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Deriving a complex *BIN* through adverbial *BIN* complexes

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Abstract. Work by Green (1998) discusses 3 sub-types of stressed *BIN* in African American English (AAE): stative, habitual, and completive. *BIN* constructions that co-occur with temporal adverbials exhibit limited grammaticality, with each sub-type differing in how they interact with these adverbials. Non-*BIN* constructions that involve multiple instances in the same clause of adverbials of the same class exhibit restrictions that resemble *BIN* + adverbial data. Drawing on works that analyze *BIN* as a remote past marker (Rickford 1975, Green 1998) and on works connecting adverbial position to interpretation (Ernst 2020), I argue that *BIN* is an adverbial itself that situates the initiation of an eventuality in the remote past. This adverbial *BIN*, in concert with certain combinations of tense and aspect, forms a complex that makes up the canonical *BIN* construction.

Keywords. African American English; adverbials; semantics; tense and aspect; syntax

1. Introduction. The tense and aspectual system of African American English (henceforth AAE) is very robust. This paper focuses on the lexical item stressed *BIN*, which denotes remoteness and is written in all caps here, following tradition in the literature, to denote the prominence that it (almost, Spears 2017) always is pronounced with. This paper does not discuss *BIN*'s phonetics, but more discussion about the nature of this prominence and the variation of *BIN*'s realization can be found in Green et al. (in press). Examples of *BIN* constructions can be found below in (1).

(1) a. I BIN could roller-skate backwards
'I have long been able to rollerskate backwards'
b. Bruce BIN wearing funny hats during Mardi Gras (Green 1998b:126)
'Bruce started wearing funny hats during Mardi Gras and he still wears them during Mardi Gras'
c. [The car] BIN paid (pause) uh, uh since January (Dayton 1996:707)
'The car has been paid for since January'

There have been several different accounts given for *BIN*. Labov (1972) and Spears (2017) analyze *BIN* as a remote perfect, as does Dayton (1996) to a certain extent in addition to analyzing it as a past marker. Conversely, works like Rickford (1973, 1975) and Green (1993, 1998a, 1998b, 2002) categorize *BIN* as a remote past marker, with specific work by Green (1998a) suggesting that *BIN* is the head of an AspP. I believe these first two groups make two natural camps of analyses for *BIN*, but of course these are not the only treatments for *BIN*. In Winford (1993) and Dayton (1996) both also discuss *BIN* as a past modal. However, Labov (1972) and Dayton (1996) as well as DeBose & Faraclas (1993) also consider the possibility that *BIN* has grammaticalized into something like an aspectual adverb with remoteness built into its meaning. And more recent work done in a thesis by Britlea Jernigan-Hardick (2021) builds on

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Green's works and analyzes *BIN* as a VP-internal aspectual head that both binds event variables and creates predicate times related to that event.

This paper builds on facts discussed in Rickford's and Green's works to address specific behaviors of *BIN* namely the limited ability to occur with certain classes of adverbials and its apparent multiple syntactic positions. Data from Ernst (2020) involving multiple adverbials of the same class in the same utterance show similar properties. I draw parallels between the multiple adverbial cases in Ernst (2020) and *BIN* data from Rickford (1975) and from Green (1998b) and analyze *BIN* as an aspectual adverb itself to explain the limitation with adverbials and the multiple syntactic positions. Additionally, I argue that the readings that come with *BIN* constructions of various sorts are the result of specific combinations of tense and aspect in addition to the presence of a *BIN* adverbial.

The rest of the paper is structured as follows. Section 2 will review more closely the works that I draw on in my analysis, Rickford (1975) and Green (1998b),which show key data points that aren't deeply discussed in other accounts. Section 3 discusses the nature of BIN constructions more in depth. Section 4 lays out the proposal for *BIN* 's semantics, basic derivations of *BIN* constructions of different types, and addresses the limited co-occurrence exhibited with adverbials and the different surface heights. Section 5 concludes with further questions.

2. Foundational accounts of BIN. In his 1975 work on *BIN*, Rickford notes 2 kinds of *BIN* constructions. The first, which he calls remote phase continuative, consists of *BIN* followed by a stative predicate or a progressive marked verb. He notes that this type of *BIN* construction can be paraphrased as 'Have been [predicate]/[verb-ing] for a long time'. An example can be seen below in (2).

(2) They BIN hosting the event
'They have been hosting the event for a long time'

The second type of *BIN* construction is called the remote phase completive. It consists of *BIN* followed by a past-tense marked non-stative verb. Rickford paraphrases this construction as '[Verb-ed] a long time ago'. This is exemplified in (3).

(3) They BIN hosted the event
'They hosted the event a long time ago'

Rickford unites these two types of *BIN* constructions through the fact that they both indicate the start of a process in the remote past. In the case of the continuative constructions, some eventuality begins in the remote past and is ongoing at utterance time. In the case of the completive constructions, the event denoted by the verb completes in the remote past, which necessitates that the event also began in the remote past. Another important point that Rickford makes is that *BIN* constructions of either sort exhibit an incompatibility with temporal adverbials. As shown in (4) and (5) attempting to modify the long interval stretching out from the remote past with a temporal adverbial, regardless of how specific the adverbial is, yields ungrammaticality.

