INITIAL CONSONANT CLUSTERS IN
HEBREW AND ARAMAIC

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THE feminine numeral 'two' has been a perennial problem of Biblical Hebrew orthography and phonology. It is the only word in Hebrew with a dagesh in the second consonant following an initial letter marked with a shewa. It thus must violate at least one of the following principles, which are generally assumed to govern the phonetic interpetation of Hebrew orthography:

1. The rule of spirantization applies invariably: non-geminate *b g d k p t* are always spirantized if preceded by a vowel, even a reduced vowel.
2. A reduced vowel (written with shewa or ḥatef) can occur only in an open syllable, never in a closed syllable, even one closed by a long consonant.
3. There are no syllable-initial consonant clusters; hence a shewa symbol under the first letter of a word must indicate a reduced vowel, not zero.

The word for 'two' begins with *š*-shewa-*t*-dagesh, and both the shewa and dagesh are multivalued symbols: a shewa symbol can indicate a reduced vowel or no vowel at all, and a dagesh can indicate a geminate (long) consonant or simply the stop character of one of the spirantizable letters. Two choices times two variables gives four logical possibilities, and most of these possibilities have been proposed by scholars in the past. According to one's choice of which principle to violate, one will consider this word to have been phonetically *šətáyim* (violates principle 1),[1] *šəttáyim* (violates principle 2 or 3),[2] *štáyim* (violates principle 3);[3] the only logical combination which does not seem to have its advocates is *šttáyim* (violates principle 3). H. Bauer and P. Leander raise the possibility that the spelling is designed to indicate a choice between two readings, *šəθáyim* and *šittáyim*.[4] Occasionally it has been suggested that the unusual spelling indicates a more unusual pronunciation; for instance, "It may well be . . . a phonetic reality best indicated as *š:t-*."[5] In this paper, it will be argued on comparative and typological grounds that the most likely interpretation is simply *štáyim*.

[1] Carl Brockelmann, *Grundriss der vergleichenden Grammatik der semitischen Sprachen,* vol. 1 (Berlin, 1908; repr. Hildesheim, 1966), p. 485; Paul Joüon, *Grammaire de l'hébreu biblique* (Rome, 1923; repr. 1965), p. 262.

[2] Jacob Barth, in *Orientalische Studien: Theodor Nöldeke . . . gewidmet . . . ,* vol. 2 (Giessen, 1906), pp. 792–93, cited in W. Gesenius, *Gesenius' Hebrew Grammar,* ed. E. Kautzsch, trans. and rev. by A. E. Cowley, 2d ed. (Oxford, 1910; 1970), pp. 288–89, n. 1.

[3] Gesenius, *Grammar;* Joshua Blau, *A Grammar of Biblical Hebrew* (Wiesbaden, 1976), p. 76; Thomas O. Lambdin, *Introduction to Biblical Hebrew* (New York, 1971), p. 135; Meïr M. Bravmann, "Hebrew *štayim* in the Light of Syriac and Turcic," *American Academy for Jewish Research, Proceedings* 21 (1952): 1–2.

[4] Hans Bauer and Pontus Leander, *Historische Grammatik der hebräischen Sprache des Alten Testamentes* (Halle, 1922; repr. Hildesheim, 1962), p. 622.

[5] Stephen A. Kaufman, "On Vowel Reduction in Aramaic," *JAOS* 104 (1984): 91.

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An analogous problem exists with regard to Syriac words based on the number 'six':
štā 'six' and *štīn* 'sixty', and in the East Syriac tradition also *štīθāyā* 'sixth'. These have
optional variant forms with an epenthetic initial vowel: *ʾeštā* 'six', *ʾeštīn* 'sixty'. To
these we must add the word for 'drink', where the form with the epenthetic vowel is
the only one attested: Biblical Aramaic *ʾištīw* 'they drank', Syriac *ʾeštī* 'he drank'.[6]

While these Hebrew and Aramaic words all show the same synchronic form, they
have disparate histories, and so a historical analysis will not give us an unequivocal
interpretation of the orthography. Therefore, we shall turn to a general, typological
line of reasoning, and come back to the history afterwards.

