

Pausal Forms and Prosodic Structure in Tiberian Hebrew*

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February 2019

Unless this question of the use of conjunctives with pausal forms can be resolved in agreement with Dresher's basic premises, there seems no reason to doubt that accents and vowels reflect distinct (though related) reading traditions.

Revell (2015: 15)

1. Introduction

Tiberian Hebrew (TH), the canonical dialect employed in the reading of the received biblical text, is characterized by the occurrence of PAUSAL FORMS, words that are marked by variations in vowel quality and/or word stress. These pausal forms occur at the ends of constructions that are cross-linguistically typically associated with prosodic units called INTONATIONAL PHRASES (Dresher 1994; DeCaen 2005).

To the biblical *textus receptus* the Tiberian scholars also added musical phrasing by means of complex systems of conjunctive and ranked disjunctive ACCENTS that, among other things, reflect the prosodic structure of each verse, indicating prosodic words (including clitic groups) and nested phonological phrases. We would therefore expect pausal forms to align with the phrasing indicated by the accents; in particular, we might expect pausal forms to systematically occur on particular disjunctive accents that mark the ends of intonational phrases.

As Revell has convincingly shown in many important publications on this topic (Revell 1980, 1981, 2015, among others), this is not what we find. In the words of Revell 2015: 11, 'lack of consistency between the vowels and the accents is endemic, at a low level, throughout the text.' Not only do we occasionally find pausal forms even on the most minor disjunctive accents, in roughly ten glaring cases we unexpectedly find the 'bizarre combination' of pausal forms apparently *in the middle* of a phonological phrase (Revell 2015: 6). How are we to explain these contradictions, which point to a mismatch between the distribution of pausal forms and the phrasing indicated by the accentuation?

First, we agree with the thesis stated by Revell (1980: 170):

It is clear, then, that the pausal forms were already fixed in the reading tradition when its received form was established by the masorettes. Consequently, their position in the text, and so the system of text division which they represent, must date from some earlier period.

* An earlier version of this paper was presented jointly at SBL 2018 in Denver. We thank the participants in the section Masoretic Studies: Vocalization and Accentuation for their comments and questions.

This must be the case, because the occurrence of pausal forms cannot be predicted from the accents. As Revell (2015: 1) puts it, ‘The Masoretic Text, then, evidently includes features, sometimes mutually contradictory, deriving from different stages of the reading tradition.’

This much appears to be irrefutable. Revell’s explanation for *how* this state of affairs came to be, however, is not as convincing to us. According to Revell (2015: 6), the apparent contradictions between prosodic phrasing and accentual phrasing in certain examples, and more generally, the unsystematic appearance of pausal forms with all sorts of accents, must reflect different ‘understandings’ of the text, even though the ‘difference in meaning between the two interpretations is slight’. Since there are instances where the accents seem to run roughshod over the pausal forms, it must be the case that the pausal forms were no longer recognized or appreciated for what they (originally) were: at the time that the accents were finalized, the pausal forms ‘must have been regarded simply as indeterminate variants of contextual forms’ (Revell 2015: 6); they were ‘superseded and their function forgotten’ (Revell 2015: 9).¹

A somewhat different view is expressed by Drescher (1994: 14):

Put in traditional terms, pausal forms follow neither the syntax nor the accents; but it is not necessary to suppose on this account that they derive from a distinct reading tradition. The reason for the inconsistent matching of pausal forms with accents is that the Tiberian representation has no means of consistently marking this level [i.e., the intonational phrase] of the prosodic hierarchy.

In the quote at the top of this article, Revell (2015: 15), in his generous comments on Drescher 1994, takes issue with the denial of a ‘distinct reading tradition’. Of course, there are different ways of understanding ‘distinct’. In this article, we elaborate on Drescher’s (1994) account and advance a theory of how pausal forms came to co-exist with a musico-prosodic structure that does not entirely suit them. We agree with Revell (2015) that pausal forms do not depend on the accents and must originate in a stage of the reading tradition prior to the fixing of the accents. In this sense, pausal forms and the accents can be said to arise from ‘distinct’ stages.

However, we do not think that it therefore follows that the pausal forms derive from a tradition that is *different* from the one that produced the accents, in the sense that there were two schools with different understandings of the text. This is because, as we will show, mismatches between pausal forms and accentual phrasing are *inevitable*, and are *crucially* due to the way the TH system of accents is designed. In other words, the mismatches are not necessarily due to different

¹ Implicit is the superiority of the vowel and stress patterns versus the accentuation. It is puzzling that the modern scholarly tradition discounts the accentuation as inferior, even though seminal Jewish commentators follow the accentuation (see Strauss Sherebrin 2013). After all, the practice of chanting poetry is as old as the iron-age prophecy and temple liturgy.

reading traditions with different understandings of the text or to ignorance about the nature of pausal forms, but rather to a basic flaw in the TH theory of prosodic structure. That is, while we cannot exclude the scenario put forward by Revell, we will argue that the vast majority of the mismatches between pausal forms and accents would have arisen *even if* the accentuators had been fully aware of the function of pausal forms, because the TH system of accents gave them no alternative way to handle them.

In section 2 we present a brief introduction to the theory of the prosodic hierarchy and show how it compares with the Tiberian accentual representation. In section 3 we argue that pausal forms occur at the ends of intonational phrases, and in section 4 we show why pausal forms *cannot* systematically align with the Tiberian system of accents. In §4.1 we discuss why pausal forms occur on lower disjunctives, with a focus on variation in Lev 8-9. In §4.2 we take up the thorny issue of pausal forms on conjunctive accents; our argumentation concentrates on the example of Deut 5:14,12 in contrast to the parallel of Exod 20:10,14, a major crux in Revell 2015: 4f, 13. Section 5 is a brief conclusion.

2. Prosodic representation: Prosodic levels in the Tiberian transcription

Theories of prosodic structure in the tradition of Selkirk (1978, 1984, 1986, 2011), Hayes (1989), Truckenbrodt (1999), and Nespor & Vogel (2007) posit that prosodic representation mediates the relationship between phonology and syntax. On this view, a PROSODIC HIERARCHY organizes the domains in which phonological rules operate. From the word level up, the units of the prosodic hierarchy are commonly supposed to have at least the levels shown in (1a):

- | | | | |
|------------------------------|--------------------------------|------------------------------|------|
| (1) Prosodic hierarchies | | | |
| a. Modern prosodic hierarchy | b. Tiberian prosodic hierarchy | | |
| Utterance | U | Verse | V |
| Intonational phrase | I | Hierarchy of disjunctive | Di |
| Phonological phrase | P | phrases, $i = \{0-3\}$ | |
| Prosodic word (plus clitics) | W | Prosodic word (plus clitics) | W |

The Tiberian transcription also encodes a prosodic hierarchy, shown in (1b). It marks the bottom and top of the hierarchy very systematically (Dresher 1994, 2013). At the top, the biblical verse plays the role of the utterance. Like an utterance, a verse may consist of a single complete sentence, but may also be less than a sentence (a sentence fragment or a list, for example) or more than a sentence. For purposes of this study, we will take the verse divisions as given.²

Prosodic words are set off by blank spaces. A *maqgef* ‘hyphen’ is used to join one or more grammatical words into a single prosodic word (called by some a clitic group). The principles governing cliticization are complex and intricately tied in

² That is, we are assuming that the verse divisions were fixed before the internal parsing of verses indicated by the accents. However, the evidence is not conclusive; see Dotan (2007) for discussion.

with the accentual division (Breuer 1982; Drescher 2009; Holmstedt & Drescher 2013). Whether a form is an independent prosodic word or a prosodically dependent clitic has implications for its phonology. For example, the accusative particle has the form תָּלָּ ׀*θ* and receives an accent when it is an independent prosodic word, and appears as תָּלָּ ׀*θ*- when it is cliticized to a following word.³

2.1 The TH hierarchy of disjunctive accents

Between the utterance (U) and the word (W), the TH transcription departs from the prosodic hierarchy in (1a). Rather than two distinct types of phrase—an intonational phrase and a phonological phrase—the Tiberian transcription parses each verse into a hierarchy of phrases. The Tiberian notation distinguishes two types of accents: a ranked series of disjunctives and the conjunctives that serve them. A CONJUNCTIVE ACCENT (C) on a word indicates that the word is part of the same phonological phrase as the word that follows it. A DISJUNCTIVE ACCENT (*Di*) indicates that a word is final in its phrase.

A phrase that ends in a disjunctive accent and which contains no other disjunctive accents is a MINIMAL PHRASE (MP; Strauss 2009). We identify the Tiberian MP with the phonological phrase P in the prosodic hierarchy. In the example in (2), the word וַיִּלְחָמוּ ׀ *vayyillō:ḥamú:* ‘and they fought’ has a conjunctive accent and forms a minimal phrase with the hyphenated בְּנֵי־יְהוּדָה *vanè:-jahu:ḏó:* ‘men of Judah’. The third word בִּירוּשָׁלַם *bi:rù:šó:lá:jim* ‘against Jerusalem’ makes up a second minimal phrase by itself.

