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On morphological requirements for auxiliary verb periphrasis in Turkish

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This paper investigates auxiliary verb periphrasis in Turkish with a particular focus on its morphological requirements. The distribution of auxiliary verbs in Turkish shows the overflow pattern (*à la* Bjorkman 2011), where auxiliary verbs are present only in complex inflection forms. I argue that their pattern follows from a well-formedness constraint, which requires tense, aspect and modality suffixes be linearly adjacent to a verbalized M-Word under the definition in Embick (2007). The proposed analysis follows the previous literature in that it takes auxiliary verbs to be inserted at PF (Bjorkman 2011; Fenger 2020), but in addition assumes that the PF-insertion is driven by morphological requirements. The analysis is particularly supported by the behavior of the abilitative modality in Turkish. The present study thus suggests that languages may use different strategies for auxiliary verb periphrasis despite their surface similarity, and sheds light on the morphosyntactic nature of verb complexes formed under agglutination.

1 Introduction

When an auxiliary verb is used in verbal periphrasis, its presence was argued to reflect the realization of a syntactic projection. However, recent research argues that some of the auxiliary verbs are inserted at PF in order to salvage a derivation that would otherwise crash (Cowper 2010; Bjorkman 2011; Fenger 2020). For example, Fenger (2020) argues that auxiliary verbs in Turkish are inserted when an inflection form appears without a syntactic host. Focusing on auxiliary verb periphrasis in Turkish, I argue that auxiliary verbs are inserted at PF, but the PF-insertion is not to repair a failed syntactic derivation. Rather, the PF-insertion is required due to the well-formedness of suffixes. It thus extends the claim of Bjorkman (2011) that languages may opt for different strategies in auxiliary verb periphrasis, and retains the insight of Fenger (2020) in that morphosyntactic units constrain the presence of auxiliary verbs.

The presence of auxiliary verbs was attributed to designated syntactic positions in base-generation approaches (Ross 1969; Huddleston 1974; Emonds 1976, *among others*). More recently, however, several researchers argue for morphological insertion in auxiliary verb periphrasis. For instance, Bjorkman (2011) argues that some auxiliary verbs are inserted at PF, based on the observation that auxiliary verbs in many languages do not depend on the inflection type. This observation led Bjorkman to distinguish two auxiliary verb patterns: *the additive pattern* and *the overflow pattern*. In the additive pattern, auxiliary verbs are present whenever a particular inflectional category is involved. For example, the progressive aspect in English is always accompanied by the auxiliary verb *be*. In (1), the presence of *be* is associated with the category of *progressives*.

(1) *English: the additive pattern*

a. They watched a movie. (past: no AUX)
b. They **are** watching a movie. (present progressive: AUX present)
c. They will **be** watching a movie. (future progressive: AUX present)

In the overflow pattern, on the other hand, auxiliary verbs are present only in complex inflection forms, while they are absent in simple inflection forms. As the simple inflection requires no auxiliary verb, the presence of auxiliary verbs can no longer be associated with a particular inflectional category. In the overflow pattern the presence of auxiliary verbs seems to depend on the *complexity* of inflection, not on the *category* of inflection. Here the notion of *complexity* refers to the number of overt inflectional categories. Among the languages Bjorkman (2011) analyzed, Kinande, a Bantu language, clearly illustrates the overflow pattern in (2). In Kinande, the auxiliary verb *bya* is present only when *two* overt inflectional categories co-appear in a verb complex.

(2) *Kinande: the overflow pattern* (Bjorkman 2011: (73))

a. tw-**á**-húma.
1PL-PAST-hit
'We hit (recently).' (recent past: no AUX)

b. tu-**nému**-húma.
1PL-PROG-hit
'We are hitting.' (present progressive: no AUX)

c. tw-***á-bya*** i-tu-**nému**-húma.
1PL-PAST-AUX LNK-1PL-PROG-hit
'We were (recently) hitting.' (recent past progressive: AUX present)

In (2), the auxiliary verb *bya* is required only for the complex inflection of (2c), while it is absent in the simple inflection of (2a) and (2b). The PAST and PROG inflection are marked with the *á* and *nému* morpheme respectively, and the auxiliary verb *bya* is found only when they appear together. This observation is closely related to the *morphological* characteristics of the language: the present tense in Kinande is the most unmarked option for tense and is morphologically null. This unmarkedness renders the present progressive inflection a *simple* inflection, since only one morpheme is *overtly* expressed for tense or aspect in the verb complex despite the present tense interpretation.

The overflow pattern is difficult to capture with purely syntactic accounts, since the presence of auxiliary verbs cannot be associated either with the past tense or with the progressive aspect. Rather, their presence depends on the *complexity* of inflection. Given this, alternatives to syntactic accounts have been proposed. Bjorkman (2011) argues that the overflow pattern arises due to a PF-repair for a 'stranded' feature after syntactic Agree. Fenger (2019; 2020) suggests that auxiliary verbs are inserted as a PF-repair for an 'unhosted' inflection. Both analyses share the common premise that auxiliary verbs are PF-inserted to salvage a syntactic failure.

The distribution of auxiliary verbs in Turkish seems to follow the overflow pattern, as an auxiliary verb is required only for the morphologically complex inflection just like the Kinande case. After showcasing the auxiliary verb pattern in Turkish, I will introduce my morphological requirement analysis. Crucially, the present analysis also argues for PF-insertion of auxiliary verbs, yet it departs from the previous analyses since it does not refer to any syntactic failure to be salvaged at PF. Rather, it is a morphologically-driven proposal in that it is *suffixes* that require the linear adjacency to a verbalized unit. This will be demonstrated by various auxiliary verb periphrasis patterns in Turkish.

This paper is organized as follows. Section 2 illustrates the auxiliary verb pattern in Turkish and briefly reviews two previous accounts attempted for such a pattern. Section 3 introduces the

main proposal, in which a morphological requirement of suffixes plays a role in auxiliary verb periphrasis. Section 4 presents novel data from the abilitative modality, which corroborates the present analysis. Section 5 revisits previous studies on morphological and phonological conditions regarding auxiliary verb periphrasis in the language. Section 6 discusses implications of the study, focusing on the morphosyntactic nature of verb complexes in Turkish and on different strategies languages use for similar auxiliary verb patterns. Section 7 concludes.

2 Auxiliary Verb Periphrasis in Turkish

The distribution of auxiliary verbs in Turkish shows the overflow pattern, as the presence of the auxiliary verb *ol* is required only for the complex inflection. This is illustrated with future and progressive inflection forms, as only the combination of these two requires the auxiliary verb *ol*. See (3).

(3) *Turkish: the overflow pattern*

a. Gid-**ecek**-sin.
go-FUT-2SG
'You will go.' (future: no AUX)

b. Gid-**iyor**-sun.
go-PROG-2SG
'You are going.' (present progressive: no AUX)

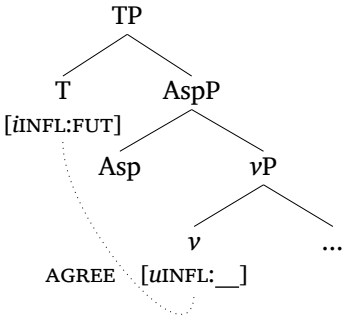
c. Gid-**iyor** ***ol*-acak**-sın.
go-PROG AUX-FUT-2SG
'You will be going.' (future progressive: AUX present)

In (3a) and (3b), the simple future or the simple progressive does not require an auxiliary verb. Only when they combine together to derive the future progressive inflection in (3c), the presence of the auxiliary verb *ol* becomes obligatory. Similar to the Kinande case in (2), this observation is related to the fact that the present tense is the most unmarked option for tense and thus morphologically null in Turkish. In each simple inflection case only one overt morpheme is present for tense or aspect, in contrast with the complex inflection case where two overt morphemes appear for tense and aspect. The presence of auxiliary verbs thus depends on the *complexity* of inflection: the overflow pattern.

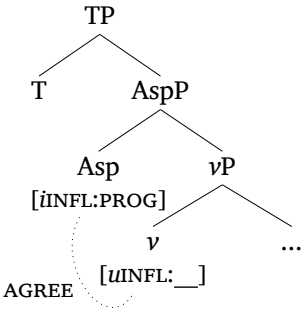
Bjorkman (2011) attributes the overflow pattern to a failure of inflectional agreement. In the simple inflection, Agree between [*u*INFL] of a verb and [*i*INFL] of an inflectional category suffices as no feature is left unchecked after this Agree operation. The derivation thus converges, and no auxiliary verb is required. This is schematized in (4). Note that the absence of the [*i*INFL] feature

is tied with unmarkedness in Bjorkman (2011). In (4a) the Asp head does not bear [*i*INFL], thus has no need for Agree. Similarly, in (4b) the T head does not bear [*i*INFL], thus has no need for Agree either. Only one Agree operation takes place in both cases under the upward Agree mechanism.

(4) a. *Simple future*

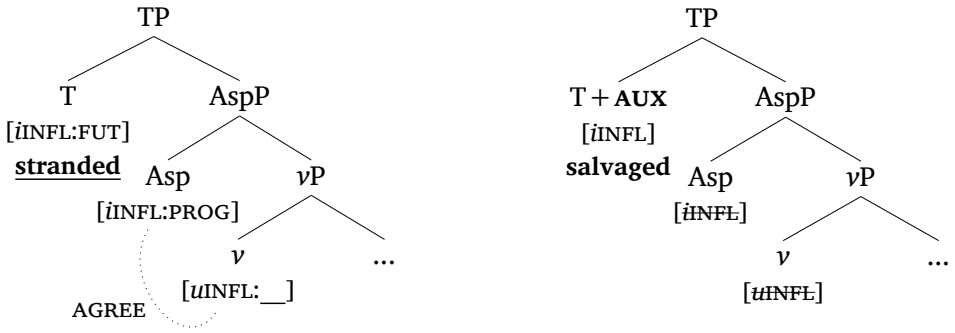


b. *Simple progressive*



The complex inflection, on the contrary, inevitably leaves [*i*INFL] of the upper inflection (*i.e.*, T) unchecked since Agree between the verb and the lower inflection (*i.e.*, Asp) is not enough to deactivate all the [INFL] features. The upper inflection bears [*i*INFL] as well, yet there is nothing for this feature to agree with, as *v*'s [*u*INFL] is already deactivated by the initial Agree. As a result, [*i*INFL] in T is unchecked and causes the derivation to crash.[1] A proposed solution in Bjorkman (2011) to prevent this crash is a PF-repair: insertion of an auxiliary verb at PF salvages the derivation by supporting the 'stranded' feature in T. The auxiliary verb insertion is thus a Last Resort operation, and is post-syntactic. This is illustrated in (5).

(5) a. *Future progressive* ⟹ b. *AUX salvages 'stranded' feature*

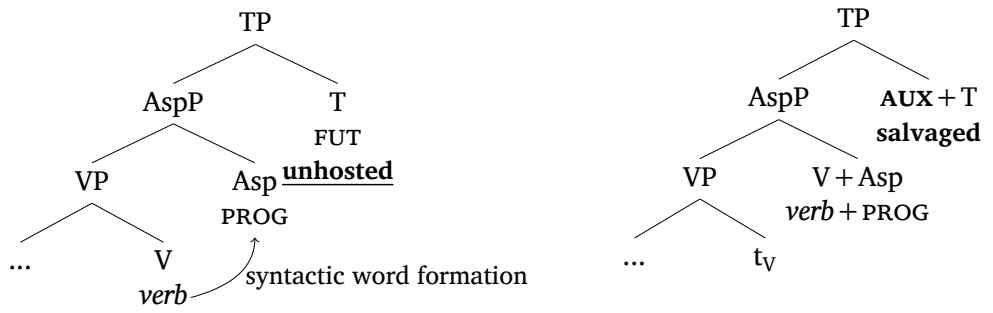


[1] In Bjorkman (2011), both uninterpretable and interpretable features cause a derivation to crash unless they undergo Agree. That is, every feature has to be involved in Agree once it is introduced in derivation.