Speech sounds differ in their sonorousness. Vowels are more sonorous than con-
sonants; among consonants, the voiceless obstruants *p t k* are the least sonorous, the
nasals, liquids, and glides *m n r l y w* the most; and the fricatives and sibilants in
between. Here are a few examples of sounds arranged according to the sonority
hierarchy:

most sonorous					least sonorous
ieaou	*yw*	*rl*	*mn*	*šszfv*	*pbtdkg*

Surveys of many languages have shown that at the beginnings of syllables sounds tend
to be ordered from the least to the most sonorous; in contrast, at the ends of syllables
sounds are most frequently arranged in order of decreasing sonority.[7] For example, at
the beginning of a syllable in English a *tr* cluster occurs (as in *tree*) but not *rt* because *r*
is more sonorous than *t*. At the end of a syllable the opposite is true: *rt* occurs (*cart*)
but no *tr*. Similarly, *sl* occurs initially (*sleep*) but *ls* finally (*false*). The only exceptions
in English are clusters of *s* plus a stop; the *sp, st, sk* in *spill, stop, skip* violate the
generalization that initial clusters are of increasing sonority. Furthermore, these may
be followed by a third consonant (*spring, splash, spew* [spyū], *stray, scream, square*
[skwēr], *skew* [skyū]); no other three-consonant clusters occur at the beginning of
syllables in English. Thus not only do the initial *s*-stop clusters occur, standing outside
the generalization that initial clusters increase in sonority, but also the *s*-stop combina-
tion counts as only a single consonant in that it allows another consonant to follow.[8]
The sibilants *s* and *š* are of the same sonority; in German, it is *š* rather than *s* that has
the special freedom to occur in clusters: *spät* [špēt], *stark* [štark], *Strasse* [štrāsə] in
violation of the sonority principle.

According to principle 3 above, Hebrew and Aramaic are assumed to have had no
consonant clusters at the beginnings of syllables. However, the anomalous spellings
cited above suggest that initial *št*- clusters did in fact occur in these languages, in
precisely these words. Thus there were isolated exceptions to principle 3, but this is not

[6] Alongside the masoretic Hebrew *štáyim* there
are forms of the number 'two' with epenthesis in a
tenth-century Tiberian grammatical essay and in
Phoenician; Rudolf Meyer, *Hebräische Grammatik*,
4 vols. (Berlin, 1966–72), vol. 1, pp. 79–80; vol. 2,
pp. 85–86.

[7] J. Hankamer and J. Aissen, "The Sonority
Hierarchy," in Anthony Bruck, Robert A. Fox, and
Michael Lagaly, eds., *Papers from the Parasession*

on Natural Phonology (Chicago, 1974), pp. 131–45;
Joan B. Hooper, *An Introduction to Natural Genera-
tive Phonology* (New York, 1976), pp. 229–32.
Hooper attributes the fundamental idea to Otto
Jesperson and Ferdinand de Saussure.

[8] Elisabeth O. Selkirk, "The Syllable," in Harry
van der Hulst and Norval Smith, eds., *The Struc-
ture of Phonological Representations (Part II)*
(Dordrecht, Holland, 1982), pp. 346–47.

unexpected because the very same clusters are exceptions to generalizations about clusters in other languages for which we have direct phonetic information. A suggestion that, say, clusters such as *pt-*, *lt-*, *yt-* occur in the absence of any other clusters in a language attested only in writing would rightly be met with incredulity; conversely, the fact that the anomalous spellings in Hebrew and Aramaic involve precisely a sibilant-stop cluster can hardly be a coincidence.

If Hebrew and Aramaic had phonetic *štáyim* and *štā*, with the initial clusters atypical for these languages, how did these forms come into existence? In the case of Hebrew *štáyim*, many proposals have been advanced, mostly involving an unexplained reduction from **šittayim* or something similar.[9] The key to this form lies in the fact that the numeral 'two' was one of the few stems with initial clusters in Proto-Semitic. This is attested in Arabic, where the *i* of masc. *(i)θnāni* is epenthetic, as it is in *(i)bn-* 'son', *(i)sm-* 'name', and a few other basic stems. D. Testen has shown that the initial cluster must have survived into the earliest Aramaic, where it accounts for the change from *n* to *r* in Aramaic *trēn* 'two' from **θnayn* and *bar/brā* 'son' from *bn-*.[10] Original *n* became *r* in Aramaic only when it is the second member of an initial cluster; thus the change took place in the singular *bar/brā* but not in the plural *bənīn* from **banīn*. Since the initial cluster in the numeral 'two' survived into Aramaic, it is not unreasonable to suppose that it survived into Hebrew as well, so that the earliest Hebrew forms for 'two' were masc. *šnáy(i)m*, fem. **šnatáy(i)m* or **šintáy(i)m* (perhaps becoming **šittáy(i)m*). Whatever the original feminine form was, it was reshaped on the model of the masculine *šnáyim with the initial cluster*, as *štáy(i)m*. At least at that time, both the masculine and the feminine had initial clusters.