(2) Conjunctive and disjunctive accents

וַיִּלְחָמוּ ׀ בְּנֵי־יְהוּדָה בִּירוּשָׁלַם ‘The Judites attacked Jerusalem’ (Judg 1:8)⁴

C	D2	D1
<i>(vayyillō:ḥamú:</i>	<i>vanè:-jahu:ḏó:)</i>	<i>(bi:rù:šó:lá:jim)</i>
and.they.fought	men.of-Judah	against.Jerusalem

The MP forms the domain for three phonological rules: spirantization, external gemination, and *nesiga* (rhythmic stress retraction). We will illustrate one of these rules, spirantization, which applies as indicated in (3).

(3) Spirantization

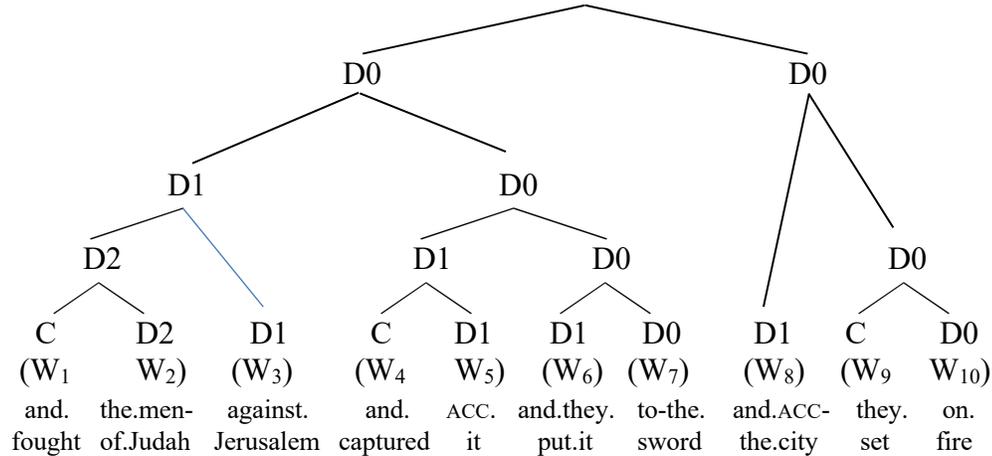
A non-emphatic non-geminate plosive consonant—one of /b, g, d, k, p, t/—is spirantized to [v, ɣ, ḏ, x, f, θ], respectively, following a vowel, within words, as well as across words that are in the same minimal phrase (Kautzsch 1910: 75–76; Joüon & Muraoka 2006: 76–77).

In the first phrase in (2), the initial consonant of the second prosodic word *vanè:-jahu:ḏó:* is spirantized to [v] from underlying /b/ because it follows a vowel that ends the preceding word in the same MP. By contrast, the initial /b/ of

³ Our phonetic transcriptions of TH forms follow Khan (1987, 2013b).

⁴ English free translations are from *Tanakh* (Jewish Publication Society 1988).

b. Phrasing of Judges 1.8



The verse has ten prosodic words, labelled W₁–W₁₀. There are seven MPs, indicated by the parentheses. Again, these MPs can be equated with the phonological phrase P, and serve as the domain of the three phonological rules mentioned above.

This verse is divided into two parts by D0 accents. The largest break comes after W₇, which ends the first half-verse. There is a maximum of two D0 accents in a verse. Every verse ends in a D0 accent; short verses may lack a second D0.⁶

The first half-verse, from W₁ to W₇, consists of five MPs. These phrases have an internal organization, whereby the first two MPs—(W₁ W₂) and (W₃)—are grouped together, and the next three MPs—(W₄ W₅), (W₆), and (W₇)—are grouped together. Thus, the main division in this half-verse comes after the second MP (W₃). Since the whole half-verse ends in D0, it must be divided by a D1 accent, which falls here on W₃. This D1 phrase is in turn divided by the D2 accent on W₂. This is the three-word phrase in (4).

2.2 Prosodic transformations in TH

Unlike the MP, the higher-level phrases are not associated with phonological rules; rather, they indicate how the MPs are organized. This hierarchical organization is important in determining the accentual phrasing. In the realization of the logogenic liturgical chant, various transformations were applied for prosodic and musical reasons (Wickes 1887; Cohen 1969; Breuer 1982; Price 1990).⁷ These trans-

⁶ Verses lacking an internal D0 are apt to occur in poetry; for example, every verse in Lam 5 has only a final D0. Short verses also occur in prose; see Ben-David (1984) for a study of pausal forms in verses with only one D0 in the twenty-one prose books.

⁷ For a generative syntax of the two TH accent systems (the poetic system of the three poetic books Job, Proverbs, and Psalms, and the prose system of the other twenty-one books), see Price (1990).

formations are sensitive to prosodic conditions that depend on the hierarchical organization of a verse.

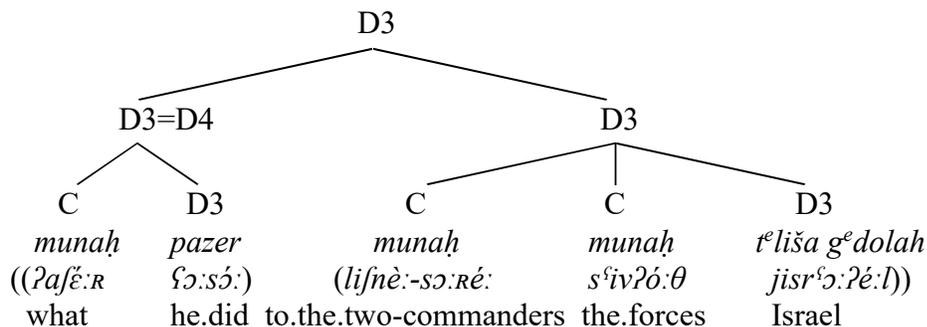
There are two kinds of transformation: division and simplification. In division, words that would ordinarily form a single MP are divided into two MPs (Breuer 1982: 108–27; Drescher 1994: 34–6). Division occurs at the higher levels of the prosodic hierarchy, and most commonly in the domain of D0. It corresponds to a slowing down of the reading in prominent prosodic positions (Janis 1987).

The converse of division is simplification (Cohen 1969; Breuer 1982: 50–82; Price 1990; Drescher 1994: 36–7, 44–7): words that would ordinarily form two or more separate MPs are combined into a single MP. When simplification occurs, a disjunctive accent is transformed into a conjunctive.⁸ Simplification amounts to a speeding up of the reading in prosodically subordinate parts of a verse.

In the accent system of the twenty-one prose books, simplification occurs more freely as one moves down the hierarchy: D0 and D1 accents are only rarely transformed; D2 accents are transformed in particular limited contexts; and D3 accents are frequently transformed. For example, the D3 accents *gereš* and *l^egarmeh* often become conjunctives when they are close to a following D2 (Breuer 1982: 50). Simplification also frequently affects subordinate D3 accents, that is, D3 accents that divide other D3 accents.

For example, the D3 accent *l^eliša g^edolah* is divided by the D3 *pazer*. This *pazer* is always transformed to the conjunctive *munaḥ* when it is immediately adjacent to the D3 it divides, and it is frequently transformed even when several words intervene between them (Breuer 1982: 74). Breuer gives the example shown in (6). The tree in (6a) shows what the phrasing would be in the domain of higher disjunctive accents; compare the phrasing of ‘what I did to the Egyptians’ in the domain of D0, shown in (7a). The label D3=D4 indicates that the D3 *pazer* is dividing a D3 domain, acting structurally (but not prosodically) like an accent that is one level lower than D3.

- (6) Transformation of D3 *pazer* that divides D3 *l^eliša g^edolah*
 a. 1 Kings 2:5 before transformation of *pazer* (Breuer 1982: 74)

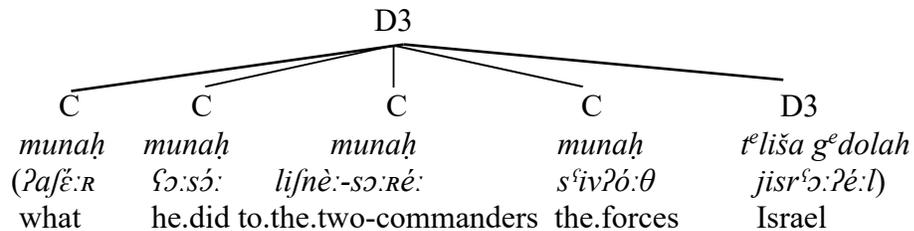


⁸ Price (1990: 36, 170) refers to such conjunctive accents as ‘virtual disjunctives’; though realized by a conjunctive accent, they retain a structurally disjunctive status. Thus, the phrase in the domain of such a transformed disjunctive continues to be divided as if the accent were still a disjunctive.