This accounts for languages with the overflow pattern in Bjorkman (2011), and the same may carry over to the Turkish case in (3). If we assume this PF-repair strategy, only the complex inflection requires the presence of an auxiliary verb since an inflectional feature is inevitably 'stranded'. In short, auxiliary verbs are present in this type of languages due to a syntactic failure that has to be repaired at PF by inserting an auxiliary verb.

More recently, Fenger (2019; 2020) argues that syntactic word formation in interaction with the phase system accounts for the auxiliary verb pattern in Turkish. Head movement in a successive manner creates a complex head that forms a *syntactic word*, yet it has to stop at AspP, which Fenger assumes to be the phase boundary in Turkish. As a result, the upper inflection which is outside of the lower phase is left without a host, and this has to be supported by an auxiliary verb to form its own syntactic word in the upper domain. This analysis is schematized in (6).

(6) a. *Future progressive* ⟹ b. *AUX salvages 'unhosted' T*



In (6), head movement to the Asp head creates a syntactic word, but head movement cannot proceed further due to the phase boundary, leaving the inflection in T 'unhosted'. An auxiliary verb is thus inserted to support this 'unhosted' inflection, forming another syntactic word in the upper domain.[2] Similar to Bjorkman (2011), this is also a PF-repair strategy triggered by a syntactic failure. In this case, a failure to build its own syntactic word due to the blocked head movement causes the auxiliary verb insertion at PF.

So far, both analyses can account for the auxiliary verb pattern in (3) where the auxiliary verb *ol* is required only for the complex inflection. However, a couple of questions can be cast. First, in Bjorkman (2011), it remains unclear why morphologically null inflection forms such as the present tense do not bear any [*i*INFL] feature. In the simple progressive (3b), repeated below, the morphologically null present tense may as well be *syntactically* present, as the semantic interpretation of the present tense obtains despite the absence of overt morphology.

[2] For Fenger (2020), this is also necessary for deriving the correct phonological patterns of stress assignment and vowel harmony. I will revisit this issue in Section 6.1.

(7) *Simple progressive with the present tense interpretation*
Gid-iyor-∅-sun.
go-PROG-PRES-2SG
'You are going.'

If the present tense is syntactically present, albeit covertly, a question arises as to why it does not bear [*i*INFL:PRES]. In other words, the stranded feature analysis has to assume that a morphologically null inflection is void of the [INFL] feature. Then, what determines the complexity of inflection heavily depends on morphology (*i.e.*, whether an inflection spells out an overt exponent or not). Second, in Fenger (2020), the simple tense inflection raises a question. In the simple past tense, head movement does not reach the past tense inflection since T is outside of the phase boundary.[3]

(8) *Simple past beyond the phase boundary*
Git-ti-n.
go-PAST-2SG
'You went.'

Since head movement that creates a syntactic word cannot proceed up to the past tense inflection *-ti* (which she assumes to be in T), an additional assumption is needed in order to make the verb *git* and the suffix *-ti* into a single syntactic word. This is done in Fenger (2020) by what she called *2nd cycle head movement*. Two cycles of head movement had to be postulated to derive the correct syntactic word unit (and subsequent phonological patterns). If this is the case, however, it is hard to capture the *morphological simplicity* the simple inflection forms (*e.g.*, (7) and (8)) commonly share: they both consist of a verb and a tense or aspect suffix. In short, these two analyses correctly capture the presense of auxiliary verbs in the complex inflection, yet a question remains for simple inflection cases. Having this in mind, in what follows I argue that a morphological requirement on suffixes that does not refer to any syntactic failure captures both the simple and complex inflection cases in a unified manner.

Before moving on, it should be noted that a morphological account of auxiliary verb periphrasis in Turkish was suggested in Göksel (2001). She argues that the auxiliary verb *ol* is morphological and invisible to syntax, because its presence depends on the *type* of inflection and the *size* of a verbal stem. Simplifying somewhat, *ol* has to be inserted if two morphemes co-occur in the same inflectional slot, or if the suffixes-per-word exceeds an upper limit. An example is given in (9) with the future perfective inflection.

[3] Here I used the past tense instead of the future tense to illustrate the pattern described in Fenger (2020). In Turkish, the future tense shows an interesting behavior in terms of syntactic hierarchy, which suggests that it spells out a functional head lower than T but higher than Asp. This issue will be revisited in Section 5.

(9) *Auxiliary verb ol in main clauses* (Göksel 2001: (16b))

Gelecek	yıl	sonunda	Berlin-e	git-miş	**ol**-acağ-ız.
next	year	end	Berlin-DAT	go-PERF	AUX-FUT-1PL

'We will have gone to Berlin by the end of next year.'

In (9), *ol* is morphologically inserted since the *perfective* morpheme *-miş* and the *future* morpheme *-acağ* are from the same inflectional slot. As her analysis touches upon the issue of different auxiliary verbs and distinguishes different functions of *ol*, I will postpone the relevant discussion until Section 5, at which point different exponents of auxiliary verbs in Turkish are elaborated. For the time being, it is worth noting that I follow the insight of Göksel (2001) in that *ol*-insertion is morphologically-driven, yet I depart from her approach in that auxiliary verbs are inserted due to a requirement of *suffixes*.

3 Morphological Requirements of Suffixes

The observation in the previous sections suggests that the simple inflection cases share a common property, in that only one tense or aspect inflection morpheme is overtly present in verb complexes. This contrasts with the complex inflection where two distinct tense and aspect inflection morphemes are overtly present, accompanied by an auxiliary verb. I propose that this effect reflects a morphological requirement of suffixes and does not refer to any syntactic failure. This does not necessarily mean that auxiliary verb periphrasis has nothing to do with Narrow Syntax, since morphological operations are sensitive to syntactic information given the architecture of grammar and the premise of realizational morphological theories such as the Distributed Morphology (henceforth DM). I argue that upon completion of a syntactic derivation, morphological requirements are in play to derive a well-formed verb complex: inflectional suffixes locally require its own verbalized M-Word in Turkish, with the definition given in Embick (2007).

3.1 Linear Adjacency of Inflectional Suffixes

The auxiliary verb pattern in (3) can be described in terms of the requirements of *suffixes*, and I will argue that this accounts for the distribution of auxiliary verbs in Turkish. First, consider the simple inflection cases in (10), where each inflectional morpheme from the tense, aspect and modality (TAM) domain is linearly adjacent to the verb *gid* or *git* 'to go'.[4]

(10) a. Gid-ecek-sin.
go-FUT-2SG
'You will go.'

[4] For now, I am using the terminology '*verb*' in a theory-neutral manner, which roughly corresponds to a verb root. As the discussion in this section proceeds, I will elaborate on what it means to be a verb, referring to the novel concept of verbalized M-Word.

b. Gid-iyor-sun.
go-PROG-2SG
'You are going.'

c. Git-meli-sin.
go-NECE-2SG
'You should go.'

(10) demonstrates that TAM suffixes are linearly adjacent to a verb. Crucially, I propose that this generalization extends to cases of complex inflection. Consider the cases with two TAM morphemes and an auxiliary verb in (11).

(11) a. Gid-iyor ***ol***-acak-sın.
go-PROG AUX-FUT-2SG
'You will be going.'

b. Gid-iyor ***ol***-malı-sın.
go-PROG AUX-NECE-2SG
'You should be going.'

In (11), the progressive aspect morpheme *-iyor* is adjacent to the verb *gid*. What is crucial is that the second TAM morpheme, the future tense *-acak* in (11a) and the necessitative modality *-malı* in (11b), can never be adjacent to the verb *gid*, due to the presence of the intervening progressive morpheme *-iyor*. Instead, they are adjacent to the semantically vacuous auxiliary verb *ol*. In other words, I suggest that the presence of auxiliary verbs in (11) is due to the requirement of TAM suffixes to be linearly adjacent to a verb. If these suffixes were to concatenate to the preceding TAM suffix, here to *-iyor*, the verb complexes would be ill-formed since these suffixes cannot be linearly adjacent to a verb. I call this concatenation requirement Linear Adjacency, which requires inflectional suffixes from the TAM domain to be linearly adjacent to a verb. If a TAM suffix cannot satisfy Linear Adjacency in its local environment, an auxiliary verb is inserted. I argue that this well-formedness constraint is the source of auxiliary verb periphrasis in Turkish.

(12) ***Linear Adjacency*** (*to be revised*)
Inflectional suffixes from the TAM domain must be linearly adjacent to a verb to be well-formed.

Note that Linear Adjacency in (12) explicitly states that a suffix must be linearly adjacent to a *verbal* category, not to any kind of category.[5] Therefore it predicts that non-verbal predicates such as nominal or adjectival ones cannot satisfy (12). This is borne out, since TAM suffixes cannot attach directly to a non-verbal predicate. This point can be illustrated with the necessitative

[5] More specifically, this unit has to be a verbalized one under the assumption of DM that the verbalizer *v* renders an acategorial root into a verb. I will pin down the theoretical upshot of such a definition in Section 3.2.

modality, which requires Linear Adjacency (see (10c) and (11b)). If this morpheme appears adjacent to a non-verbal predicate, a dummy auxiliary verb, here again *ol*, must be present. See (13).

(13) a. Yorgun ***(ol)**-malı-sın.
be.tired *(AUX)-NECE-2SG
'You should be tired.'

b. Öğretmen ***(ol)**-malı-sın.
teacher *(AUX)-NECE-2SG
'You should be a teacher.'

The requirement of *ol* in (13) shows that Linear Adjacency must be satisfied by a verbal category. Also, Linear Adjacency only holds for TAM suffixes. This can be demonstrated with the suffix *-DIr*, which is argued to be a type of illocutionary force marking, related to indicative mood (Özgen 2021). As it is not a part of the TAM system, it does not require any auxiliary verb and can directly concatenate to non-verbal predicates as in (14).

(14) a. Murat yorgun-dur.
Murat be.tired-DIR
'Murat is (definitely) tired.'

b. Murat öğretmen-dir.
Murat teacher-DIR
'Murat is (definitely) a teacher.'

3.2 Morphosyntactic Composition of Verb Complexes in Turkish

Although Linear Adjacency accounts for the distribution of auxiliary verbs in Turkish, there exist more complications that require a finer justification regarding the definition of *verb* in (12). Observe the following data, where the TAM suffix is not linearly adjacent to the verb when another kind of morpheme intervenes.

(15) a. Çalış-tır-**dı**-m.
work-CAUS-PAST-1SG
'I made someone work.'

b. Aç-ıl-**dı**.
open-PASS-PAST
'It was opened.'