(4) *They BIN hosting the event [for a long time/for 20 years/since 2001]
Intended: 'They have been hosting the event for a long time(=20 years/since 2001)'
(5) *They BIN hosted the event [a long time ago/3 weeks ago/on Saturday]
Intended: 'They finished hosting the event a long time ago(=3 weeks/since Saturday)'

There are two points of complexity to add here. The first is that, as Rickford notes, this incompatibility only arises when the *BIN* constructions and the offending temporal adverbials occur within the same 'intonational pattern'. Including a pause seems to create different intonational patterns and thus gets rid of the ungrammaticality, as (6) and (7) show. Rickford also notes that with a different *been,* for example the perfect participle, adding adverbials without pauses doesn't yield ungrammaticality. An example of this is shown in (8).

(6) They BIN hosting the event (pause) [for a long time/for 20 years/since 2001]
'They have been hosting the event for a long time(=20 years/since 2001)'

(7) They BIN hosted the event (pause) [a long time ago/3 weeks ago/on Saturday]
'They finished hosting the event a long time ago(=3 weeks/since Saturday)'

(8) They been hosting the event [for a long time/for 20 years/since 2001]
'They have been hosting the event for a long time(=20 years/since 2001)'

The second point is that this incompatibility does not mean that the long interval indicated by *BIN* constructions is restricted in the sense that it cannot be 20 years/3 weeks/the quantity of time between utterance time and 2001 or Saturday. What is crucial for Rickford is that there is a certain level of distance that the adverbial and the rest of the *BIN* constructions must have.

Green's (1993, 1998a/b, 2002) work builds on Rickford (1975) directly. Specifically, in her 1998b work, Green argues in line with Rickford that *BIN* is a remote past marker, but expands upon the different types of *BIN* 's available. These different *BIN* 's give rise to the slightly different readings that Rickford also notes; however, Green's account makes a three-way distinction. One of the three 'flavors' of *BIN* constructions she discusses she calls stative. The formal denotation from Green (1998b) is given below in (9)

(9) $[\![\text{BIN}_{\text{stat}}]\!] = \exists I[\text{long}(I) \,\&\, \text{Beg}(I) < \text{now} \,\&\, \text{End}(I) = \text{now} \,\&\, \exists e \exists s[P(e) \,\&\, \text{Theme}(e,x) \,\&\, \text{IP-state}(e,s) \,\&\, \text{Hold}(s,I)]]$

The formal denotation for the stative *BIN* that derives this reading states that there is an in-progress state IP holds over a long interval I. This interval spans from some point in the remote past to utterance time. A second, similar 'flavor' comes from a habitual version of *BIN*. See Green's formal denotation written out below in (10).

(10) $[\![\text{BIN}_{\text{hab}}]\!] = \exists I[\text{long}(I) \,\&\, \text{Beg}(I) < \text{now} \,\&\, \text{End}(I) = \text{now} \,\&\, (i)[i \in I \,\&\, \text{HAB}_i[\text{setting},i]] \exists e \exists s[P(e) \,\&\, \text{Theme}(e,x) \,\&\, \text{IP-state}(e,s) \,\&\, \text{Hold}(s,i)]]$

The denotation she gives for the habitual *BIN* states that there is a habit that holds over I. The episodes of the habit are distributed across sub-intervals of I, called i. The in-progress state of the habit holds at each i. Both the habitual and stative *BIN*'s that Green posits correspond to the remote phase continuative construction that Rickford (1975) posits. The third *BIN* 'flavor' Green posits she calls completive *BIN* given in (11) below.

(11) $[\![\text{BIN}_{\text{comp}}]\!] = \exists I[\text{long}(I) \,\&\, \text{Beg}(I) < \text{now} \,\&\, \text{End}(I) = \text{now} \,\&\, (i)[i \in I \,\&\, \exists e \exists s\, [P(e) \,\&\, \text{Agent}(e,y) \,\&\, \text{Theme}(e,x) \,\&\, \text{R-state}(e,s) \,\&\, \text{Hold}(s,i)]]]$

The denotation given for completive *BIN* states that there is a result state of the event described by the verb in the *BIN* construction. The result state holds over all sub-intervals i. This completive *BIN* corresponds to remote phase completive *BIN* that Rickford (1975) posits. With all three denotations, Green accounts for all the readings that are contained within Rickford's

remote phase continuative and completive *BIN*'s and also preserves the observation that all *BIN* constructions involve the start of an eventuality in the remote past.

Green's additional habitual *BIN* covers a set of data that Rickford (1975) doesn't focus on in depth. First, it is important to understand why it is helpful to break down the remote phase continuative down like Green has done. Consider the *BIN* example in (12).