- b. After transformation (actual phrasing)

יִשְׂרָאֵל אֲשֶׁר עָשָׂה לְשֵׁנֵי-שָׂרֵי צְבָאוֹת

‘what he did to the two commanders of the forces of Israel’ (1 Kgs 2:5)

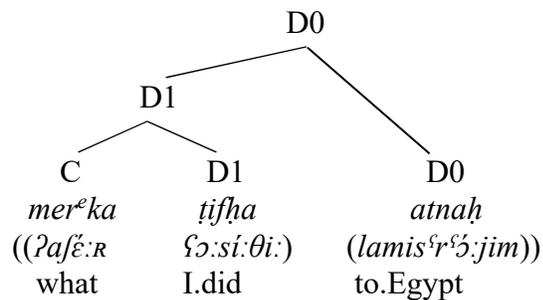


The second D3 phrase in (6a), the one ending in *ʔliša gʔdolah*, has already undergone a round of simplification (as well as cliticization of ‘to the two’); compare the more expansive phrasing in the domain of D2 shown in (7b).

- (7) Phrasing in the domain of higher disjunctives

- a. Object of the verb *ʕɔːs-* ‘did’ in a separate phrase

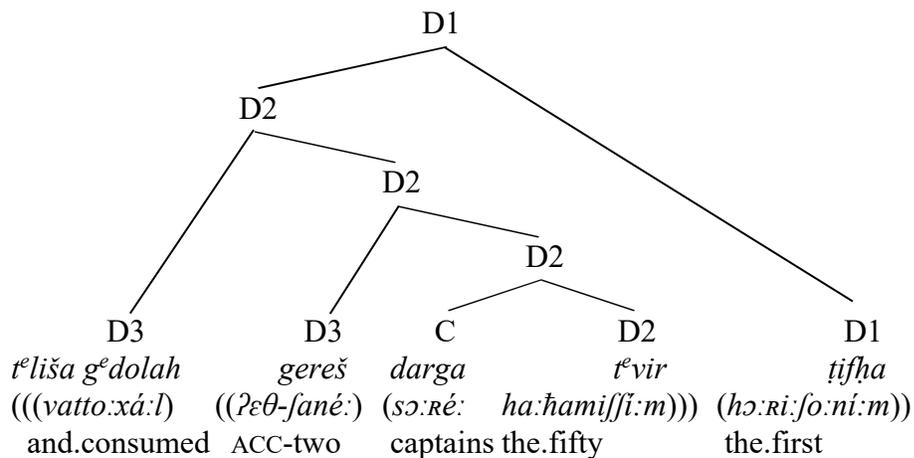
אֲשֶׁר עָשִׂיתִי לְמִצְרַיִם ‘What I did to the Egyptians’ (Exod 19:4)



- b. The number two in a separate phrase before *sɔːréː*

וַתֹּאכַל אֶת-שְׁנֵי שָׂרֵי הַחֲמִשִּׁים הָרִאשֹׁנִים

‘and consumed the first two captains of fifty’ (2 Ki 1:14)



In the system of accents used in the three poetic books, simplification occurs at all levels of the prosodic hierarchy when a disjunctive accent is adjacent to the disjunctive it is subordinate to (Breuer 1982: 222; Price 1990: 170). For example,

us. However, it has been observed that the ends of Is coincide with positions in which pauses may occur (Bierwisch 1966; Bing 1979; Nespor & Vogel 2007: Ch. 7). Therefore, we might expect pausal forms to be associated with the ends of Is.

The most obvious position where a pause can occur is of course at the end of an utterance. Within utterances, it has been noted that certain syntactic constructions usually form their own I-phrase. These include parenthetical expressions, non-restrictive relative clauses, certain adjunct clauses, vocatives, lists, and other such expressions (see Selkirk 1978, 1984; Nespor & Vogel 2007: 187–220). This set of constructions aligns nicely with the constructions in which pausal forms have been observed to occur. Thus, Revell (1980: 166) observes that about 75% of the pausal forms in Deuteronomy occur at the ends of clauses. Within clauses, pausal forms are used in lists; TH characteristically groups items in lists by twos or threes, with a pausal form at the end of each such grouping. Elsewhere, pausal forms ‘seem generally to occur at the end of the most significant part or “core” of the clause, and to divide it from less important phrases, often explanatory modifiers, which follow’. Clauses in Deuteronomy that end in a contextual form ‘are usually closely related to the following clause, and they are usually short’ (Revell 1980: 167). Revell (1980: 171–5) also observes that pausal forms within a clause occur in the same places as the interjection *nʔm yhwʔ* ‘declares the LORD’.

We have observed that a verb that precedes an object clause headed by the complementizer *ki*: ‘that’ tends to be in contextual form, as in (9a), whereas a verb preceding an adjunct clause headed by *ki*: ‘because, for, but’, etc., tends to be in pausal form, underlined in (9b).

(9) Two kinds of *ki*: phrase

a. Direct object clause headed by *ki*: ‘that’

כִּי שָׁמְעוּ כִּי־יֵאָכְלוּ לָהֶם:

‘for they heard *that* they should eat bread there’ (Gen 43:25)

((*ki*: *fə:mʕu:*)D1 ((*ki*:*-fə:m*)D1 (*jə:xlu:* *lə:ħem*)))D0
for they.heard *that*-there they.should.eat bread

b. Adjunct clause headed by *ki*: ‘but’

וְגַם אֶל־שֹׁפְטֵיהֶם לֹא שָׁמְעוּ כִּי זָנוּ אַחֲרַי אֱלֹהִים אֲחֵרִים וַיִּשְׁתַּחֲוּוּ לָהֶם

‘And yet they would not hearken unto their judges, *but* they went a whoring after other gods, and bowed themselves unto them’ (Judg 2:17)

((*wayá:m ʔel-fə:ftʕe:ħém*)D2 (*lə: fə:mé:ʕu:*)D1 ((*ki*: *zə:nú:*)D2 ...
and.yet to-their.judges not they.heard *but* they.whored ...

In (9a), the second instance of *ki*:, glossed as ‘that’, heads a clause that is the direct object of the verb ‘they heard’. An I-phrase boundary does not typically intervene between a verb and its direct object, and therefore the verb *fə:mʕu:* is in its contextual form. In (9b), the clause headed by *ki*:. is much less closely linked to the verb semantically, and presumably syntactically as well. We expect this kind of *ki*:. to begin a new I-phrase, causing the verb *fə:mé:ʕu:* to end the preceding I-phrase,

and indeed it is in pausal form. Note that despite this crucial difference in the phrasing, both verbs ‘hear’ are assigned the same D1 accent (*zaqef*).

I-phrases, hence pausal forms, are not entirely determined by syntax. The length of a phrase, as well as factors such as speech tempo, rhetorical pause, and emphasis play a role (Nespor & Vogel 2007: 193–205). The position of a phrase within the utterance (or biblical verse) as well as semantic factors might lead to variation in whether or not a particular construction ends in an I or in a P.

The phonology of pausal forms is also consistent with what we expect to find at the ends of I-phrases. We commonly find that words at the end of an I tend to be pronounced with some combination of higher stress and longer articulation. It appears that these factors were important in the creation of the special phonology of pausal forms. In (10) we list some typical differences between contextual and pausal forms.¹⁰

(10) Some contextual forms and their pausal counterparts

	CONTEXTUAL		PAUSAL		GLOSS
a.	אָמַרְתָּ <i>ʔa:má:rtɔ:</i>		אָמַרְתָּ <i>ʔa:mó:rtɔ:</i>		‘you.M.S said’
b.	שֶׁשׁ <i>ʃé:mɛʃ</i>		שֶׁשׁ <i>ʃɔ:mɛʃ</i>		‘sun’
c.	יָדָה <i>jɔ:lá:ð</i>		יָדָה <i>jɔ:ló:ð</i>		‘he.begot’
d.	יִשְׁמְרוּ <i>jɪʃmarú:</i>		יִשְׁמְרוּ <i>jɪʃmó:ru:</i>		‘they.M will observe’
e.	יָדְךָ <i>jɔ:ðxó:</i>		יָדְךָ <i>jɔ:ðé:xɔ:</i>		‘your. M.S hand’
f.	אֲנִי <i>ʔa:ni:</i>		אֲנִי <i>ʔa:nó:xi:</i>		‘I’
g.	וַיֹּאמֶר <i>vajjó:mer</i>		וַיֹּאמֶר <i>vajjo:má:r</i>		‘and.he.said’

In (10a, b, c), a stressed vowel *á:* or *é:* in the contextual form corresponds to pausal *ó:*. In (10d), the contextual form has a schwa (written *a*) followed by a stressed final syllable; in the pausal form the stress is on the penultimate syllable which has the vowel *ɛ* corresponding to the contextual schwa. The alternation in (10e) is similar, except that pausal stressed *é:* in the penult corresponds to the lack of a vowel (quiescent schwa) in the contextual form. In (10f), the contextual form has stress on the final syllable with no change in the vocalism. The stress alternation is reversed in (10g): here, the contextual form has penultimate stress and the pausal form has final stress, with a different vowel in the final syllable.