The causative and passive morphemes intervene between the verb and the past tense *-dı* in (15). That is, Linear Adjacency of this TAM suffix seems to be violated, but (15) is still well-formed. Such being the case, a more elaborated definition of *verb* with respect to causative or passive

morphology must be provided. Intuitively, causatives or passives bear some particular syntactic and semantic properties that are distinct from the TAM domain. Syntactically, they merge lower in the derivation, thus appearing closer to a verb than any TAM morphology. Semantically, they encode information related to argument structure, corresponding to the notion of *derivational* morphology. In this regard, it is worth noting that such morphemes are not sufficient to make a verb complex well-formed. See (16).

(16) a. *Çalış-tır-ım.
work-CAUS-1SG
(intended) 'I make someone work.'

b. *Aç-ıl.
open-PASS
(intended) 'It is opened.'

The sequence of a verb and the causative or passive morpheme cannot form a well-formed verb complex. Only if this sequence is further suffixed by a TAM morpheme does it result in a well-formed verb complex as in (15). The same point is illustrated with the simple present tense case, as observed in Jendraschek (2011).

(17) *Simple present tense requires overt suffixation*
a. *Gid-im.
go-1SG
(intended) 'I go.'

b. Gid-er-im.
go-AOR-1SG
'I (habitually) go.'

Although the present tense inflection is morphologically null in Turkish, a corresponding interpretation, either habitual or generic, obtains only with the aorist morpheme, hence the contrast between (17a) and (17b). This observation seems to be conditioned by the type of utterance (*i.e.*, sentential force) as well. For example, just a simple verb suffices for an imperative utterance in (18).

(18) Git!
go
'Go!'

(18) is well-formed despite the absence of an overt TAM morpheme. (18) contrasts not only with declaratives in (17), but also with interrogatives where an overt TAM morpheme is required in addition to the yes/no-question particle *mi*. This is illustrated in (19).

(19) *Overt suffixation for interrogatives*

a. *Gid-sin mi?
go-2SG Q
(intended) 'Do you go?'

b. Git-ti-n mi?
go-PAST-2SG Q
'Did you go?'

The requirement of TAM morphology seems to be conditioned by the syntactic context, in that declaratives and interrogatives, but not imperatives, require temporal or aspectual anchoring (Huntley 1980; Platzack & Rosengren 1997; Schwager 2011, *among others*). Note also that *φ*-agreement suffixes are not sufficient to make a verb complex well-formed in (17a) or in (19a), again suggesting that this suffixation must involve TAM morphology.

This line of discussion is connected to the idea that syntactic derivation is divided into subdomains with their respective syntactic and semantic properties (Grohmann 2003; Ramchand & Svenonius 2014). Ramchand & Svenonius (2014) in particular argue that syntactic and semantic derivation are divided into three domains: the *event* domain (with thematic information), the *situational* domain (with tense and aspect information) and the *propositional* domain (with discourse information). They further argue that the *situational* domain in the middle is responsible for anchoring the lower *event* domain onto the higher *propositional* domain. The empirical pattern suggests that this anchoring is implemented by the TAM suffixation in agglutinative languages like Turkish. Lacking this anchoring, imperatives do not require the TAM suffixation unlike declaratives and interrogatives.[6] This is stated in (20).[7]

[6] A detailed analysis of imperatives being distinct from declaratives and interrogatives is beyond the scope of this paper. However, it is worth noting that in many languages imperatives are morphosyntactically meagre. For example, many languages require infinitival morphology for imperatives. Platzack & Rosengren (1997) attribute this to the lack of FinP and TP.

[7] Non-verbal predicates seem to be exempt from this generalization, as the anchoring need not involve overt suffixation. In (i), non-verbal predicates in the present tense are well-formed without TAM morphology.

(i) a. Yorgun-um.
be.tired-1SG
'I am tired.'

b. Öğretmen-im.
teacher-1SG
'I am a teacher.'

Then, only verbal predicates involve the TAM suffixation in satisfying the well-formedness condition in (20). This contrast seems to stem from independent differences between verbal and non-verbal predicates in the language. I leave this open for future research.

(20) ***Syntactic Well-Formedness of Utterances***
Declaratives and interrogatives must accompany temporal/aspectual anchoring.

Note that (20) holds true independently from Linear Adjacency in (12). (20) arises due to the syntactic profile of utterances, while (12) arises due to the morphological need of TAM suffixes. With this, consider the causative and passive cases again.

(21) a. Çalış-tır-**dı**-m.
work-CAUS-PAST-1SG
'I made someone work.'

b. Aç-ıl-**dı**.
open-PASS-PAST
'It was opened.'

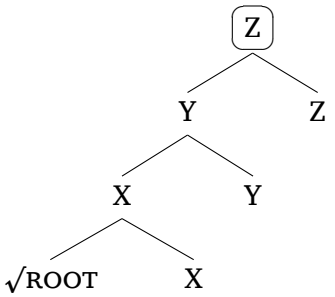
In (21), the past tense morpheme *-dı* is adjacent to the *unit* including the verb and the causative or passive morpheme. Linear Adjacency should then be able to capture these configurations. Given that these kinds of morphemes share particular characteristics that are distinct from TAM morphemes, they can be considered as part of the lower verbal domain. Under the theory of DM, a *root* is acategorial, and it has to be verbalized so that it can function as a verb (*e.g.*, $\sqrt{\text{GID}} + v \Leftrightarrow$ *gid* 'to go'). Syntactically speaking, both the verbalized root and the causative or passive morphology are realized within VoiceP which encodes thematic relations and the argument structure (Grohmann 2003; Harley 2008; Key 2013; Ramchand & Svenonius 2014). For Turkish, Key (2013) hints at a possibility that the lower domain including the causative and passive morphology accompanies head movement. A similar approach was attempted in Fenger (2020), in which the first phase involves head movement to its edge.[8] Although the respective implementations vary, they share the basic intuition that VoiceP is included in the domain of forming a syntactic unit. From a morphological standpoint, such a unit may be revisited with the notion of M-Word (Embick & Noyer 2001; Embick 2007; 2015).

(22) ***M-Word (morphosyntactic word)*** (definition in Embick 2007)
A (potentially) complex head not dominated by a further head projection

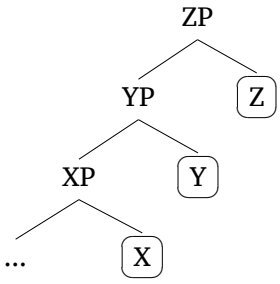
[8] More precisely, the domain of complex head formation is AspP in Fenger (2020) which she assumes to be the phase boundary in Turkish. Here I assume VoiceP as the phase boundary following the general assumption of the phase system. This is because the implementation of a syntactic (and morphological) unit in the present context is distinct from that of Fenger (2020)'s. In what follows, I will elaborate on this issue whenever it becomes relevant, comparing the present analysis with the one in Fenger (2020)'s.

By the definition given in (22), an M-word may be i) a complex head formed by head movement as in (23a) or ii) each terminal head without head movement as in (23b) (each M-Word is represented in boxes).

(23) a.



b.



Key (2013) assumes that the *v* head which spells out the causative morphology can form a complex head by head movement from an acategorial root. Fenger (2020) argues that head movement to the edge of the first phase (AspP) forms a syntactic word. This is in line with the present analysis with a reformulation on the structural definition of *verb*. If head movement forms a syntactic (and thus morphological) unit within VoiceP, this unit stands for an M-Word for the purpose of morphological concatenation.[9] This in turn corresponds to a *verbalized M-Word*. Also, by definition, each TAM suffix in terminal heads represents an M-Word. Suffixation from the TAM domain then can be understood as a concatenation between M-Words.

Now, consider (24). (24a) represents a complex Voice head formed by head movement, which consists of the verbalized root and the causative morpheme.[10] This entire complex Voice head represents a single M-Word. Later in the derivation, (24b) represents each M-word in the TAM domain, namely the previously formed M-Word (*i.e.*, the complex Voice head) and the inflectional T head which also stands for an M-Word. Since only the overt exponents matter for morphological concatenation, two M-Words, skipping Asp, concatenate together to derive the well-formed unit in (24b).

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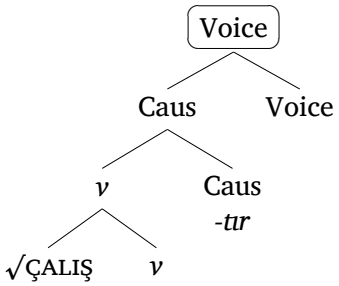
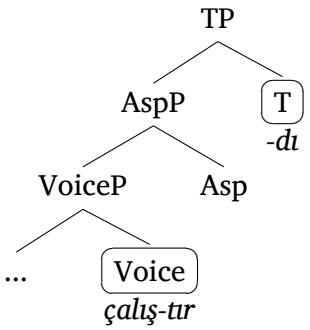
[9] It is assumed that an M-Word can concatenate only to another M-Word, by the typing assumption given in Embick (2007; 2015). Under such a typing assumption, each terminal head within a complex M-Word unit stands for a *Subword*, which is a distinct unit for concatenation. In (23a), for example, √ROOT, X, Y and Z are Subwords that can concatenate only to another Subword. Following this, the concatenation within the VoiceP domain (*i.e.*, suffixation between a verbalized root and a causative or passive morpheme) is Subword-level concatenation. This contrasts with M-Word-level concatenation in the upper domain.

[10] Note that under Key (2013)'s analysis, CAUS is a realization of the *v* head among different flavors of *v* (*à la* Folli & Harley 2007). Although I distinguished the Caus head from the *v* head, this is for expository purpose and does not cause any critical problem in the present context.

(24) a.



b.



Therefore, M-Word is a morphological basis for concatenation under adjacency: a verb complex is formed with concatenated M-Word unit(s). Linear Adjacency in (12) can then be understood as a requirement for TAM suffixes to be linearly adjacent to a verbalized M-Word. Consider (25), where verbalized M-Words are underlined.[11]

(25) *Verbalized M-Words*

a. **Çalış-tır**-dı.
work-CAUS-PAST
'S/he made someone work.'

b. **Gid**-iyor **ol**-acak-sın.
go-PROG AUX-FUT-2SG
'You will be going.'

In (25a), the verbalized root *çalış* and the causative morpheme *-tır* form an M-Word, and the TAM suffix *-dı* is linearly adjacent to this verbalized M-Word. Similarly, in (25b), the verbalized root *gid* forms an M-Word on its own, and the TAM suffix *-iyor* concatenates to this M-Word, satisfying Linear Adjacency. However, the future tense *-acak* also requires Linear Adjacency, thus the auxiliary verb *ol* is inserted. The crucial point here is that the auxiliary verb is also a verbalized M-Word, by virtue of being a verbal root despite its semantic vacuousness. In short, two M-Words concatenate to form a morphological unit, and such a unit is the necessary condition for a (minimally) well-formed verb complex. This idea also reflects the observation regarding the temporal and aspectual anchoring, in the sense that Turkish opts

[11] A reviewer raised a question regarding head movement and the formulation of M-Word, on the possibility of construing *çalış-tır-dı* in (25a) as a single M-Word with further head movement, similar to Fenger (2020)'s analysis. I contend that positing two M-Words is advantageous, since further head movement (from Voice to T in this case) traverses the phase boundary, thus requiring an ancillary assumption about head movement. This issue was briefly mentioned in Section 2, and will be revisited in Section 6.1.

for overt suffixation in accomplishing such an anchoring. Linear Adjacency is thus restated as follows:

(26) ***Linear Adjacency*** (*final version*)
A TAM suffix must be linearly adjacent to a verbalized M-Word to its left.

