Eds.), *Proceedings of 35th annual meeting of the North East Linguistics Society*.

Bennett, M. and B. H. Partee (2004). Toward the Logic of Tense and Aspect in English. In B. H. Partee (Ed.), *Compositionality in Formal Semantics* (1 ed.)., pp. 59–109. Wiley.

Copley, B. and H. Harley (2015). A force-theoretic framework for event structure. *Linguistics and Philosophy 38*(2), 103–158.

Dowty, D. R. (1979). *Word Meaning and Montague Grammar: The Semantics of Verbs and Times in Generative Semantics and in Montague's PTQ*. Springer Science & Business Media.

Filip, H. (2008). Events and maximalization: The case of telicity and perfectivity. In S. Rothstein (Ed.), *Theoretical and Crosslinguistic Approaches to the Semantics of Aspect*, pp. 217–256. John Benjamins Publishing Company.

Kasher, N. and A. Hacohen (2023). A star is drawn: Testing the culmination inferences of Russian perfective accomplishments. *Glossa: a journal of general linguistics 8*(1), 1–14.

Kennedy, C. (2007). Vagueness and grammar: the semantics of relative and absolute gradable adjectives. *Linguistics and Philosophy 30*(1), 1–45.

Kennedy, C. (2012). The composition of incremental change. In V. Demonte and L. McNally (Eds.), *Telicity, Change, and State*, Oxford Studies in Theoretical Linguistics, pp. 103–121. Oxford University Press.

Kennedy, C. and B. Levin (2008). Measure of change: The adjectival core of degree achievements. In L. Mcnally and C. Kennedy (Eds.), *Adjectives and Adverbs*, pp. 156–182. Oxford University Press.

Koenig, J.-P. and N. Muansuwan (2000). How to End Without Ever Finishing: Thai Semi–perfectivity. *Journal of Semantics 17*(2), 147–182.

Kovalev, P. (2024). *Modeling Telicity With Dependent Types*. Ph.D., Indiana University.

Kratzer, A. (1996). Severing the External Argument from its Verb. In J. Rooryck and L. Zaring (Eds.), *Phrase Structure and the Lexicon*, pp. 109–137. Dordrecht: Springer Netherlands.

Krifka, M. (1989). Nominal Reference, Temporal Constitution and Quantification in Event Semantics. In *Nominal Reference, Temporal Constitution and Quantification in Event Semantics*, pp. 75–116. De Gruyter Mouton.

Krifka, M. (1998). The Origins of Telicity. In G. Chierchia, P. Jacobson, F. J. Pelletier, and S. Rothstein (Eds.), *Events and Grammar*, Volume 70, pp. 197–235. Dordrecht: Springer Netherlands. Series Title: Studies in Linguistics and Philosophy.

Landman, F. (1992). The Progressive. *Natural Language Semantics 1*(1), 1–32.

Lasersohn, P. (1999). Pragmatic halos. *Language 75*(3), 522–551.

Malamud, S. A. (2012). The meaning of plural definites: A decision-theoretic approach. *Se-*

mantics and Pragmatics 5, 1–58.

Martin, F. (2019). Non-culminating accomplishments. *Language and Linguistics Compass 13*(8), e12346.

Martin, F. and H. Demirdache (2020). Partitive accomplishments across languages. *Linguistics 58*(5), 1195–1232.

Nadathur, P. and E. B.-A. Siegal (2022). Modeling progress: causal models, event types, and the imperfective paradox. In *West Coast Conference in Formal Linguistics (WCCFL),*.

Nederveen, S. (2024). Maximal and non-minimal change of state in Salish event structure. In *Proceedings of Semantics of Under-Represented Languages in the Americas*, Volume 12, Amherst, MA, pp. 83–98. GLSA Publications.

Piñón, C. (2008). Verbs of creation. In J. Dölling, T. Heyde-Zybatow, and M. Schäfer (Eds.), *Event Structures in Linguistic Form and Interpretation*, pp. 493–522. De Gruyter.

Rappaport Hovav, M. (2008). Lexicalized meaning and the internal temporal structure of events. In *Theoretical and crosslinguistic approaches to the semantics of aspect*, Volume 110, pp. 13 – 42. John Benjamins Publishing Company. Publisher: John Benjamins Amsterdam.

Tatevosov, S. (2008). Subevental structure and non-culmination. In O. Bonami and P. Cabredo Hofherr (Eds.), *Empirical issues in syntax and semantics*, Volume 7, pp. 393–422. CNRS.

Tatevosov, S. and M. Ivanov (2009). Event structure of non-culminating accomplishments. In *Cross-linguistic Semantics of Tense, Aspect, and Modality*, pp. 83–130. John Benjamins.

Tenny, C. L. (1994). *Aspectual Roles and the Syntax-Semantics Interface*, Volume 52 of *Studies in Linguistics and Philosophy*. Dordrecht: Springer Netherlands.

Wright, T. A. (2014). *Strict vs. flexible accomplishment predicates*. PhD Thesis, University of Texas, Austin.