Though the motivation for these contextual ~ pausal alternations is obscured in the medieval Tiberian pronunciation, the general consensus is that the differences originated in the longer vowel length and heightened stress of forms in pause compared with contextual forms (see, for example, Blau 1981, 2010). Thus, the alternations in (10a, b, c) historically derive from stressed short /a/ or /i/ being lengthened in pause to /a:/, which subsequently became /ɔ:/.

¹⁰ For various classifications of pausal forms, see Goerwitz (1993), Ben-David (1990, 1995), and Revell (2015). Some forms, such as the second person masculine singular pronoun, display a three-way alternation: contextual אַתָּה *ʔa:ttá:*, ‘minor’ pause אַתָּה *ʔá:ttɔ:*, and major pause אַתָּה *ʔɔ:ttɔ:*. We will not be considering minor pause here (see Decaen 2005; Revell 2015: 28–30).

The form in (10d) originates from /ja+ʃmór+u/ with word stress on the penultimate vowel. In context (nonpausal positions), the word stress was not strong enough to preserve the penultimate vowel from reduction, with concomitant shift of the stress to the final syllable. In pause, the word stress was reinforced by the main phrase stress, and the penultimate vowel was lengthened, preserving it from reduction (Blau 2010: 154). A similar derivation accounts for (10e). In (10f), the stress shifted from the penultimate to the final syllable with reduction of the penultimate vowel. In these forms, according to Blau, the pausal forms maintain the older stress pattern and preserve a syllable that is reduced or deleted in context. The pausal form does not always preserve the original stress; in (10g), it is the contextual form that maintains the older stress on the penult, and in pause the stress shifts from the penult to a closed final syllable (Blau 2010: 155).

Though pausal forms show a variety of manifestations, it can be said in sum that the characteristic phonological processes that gave rise to pausal forms are heightened stress and vowel lengthening or resistance to reduction, that is, processes that might be expected to occur at the edges of I-phrases.

It is clear, then, from both the positions that pausal forms occur in and the nature of the phonological processes that created them, that pausal forms occur at the ends of I-phrases. But where is the I-phrase in the TH transcription?

4. Why pausal forms cannot align with the Tiberian system of accents

The answer is that *there is no I* in the TH transcription, and this is the crux of the matter. Rather than the two types of phrase distinguished in the modern prosodic hierarchy, I and P, the TH system employs what Wickes (1887) calls the CONTINUOUS DICHOTOMY, that is, the hierarchy of disjunctive accents. We might try to equate the D0 disjunctives with I; in fact, most pausal forms (~ 80%) do fall on a D0 accent. We would expect a D0 accent to mark the end of an I-phrase: the end of a verse, marked by the D0 *silluq*, almost by definition ends an I-phrase; and the main verse division, marked by the D0 *atnaḥ*, is very often associated with a major pause, for either grammatical or prosodic reasons.¹¹ The problem is that there is a maximum of two D0 accents for each verse. I-phrases, however, are not limited in this way: in a complex verse, for example, or a verse with a list, there can be multiple Is. We can try to include lower-level disjunctive accents as also representing I; but this would fail to account for the fact that these accents are more commonly associated with nonpausal forms.

¹¹ We are referring here to the twenty-one prose books; *atnaḥ* in the accent system of the three poetic books has a different status. The regular association of the D0 accents with pausal forms may have contributed to the view that pausal positions are systematically marked by the accents, contrary to what has been demonstrated by Revell. Indeed, Ben-David (1984) demonstrates that when *atnaḥ* is lacking and the major division in a verse is marked by the D1 *zaqef*, then pausal forms occur with this *zaqef* as if it were a D0 accent.

We have argued above that the various prosodic transformations—the division and simplification of phrases, and the associated change of conjunctives to disjunctives and disjunctives to conjunctives—must have originated in actual prosodic patterns in the living language that gave rise to the TH phrasing. It is these transformations that make the TH accents a flexible system capable of reflecting subtle aspects of phrasing. However, our hypothesis is that the prosody of the living language, like other languages, distinguished I-phrases from P-phrases. The biggest difference that we expect to find between the two is in the domain of simplification: a simple P-phrase boundary is weaker than an I-phrase boundary. There would be contexts in which a P boundary, but not an I boundary, would be cancelled as part of simplification.

Since the TH system does not distinguish I from P, we might expect it to treat Is as if they were Ps. The system is not capable of representing Is in whatever part of the prosodic tree that they may occur in due to the vagaries of the syntactic, semantic, and prosodic factors that are associated with Is. In §4.1 we will show why pausal forms cannot be consistently associated with particular disjunctive accents (except the D0 accents), and in §4.2 we will consider the more extreme cases of a pausal form on a conjunctive accent.

Before proceeding, we would like to briefly mention two possible sources of pause-accent mismatches that we will not be considering here. First, we set aside possible scribal lapses. For example, we find the pausal hypercorrection מִמַּעַל *mimmó:ʕal* ‘above’ at Job 3:4,8 in the Leningrad Codex. In this case, the superior Aleppo Codex has the correct nonpausal form מִמָּעַל *mimmá:ʕal*.

Second, we do not deny that there may be genuine examples of clashing readings in the text. Breuer (1992) has collected a number of such cases (see Strauss Sherebrin 2013 for discussion), and Revell (2015: 21–2) mentions a number of verses in which the distribution of pausal forms might suggest a different verse division than the one suggested by the accents. A key element of this type of mismatch is the existence of an *alternative* phrasing that would resolve the mismatch; that is, the accents give one way of phrasing the verse, and the pausal forms suggest a different, but *equally possible*, phrasing that the accentuators could have chosen.

As we will see, the cases we will be considering, which account for the majority of cases of pausal forms on lower disjunctives and conjunctives, are not resolvable in this way, and are indeed ‘endemic’ to the TH system itself.

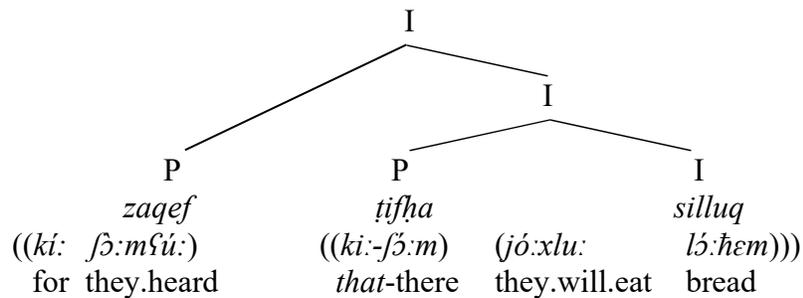
4.1 Pausal forms on lower disjunctive accents

Consider again the two examples in (9): in (9a), there is a small break after the verb ‘heard’ (a P-boundary), and the verb is in contextual form שָׁמַעַי *ʕá:mʕú:*; in (9b), there is a more significant break after this verb (an I-boundary), and the verb is in pausal form שָׁמַעַי *ʕá:mé:ʕu:*. In (11) we give the phrasing of these verse portions indicated by the accents (only disjunctive accents shown) in tree form, and indicate the hypothesized P and I phrases. Despite this crucial difference in the phrasing, both verbs ‘heard’ are assigned the same D1 accent (*zaqef*). This is because both verbs stand at the main division of a D0 phrase, and a D0 phrase must be divided

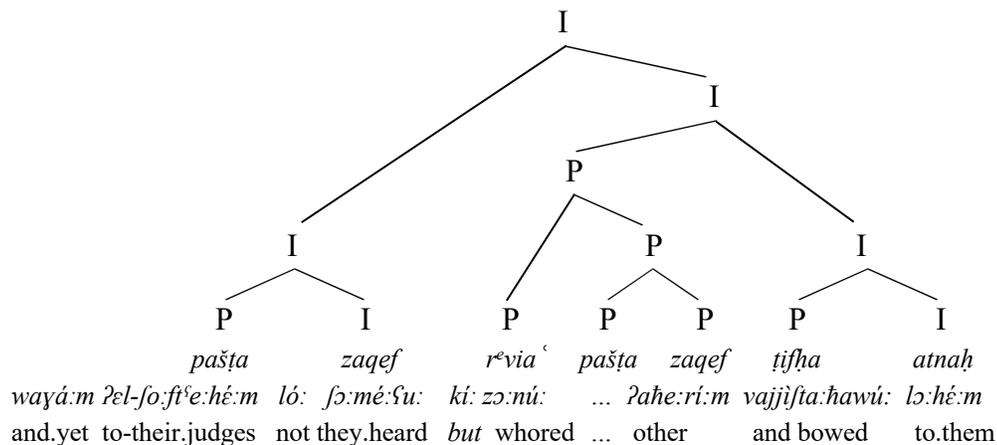
by a D1 accent. These structures clearly show the RELATIVE value of the accents emphasized by commentators going back to Wickes (1887). In this system, the difference between a P-phrase and an I-phrase cannot be indicated.