(26) now correctly captures the pattern of passives and causatives with the definition of the verbalized M-Word. Finally, reconsider the non-verbal predicate cases where a dummy auxiliary verb is required, repeated below from (13).

(27) a. Yorgun *__(ol)__-malı-sın.
be.tired *(AUX)-NECE-2SG
'You should be tired.'

b. Öğretmen *__(ol)__-malı-sın.
teacher *(AUX)-NECE-2SG
'You should be a teacher.'

Non-verbal predicates involve different categorizing heads (*a* for adjectives; *n* for nouns), thus cannot satisfy Linear Adjacency of the necessitative modality *-malı*. For this reason, a verbalized M-Word, here again *ol*, is required.

3.3 Deriving Well-Formed Verb Complexes

Linear Adjacency in (26) accounts for the distribution of auxiliary verbs, and this is due to the morphological well-formedness of TAM suffixes. The actual implementation is as follows, where the subscripted [VM] indicates a verbalized M-Word. First, consider the simple inflection cases in (28).

(28) a. *simple progressive: gid-iyor-sun*

$$\underset{\text{ADJACENCY}}{\text{gid}_{[\text{VM}]}\ \text{-iyor}_{[\text{PROG}]}}$$

b. *simple future: gid-ecek-sin*

$$\underset{\text{ADJACENCY}}{\text{gid}_{[\text{VM}]}\ \text{-ecek}_{[\text{FUT}]}}$$

(28a) and (28b) are morphologically well-formed, since the M-Word *gid* satisfies Linear Adjacency of *-iyor*$_{[\text{PROG}]}$ or *-ecek*$_{[\text{FUT}]}$. The present analysis is advantageous in that it does not need any additional assumptions in accounting for the simple inflection cases. Recall that Bjorkman (2011) assumes the lack of [*i*INFL] for the morphologically null present tense given its unmarkedness, and Fenger (2020) posits another cycle of head movement for the simple

tense inflection. Linear Adjacency, on the other hand, provides a unified explanation for the simple inflection cases as they involve a single concatenation between a verbalized root and a TAM suffix. This concatenation forms a unit of two M-Words. In (28), *morphology* plays a crucial role in deriving a well-formed unit, and this does not require any additional assumptions in accommodating simple inflection forms.

The same explanation applies to the complex inflection cases in (29) as well.

(29) a. *progressive + future: gid-iyor ol-acak-sın*

gid$_{[VM]}$ -iyor$_{[PROG]}$ **ol**$_{[VM]}$ -acak$_{[FUT]}$

ADJACENCY ADJACENCY

b. *progressive + necessitative: gid-iyor ol-malı-sın*

gid$_{[VM]}$ -iyor$_{[PROG]}$ **ol**$_{[VM]}$ -malı$_{[NECE]}$

ADJACENCY ADJACENCY

Both (29a) and (29b) are morphologically well-formed, since Linear Adjacency is satisfied for each TAM morpheme in the verb complexes. The first unit *gid-iyor* is well-formed as expected. What makes these configurations *complex* is the presence of the additional TAM suffix: *-acak*$_{[FUT]}$ in (29a); and *-malı*$_{[NECE]}$ in (29b). Since these additional suffixes cannot be linearly adjacent to a verbalized M-Word due to the intervening suffix *-iyor*, they require the auxiliary verb *ol*. Finally, the cases in which a causative or passive suffix intervenes are also accounted for, as both causative and passive morphemes are included in the same M-Word with the verbalized root. This is illustrated in (30).[12]

(30) a. *causative + past: çalış-tır-dı*

çalış-tır$_{[VM]}$ -dı$_{[PAST]}$

ADJACENCY

b. *passive + past: aç-ıl-dı*

aç-ıl$_{[VM]}$ -dı$_{[PAST]}$

ADJACENCY

In (30) the past tense *-dı* does not require an auxiliary verb, since *çalış-tır* in (30a) and *aç-ıl* in (30b) count as a verbalized M-Word. Also, note that a focus particle can intervene between the concatenated M-Word units, but the same particle can never appear within such a unit.[13] (31)

[12] A similar observation holds with respect to the negation morpheme *-mA*. For discussion, see Appendix.

[13] I'd like to thank an anonymous reviewer for pointing this out to me. The possibility of such an intervention by particles was actually acknowledged and used as a diagnostic for testing syntactic words in Fenger (2020). Here, I illustrate this point to show which units constitute a *morphological* unit.

illustrates this point: the particle *da* may *attach to* the concatenated M-Word unit, but cannot *split* the M-Word unit. More discussion on particle placement will be provided in the following sections when it becomes relevant.

(31) a. Gid-iyor-**da** ol-acak-sın.
go-PROG-also AUX-FUT-2SG
'You will also be going.'

b. *Çalış-tır-**da** dı.
work-CAUS-also PAST
(intended) 'S/he also made somebody work.'

All three analyses, namely Linear Adjacency, Bjorkman (2011)'s and Fenger (2020)'s, account for the distribution of auxiliary verbs. They share the intuition that auxiliary verb periphrasis involves PF-insertion. However, they differ as to the trigger of the insertion. Linear Adjacency attributes the insertion to a morphological requirement of TAM suffixes. On the other hand, the two previous analyses propose this insertion in order to repair a syntactic failure. In the following section, I will show that these analyses crucially make different predictions as to how the abilitative modality behaves in Turkish, and that my morphological requirement analysis provides a simpler account for the behavior.

4 A Peculiar Case of Abilitatives

A crucial observation in accounting for auxiliary verb periphrasis in Turkish comes from the abilitative modality which shows a very different pattern from other TAM morphemes in the language. I will first illustrate the peculiar behavior of the abilitative modality, and then compare different predictions for the auxiliary verb insertion by each analysis. It will be shown that a simpler solution for the behavior of abilitatives is possible with my morphological requirement.

4.1 The Dual Behavior of Abilitatives

Before delving into the behavior of abilitatives, observe the behavior of necessitatives one more time for a comparison. The necessitative suffix behaves exactly on a par with other tense or aspect morphemes in Turkish, in requiring Linear Adjacency: it always has to be linearly adjacent to a verbalized M-Word, to *git* or to *ol* in (32).

(32) a. Git-**meli**-sin.
go-NECE-2SG
'You should go.'

b. Gid-iyor ***ol*-malı**-sın.
go-PROG AUX-NECE-2SG
'You should be going.'

However, the abilitative modality in Turkish behaves differently from necessitatives. The abilitative modality is not sufficient to make a verb complex well-formed by itself, and requires one more suffixation by a TAM morpheme. This is illustrated in the contrast between (33a) and (33b).

(33) a. *Gid-**ebil**-im.
go-ABIL-1SG
(intended) 'I can go.'

b. Gid-**ebil**-ir-im.
go-ABIL-AOR-1SG
'I can go.'

Although *-ebil* is linearly adjacent to the verbalized M-Word *gid*, (33a) is ill-formed. The intended present tense interpretation of (33a) does not obtain, and this sharply contrasts with (32a).[14] Whenever the abilitative morpheme appears in a verb complex, the verb complex is well-formed only if another TAM morpheme is suffixed to ABIL. In (33b), the present tense reading obtains with the aorist morpheme *-ir*.[15] Note that this suffixation can also be done by different TAM morphemes, in (34a) by the progressive aspect *-iyor*, and in (34b) by the past tense *-di*.

(34) a. Gid-**ebil**-iyor-sun.
go-ABIL-PROG-2SG
'You are able to be going.'

b. Gid-**ebil**-di-n.
go-ABIL-PAST-2SG
'You could go.'

This observation can be revisited from the perspective of the morphological requirement. First, the fact that ABIL requires one more TAM suffix to be well-formed indicates that it behaves as a *verb*: it is subject to the same syntactic well-formedness condition like other verbs (see (20)),

[14] One anonymous reviewer pointed out that there also exists a difference in their relative height: ABIL cannot appear higher than NECE (Göksel 2001; Sezer 2001; Kabak 2007). For more discussion, I refer readers to Section 5 on the functional hierarchy in the verbal spine.

[15] Similar to the contribution of the aorist morpheme in the simple inflection case (see (17)), in (33b) the aorist *ir* gives rise to general ability interpretation: (33b) can be roughly paraphrased as 'You have a general ability of going'. I'd like to thank one anonymous reviewer for pointing out the semantic contribution of the aorist morpheme.

despite being a modality inflection. This captures the ill-formedness of (33a): it is ill-formed not because of *gid*, but because of *-ebil*. With the same logic, (33b) and (34) are well-formed as each additional TAM morpheme is linearly adjacent to the verb-like ABIL. This in turn suggests that ABIL itself is a verbalized M-Word. At the same time, in all these cases *-ebil* is linearly adjacent to the verbalized M-Word *gid*, satisfying Linear Adjacency. Then, the abilitative modality seems to behave as a verbalized M-Word and as a TAM suffix simultaneously. What does this duality mean?

Such an intermediate status has been described in the literature as *semi-lexicality* (Corver & Van Riemsdijk 2001; De Belder 2011; Cavirani-Pots 2020, *among others*): some verbal suffixes are argued to morphosyntactically exhibit a *dual* behavior, suggesting that they are a development in progress. As for the abilitative modality in Turkish, this peculiar behavior historically stems from verb compounding (Németh 1962; also Underhill 1976). If one further dissects this morpheme, it is composed of the linking morpheme *-A* and the lexical verb *bil* 'to know'. That is, *-A* + *bil* together with the verb *gid* 'to go' literally means 'to know how to go'. This compounding nature of ABIL is on a par with other compounding verbs such as *-A* + *kal* (from *kal* 'to stay'), yielding the meaning of 'keep V-ing' when it combines with a verb. This type of compounding has been attested in the history of Turkish (Németh 1962), yet is very restricted and not productive in the contemporary stage. Among those, ABIL is the most productive one and grammaticalized into the inflectional system. Such being the case, ABIL has been considered the lowest morpheme among the inflection slots in Turkish as it typically appears adjacent to a lexical verb. However, if one maintains that ABIL is a part of a compounding verb (thus, a part of a verbalized M-Word), it is difficult to explain the following observation, where ABIL appears *higher* in the derivation (Göksel 2001; Sezer 2001; Kabak 2007).

(35) a. Gid-**ebil**-iyor-sun.
go-ABIL-PROG-2SG
'You are able to be going.'

b. Gid-iyor ***ol*-abil**-ir-sin.
go-PROG AUX-ABIL-AOR-2SG
'It is possible that you are going.'

The different positions of ABIL in (35) suggest that ABIL does not belong to the same M-word with the verbalized root *gid*. In (35b) ABIL appears after PROG, in which case it requires the auxiliary verb *ol* and the presence of an additional TAM suffix *-ir*. Note that (35) bears a subtle difference in the flavor of modality, indicated by the translation: the lower abilitative modality encodes the meaning of *ability*, and the higher abilitative modality encodes the meaning of epistemic

possibility.[16] Nonetheless, they share one morphological commonality that ABIL is concatenated to a verbalized M-Word and to a TAM suffix. In other words, ABIL seems to show the distribution of the additive pattern of auxiliary verbs: the abilitative modality always involves the auxiliary verb *bil* (see the English progressive case in (1)).