(12) Bruce BIN running (Green 1998b)
'Bruce has been running for a long time'
'Bruce started running a long time ago and he still runs'

There are two possible readings for (12). The first reading involves one instance of running that started a long time ago. The second reading involves enough instances of running to instantiate a long-established habit. While these two readings can be true at the same time—for example, in a context where Bruce is a runner who is currently on a long run—the two readings can be teased apart. In a context where Bruce is a long-established runner and has not gone for his daily run yet, then the first reading of (12) is not felicitous while the second one is. Conversely, in a context where Bruce runs sporadically but happens to be on a long run at the moment of utterance, then only the first reading is felicitous.

Another way to pull the two readings apart is by looking to adverbial modification. While Rickford notes that *BIN* constructions are generally incompatible with adverbials, Green (1998b) demonstrates that this is not an absolute incompatibility.

(13) John BIN running for three hours
*'John has been running for three hours'
'John started to run for three hour stretches a long time ago and he still runs for three hour stretches' (adapted from Green 1998b:(25))

What can be gleaned from (13) is that adverbials and *BIN* constructions can co-occur, but only with certain *BIN* constructions. The analysis in this paper aims to provide an account for data points like these while building on Green's concept of three different readings that can accompany *BIN* constructions.

3. What is *BIN?* Though there are a variety of analyses regarding *BIN* 's syntactic/semantic identity, there is agreement that *BIN* constructions have a long time or remoteness meaning. Below are some examples of *BIN* constructions to show the slightly different readings that are available. All of them contain some long interval derived from a remote past start point of the relevant eventuality denoted by the predicate *BIN* combines with.

(14) I BIN watched that movie
'I finished watching that movie a long time ago'
*'I just/recently watched that movie'
*'I watched that movie for a long time'

In example (14) the action denoted by the verb is not ongoing during the moment of utterance. That is, (14) could not be used when the speaker is still watching the movie. Furthermore, (14) can't be used when the speaker has recently finished the movie, nor does it tell the listener anything about how long the watching event was. What (14) signals directly is that there was a remote past competition of a movie, and necessarily this means that there was a remote past start point of the movie as well. This is where the long interval meaning of the *BIN* construction comes from.

(15) I BIN cooking
'I have been cooking for a long time'

Example (15) means that the speaker is currently engaged in a long, ongoing cooking event. The fact that the cooking event is a long one comes from the fact that it started in the remote past and continues into utterance time. Such a reading lines up with Rickford's (1975) remote phase continuative use for *BIN* and Green's (1998b) stative 'flavor' of *BIN*. Example (15) has an additional meaning which is the habitual 'flavor' that Green describes, another facet of Rickford's remote phase continuative. Under this second reading, (15) means the speaker is currently in the long-established habit of cooking, though they need not be cooking at utterance time. An important fact to note is that not all *BIN* constructions containing progressive-marked verbs receive two readings.

(16) I BIN locking my door
'I have been in the habit of locking my door for a long time'

The only reading available to (16) without a very carefully crafted context is the habitual reading. This has to do with the difference in event structure of *locking my door* and *cooking*. Activities like *cooking* which have some duration to them can be appropriate in cases where the activity is ongoing for a long while. But achievements like *locking my door* are punctual and therefore having a drawn-out moment of locking is strange. The only resulting reading is one where the locking events themselves are regularly sized but the habit of locking, containing many locking events, is long. This shows that the readings available to *BIN* constructions are determined not just by the verbal marking but the kind of predicate as well.

Both the stative and the habitual readings are also readings that are compatible with the universal perfect, as shown in the paraphrase in quotes underneath. Naturally the fact that *BIN* exhibits these perfect-like readings and is pronounced so similarly to the perfect participle *been,* makes it clear why some scholars analyze *BIN* as a perfect. However, examples like (14) demonstrate where *BIN* diverges from perfect *been*. Such an issue remains a part of discussion much larger than the scope of this paper.

Given the examples so far, it might also seem as though *BIN* and adverbials like *for a long time* are the same. This is not so implausible since the paraphrases for the *BIN* constructions shown in this paper contain such adverbials. The first piece of evidence against this is that adverbials like *a long time ago* are restricted in what type of morphology can be on the predicate it combines with. It's fine to say *I read a long time ago* but not **I am reading a long time ago*; past morphology is necessary and the only way to improve the second sentence is by adding *was* before the progressive-marked verb. *BIN* is not constrained in this way, showing up in (14) and (15). More evidence to show that there are subtle differences between *BIN* and adverbials like *for a long time* can be seen below.

(17) I have been baking for a long time/I baked for a long time
(18) a. I BIN baking
'I have been baking for a long time'
b. I BIN baked
'I finished baked a long time ago'
c. I had BIN baking
'I baked for a long time'

BIN and *for a long time* are similar in that they can combine with both past tense- and progressive-marked verbs. But from looking at certain examples side by side, it is clear that *for a long time* remains stable in its meaning when it appears in different places. This is not the case for *BIN* when comparing the various paraphrases. The interpretation of *for a long time* refers to the run time of the baking event in (17), even though there is a switch from having the baking take place during utterance time and having it precede utterance time. Example (18a) is equivalent to the first half of (17), but once the sentence shifts to (18b), the long time in question is no longer the baking but the time since the baking. It is no longer clear what the run time of the baking is, as in (17)/(18a). To achieve something like the second half of (17) with *BIN,* overt past tense in the form of *had* is necessary in (18c). So not only do (17) and (18) demonstrate a divergence between *BIN* and for a long time but (18c) specifically demonstrates the role that tense has on the construal of *BIN* constructions.