(11) I-phrase and P-phrase both marked with D1 *zaqef*

a. Gen 43:25



b. Judg 2:17



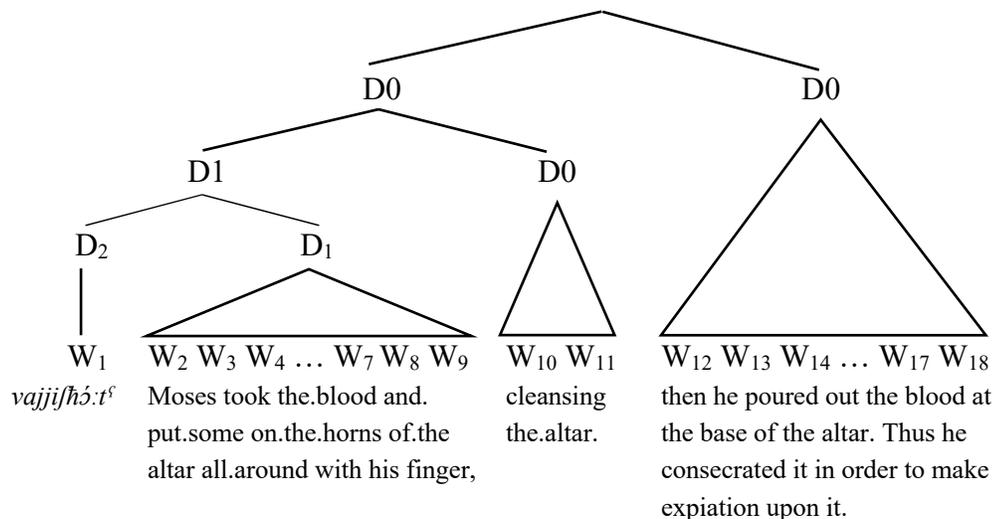
Consider next the Levitical expression $\text{וַיַּجְיִחְסֹׁתְ} \text{ vajji}f̄ħó:t̄^s$ 'and it was slaughtered' in pause with stressed [ó:]. This occurs three times, all in Lev 8, in verses 15,1, 19,1, and 23,1; compare the nonpausal form $\text{וַיַּגְיִחְסֹׁתְ} \text{ vajji}f̄ħá:t̄^s$ with stressed [á:], which occurs elsewhere (three times in Lev 9, in 8,5, 12,1, and 18,1; also twice in Jeremiah, in 39:6,1 and 52:10,1). The three pausal forms are sentences in their own right, word-sentences as it were, and so we expect the pausal form terminating its own I-phrase. In contrast, the nonpausal forms are not sentences. Rather, the verb takes an overt object, and does not coincide with the right edge of an I-phrase.

If the word-sentence $\text{vajji}f̄ħó:t̄^s$ terminated a verse, it would be assigned the D0 *silluq* as befits a word that is final in an I. However, it does not appear verse finally in our text. In the three occurrences in Lev 8, it appears verse initially. We are thus confronted by the unusual phenomenon of a major break right at the beginning of a verse.

In Lev 8:19, the word-sentence terminates the first half-verse, as shown in (12). As such, it receives the D0 *atnaħ*. In this verse, then, the end of the I-phrase coincides felicitously with a D0 accent.

(14) Phrasing of Lev 8:15

וַיִּשְׁחֹט וַיִּקַּח מִדָּמַי אֶת־הַדָּם וַיִּתֵּן עַל־קַרְנוֹת הַמִּזְבֵּחַ סָבִיב בְּאַצְבָּעוֹ וַיִּסְמָא אֶת־הַמִּזְבֵּחַ
וְאֶת־הַדָּם יָצַק אֶל־יְסוּד הַמִּזְבֵּחַ וַיִּקְדֹּשׁהוּ לְכַפֵּר עָלָיו:



In summary, the three verses are shown together in (15). The intuition embodied by contemporary prosodic theory is that the initial word is *equally* an I-phrase in all these verses, irrespective of how much material follows. The continuous dichotomy, which is otherwise correct in its assumption that phrasing is based on dependencies that involve the entire verse, cannot assign I-phrases to a consistent set of accents.

(15) Three verses with an initial pausal form

- a. Lev 8:19
(And it was slaughtered.)_I **D0** (Moses dashed the blood against all sides of the altar.) **D0**
- b. Lev 8:23
(((And it was slaughtered.)_I **D1** (Moses took some of its blood and put it on the ridge of Aaron's right ear,)) **D0** (and on the thumb of his right hand, and on the big toe of his right foot.) **D0**
- c. Lev 8:15
((((And it was slaughtered.)_I **D2** (Moses took the blood and with his finger put some on each of the horns of the altar,)) **D1** (cleansing the altar,)) **D0** (then he poured out the blood at the base of the altar. Thus he consecrated it in order to make expiation upon it.) **D0**

4.2 Pausal forms on conjunctive accents

In a small number of extreme cases, a pausal form, which indicates that a word is at the end of its I-phrase, is assigned a *conjunctive* accent, which indicates that a word is medial in its phrase. Revell (2015: 4n5) lists 27 such tokens. Of these, he marks 9 as questionable. For example, Ps 119:43,9 לַמִּשְׁפָּטָה lamifpɔ:tʰé:xɔ: and Ps 119:149,5 לַמִּשְׁפָּטָה kamifpɔ:tʰé:xɔ: look like pausal forms in the singular; however,

in both cases, the forms are understood as ‘judgements’ in the *plural*, and thus not subject to pausal variation.¹²

We find an additional five tokens to be questionable on the grounds that it is unlikely that the pausal form marks the end of an I-phrase. For example, 1 Sam 7:17 has pausal $\text{וַיִּשְׁפֹּט} \text{ } \text{f}\acute{o}:\text{f}\acute{o}:\text{t}^{\text{f}}$ ‘judged’ immediately preceding a short direct object, a very unlikely environment for an I-phrase boundary (16a); indeed, the preceding verse has the nonpausal form of the same word in a very similar context (16b).¹³

(16) Verb in pausal form before direct object

a. Unexpected pausal form

$\text{וַיִּשְׁפֹּט} \text{ } \text{אֶת־יִשְׂרָאֵל}$ ‘and there too he would judge Israel’ (1 Sam 7:17)

$((\text{va}\text{f}\acute{o}:\text{m})\text{D1} \quad (\text{f}\acute{o}:\text{f}\acute{o}:\text{t}^{\text{f}} \quad \text{ʔ}\varepsilon\theta\text{-jisr}\acute{o}:\text{ʔ}\acute{e}:\text{l}))\text{D0}$
and.there he.judged ACC.Israel

b. Expected nonpausal form

$\text{וַיִּשְׁפֹּט} \text{ } \text{אֶת־יִשְׂרָאֵל}$ ‘and acted as judge over Israel’ (1 Sam 7:16)

$(\text{va}\text{f}\acute{o}:\text{f}\acute{a}:\text{t}^{\text{f}})\text{D2} \quad (\text{ʔ}\varepsilon\theta\text{-jisr}\acute{o}:\text{ʔ}\acute{e}:\text{l})\text{D1}$
and.he.judged ACC-Israel

Leaving aside questionable cases, we are left with eleven tokens of pausal forms in plausible pausal contexts (that is, where we would expect an I-phrase boundary), of which Revell (2015) treats five directly: Deut 5:14,12, Isa 65:1,8, Mal 1:6,8 and 1:6,13, and Ezek 17:15,11.¹⁴ Though they are very few, they nevertheless cannot be dismissed as errors, and require some explanation. It is cases such as these that we will be concerned with here.

Though a pausal form on a conjunctive accent amounts to a contradiction, it does not necessarily stem from different reading traditions, or from a lack of understanding on the part of the accentuators of the function of pausal forms, as Revell (2015) concludes. Rather, we propose that such contradictions are *by-products* of the continuous dichotomy and the rules of simplification discussed in §4.2 that transform disjunctive accents into conjunctive ones.

¹² This interpretation is reflected in the Masoretic list Mm 2028: ‘5 times written defectively’.

¹³ Fixity of pausal idiom appears to be the explanation for the conspicuous exception $\text{וַיִּשְׁפֹּט} \text{ } \text{אֶת־אֲרֶץ־עוֹלָם}$ ‘and earth’, a pausal form that appears in Isa 65:17,6 and Prov 25:3,3, both times in close connection to a following word that would appear to rule out an I-phrase boundary. It is the subject of Masoretic note Mm 3640: ‘three times exceptionally [vɔ], else all in the [fixed] idiom ‘heavens and earth’ [in pause]’ (the third exceptional token with [vɔ] is found in Isa 26:19,13 on disjunctive D1 *tifha*).