The present analysis can account for the behavior of ABIL with its bipartite internal composition: the verbal part *bil* requires suffixation from the TAM domain (*i.e.*, (20)), and the suffixal part *-A* requires a verbalized M-Word (*i.e.*, Linear Adjacency), satisfied by *gid* in (35a) or by *ol* in (35b). In other words, *-A* is responsible for the suffixal behavior, and *bil* is responsible for the verbal behavior. Thus, both abilitatives in (35) are subject to the same requirements, despite the differences in syntactic position and semantic flavor. See (36) for illustration.

(36) a. *abilitative + progressive: gid-e.bil-iyor*

$\underset{\text{ADJACENCY}}{\text{gid}_{[\text{VM}]}\ \text{-e}_{[\text{ABIL}]}}\ \underset{\text{ADJACENCY}}{\textbf{bil}_{[\text{VM}]}\ \text{-iyor}_{[\text{PROG}]}}$

b. *progressive + abilitative + aorist: gid-iyor ol-a.bil-ir*

$\underset{\text{ADJACENCY}}{\text{gid}_{[\text{VM}]}\ \text{-iyor}_{[\text{PROG}]}}\ \underset{\text{ADJACENCY}}{\textbf{ol}_{[\text{VM}]}\ \text{-a}_{[\text{ABIL}]}}\ \underset{\text{ADJACENCY}}{\textbf{bil}_{[\text{VM}]}\ \text{-ir}_{[\text{AOR}]}}$

In (36), the abilitative morpheme is divided into two parts, with each part contributing to the respective properties. The linking morpheme *-e* or *-a* requires Linear Adjacency, and it is satisfied by the lexical verb in (36a) and by the auxiliary verb in (36b). The verbal part *bil* satisfies Linear Adjacency of additional TAM suffixes, *-iyor* in (36a) and *-ir* in (36b). The bipartite internal composition is further corroborated by the fact that the abilitative modality can actually be split by an intervening particle as shown in (37). This is in the same line with the observation in (31) where such an intervention is allowed for auxiliary verb periphrasis involving *ol*, highlighting their morphological parallelism.

(37) Gid-e-**de** bil-ir-sin.
go-ABIL-also AUX-AOR-2SG
'You can also go.'

The particle *de* is allowed in (37) as both *gid-e* and *bil-ir-sin* are concatenated M-Word units. To summarize, the abilitative morpheme consists of two parts, and this leads to its duality.

[16] Such an interpretational difference in the verbal spine is not exclusive to the abilitative modality in Turkish. For example, the *-mIş* morpheme encodes the *perfective* aspect or the *inferential past* tense depending on its configuration (Slobin & Aksu 1982). More discussion on this point will be provided in Section 5 with respect to the aorist and future morphemes as well.

Crucially, regardless of syntactic position, the abilitative modality retains the same morphological properties that are captured by the current analysis.

4.2 Predictions for Auxiliary Verb Insertion with Abilitatives

The analyses proposed by Bjorkman and Fenger predict different auxiliary verb patterns with respect to (35). Recall that the presence of *bil* is necessary in abilitatives, which suggests that ABIL exhibits the additive pattern of auxiliary verbs. In Bjorkman (2011), the additive pattern is ascribed to the interaction between head movement and upward agreement mitigated by the Relativized Minimality (Rizzi 1990): the [INFL] agreement occurs under the absence of an intervener with [*i*INFL]. If ABIL followed the additive pattern, however, it would predict (38) to be grammatical, contrary to the fact.

(38) *Gid-e.bil-im.
go-ABIL.AUX-1SG
(intended) 'I can go.'

The presence of *bil* should suffice for a derivation to converge, as there is no 'stranded' feature. The presence of an additional TAM suffix is not predicted under the assumption that the present tense is the most unmarked option, and is morphologically null with no [INFL] feature. Alternatively, one may conjecture that the abilitative modality consists of a single morpheme, putting aside the possibility of decomposition. Then, only one Agree operation must have taken place in (35a), as no auxiliary verb is involved. This suggests that ABIL lacks the [*i*INFL] feature due to its peculiarity. However, if this were the case, the absence of [*i*INFL] would predict a different auxiliary verb pattern for (35b). As no feature is 'stranded' in abilitatives, *ol* is not inserted to support the abilitative inflection. The predicted patterns in (39), however, are different from the attested one in (35b).

(39) a. *Gid-iyor-abil-sin.
go-PROG-ABIL-2SG
(intended) 'You are able to be going.'

b. *Gid-iyor-abil ol-ur-sun.
go-PROG-ABIL AUX-AOR-2SG
(intended) 'You are able to be going.'

(39) is ungrammatical regardless of the presence of the aorist morpheme *-ur*. This might be circumvented by positing two distinct abilitatives, one with the [*i*INFL] feature and one without. However, this would challenge the generalization regarding unmarkedness, which was linked to the absence of [*i*INFL] in Bjorkman (2011).

For the analysis in Fenger (2019; 2020), the pattern in (35a) can be accounted for since ABIL is hierarchically lower than the phase head Asp. This is indeed Fenger (2020)'s conjecture, since the low modality ABIL is included within the first syntactic word. The higher behavior of ABIL, on the other hand, may be accommodated if *bil* is an auxiliary verb that is to be present with ABIL, supporting the 'unhosted' upper inflection. See (40).

(40) a. Gid-ebil-iyor-sun.
go-ABIL-PROG-2SG
'You are able to be going.'

b. Gid-iyor **ol**-a **bil**-ir-sin.
go-PROG AUX-ABIL AUX-AOR-2SG
'It is possible that you are going.'

If this were the case, the same abilitative inflection would be constructed differently. In (40a) ABIL is a single morpheme, belonging to the first syntactic word in the lower phase. In (40b), however, ABIL is bipartite, with *-a* being hosted by the auxiliary verb *ol* and *bil* hosting the aorist inflection. Then, a question remains as to why the same exponent of an inflectional category shows a discrepancy in its internal composition depending on the configuration. Alternatively, if both abilitatives were a single morpheme, the predicted auxiliary verb pattern in (41) would be different from the attested one.[17]

(41) *Gid-iyor **ol**-abil **ol**-ur-sun.
go-PROG AUX-ABIL AUX-AOR-2SG
(intended) 'It is possible that you are going.'

Either way, the observation regarding two different abilitative configurations is hard to receive a uniform explanation.[18] Furthermore, the possibility of an intervening particle with the abilitative

[17] Note that more than two TAM morphemes may co-occur in a verb complex in Turkish, although constrained by the inflectional hierarchy. In such cases, each upper inflection is accompanied with respective auxiliary verbs, as Fenger (2020) predicts.

(i) *Multiple inflectional morphemes* (Fenger 2020: (106); adopted from Kornfilt 1997)
Bit-ir-iyor **ol**-malı **i**-di.
finish-CAUS-PROG AUX-NECE AUX-PAST
'S/he had to be finishing.'

In (i), each upper inflection, *-malı* and *-di*, is supported by different exponents of auxiliary verbs. I postpone the discussion on different exponents of auxiliary verbs (*i.e.*, *ol vs. i*) until Section 5.

[18] The predicted patterns illustrated here do not necessarily mean that this observation cannot be accounted for with previous accounts. Rather, alternative assumptions may be posited to accommodate such a pattern both for the stranded feature analysis and for the unhosted inflection analysis. In other words, it is not to exclude possible syntactic accounts for the same facts. I thank one of the anonymous reviewers for drawing my attention to this issue. For more discussion on this, see Section 6.3.

modality is not expected in Fenger (2020), since the low abilitative morpheme is always included in the first syntactic word. See (42).

(42) a. Gid-iyor-**da** ol-acak-sın.
go-PROG-also AUX-FUT-2SG
'You will also be going.'

b. Gid-e-**de** bil-ir-sin.
go-ABIL-also AUX-AOR-2SG
'You can also go.'

According to Fenger (2020), the presence of *da* in (42a) is expected since *gid-iyor* and *ol-acak-sın* are two distinct syntactic words. However, this conjecture is difficult to be maintained for (42b). Fenger (2020) treats *gid-ebil-ir-sin* as a single syntactic word, thus the particle intervention is not expected. (42b) then can only be accommodated at the cost of losing the parallelism between the phase boundary and syntactic word formation.

Linear Adjacency provides a unified explanation for the particle placement in (42). The attested patterns are again illustrated in (43), and the possibility of intervening particles naturally follows: they can attach to a concatenated M-Word unit.

(43) a. *progressive + future: gid-iyor ol-acak*

$$\underset{\text{ADJACENCY}}{\text{gid}_{[\text{VM}]}\ \text{-iyor}_{[\text{PROG}]}}\ \underset{\text{ADJACENCY}}{\mathbf{ol}_{[\text{VM}]}\ \text{-acak}_{[\text{FUT}]}}$$

b. *abilitative + aorist: gid-e.bil-ir*

$$\underset{\text{ADJACENCY}}{\text{gid}_{[\text{VM}]}\ \text{-e}_{[\text{ABIL}]}}\ \underset{\text{ADJACENCY}}{\mathbf{bil}_{[\text{VM}]}\ \text{-ir}_{[\text{AOR}]}}$$

Even though (43a) seems to consist of two units and (43b) of one unit, morphologically speaking they both consist of two concatenated M-Word units. Put differently, the unit of syntactic word in Fenger (2020) might as well be understood as a unit of morphological concatenation. Further implications regarding this issue will be discussed in Section 6.

4.3 Interim Summary

Linear Adjacency requires that a TAM suffix be concatenated to a verbalized M-Word, and this may be satisfied either by a lexical verb or by an auxiliary verb. This accounts not only for the overflow pattern of auxiliary verbs but also for the peculiar case of the abilitative modality. It thus retains the insight of the previous analyses that auxiliary verbs are sensitive to the complexity of inflection and are inserted at PF. The present analysis can also derive the simple inflection cases without any further assumptions.

5 Allomorphs of Auxiliary Verbs and Complex Inflection

This section focuses on different exponents of auxiliary verbs in Turkish with reference to the previous literature. The past progressive inflection will be the case in point, as it requires a different auxiliary verb. The past progressive inflection paradigm also follows the overflow pattern, but it crucially differs from the cases with *ol*, in that the auxiliary verb *i* is used instead of *ol*, and that the auxiliary verb seems to be optional. See (44).

(44) a. Git-**ti**-n.
go-PAST-2SG
'You went.' (past: no AUX)

b. Gid-**iyor**-sun.
go-PROG-2SG
'You are going.' (present progressive: no AUX)

c. Gid-**iyor** ***i***-**di**-n. / Gid-**iyor**-**du**-n.
go-PROG AUX-PAST-2SG go-PROG-PAST-2SG
'You were going.' (past progressive: AUX optional)

(44) follows the overflow pattern as only the complex inflection exhibits auxiliary verb periphrasis. However, the exponent of the auxiliary verb is *i*, not *ol*, and *i* seems to be optional in (44c) with different vowel harmony patterns. Such optionality of an auxiliary verb is not expected from any of the analyses introduced thus far.

Regarding this pattern, a two-fold claim will be entertained. First, different exponents of auxiliary verbs in Turkish are syntactically conditioned allomorphs (Sağ 2013; Fenger 2020). Second, the optionality of *i* is a surface illusion created by phonological operations (Kornfilt 1996). I begin with the question as to why there exist two different exponents of auxiliary verbs. See (45).