3.1. SUBJECTIVITY OF *BIN*. The choice of predicate can also contribute to variation in just how long the long interval connoted by *BIN* constructions is. Consider the pair of examples below, which are fairly similar down to the verb. The difference comes in at the object of *waiting*

(19) I BIN waiting for a table at the new restaurant
'I have been waiting for a table at the new restaurant for a long time'
(20) I BIN waiting for this page to load
'I have been waiting for this page to load for a long time'

In a context in which a new restaurant has opened in the speaker's town and it is so popular that the speaker hasn't been able to get a table yet because of how far it is booked up, the speaker might say (19). Given knowledge about the world, this long interval that the speaker has in mind might be anywhere from a few days to weeks on end. However, in a context where the speaker is dealing with a tricky internet connection or a website with some internal issues, the long interval takes on a different range. With a faulty internet connection and certain standards about loading speed, the long interval is likely to range from 10 minutes to an hour or two. When this range of times is compared to the range of times to waiting for the restaurant table or to the range of times one might get for another predicate, the long interval varies. What it is important to note with this pair of examples is that the long interval that *BIN* connotes is not a fixed one, but one that varies with world-knowledge and predicate type. But there cannot be too much idiosyncrasy involved because a listener must understand a speaker who uses a *BIN* construction. This is an issue that could be pursued in further research.

Additionally, as noted in earlier sections, overtly quantifying the long interval from *BIN* using temporal adverbials is complicated. Below are examples (4) and (5) repeated here as (21) and (22) with corresponding schema, in Figure 1 and Figure 2.

(21) *They BIN hosting the event [for a long time/for 20 years/since 2001][1]
Intended: 'They have been hosting the event for a long time(=20 years/since 2001)'

[1] As noted in the beginning of this section, *BIN* and *been* do exhibit some overlap. Examples such as these show another case where the two diverge, as *been* is felicitous in these contexts with an overt adverbial modifying the period that perfect *been* brings up

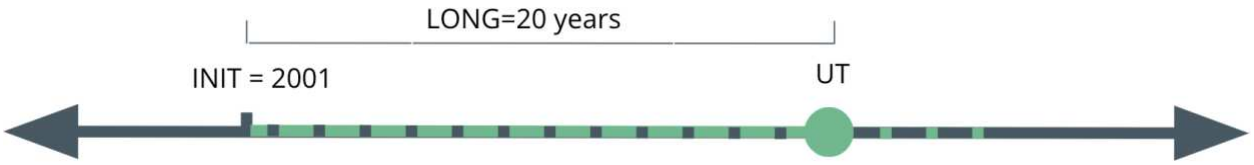

Figure 1. Schema for stative/habitual *BIN*: green = state/habit, black dots = episodes of the habit, green circle = eventuality is ongoing at UT, period denoted by *BIN* = overhead line

As just discussed, the length of the long interval can vary depending on things like speaker standard or predicate choice, so there is nothing inherently wrong if the actual length that the speaker has in mind is 20 years. The ungrammaticality that is reported comes from the fact that the adverbial is overtly quantifying the long the interval that *BIN* brings up. This is demonstrated in the scheme with the 'long=20 years' line that hangs over the span of the long green interval. If the interval were indeed 20 years long in the speaker's mind, but there was no adverbial used in (22), then the utterance would be grammatical. Similarly, it is also ungrammatical to use an adverbial like *since 2001* to overtly quantify the left boundary of the long interval, as is shown in the schema with 'init(itation)=2001'. This is true both for the interpretation in which there is a single event of hosting or if there is a habit of hosting, as shown through the small perforations in the green long to denote episodes of the habit.

(22) *They BIN hosted the event [a long time ago/3 weeks ago/on Saturday]
Intended: 'They hosted the event a long time ago(=3 weeks/since Saturday)'

Figure 2. Schema for completive *BIN*: green = run time of eventuality, period denoted by *BIN* = overhead line[2]

Similar issues arise with the completive kind of *BIN* constructions. For example, marking the beginning of the long event by my marking the point labeled comp(letion) with an adverbial like *on Saturday* also results in ungrammaticality.

What these examples (21) and (22) demonstrate, coupled with cases like (13) that Green (1998b) brings up, suggest that having *BIN* and the temporal adverbial work on the exact same interval results in ungrammaticality. We say that when the adverbial target things like the episodes of a habit, a subset of the larger interval that *BIN* targets, ungrammaticality does not arise. In section 4, I lay out an analysis that aims to address these facts.