¹⁴ In addition to the verses mentioned above these include Isa 32:11,5, Isa 49:18,10, Mic 3:11,12, Ps 3:9,5, Ps 47,5,9, and Ps 119:125,2.

Consider the portion of Deut. 5:14 in (17), a long verse which contains a long list.¹⁵ The pausal forms are underlined.

(17) Portion of Deut. 5:14: A pausal form on a conjunctive accent

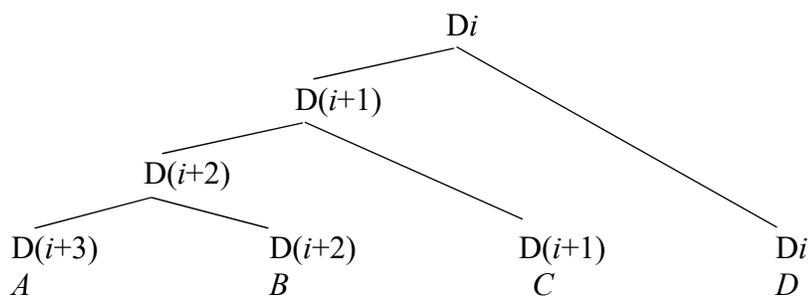
לֹא תַעֲשֶׂה כָּל־מְלָאכָה אֲתָה וּבִנְךָ־וּבִתְךָ וְעַבְדְּךָ־וְאִמְתְּךָ וְשׁוֹרְךָ וְחֲמֹרְךָ וְכָל־בְּהֵמָתְךָ
וְגֵרְךָ אֲשֶׁר בְּשַׁעְרֵיךָ לְמַעַן יָנוּחַ עַבְדְּךָ וְאִמְתְּךָ כָּמֹךָ:

	<i>List</i>	<i>Accent</i>
you shall not do any work—		D3 <i>pazer</i>
you, your son or <u>your daughter</u> ,	(A)	C <i>munah</i>
your male or <u>female slave</u> ,	(B)	D3 <i>t^eliša g^edolah</i>
your ox or your ass, or any of <u>your cattle</u> ,	(C)	D2 <i>r^evia</i> ´
or the stranger in your settlements,	(D)	D1 <i>zaqef</i>
so that your male and female slave may rest as you do.		D0 <i>silluq</i>

The main division of the verse portion in (17) is after ‘your settlements’; as this accent divides a D0 phrase, it is assigned the D1 *zaqef*. Accordingly, all the rest of the verse is now in the domain of this D1. Moreover, everything after ‘work’ is part of a list. In TH, lists are typically grouped into twos and threes, and the final item in each group receives a pausal form (‘your settlements’ has no special pausal form). The list in (17) has four main members: the first item, labeled *A*, itself contains three items (you, your son, your daughter); the second member, *B*, has two (your male slave, your female slave); the third, *C*, has three (your ox, your ass, any of your cattle); and *D* has one item that comprises three words (lit. ‘and your stranger that is in your settlements’).

Lists are typically parsed as left-branching structures, as shown in (18). In a left-branching structure, disjunctives get progressively weaker proceeding from right to left; that is, an item earlier in the list occurs on a lower disjunctive (with a higher index) than a later item.

(18) Phrasing of lists in Tiberian Hebrew



The last item in the list in Deut 5:14, item *D* in (17), ends on D1; therefore, plugging in the other items predicts, correctly, a D2 accent on item *C*, and a D3 accent on item *B*. According to the formula, the accent on item *A* should be D(3+1)

¹⁵ There is no relevant distinction between the ‘lower’ and ‘upper’ cantillation in our example. The only difference is in the D0: in the lower cantillation, it is *silluq* (the verse ends here); in the upper cantillation, it is *atnah* (the verse goes on).

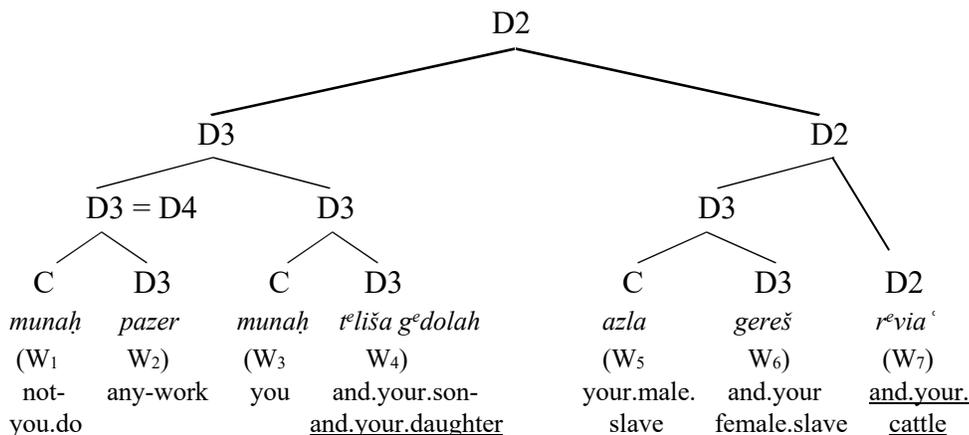
(21) Portion of Exod 20:10 (upper cantillation)

לֹא תַעֲשֶׂה כָּל־מְלָאכָה אֲתָהּ וּבְנֶיךָ־וּבָתֶּךָ וּבְיָמֶיךָ וּבְיָמֵי בְשֻׁעֶיךָ

	<i>List</i>	<i>Accent</i>
you shall not do any work—		D₃ <i>pazer</i>
you, your son or <u>your daughter</u> ,	(A)	D₃ <i>t^liša g^edolah</i>
your male or female slave, or <u>your cattle</u>	(B)	D₂ <i>r^evia^ˈ</i>
or the stranger in your settlements,	(C)	D₁ <i>zaqef</i>

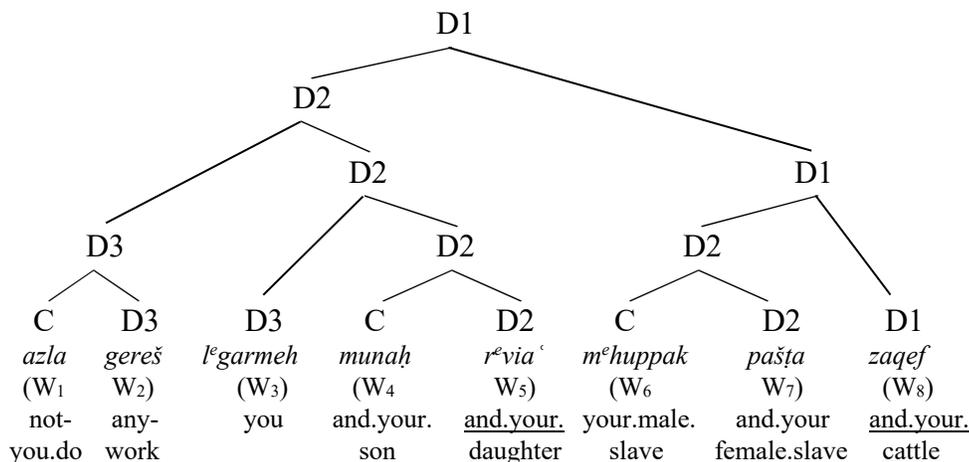
This parallel passage differs in two ways. Obviously, ‘your daughter’ no longer is assigned a conjunctive accent: here in the upper reading it is the D3 *t^liša g^edolah*. The bizarre combination of pause and conjunctive has vanished! Second, ‘female slave’ is no longer aligned with the end of an I, and so is no longer in pausal form. Breuer (1982: 72) parses this verse (which he numbers Exod. 20:9) in the upper cantillation; a detailed tree based on his parse is given in (22).

(22) Phrasing of a portion of Exod 20.10 (upper cantillation)



The hierarchical structure of this list is revealed even more transparently in the accentuation of the lower cantillation (23), in which the verse is shorter, and the pausal ‘your daughter’ is assigned the D2 accent *r^evia^ˈ*.