(45) a. *Future progressive inflection: ol*
Gid-iyor **ol**-acak-sın.
go-PROG AUX-FUT-2SG
'You will be going.'

b. *Past progressive inflection: i*
Gid-iyor **i**-di-n.
go-PROG AUX-PAST-2SG
'You were going.'

In (45a) the future tense *-acak* requires *ol*, and in (45b) the past tense *-di* requires *i*. This *i* is typically considered a copula that serves a purely functional role (Kornfilt 1997), and thus

cannot be used as a main lexical verb unlike *ol*.[19] The *i*-auxiliary is used with the past tense morpheme *-DI*, with the inferential past tense *-mIş*, and with the conditional morpheme *-sA*. All the morphemes that take the *i*-auxiliary are argued to be higher than the other inflectional categories in the syntactic hierarchy (Göksel 2001; Sezer 2001; Kabak 2007: *among others*). In this sense, the *i*-auxiliary is in complementary distribution with the *ol*-auxiliary.[20]

Following previous research on the issue (Göksel 2001; Kelepir 2001; Sezer 2001; Enç 2004; Kabak 2007; Sağ 2013, *among others*), I assume that PAST is syntactically higher than FUT: PAST spells out the T head, whereas FUT spells out the (higher) Asp head, which is lower than T but higher than (lower) Asp that spells out PROG.[21] This suggests that *i* and *ol* are syntactically

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[19] When used as a lexical verb, *ol* means 'to become'. If both auxiliary verbs were to be used as a lexical verb, they should in principle be able to combine with any tense. This is possible with *ol*, but not with *i* as shown in (i). In (ia) *ol* may co-occur with the past tense, but in (ib) *i* cannot co-occur with the future tense.

(i) a. Öğretmen **ol**-du-n.
teacher become-PAST-2SG
'You became a teacher.'

b. *Öğretmen **i**-yecek-sin.
teacher be-FUT-2SG
(intended) 'You will be a teacher.'

[20] Regarding this point, one anonymous reviewer pointed out that the past tense *-du* may actually take the auxiliary verb *ol*, with the following data:

(i) a. Gid-er **ol**-du-m.
go-AOR AUX-PAST-1SG
'I (habitually) went.'

b. Gid-er **(i)**-di-m.
go-AOR (AUX)-PAST-1SG
'I used to go.'

Note the subtle difference in interpretation: (ia) reports that the habitual going event took place (roughly paraphrased as 'it was the case that I (habitually) went'); and (ib) utters that the going event frequently took place in the past but not anymore. Given the difference, I speculate that *ol* in (ia) is used as a lexical verb. For a similar line of discussion on *ol* and *i* co-occurring with the past tense, see Van Schaaik (2001).

[21] There exists independent evidence that FUT and PAST spell out different syntactic heads in Turkish. One of such evidence is the different *φ*-agreement paradigms (Good & Yu 2005). In terms of the syntactic hierarchy, Sağ (2013), following Enç (2004), argues that different auxiliary verbs are conditioned by syntactic *zone*s. According to them, FUT belongs to zone 2 and PAST belongs to zone 3. This claim can also be demonstrated explicitly as they are not in complementary distribution:

(i) a. Gid-ecek i-di-m.
go-FUT AUX-PAST-1SG
'I was going to go.'

b. *Git-ti ol-acağ-ım.
go-PAST AUX-FUT-1SG
(intended, roughly) 'I will have gone.'

conditioned allomorphs of the same auxiliary verb in Turkish (Sağ 2013; Fenger 2020), only differing in their hierarchical positions in the derivation. Assuming the exponent of a syntactic item is realized at the level of Vocabulary Insertion (Embick & Noyer 2001; Arregi & Nevins 2008), the exponent of [AUX] is not yet specified at the point of its insertion, and may refer to its syntactic context. I will further discuss implications of this point in Section 6.1.

One more crucial observation regarding the auxiliary verb *i* is its optionality. In what follows, I will show that the optionality of *i* is a surface illusion created by phonological operations at PF, which derivationally follow the morphological requirement. This will be discussed with two foundational studies on auxiliary verbs in Turkish (Kornfilt 1996; Göksel 2001). I will introduce each in turn.

5.1 Kornfilt (1996) on the Deletion of the i-Auxiliary

Kornfilt (1996) argues that combinations of a lower inflection and an upper inflection (*e.g.*, PROG and PAST) always include a copula, either the full-fledged *i* or the reduced *y*. The reduced copula *y* undergoes deletion in *interconsonantal* environments, thus it does not surface in most cases. The optionality of *i* in (44c) is then reanalyzed as follows.

(46) a. Gid-iyor i-di-n.
go-PROG AUX-PAST-2SG
'You were going.'

b. Gid-iyor-∅-du-n.
go-PROG-AUX-PAST-2SG (y → ∅ / r __ d)
'You were going.'

(i) shows that PAST and FUT may co-occur in the same verb complex, with their relative order being fixed. The contrast between (ia) and (ib) indicates that PAST spells out a higher syntactic head than FUT. Note also that the meaning of the future tense morpheme in (ia) is that of the prospective aspect. Such being the case, it has been argued that the role of the future morpheme in Turkish is actually closer to that of aspect, syntactically lower than T. See Cinque (2001), Kelepir (2001) and Zanon (2014) for discussion.

Also, recall that the aorist morpheme encodes the meaning of habituality (here repeated as (iia)), which is a type of aspect. This can be further corroborated by the observation that it can co-occur with the past tense. (ii) indicates that the aorist morpheme *-er* spells out the (higher) Asp head as well.

(ii) a. Gid-er-∅-im.
go-AOR-PRES-1SG
'I (habitually) go.'

b. Gid-er i-di-m.
go-AOR AUX-PAST-1SG
'I used to go.'

I would like to thank an anonymous reviewer for drawing my attention to this issue. However, a detailed explanation on the hierarchy of the verbal spine would be beyond the scope of this paper. I refer the readers to some relevant research for discussion (Göksel 2001; Sezer 2001; Wilson & Saygın 2001; Kabak 2007).

In (46b), the reduced copula *y* is in the interconsonantal environment and deleted. This deletion process explains the surface optionality of *i*. Since every possible combination between aspect and tense inflection involving *i* happens to feed the deletion environment, *y*-deletion is inevitable.

The environment where *y* would surface is after a vowel, and the inflectional categories that end in a vowel and appear before *i* are the necessitative modality and the conditional morpheme. In the past necessitative inflection, *y*-deletion is predicted not to take place since it does not feed the deletion environment. The prediction is borne out: see (47).

(47) a. Git-meli **i**-di-n.
go-NECE AUX-PAST-2SG
'You had to go.'

b. Git-meli-**y**-di-n.
go-NECE-AUX-PAST-2SG
'You had to go.'

In (47), both the full-fledged *i*-auxiliary and reduced *y*-auxiliary surface, and this confirms that the *i*-auxiliary in (46) is obligatory, since the optionality is induced by phonological deletion (*y* is deleted interconsonantally). The same observation holds for the conditional morpheme *-sA*. See (48).

(48) a. Git-se **i**-di-n,
go-COND AUX-PAST-2SG
'If you had gone,'

b. Git-se-**y**-di-n,
go-COND-AUX-PAST-2SG
'If you had gone,'

In summary, any auxiliary verb required by Linear Adjacency is *morphologically* present, but may be *phonologically* absent due to its subsequent deletion. In the present context, I take *i* and *y* to be the allomorphs of the *i*-auxiliary: *i* and *y* may alternate, but only the latter is subject to deletion. More discussion on this will be provided in Section 6.1.

5.2 Göksel (2001) on the Morphology of the ol-Auxiliary

Also related to the present discussion is the morphological insertion of the *ol*-auxiliary in Göksel (2001). She argues that the behavior of the *ol*-auxiliary is not uniform in Turkish, and there are two constraints in play for the *ol*-insertion. First, consider the configuration where *ol* is found with a certain type of the inflection. I repeat the relevant data below:

(49) *Auxiliary verb ol in main clauses* (Göksel 2001: (16b))

Gelecek yıl sonunda Berlin-e git-miş **ol**-acağ-ız.
next year end Berlin-DAT go-PERF AUX-FUT-1PL
'We will have gone to Berlin by the end of next year.'

For Göksel (2001), *ol*-insertion takes place due to the slot type of each inflection. In the morpheme slots provided in Göksel (2001), both the perfective aspect *-miş* and the future tense *-acağ* compete for the same slot. However, it is semantically possible to realize both within the same verb complex, yielding the future perfective inflection. Therefore the auxiliary verb *ol* has to be *morphologically* inserted, so that both morphemes can co-occur. In other words, *ol*-insertion allows co-occurrence of two morphemes from the same slot. For this analysis, the past progressive case does not induce any significant issue since it involves the copula. More precisely, either PROG and PAST are from different slots (thus no auxiliary verb is required to begin with), or the presence of the copula mitigates the problem even if they are from the same slot. Both possibilities were entertained in Göksel (2001). I have argued that *i* and *ol* are the allomorphs of the same auxiliary verb. This is another way of looking at the explanation in Göksel (2001): the slot difference or the presence of copula is associated with the type of morphemes, which is conditioned by the morphosyntactic hierarchy. This idea thus elucidates the relationship between syntactic and morphological approaches: see Section 6.1 for further discussion on this.

The second case of *ol*-insertion is what she calls *compound verbs*, which contain a main verb and at least one auxiliary verb. They are morphologically complex, and the presence of an auxiliary verb is conditioned by the size of a verbal stem. Specifically, when the suffixes-per-word passes the upper limit, *ol* is inserted as a morphological buffer, and this is invisible to syntax and semantics.

(50) *Compound verbs in main clauses* (Göksel 2001: (14))

a. Gör-müş **ol**-abil-ir-miş-iz.
see-PERF AUX-ABIL-AOR-EV-1PL
'It might be the case that we have seen (it).'

b. Gör-ebil-iyor **ol**-malı-ymış-ız.
see-ABIL-PROG AUX-NECE-EV-1PL
'It seems to be the case that we should have been seeing (it).'

In these *compound verbs*, *ol* has to be inserted if the suffixes-per-word were to pass *three*. This is a well-formedness condition induced by the number of suffixes that a stem can bear. However, according to Linear Adjacency, the insertion of auxiliary verbs is induced by the requirement of TAM suffixes. If one looks closely at the data presented in (50), there is an *i*-auxiliary which is

deleted in (50a) and reduced in (50b). This is the pattern argued for the *i*-auxiliary in Kornfilt (1996). Also, in both cases the verb complex involves the abilitative modality, which is argued to show the dual behavior. (50), therefore, can be reanalyzed as follows, where each auxiliary verb is boldfaced.

(51) a. Gör-müş **ol**-a.**bil**-ir-∅-miş-iz.
see-PERF AUX-ABIL.AUX-AOR-AUX-EV-1PL
'It might be the case that we have seen (it).'

b. Gör-e.**bil**-iyor **ol**-malı-**y**-mış-ız.
see-ABIL.AUX-PROG AUX-NECE-AUX-EV-1PL
'It seems to be the case that we should have been seeing (it).'