4. Proposal: *BIN*'s semantics. I build on Rickford (1975) and Green (1998b) and assign *BIN* the following denotation to encode the long interval of *BIN* constructions.

(23) $[\![\text{BIN}]\!] = \lambda e_s.\text{init}(e) << t$

This denotation makes *BIN* a predicate of events that places an event's initiation greatly before a reference time t. This denotation is in line with Rickford's observation that *BIN* situates

[2] Having an event that is bounded with a clear beginning and end is not required to use BIN in the 'completive' sense. When combining with some predicates (e.g., *hosted*), the resulting reading is one involving a whole, completed event. But with other predicates (e.g., *left*) the resulting reading is not necessarily one in which the person leaving arrived at their destination a long time ago. Only that they have done the leaving.

at least the initiation of an event in the remote past. This denotation makes *BIN* very similar in form to a temporal adverbial. Note here that I have only given one *BIN* kind as opposed to positing two different kinds as Rickford does or three different kinds as Green does. Instead, I argue that the different 'flavors' that Rickford and Green note respectively are derived from an interaction of this single *BIN* denotation with tense and aspect and predicate kind. Before demonstrating the derivations of these three kinds, I discuss some assumptions I make in the next paragraph.

The first assumption that I make regards the spell out of tense in AAE. Following Dechaine (1995), I assume that present tense is null in default cases but overt in cases involving modals or auxiliaries, which I take to be overt instantiations of tense. With *BIN* specifically, Green (1998a) demonstrates that auxiliary *have* (or *ain't*) appears in cases of negation, question formation, emphasis, among others, perhaps as a form of *have*-support. Conversely, past tense is always overt in AAE. I also assume pronominal system of tense, but this isn't integral to the analysis. In terms of aspect, I assume Kratzerian (1998) forms for aspect and verbal predicates. They take the following shape, respectively: $\lambda Q_{s,t}.\lambda t_i.\ \exists [Q(e)\ \&\ ...]$ and $\lambda e_s.$ PRED(e).

I also adopt the Lexical Stativity Parameter as it is presented by DeBose & Faraclas (1993) as my second assumption. The Lexical Stativity Parameter allows for a non-past stative interpretation with morphologically null present tense in T. This is what allows *BIN* constructions with no overt form of tense to still be interpreted as non-past or ongoing at the moment of utterance. Finally, I adopt a habituality operator that makes use of plural events from Boneh & Doron (2008). Using this operator, habits are larger events e that are composed of sub-events e', which make up the episodes of the habit.

4.1. DERIVING THE BIN'S. The first *BIN* construction I will derive corresponds to Green's stative 'flavor', which involves one single long event that began in the remote past. An example is shown in (24).

(24) Mary BIN running
'Mary has been running for a long time'

To derive this, in addition to *BIN* and a predicate/VP, I also include imperfective aspect and present tense. The denotations of these components are given below.

(25) $[\![\text{present}]\!]^{g,c}$ is only defined if c provides an internal t that includes t_0 (UT). If defined, then $[\![\text{present}]\!]^{g,c} = t$

(26) $[\![\text{IMP}]\!] = \lambda Q_{s,t}.\lambda t_i.\ \exists [Q(e)\ \&\ t \subseteq \tau(e)]$

(27) $[\![\text{BIN}]\!] = \lambda e_s.\text{init}(e) << t$

(28) $[\![\text{VP}]\!] = \lambda e_s.\text{m-run}(e)$

The first step is to modify the VP with *BIN* to take the predicate of events of *Mary run* and situate the initiation point of this event in the remote past, shown below in Figure 3.

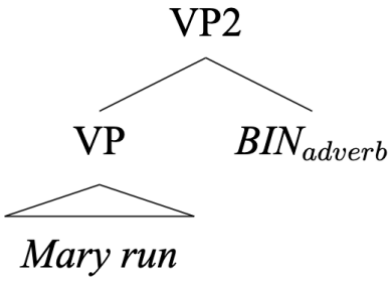

Figure 3. Sub-tree after adjoining *BIN* to VP

(29) ⟦VP⟧ = **λ**e_s.m-run(e)
⟦BIN⟧ = **λ**e_s.init(e) << t
⟦VP2⟧ = **λ**e_s. ⟦VP⟧(e) & ⟦BIN⟧(e) via predicate modification
⟦VP2⟧ = **λ**e_s.[**λ**e_s.m-run(e)](e) & [**λ**e_s.init(e) << t](e) via definition substitution
⟦VP2⟧ = **λ**e_s.[~~**λ**e_s.~~m-run(e)](e) & [~~**λ**e_s.~~init(e) << t](e) via argument saturation
⟦VP2⟧ = **λ**e_s m-run(e) & init(e) << t

This modified, VP2, can then combine with imperfective aspect to make it so that the reference time t is subsumed within the running time of this running event. This is what will give the interpretation that the event is ongoing.