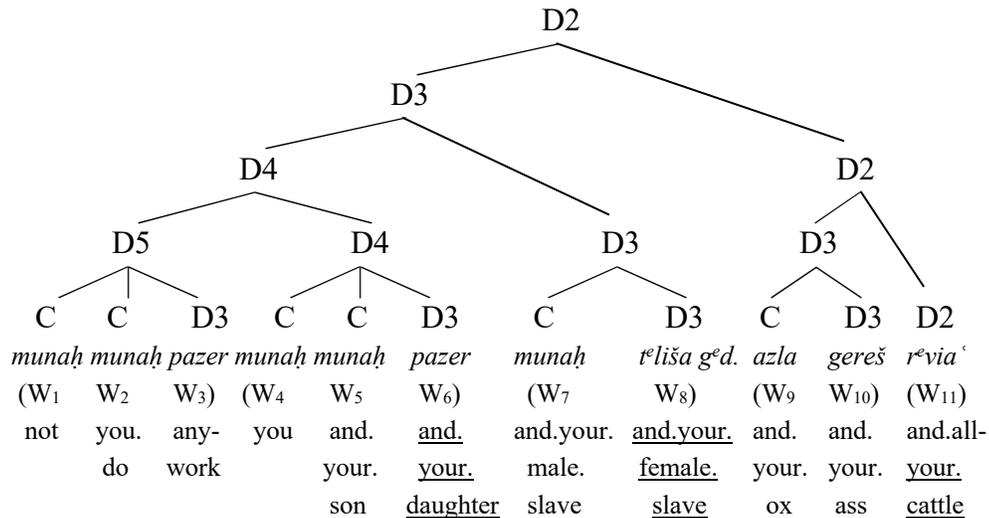
(23) Phrasing of a portion of Exod 20:10 (lower cantillation)



Because the last list item ‘and your stranger who is within your settlements’ ends in D0 (not shown in (23)), all the disjunctive accents move up one grade, and so we have no D3 accents dividing D3 accents, which obscures the hierarchical structure. Notice also that ‘your son’ is no longer cliticized in the lower cantillation, because the prosody is less compressed at higher levels in the prosodic tree.

Now that we have seen ‘your daughter’ assigned disjunctive accents in both readings of Exod 20:10, let us return to the problematic conjunctive on this word in Deut 5:14, and pursue our hypothesis that it is a transformed disjunctive. In (24), we give our hypothesized untransformed structure of the tree in (20).

(24) Phrasing of (20) before transformation of D3 to C



In the transformed structure in (20), ‘and your male slave’ is cliticized to ‘and your female slave’, forming one prosodic word. If this cliticization takes place independently of the transformation of *pazer*, then the transformation is obligatory, because the *pazer* is adjacent to the following *t^eliša g^edolah*. In (24) we have made the more conservative assumption that ‘and your male slave’ is not joined to ‘and your female slave’ with *maqgef*, causing the *pazer* to be separated from the following disjunctive by one word. Thus, we cannot say that that the same list structure that yields the upper and lower cantillation in Exod. 20.10 will *inevitably* result in a conjunctive *munah* on the pausal form ‘and.your.daughter’; but it is very likely.

It remains to explain why ‘your female slave’ is pausal $\text{va:}\rho\text{am}\dot{\omega}:\theta\acute{\epsilon}:\chi\omega$: at Deut 5:14,14 but nonpausal $\text{va:}\rho\text{am}\dot{\omega}:\theta\chi\acute{\omega}$: at Exod 20:10,14. The difference is correlated with a change in the way the list elements are grouped: in Deut 5:14, the servants are grouped with the family (presumably after being grouped by themselves in the untransformed structure), whereas in Exod 20:10 they are grouped with the cattle. Revell (2015: 5) comments that the difference possibly reflects ‘a change in the position of servants in the society, which took place between the fixing of the vowels in the reading-tradition and the fixing of the accents’. That is, the grouping in Exod 20:10, where the servants are with the cattle and pausal ‘your daughter’ is final in its group, reflects the older grouping; in Deut

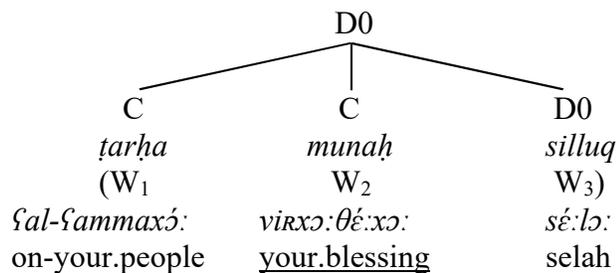
5:14, the servants were promoted to join the family members, stranding ‘your daughter’ with a pausal form in a nonpausal position in the middle of grouping. ‘The two traditions were separate, each meaningful on its own’ (Revell 2015: 13).

This proposal seems to us to be unnecessary. The key difference between the two lists is that in Exod 20:10 the animals are represented by one item (‘your cattle’), whereas in Deut 5:14 there are three (‘your ox’, ‘your ass’, and ‘all your cattle’). Certainly, the choice of detailing the types of livestock (Deut) or not (Exod) is extralinguistic, and this choice may or may not be meaningful. But *once* that decision is made, the formal TH constraint of grouping items by twos and threes suffices to account for the changed position of the servants. In Exod 20:10, as shown in (21), group *A* and *B* each have three items. By contrast, in Deut 5:14 (17), the family group (*A*) has three items, and the animal group (*C*) has three items. Thus, the servants must form a group of two by themselves (*B*); then the continuous dichotomy and the rules of simplification require groups *A* and *B* to be combined in this verse.

As a final example we will consider Ps 3:9,5, which is an example of a pausal form on a conjunctive accent in the poetic books.

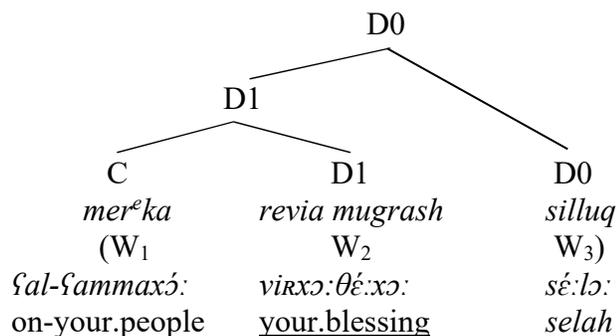
(25) Phrasing of a portion of Ps 3:9

עַל־עַמִּי בְרַכְתָּהּ סֵלָה: ‘Your blessing be upon your people! *Selah*.’



In (25) we find pausal בְרַכְתָּהּ *virxɔ:θé:xɔ:* on the conjunctive *munah*. We have seen the accent sequence *tarḥa munah silluq* in (8b), where *munah* is the transformation of *r^evia* ‘*mugraš*’ when it stands next to *silluq*. That is, this *munah* is ‘virtual disjunctive’ standing in place of the D1 *revia mugrash* (26), whose transformation is obligatory in this context.

(26) Phrasing of a portion of Ps 3:9 before the transformation of *revia mugrash*



We observed above that this transformation has the effect of avoiding a sequence of adjacent disjunctives, resulting in a more fluid reading. This works

well in Ps 22:27 (8), where an internal P boundary before the last word ‘forever’ is not necessary. It does not work so well in Ps 3:9, where there is a strong I-boundary, marked by a pausal form, before the last word, *selah*, which is not a part of the preceding sentence at all.¹⁶ However, the transformation of *revia mugrash* is not sensitive to the difference between P and I, and therefore proceeds in this example, also, with the result that the pausal form ends up on a conjunctive accent.

It follows that the appearance of a pausal form on a conjunctive accent, though seemingly contradictory, is nevertheless the logical result of applying the iron rule of the continuous dichotomy and the attendant rules of simplification that transform disjunctive accents into conjunctive ones. We leave the reader to consider whether this mode of explanation also extends to the other verses with pausal forms on conjunctive accents, listed above and in note 14, as we would argue.

5. Conclusion

We agree with Revell’s (2015: 6) conclusion that ‘the vocalization (including the stress patterns of the words) was fixed in the reading tradition first, and the melody marked by the accents came into use later.’ This is necessarily the case, because the distribution of pausal forms cannot be derived from the placement of the accents. However, it does not follow that the vocalization, including the pausal forms, derives from a different reading tradition from the one that created the accents. Nor does it necessarily follow that the lack of coordination between the pausal forms and the accents indicates that the function of the latter was no longer apparent to the Tiberian scholars.

Of course, we have not excluded these scenarios. It is an empirical question to what extent the accentuators appreciated the significance of the contextual ~ pausal alternants. Our claim here is that the mismatches we have discussed between the pausal forms and the accents are not *in themselves* sufficient grounds to draw conclusions about this issue, because they have another explanation.

As Aronoff (1985: 28) writes in connection with the Tiberian transcription, ‘any orthography must ... involve a linguistic theory’. In other words, the Tiberian transcription is not a pure record of recitation *per se*, but is filtered through a theory, in this case, the continuous dichotomy, the hierarchy of disjunctive accents, and the transformation rules involved in the division and simplification of phrases. The Tiberian theory of prosody is capable of reflecting subtle prosodic distinctions and in general provides one of the most detailed prosodic representations of an extended

¹⁶ Pausal forms do not always precede *selah*; for example, Ps 32:4,10 has contextual $\text{רָיָה} \text{qá:jis}^{\text{f}}$ ‘summer’ before *selah*. This may indicate that an I boundary did not always have to occur before *selah*. Another possibility is that the crucial difference between Ps 3:9,5 and Ps 32:4,10 is the type of word before *selah*. Ben-David (1984, 1995) observes that words of type (10e), like $\text{vixx}:\theta\acute{e}:x\text{w}$:, in which the stressed vowel of the pausal form corresponds to a reduced or deleted vowel in the contextual form, appear in pausal form more readily than words of type (10a–c), like qá:jis^{f} (pausal $\text{רָיָה} \text{qá:jis}^{\text{f}}$).

text ever devised. Crucially, however, this theory of prosody does not have a way of systematically marking I-phrases.