Observe that in (51), without exception each TAM suffix is adjacent either to a lexical verb or to an auxiliary verb, which stands for a verbalized M-Word. Although the exponents of auxiliary verbs vary (*i.e.*, *ol*, *i*, *y* or *bil*) due to the type of TAM morphemes, they all abide by Linear Adjacency. Therefore, I follow the insight of Göksel (2001) in that the insertion of the *ol*-auxiliary is morphologically induced, but I depart from her analysis in that Linear Adjacency does not refer to any kind of *slot* competition or well-formedness of *word* units in verb complexes. Rather, auxiliary verb insertion takes place due to the requirement of each TAM suffix to be linearly adjacent to a verbalized M-Word.

6 Implications

Thus far, I have argued that the morphological requirement of TAM suffixes accounts for auxiliary verb periphrasis in Turkish. Some implications of the present analysis are in order. The first point endorses the idea that the present analysis is desirable as it nicely instantiates the order of PF-operations. The second point is elaborated with a conjecture that verb complexes in Turkish are linearized as a single syntactic unit, within which multiple morphological units are formed by concatenation. In this regard, Turkish differs from languages that exhibit similar auxiliary verb patterns (*e.g.*, Swahili). This will be extended to the third point: languages utilize different strategies for auxiliary verb periphrasis despite their surface similarity (*i.e.*, the overflow pattern). This section will also revisit possibilities of syntactic accounts for auxiliary verb periphrasis, highlighting the advantages of the present morphological analysis in comparison with alternatives.

6.1 Head Movement and PF-Operations

The status of *head movement* in strictly head-final languages like Turkish is not-so-well established, since it is string-vacuous and difficult to detect. One interesting conjecture in this regard was made by Fenger (2019; 2020) in which the phase system interacts with the possibility of head movement. Fenger assumes AspP as the phase domain in Turkish, following Harwood (2015)'s

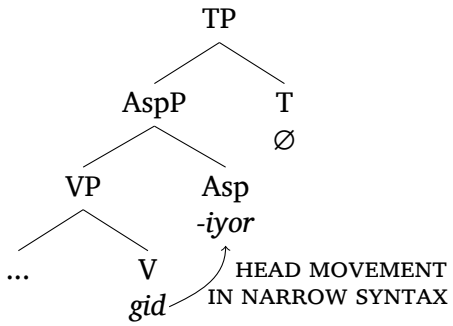
diagnostics. Positing this boundary is crucial as it is the domain of *syntactic word formation*. A complex head is created by head movement and stands for a syntactic word. Since further head movement is blocked by the phase boundary, the upper inflection has to be hosted by an auxiliary verb. This analysis nicely captures the overflow pattern, yet postulates an additional mechanism for the simple inflection cases involving T. Consider the simple inflection cases again in (52).

(52) a. Gid-iyor-sun.
go-PROG-2SG
'You are going.'

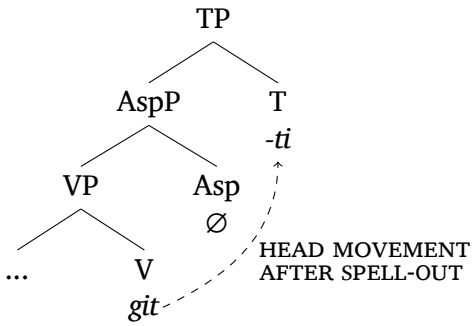
b. Git-ti-n.
go-PAST-2SG
'You went.'

In (52), an issue arises with the phase boundary, in that Asp (*i.e.*, PROG) is always inside the first phase, while T (*i.e.*, PAST) can never be. The past tense inflection in T is thus left without a host unless a further operation makes the syntactic word formation possible. This is done by *2nd cycle head movement* in Fenger (2020), illustrated in (53).

(53) a. *Simple progressive*



b. *Simple past*



Since it is not allowed to insert any auxiliary verb between the verb and the only TAM suffix in T (*i.e.*, **gid ol-du-n* or **gid i-di-n*), the simple past inflection is accommodated with an additional assumption about head movement. This 2nd cycle head movement takes place after SPELL-OUT as in (53b). However, it traverses the phase boundary only to derive a single unit without any auxiliary verb. For Fenger's analysis, this is necessary for deriving the correct phonological patterns: stress falls on the last syllable of a unit; and the same vowel harmony is retained within this unit. In the present analysis, the simple inflection cases receive a unified explanation with M-Word-level concatenation. They both involve one concatenation between two M-Words: a verbalized M-Word and a TAM suffix. Therefore, the morphological commonality in (52) can be captured without further ado, and the subsequent phonological patterns will also follow.

Fenger (2020) further argues that an auxiliary verb is inserted in the complex inflection to form another syntactic word in the upper domain so as to derive the correct stress assignment. This is illustrated in (54), where stress is marked with an acute accent.

(54) *Complex inflection with ol* (Fenger 2020: (70))

a. *[yaz-**ɪyor** **-a′cak**]
write-PROG -FUT
(intended) 'S/he will be writing.'

b. [yaz-**′ɪyor**] [***ol*-acak**]
write-PROG AUX-FUT
'S/he will be writing.'

(54a) is ill-formed since the predicted stress pattern (*i.e.*, falling on the last syllable of a word) fails to attain. If the *ol*-auxiliary is inserted, the correct stress pattern obtains since *yaz-ɪyor* now forms its own syntactic word which bears its own stress.[22]

For Fenger's analysis, syntactic word formation is necessary as it has consequences for phonological operations: *syntax* feeds *phonology*. In the present analysis, however, the insertion of auxiliary verbs is triggered by Linear Adjacency of TAM suffixes: *-acak* in (54) requires a verbalized M-Word. The crucial point is that this is not incompatible with the model of Fenger (2020), given that morphology intervenes between syntax and phonology (Halle & Marantz 1993; Embick & Noyer 2007; Bobaljik 2017). Insertion of auxiliary verbs at the morphological level correctly feeds stress assignment and vowel harmony: the auxiliary verb *ol* inserted at PF initiates its own phonological word domain. The stress assignment and the vowel harmony follow. Then, auxiliary verb periphrasis need not resort to syntax since *morphology* also feeds *phonology*. As a result, the different timings of head movement may be dispensed with.

Also, recall that Linear Adjacency is contingent on the morphological unit, M-Word, formed by head movement. The difference lies in the domain of phase: I assumed VoiceP to be the phase, differing from AspP in Fenger (2020). This way, the insight of Fenger (2019; 2020) can be retained in that the phase system interacts with head movement. However, head movement renders a morphological unit for concatenation in the present analysis, which is associated with auxiliary verb periphrasis at PF.

The same logic carries over to the optional auxiliary verb *i* cases. Below is the pattern with the *i*-auxiliary presented in Fenger (2020).

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[22] However, as Fenger (2020) herself notes, the progressive morpheme *-Iyor* presents an exception to the stress assignment pattern, as the stress falls on the first syllable of the morpheme. This behavior of *-Iyor* has been referred to as 'stress-bearing suffix' (for discussion, see Kabak & Vogel 2001; Inkelas & Orgun 2003).

(55) *Complex inflection with I* (Fenger 2020: (77a) and (79a))

a. [[kal-**ʻıyor**] **-du**]
stay-PROG PAST
'S/he was staying.'

b. [kal-**ʻıyor**] [***i*-di**]
stay-PROG AUX-PAST
'S/he was staying.'

I argued that the *i*-auxiliary is obligatory in both cases, and further that *i* may alternate with *y* (auxiliary reduction in the sense of Kornfilt (1996)), and *y* is subject to deletion in interconsonantal environments. Fenger (2020) provides another solution for this pattern: (55a) is underlyingly two units, but phonological conditions support its realization as a single unit. Assuming *y* as the underlying form, Fenger argues that *y* is deleted as in (55a), or *y* changes into *i* when it begins a syntactic word as in (55b). This is to derive the correct phonological patterns, but the same result obtains with the morphological requirement. The auxiliary verb *i* or *y* is *morphologically* present in both cases yet *phonologically* deleted only in (55a), and the stress assignment and vowel harmony pattern are correctly derived. Therefore, the morphological insertion that does not depend on syntactic word formation actually fares well with Fenger (2020)'s analysis.

6.2 Inseparability of Verb Complexes and Their Internal Composition

The claim that auxiliary verb periphrasis has to do with a morphological requirement in Turkish bears an implication for the morphosyntactic status of verb complexes in the language. At first glance, verb complexes may consist of multiple *word*-like units, which was the basic intuition of analyses such as Göksel (2001) and Fenger (2019; 2020). In some languages with the overflow pattern, *units* within a verb complex may be separated by a phrasal element like an adverb. One such language is Swahili, in which an adverb can intervene, thus separating a verb complex into two sub-parts.

(56) *Swahili: adverbs can intervene* (Pietraszko 2023: (47))

Ni-li-**kuwa** *tayari* ni-me-ki-soma.
1SG-PAST-AUX already 1SG-PERF-7O-read
'I had already read it.'

The verb complex in (56) consists of the upper part with the auxiliary verb (*ni-li-kuwa*) and the lower part with the lexical verb (*ni-me-ki-soma*), and it may be separated by the intervening adverb *tayari* 'already'. On the other hand, even though the auxiliary verb pattern looks alike, it is not possible to have an intervening adverb in Turkish. See (57).

(57) *Turkish: adverbs cannot intervene*

a. *Gid-iyor *sadece* ol-acak-sın.
go-PROG only AUX-FUT-2SG
(intended) 'You will only be going.'

b. *Gid-iyor *ayrıca* ol-acak-sın.
go-PROG also AUX-FUT-2SG
(intended) 'You will also be going.'

Similar to Swahili, the verb complexes in (57) consist of the lower part with the lexical verb (*gid-iyor*) and the upper part with the auxiliary verb (*ol-acak-sın*). However, Turkish crucially differs from Swahili in that no adverb or phrasal material can separate the verb complex. This suggests that verb complexes are *syntactically* inseparable in Turkish, but separable in Swahili: verb complexes in Turkish are linearized as a single syntactic unit, within which multiple morphological units may be formed by concatenation of M-Words. In this respect, it is worth revisiting the observation regarding focus particles. I repeat the relevant examples below with the *ol*-auxiliary and with the abilitative modality.

(58) a. Gid-iyor-**da** ol-acak-sın.
go-PROG-also AUX-FUT-2SG
'You will also be going.'

b. Gid-e-**de** bil-ir-sin.
go-ABIL-also AUX-AOR-2SG
'You can also go.'

In (58), the particle *da/de* can intervene not only between the units with the *ol*-auxiliary, but also between the two parts of the abilitative inflection. The behavior of such *verbal particles* in Turkish is different from phrasal materials like adverbs, in that their behavior is more clitic-like (Göksel & Özsoy 2003; Göksel & Kerslake 2005). The generalization is that verbal particles may attach to a concatenated M-Word unit, but cannot split such a unit. The placement of a focus particle *dA* indicates that both (58a) and (58b) consist of two morphological units. Further note that such verb complexes robustly resist any permutation in their respective order, illustrated in (59).

(59) a. Sinema-ya gid-iyor ol-acak-sın.
cinema-DAT go-PROG AUX-FUT-2SG
'You will be going to the cinema.'

b. *Sinema-ya ol-acak gid-iyor-sun.
cinema-DAT AUX-FUT go-PROG-2SG
(intended) 'You will be going to the cinema.'

(59) is in the same line with the observation that no phrasal material can split a verb complex into sub-parts. This is an expected outcome if the entire verb complex *gid-iyor ol-acak-sın* is linearized as a single syntactic unit with the fixed order, in a way analogous to the formation of head-chains. As a verb complex may consist of multiple morphological units, invervention is allowed with particles, but not with phrasal materials.