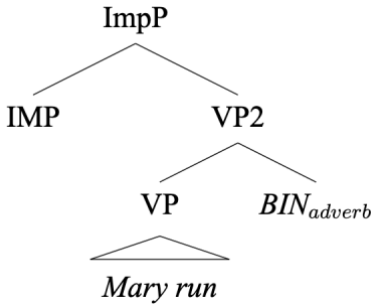

Figure 4. Merging of imperfective to VP2

(30) ⟦IMPP⟧ = ⟦IMP⟧(⟦VP2⟧) via function application
⟦IMPP⟧ = [**λ**$Q_{s,t}$.**λ**t_i. ∃e[Q(e) & t ⊆ **τ**(e)]]([**λ**e_s m-run(e) & init(e) << t]) via definition substitution
⟦IMPP⟧ = [~~**λ**$Q_{s,t}$.~~**λ**t_i. ∃e[[**λ**e_s m-run(e) & init(e) << t] (e) & t ⊆ **τ**(e)]] via argument saturation
⟦IMPP⟧ = [~~**λ**$Q_{s,t}$.~~**λ**t_i. ∃e[[~~**λ**e_s~~ m-run(e) & init(e) << t] & t ⊆ **τ**(e)]] via argument substitution
⟦IMPP⟧ = **λ**t_i. ∃e[[m-run(e) & init(e) << t] & t ⊆ **τ**(e)]]

The final step is to input the reference time to yield the truth conditions, shown in Figure 5.

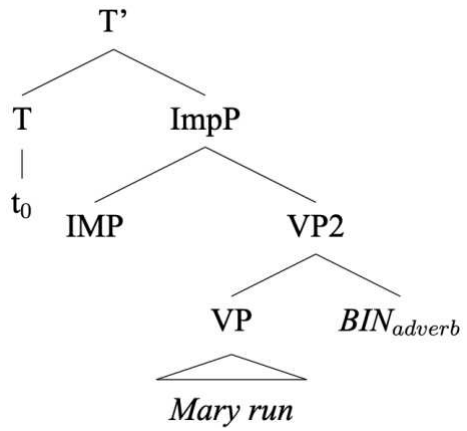

Figure 5. Final structure for *Mary BIN running*

(31) ⟦T'⟧ = ⟦IMPP⟧ (t_0) via function application
⟦T'⟧ = [**λ**t_i. ∃e[[m-run(e) & init(e) << t] & t ⊆ **τ**(e)]]] (t_0) via definition substitution
⟦T'⟧ = [**λ**t_i. ∃e[[m-run(e) & init(e) << t] & t ⊆ **τ**(e)]]] (g(0)) via pronoun rule
⟦T'⟧ = [**λ**t_i. ∃e[[m-run(e) & init(e) << t] & t ⊆ **τ**(e)]]] (t) via pronoun rule
⟦T'⟧ = [~~**λ**t_i.~~ ∃e[[m-run(e) & init(e) << t] & t ⊆ **τ**(e)]]] via argument saturation
⟦T'⟧ = ∃e[[m-run(e) & init(e) << t] & t ⊆ **τ**(e)]]

The final truth conditions for *Mary BIN running* are truth for events of Mary running that have an initiation time that greatly precedes the present and a running time that contains the present.

Recall that a sentences like *Mary BIN running* can also be interpreted habitually, and that this interpretation allows adverbial modification with the understanding that the adverbials are modifying the episodes of the habit and not the habit as a whole. The derivation for this sentence will be fairly similar but the difference will be the inclusion of the plural event habituality operator and of a durative adverbial *for 30 minutes*. The denotations for the operator and the adverbial are given below.

(32) ⟦PLUR⟧ = **λ**$P_{s,t}$.**λ**e_s.e=**σ**e'[e'⊂ e & P(e')=1]

(33) ⟦Adv⟧ = **λ**e_s.**τ**(e) = 30 min

The adverbial applies first, making the run time of the event 30 minutes long. Then the operator applies to the VP, to establish that there are a series of events e' that are 30 minute running events which make up a larger event e.

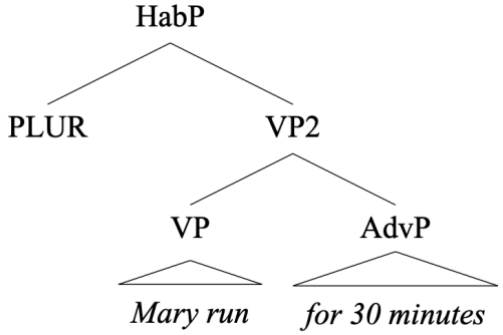

Figure 6. Merging the modified VP with the plural event operator

(34) ⟦HabP⟧ = **λ**e_s.e=**σ**e'[e'⊂ e & (m-run(e') & .**τ**(e')=30 minutes)=1]

This large event e is what will then be modified by *BIN* to establish the beginning of the larger event in the remote past. The derivation precedes the same way it did for the stative interpretation past this point.