We have argued that the Tiberian system of accents, because it does not distinguish between P-phrases and I-phrases, simply does not have the means of ensuring that pausal forms will be systematically assigned to certain accents in a predictable way. To preserve the pausal forms from prosodic subordination (that is, from appearing on lower disjunctives and conjunctives), the Tiberian scribes would have had to develop a dedicated set of accents that could be assigned to phrases ending in pausal forms, thus mimicking our contemporary division of phrases into P-phrases and I-phrases. It may not have been a trivial task to incorporate such accents into the Tiberian system; be that as it may, they did not do it.

The fact that the Tiberian scribes nevertheless recorded pausal forms even when they did not fit well with the accents is evidence that their over-riding goal was to faithfully and precisely represent the recitation tradition as they received it, and that ‘the distribution of pausal forms is, in fact, due to the generally accurate preservation of an ancient tradition.’ (Revell 1980: 179).

References

- Aronoff, Mark. 1985. Orthography and linguistic theory: The syntactic basis of Masoretic Hebrew punctuation. *Language* 61(1): 28–72.
- Ben-David, Israel. 1984. צורות הפסק בפסוקים מחוסרי אתגחתא שבכ"א ספרים [Pausal forms in verses lacking the 'etnaḥta' in the twenty-one books]. *Textus* 11: 51–63.
- Ben-David, Israel. 1990. כוחן של תבניות דקדוקיות לצור צורות הקשר וצורות הפסק במקרא [The capacity of grammatical patterns to generate contextual and pausal forms in Biblical Hebrew]. *Leshonenu* 54: 279–99.
- Ben-David, Israel. 1995. צורות הקשר וצורות הפסק בעברית שבמקרא [Contextual and pausal forms in Biblical Hebrew]. Jerusalem: Magnes Press.
- Bierwisch, Manfred. 1966. Regein für die Intonation deutscher Sätze. *Studia Grammatica 7: Untersuchungen über Akzent und Intonation im Deutschen*, ed. by Manfred Bierwisch, 99–201. Berlin: Akademie-Verlag.
- Bing, Janet. 1979. Aspects of English prosody. Doctoral dissertation, University of Massachusetts, Amherst.
- Blau, Joshua. 1981. On pausal lengthening, pausal stress shift, Philippi's Law and rule ordering in Biblical Hebrew. *Hebrew Annual Review* 5: 1–13. Reprinted in Joshua Blau, *Topics in Hebrew and Semitic linguistics*, 36–49. Jerusalem: Magnes Press, The Hebrew University, 1998.
- Blau, Joshua. 2010. *Phonology and morphology of Biblical Hebrew*. Winona Lake, IN: Eisenbrauns.
- Breuer, Mordecai. 1982. טעמי המקרא בכ"א ספרים רספרי אמ"ת [The Biblical accents in the twenty-one books and in the three books]. Jerusalem: Mikhlala.
- Breuer, Yoḥanan. 1992. מחלרקת ניקוד וטעמים בחלוקת פסוקים [Dissonance between Māoretic accentuation and vocalization in verse division of the biblical text]. In ספר היובל לרב מרדכי ברויאר: אסופת מאמרים במדעי היהדות, כרך א [Rabbi Mordechai Breuer festschrift: Collected papers in Jewish studies], ed. by Moshe Bar-Asher, vol. 1, 191–242. Jerusalem: Academon.
- Cohen, Miles B. 1969. *The system of accentuation in the Hebrew Bible*. Minneapolis, MN: Milco Press.
- DeCaen, Vincent. 2004. The Pausal Phrase in Tiberian Aramaic and the reflexes of *i. *Journal of Semitic Studies* 49(2): 215–224.
- DeCaen, Vincent. 2005. On the distribution of major and minor pause in Tiberian Hebrew in the light of the variants of the second person independent pronouns. *Journal of Semitic Studies* 50(2): 321–327.
- Dotan, Aron. 2007. Masorah. *Encyclopaedia Judaica*. 2nd edition, ed. by Michael Berenbaum and Fred Skolnik, vol. 13, 603–56. Detroit, MI: Macmillan Reference USA.
- Dresher, B. Elan. 1994. The prosodic basis of the Tiberian Hebrew system of accents. *Language* 70(1): 1–52.
- Dresher, B. Elan. 2009. The word in Tiberian Hebrew. In *The nature of the word: Essays in honor of Paul Kiparsky*, ed. by Kristen Hanson & Sharon Inkelas, 95–111. Cambridge, MA: MIT Press.
- Dresher, B. Elan. 2013. Biblical accents: Prosody. In Khan (2013a).

- Goerwitz, Richard L. 1993. Tiberian Hebrew pausal forms. Doctoral dissertation, University of Chicago.
- Gussenhoven, Carlos. 2004. *The phonology of tone and intonation*. Cambridge: Cambridge University Press.
- Hayes, Bruce. 1989. The prosodic hierarchy in meter. In *Rhythm and meter*, ed. by Paul Kiparsky & Gilbert Youmans, 201–260. Orlando, FL: Academic Press.
- Holmstedt, Robert D., and B. Elan Dresher. 2013. Clitics: Pre-Modern Hebrew. In Khan (2013a).
- Janis, Norman. 1987. A grammar of the Biblical accents. Doctoral dissertation, Harvard University.
- Jewish Publication Society. 1988. *Tanakh: A new translation of the Holy Scriptures according to the traditional Hebrew text*. Philadelphia: JPS.
- Jouön, Paul & Takamitsu Muraoka. 2006. *A grammar of Biblical Hebrew*. Rev. ed. Rome: Pontifical Biblical Institute Press.
- Kautzsch, Emil (ed.). 1910. *Gesenius' Hebrew grammar*. Translated by E. Cowley. Oxford: Clarendon Press.
- Khan, Geoffrey. 1987. Vowel length and syllable structure in the Tiberian tradition of Biblical Hebrew. *Journal of Semitic Studies* 32(1): 23–82.
- Khan, Geoffrey (ed.). 2013a. *Encyclopedia of Hebrew language and linguistics*. BrillOnline Reference Works. <https://referenceworks.brillonline.com/browse/encyclopedia-of-hebrew-language-and-linguistics>.
- Khan, Geoffrey. 2013b. Tiberian reading tradition. In Khan (2013a).
- Ladd, D. Robert. *Intonational phonology. Second edition*. Cambridge: Cambridge University Press.
- Nespor, Marina & Irene Vogel. 2007. *Prosodic phonology*. Dordrecht: Foris.
- Price, James D. 1990. *The syntax of Masoretic accents in the Hebrew Bible*. Studies in the Bible and early Christianity, no. 27. Lewiston, NY: Mellen.
- Prince, Alan S. 1975. The phonology and morphology of Tiberian Hebrew. Doctoral dissertation, MIT, Cambridge, MA.
- Revell, E. J. 1980. Pausal forms in Biblical Hebrew: Their function, origin and significance. *Journal of Semitic Studies* 25(2): 165–179.
- Revell, E. J. 1981. Pausal forms and the structure of Biblical poetry. *Vetus Testamentum* 31(2): 186–199.
- Revell, E.J. 2015. *The pausal system: Divisions in the Hebrew Biblical text as marked by vowelings and stress position*. Edited by Raymond de Hoop & Paul Sanders. Sheffield: Sheffield Phoenix Press.
- Selkirk, Elisabeth O. 1978. On prosodic structure and its relation to syntactic structure. Paper presented at the Conference on Mental Representation in Phonology. In *Nordic Prosody II*, ed. by Thorstein Fretheim, 111–140. Trondheim: TAPIR, 1981.
- Selkirk, Elisabeth O. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge, MA: MIT Press.
- Selkirk, Elisabeth O. 1986. On derived domains in sentence phonology. *Phonology Yearbook* 3: 371–405.

- Selkirk, Elisabeth. O. 2011. The syntax–phonology interface. In *The handbook of phonological theory*, 2nd edn, ed. by John A. Goldsmith, Jason Riggle, & Alan C. L. Yu, 435–84. Oxford: Blackwell.
- Strauss, Tobie. 2009. השפעת גורמים פרוזודיים וגורמים אחרים על חלוקת טעמי כ"א ספרים [The effects of prosodic and other factors on the parsing of the biblical text by the accents of the 21 books]. Doctoral dissertation, The Hebrew University of Jerusalem.
- Strauss Sherebrin, Tobie. 2013. Biblical accents: Relation to exegetical traditions. In Khan (2013a).
- Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30(2), 219–55.
- Wickes, William. 1887. *Two treatises on the accentuation of the Old Testament*. Reprinted with a prolegomenon by Aron Dotan. New York, NY: Ktav, 1970.