6.3 Different Strategies for Auxiliary Verb Periphrasis

One last point worth mentioning in this line of discussion is strategies for auxiliary verb periphrasis. Pietraszko (2023) argues that the overflow pattern in Swahili is accounted for with Cyclic Selection, which revives traditional approaches towards auxiliary verb periphrasis in that it involves *syntactic selection*, not *morphological insertion* of auxiliary verbs. Pietraszko (2023) claims that auxiliary verbs are selected under a mechanism that resembles Cyclic Agree (Béjar & Rezac 2009), according to which cyclic operations occur as a Last Resort. When an auxiliary verb is required, it merges in the specifier followed by morphological merger (*à la* Matushansky 2006). This correctly reflects the intuition that PF-insertion of auxiliary verbs is a Last Resort operation. Given the contrast in (56) and (57) on the adverb intervention, it might as well be the case that different languages may opt for different strategies for auxiliary verb periphrasis despite their surface similarity (*i.e.*, the overflow pattern). Swahili-type verbal periphrasis uses PF-repair for a syntactic failure (*à la* Bjorkman 2011) or Cyclic Selection (*à la* Pietraszko 2023), whereas Turkish-type verbal periphrasis is due to the morphological requirement of TAM suffixes. This thus extends the claim of Bjorkman (2011) that languages utilize different strategies for auxiliary verb periphrasis. That being said, there exist possible alternatives for auxiliary verb periphrasis in accordance with previous approaches. As alluded in Section 4.2, the observation regarding abilitatives may be revisited from syntactic accounts with some ancillary assumptions. I leave these possibilities open for now.

Relatedly, the present analysis mainly proposes a morphologically-driven constraint in deriving the auxiliary verb pattern in Turkish, but it was also pointed out that there are inevitably syntactic factors in play. The first case has to do with the behavior of TAM suffixes with respect to the lower domain suffixes such as passive or causative ones (see Section 3.2). This was accounted for with the notion of M-Word, which suggests that syntactic head movement feeds the formation of a morphological unit. The second case has to do with the hierarchical structure of the verbal spine (see Section 4 and 5). This results in different exponents of auxiliary verbs, and also in restrictions in the linear order of TAM morphemes. These factors being syntactic in their nature, there remains an interesting question as to how the syntactic composition of verb complexes possibly correlates with the linearization thereof, in relation with Fenger (2019; 2020)'s analysis. I leave this question for future research.

7 Conclusion

Auxiliary verb periphrasis in Turkish shows the overflow pattern, in which auxiliary verbs are present only in complex inflections. I propose to account for this with a morphological requirement dubbed Linear Adjacency, according to which a TAM suffix must be linearly adjacent to a verbalized M-Word to its left. This captures various empirical observations including the behavior of the abilitative modality in the language, and also provides a unified solution for the simple inflection cases without additional assumptions. Different exponents of auxiliary verbs are construed as syntactically-conditioned allomorphs, and the optionality of the auxiliary verb *i* is ascribed to an interaction between PF-operations. The observation indicates that verb complexes are linearized as a single syntactic unit, within which multiple morphological units may be formed by concatenation between M-Words. The present analysis further suggests that languages may opt for different strategies for auxiliary verb periphrasis, despite their surface similarity.

Appendix: Negation in Turkish

In Section 3.2, morphosyntactic composition of verb complexes in Turkish was illustrated in terms of the interaction with the causative and passive morphology. It was argued that causatives and passives spell out a syntactic head within the VoiceP domain, forming an M-Word together with a verbalized root. This was attributed to syntactic and semantic properties: causatives and passives encode a particular thematic relation with respect to verbs in argument structure. The behavior of negation in Turkish is worth mentioning in this regard, since its morphological behavior is parallel to the causative and passive morphology, despite syntactic and semantic differences.

The negation *-mA* is argued to occupy a relatively lower position in the verbal spine (Göksel 2001; Kelepir 2001; Kabak 2007, *among others*), and its distribution is roughly described as follows: *-mA* follows verb, causative and passive morphemes, and precedes all TAM morphemes (Kornfilt 1997).[23] Parallel to the causative or passive morpheme, the negation morpheme cannot make a declarative or interrogative utterance well-formed by itself. See (60).

(60) a. *Imperatives with negation*
Git-**me**.
go-NEG
'✓Don't go!'
'*S/he doesn't go.'

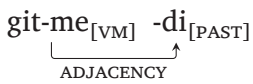
b. *Declaratives with negation*
Git-**me**-di.
go-NEG-PAST
'S/he didn't go.'

When a verbalized root forms a verb complex with the negation morpheme as in (60a), only the imperative interpretation is available. Once this sequence is suffixed by another TAM morpheme, a declarative interpretation obtains in (60b).

The distribution of *-mA* suggests that this negation morpheme, which spells out the Neg head, is lower than any Asp, T or Mod head. This leads to a rough generalization that the Neg head is located between the VoiceP domain and the lower AspP domain. In (60b), the past tense morpheme *-di* in T is linearly adjacent to the unit including the verbalized root *git* and the negation *-me*. Under the definition of M-Word and Linear Adjacency, the unit *git-me* counts as a single M-Word. This is schematized in (61).

[23] However, there exists one more piece of complication when negation co-occurs with the abilitative modality. I will discuss on this issue shortly.

(61) *negation + past: git-me-di*



With the assumption that the verbalized M-Word (as a complex head) is formed by head movement, the schematization in (61) suggests that head movement extends to NegP to form a single M-Word. Note that this is roughly related to the idea that the phase domain extends by head movement (Gallego 2006; 2010; den Dikken 2007).[24] It is also largely in line with the definition of phase suggested in Bošković (2014), according to which the phase head is defined as the highest projection in the extended projection.[25] Under the present conjecture, NegP, if present, is construed as the phase domain as it is the highest projection in the lower verbal domain. This is also parallel to the observation that the negation *-mA* must always accompany *verbalized* material to its left (Göksel & Kerslake 2005). For example, NEG cannot directly follow a TAM suffix in (62b).

(62) a. Git-**m**-iyor-sun.
go-NEG-PROG-2SG
'You are not going.'

b. *Gid-iyor-**ma**-sın.
go-PROG-NEG-2SG
(intended) 'You are not going.'

In such cases, a different type of negation must be used: *değil*. This negation morpheme is used when negating a verb complex formed below the TP domain, as *değil* can follow the progressive aspect, but never the past tense. This contrast is illustrated in (63), and the result is a cleft-like interpretation as indicated in the translation.[26]

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[24] However, it must be pointed out that the notion of phase sliding (Gallego 2006; 2010) or phase extension (den Dikken 2007) by head movement is crucially contingent on agreement or phrasal movement properties. I referred to this concept to illustrate a possibility of head movement extending the phase domain (here, Voice to Neg) in a way such that it feeds the formation of a morphological unit, but the detailed implementation based on this notion awaits further investigation.

[25] Bošković (2014) argues that some AspectPs behave as phases in some languages based on the behavior of extraction and ellipsis, and this aligns with the analysis in Fenger (2020), where AspP is the phase domain in Turkish.

[26] The same type of negation is used when negating non-verbal predicates in (i). This confirms the conjecture that the negation *-mA*, but not *değil*, requires verbalized material to its left.

(i) a. Yorgun **değil**-im.
be.tired NEG-1SG
'I am not tired.'

b. Öğretmen **değil**-im.
teacher NEG-1SG
'I am not a teacher.'

(63) a. Gid-iyor **değil**-sin.
go-PROG NEG-2SG
'It is not that you are going.'

b. *Git-ti **değil**-sin.
go-PAST NEG-2SG
(intended) 'It is not that you went.'

c. Gid-iyor **değil**-di-n.
go-PROG NEG-PAST-2SG
'It is not that you were going.'

This observation suggests that the *değil* morpheme occupies a syntactic Neg head above Asp, but below T. This is also in line with the literature that *-mA* and *değil* in Turkish syntactically exhibit different behaviors (Taylan 1986; Kornfilt 1997; Göksel & Kerslake 2005; Emeksiz 2010; Seydi 2020, *among others*). Similarly, Jeretič (2023) argues that *-mA* and *değil* correspond to 'verbal' negation and 'copular' negation, respectively. This then suggests that there exist two types of Neg heads in Turkish: *-mA* spells out the Neg head above VoiceP but below AspP; and *değil* spells out the Neg head above AspP but below TP. The crucial point for the present analysis is that the negation *-mA* is included in the same M-Word with heads in the VoiceP domain for the purpose of morphological concatenation. This claim captures the parallelism between the negation *-mA* and passive or causative morphology.

However, one more complication arises when negation interacts with the abilitative modality. In Section 4, it was shown that the abilitative morpheme in Turkish shows a kind of semi-lexical behavior, and this duality was attributed to the internally bipartite composition: the linking morpheme *-A* and the verbalized root *bil*. The argument that the suffixal part *-A* is responsible for the abilitative modality can be revisited with its behavior with the negation *-mA*. The abilitative modality may appear below or above the negation. When the abilitative modality appears above the negation, *bil* must surface. When the abilitative modality appears below the negation, however, *bil* must not surface.[27] This is illustrated in (64).

(64) a. Git-me-**yebil**-iyor-sun.
go-NEG-ABIL-PROG-2SG
'You could not go.' (ABIL ≫ NEG)

b. Gid-**e**-m-iyor-sun.
go-ABIL-NEG-PROG-2SG
'You are not able to go.' (NEG ≫ ABIL)

[27] I'd like to thank one anonymous reviewer for drawing my attention to this issue.

Note the subtle difference in interpretation of (64), which follows from their respective scope. Here, two pieces of observation are crucial regarding the absence of *bil*. First, the absence of *bil* correlates to the height of the abilitative modality: ABIL loses its bipartite nature only if it is under NEG. This is related to the generalization that verbal periphrasis obtains only in the TAM domain, which is captured by M-Word-level concatenation. But a question remains as to why the abilitative modality does not exhibit verbal periphrasis under the scope of negation. Second, the absence of *bil* is tied to the absence of additional suffixation, which is argued to be required by *bil*, not by *-A*. In (64b) *-A* seems to form an M-Word with the verbalized root *gid* and the negation *m* without *bil*, and this M-Word in turn concatenates with the progressive *-iyor* due to Linear Adjacency. The M-Word unit *gid-e-m* is thus formed by Subword-level concatenation within the complex head (see footnote 9). The pattern in (64) is schematized in (65). In (65a) ABIL stands for an M-Word (*ye* is its own terminal head), but in (65b) ABIL stands for a Subword (*e* is inside of the complex head).

(65) a. *negation* + *abilitative* + *progressive: git-me-ye.bil-iyor-sun*

git-**me**$_{[VM]}$ **-ye**$_{[ABIL]}$ bil$_{[VM]}$ -iyor$_{[PROG]}$

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b. *abilitative* + *negation* + *progressive: gid-e-m-iyor-sun*

gid-**e-m**$_{[VM]}$ -iyor$_{[PROG]}$

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Put simply, the syntactic height of ABIL seems to affect the morphological status of ABIL. Only when ABIL is under the scope of NEG, ABIL is included in the verbalized M-Word with *bil* being absent. Although the systematic correlation between the syntactic height and the morphological property can be captured by the current proposal, this pattern requires further investigation. I leave this open for future research.

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Competing interests

There is no competing interests to report.

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