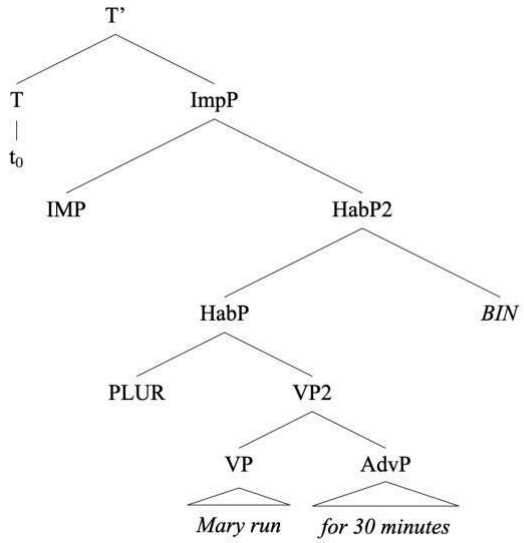

Figure 7. Final structure for *Mary BIN running for 30 minutes*

(35) ⟦T'⟧ = ⟦IMPP⟧ (⟦t_0⟧) via function application
⟦T'⟧ = [**λ**t_i. ∃e[[e=**σ**e'[e'⊂ e & (m-run(e') & **τ**(e')=30 minutes)=1]]& t ⊆ **τ**(e)]]] (⟦t_0⟧) via definition substitution
⟦T'⟧ = [**λ**t_i. ∃e[[e=**σ**e'[e'⊂ e & (m-run(e') & **τ**(e')=30 minutes)=1]]& t ⊆ **τ**(e)]]](g(0)) via pronoun rule
⟦T'⟧ = [**λ**t_i. ∃e[[e=**σ**e'[e'⊂ e & (m-run(e') & **τ**(e')=30 minutes)=1]]& t ⊆ **τ**(e)]]](t) via pronoun rule
⟦T'⟧ = [~~**λ**t_i.~~ ∃e[[e=**σ**e'[e'⊂ e & (m-run(e') & **τ**(e')=30 minutes)=1]]& t ⊆ **τ**(e)]]] via argument saturation
⟦T'⟧ = ∃e[[e=**σ**e'[e'⊂ e & (m-run(e') & **τ**(e')=30 minutes)=1]]& t ⊆ **τ**(e)]]

The final truth conditions yield truth for plural events e made of events of Mary running 30 minutes that started long before present but continue up to it.

The derivation for what corresponds to Green's completive 'flavor' is very similar to the stative derivation as well, but instead of imperfective aspect there is perfect aspect.

(36) ⟦PRF⟧ = **λ**$Q_{s,t}$.**λ**t_i. ∃[Q(e) & **τ**(e) << t]

The steps, however, are the same so I do not include all the intermediate steps for the sake of space.

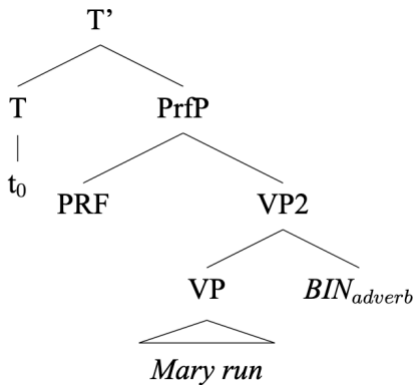

Figure 8. Final structure for *Mary BIN ran*.

(37) ⟦T'⟧ = ⟦PRF⟧ (⟦t_0⟧) via function application
⟦T'⟧ = [**λ**t_i. ∃e[m-run(e) & init(e) << t] & **τ**(e) << t]](⟦t_0⟧) via definition substitution
⟦T'⟧ = [**λ**t_i. ∃e[m-run(e) & init(e) << t] & **τ**(e) << t]] (g(0)) via pronoun rule
⟦T'⟧ = [**λ**t_i. ∃e[m-run(e) & init(e) << t] & **τ**(e) << t]] (t) via pronoun rule
⟦T'⟧ = [~~**λ**t_i.~~ ∃e[m-run(e) & init(e) << t] & **τ**(e) << t]] via argument saturation
⟦T'⟧ = ∃e[m-run(e) & init(e) << t] & **τ**(e) << t]

The truth conditions here yield truth for events of Mary running that are both initiated and complete their run time long before t.

4.2. BIN'S CO-OCCURRENCE FACTS EXPLAINED. The analysis in section 4 attempts to derive the different readings that *BIN* constructions exhibit while unifying them all with a remote past initiation point, as noted in Rickford's and Green's works. In this subsection, I discuss how an adverbial analysis also explains *BIN*'s co-occurrence with adverbials and with material that is located high and material located low in the syntax.

From looking at the data in which *BIN* can and cannot co-occur with temporal adverbials in section 3, it seems that the incompatibility stems from the temporal adverbial and *BIN* targeting the exact same interval. Consider the example below.

(38) They BIN hosting the event for 2 weeks
'They have long been hosting the event for 2 weeks'
*Intended: 'They have been hosting the event for a long time(=2 weeks)'

Under the reading where the whole hosting event's run time is targeted by both *BIN*, in trying to say that this hosting is long and ongoing, and the adverbial *for 2 weeks* there is a clash. But if *BIN* is targeting the habit of hosting and *for 2 weeks* is targeting the length of the individual episodes, then the utterance becomes felicitous.

This behavior *BIN* exhibits seems to mirror similar clashes in non-*BIN* cases where more than one adverbial of the same class co-occur. Ernst (2020) notes that there are pragmatic limits on how time-related adverbials, among other classes, may co-occur in a given clause. When they do occur felicitously, it is the case that they occur arranged semantically from larger to smaller, left to right. The two examples demonstrate that the only restriction on multiple adverbials of the same type is semantics, not number.

(39) French (Cinque 1999:204, via Ernst 2020)

*Fréquemment	ils	regardant	habituellement	la	télé
Frequently	they	watch	usually	the	tv

'Frequently they usually watched TV'

(40) For a whole year he worked out for an hour (every day) (Ernst 2020:18)

These examples involving multiple adverbials of the same class co-occurring felicitously only when there is a kind of nesting arrangement between them, as in (39) and (40), looks similar to the alternation in grammaticality that we see with the following *BIN* examples..

(41) They BIN hosting the event for 20 years
*Intended: 'They have been hosting the event for a long time(=20 years)'
(42) They BIN hosting the event for 3 days
'They have long been hosting the event for 3 days (at a time)'
(43) She BIN translated it last month
Intended: 'She translated it a long time ago last month'
(44) She BIN translated it in 2 hours
'She finished translating it in 2 hours a long time ago'

If *BIN* is an adverbial, then the adverbial incompatibility can be explained in this way, as a result of the adverbial and *BIN* being 'too close'.

An adverbial *BIN* analysis also provides an explanation for observations regarding *BIN*'s different syntactic positions. Rickford (1975:111) discusses the productivity of *BIN*'s cooccurrence relations, noting that it can co-occur with passive participles, modals, verb stems, etc. Another thing that falls out of an adverbial *BIN* analysis is the fact that *BIN* seems to surface at different syntactic heights. Cinque (1999) assigns different positions in the syntax for different classes of projections and by looking at different kinds of adverbials, among other material, we can gauge where *BIN* surfaces. For example, modals are situated higher in structure, near T. Based on the examples below, *BIN* surfaces in a high position at least some of the time.

(45) I BIN could walk on them stilts (Rickford 1975:111 via Green 1998b)
'I could walk on those stilts a long time ago/I have known how to walk on those stilts for a long time'
(46) A: [He got the money now?] (Dayton 1996:768)
B: He [$_{\text{Mod epistemic}}$ probably BIN had it]
'He has probably had it for a long time'

Other functional projections, like aspect, are thought to be located much lower. The data below show that *BIN* also surfaces low.

(47) She $_{\text{Mod possibility}}$ could [$_{\text{Asp perf}}$ a BIN left]
'She could have left a long time ago/A long time ago there was a point in which you could have left' (example from Dayton 1996:749, paraphrase mine)

Given that adverbials generally are able to adjoin at multiple heights, an adverbial analysis of *BIN* would also explain the different positions it seems to optionally occupy.

5. Conclusion and further directions. In this paper, I argued that *BIN* in AAE is an adverbial predicate of events that situates the initiation of an eventuality in the remote past, following Rickford (1975). This gives rise to the 'long time' interpretation associated with *BIN* constructions in general. The three different types of *BIN* constructions that Green (1998b) introduces then arise from this single *BIN* interacting with specific combinations of predicate, tense, and aspect. I also argue that incompatibility *BIN* exhibits against adverbs resembles a limit

on the way multiple temporal adverbs may combine in non- *BIN* sentences. Additionally, this analysis provides a possible explanation for the varying positions of *BIN*.

There are several additional lines of inquiry that can be addressed with further research. One involves exploring the clear connection between *BIN* constructions and the meaning of the perfect. Perhaps *BIN* 's adverbial characteristics and overlap with perfect meaning are indicative of a process of grammaticalization. As noted earlier, Labov (1972), Dayton (1996), and DeBose & Faraclas (1993) all consider this possibility. And research by Östen (2021) looks at the universal perfect and grammaticalization in relation to iamitives. Given that *BIN* 's overlap with the perfect seems to be specifically with the universal perfect (e.g., as opposed to an existential perfect), this might be another direction to consider. Another line of inquiry involves gathering more data to determine how grammaticality of *BIN* constructions fluctuates when different types of adverbials co-occur with it. It would also be good to see how the position of the adverbial (i.e., post-posed vs. pre-posed) changes interpretation and grammaticality as well. Yet another line of inquiry to look at is the relation between intonation of *BIN* constructions and their syntax. Rickford (1975) says that *BIN* cannot co-occur with adverbials in the same 'intonational pattern', but he doesn't give a formal account. It is not clear that he actually meant 'intonational phrase' or some other prosodic constituency. Some research has been done on the intonation of *BIN* constructions, like Green et al. (in press) and Weldon 2019, but further exploration of the structural distance between *BIN* and adverbials should be pursued.

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