As for Syriac *štā* 'six', C. Brockelmann[11] has plausibly proposed that original Aramaic *šittā* was modified under the influence of a proportional analogy with the *-CCā* termination of the adjacent numeral 'five': fem. *ḥameš* is to masc. *ḥamšā* as fem. *šet (šeθ)* is to X, where X became *štā*. This idea is supported by the fact that the opposite direction of change occurred in Hebrew, where masc. **ḥamšā* became *ḥamiššā* on the model of *šiššā*.

Subsequently, an already existing general Aramaic rule of epenthesis came to apply to the newly formed initial consonant cluster.[12] This applied both to borrowed words which had initial clusters in the original languages (including Greek στ-, σπ-) and to some native words, among them Syriac *štā*. The word for 'he drank', formerly **šatī*, at some point lost its first vowel and (simultaneously?) gained an epenthetic one, *ʾištī*, *ʾeštī*.[13] If it seems surprising for this one verb to have undergone such a change when other, phonologically similar verbs (even those with *št-* roots) did not, it is relevant to note that 'drink' and 'two' are among the earliest words a child learns, probably even

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[9] An exception is Bravmann, "Hebrew *štayim*." The rationale Bravmann offers for the reduction from **šittayim* to *štayim* has nothing in common with the present analysis.

[10] D. Testen, "The Significance of Aramaic *r < *n*," *JNES* 44 (1985): 143–46. Gene Schramm presented the same solution to the *n* to *r* puzzle in his course on Semitic linguistics, which I attended in the summer of 1973.

[11] Carl Brockelmann, *Syrische Grammatik* (Leip-

zig, 1951 and 1968), p. 77.

[12] Note that the earliest attestation of initial epenthesis in Aramaic is *ʾsm* 'name' (Rainer Degen, *Altaramäische Grammatik*, Abhandlungen für die Kunde des Morgenlandes 38/3 [Wiesbaden, 1969], p. 42), a word with an initial cluster since the Proto-Semitic stage.

[13] Cf. Bauer and Leander, *Grammatik des Biblisch-Aramäischen* (Halle, 1927; repr. Hildesheim, 1981), p. 155.

before 'be quiet' (*š-t-q, šθeq* 'he became quiet'). This is the answer to the question asked by S. Kaufman, "But if total reduction of the initial vowel is the cause of the prothetic vowel here, why did such prothesis not occur in many other verbs? Surely there are many common verbs whose first two root consonants would make an initial cluster whose pronunciation would be difficult to the speaker of Semitic (e.g., *bd-*, *qt-*)."[14] Note that it is precisely the pairs of consonants that are the easiest to pronounce as clusters that induce epenthesis. This has an exact parallel in the pronunciation of English by speakers of Egyptian Arabic, another language that disallows initial clusters, who say *filōr* 'floor', *bilastik* 'plastic', *θirī* 'three', *silayd* 'slide', *siwetar* 'sweater', but *istadi* 'study', *iski* 'ski', *izbasyal* 'special'.[15] Something very similar must have been heard in the pronunciation of Greek words by speakers of Syriac.

The ancestor of modern Eastern Aramaic (a close sister of Syriac) had epenthesis in the numeral 'six' but not the verb 'drink': Ṭūrōyo *ˀəšto* 'six', *štéle* 'he drank',[16] Northeastern Neo-Aramaic *ˀišta* 'six', *štáya* 'to drink', *štếθa* 'a drink'.[17] Neither epenthesis nor spirantization is a functioning process in modern Aramaic, so the initial vowel in 'six' synchronically is not epenthetic but a part of the stem (and is stressed), and the presence or absence of an initial vowel or of a spirant is evidence for a much older state of the language. At a time when epenthesis applied, the numeral 'six' must have had an initial cluster *št-*, while the verb 'drink' still had an intervening vowel, *šət-*, so that epenthesis applied in 'six' but not in 'drink'. The intervening reduced vowel in 'drink' must have been lost, however, before spirantization ceased to be a productive process, or the modern verb would have *šθ-* instead of *št-*. Of the other verbs with initial *š* followed by spirantizable consonants, some show spirantization and some do not: no spirantization in *štála* 'to plant', *šdáya* 'to tease (cotton or wool)', or *špána* 'to harrow', but spirantization does exist in *šwáqa* (*š-b-q*) 'to leave, *šˀára* (*š-g-r*) 'to kindle, burn', *šˀáša* (*š-g-š*) 'to shake'. (Spirantized *b* became *w* and spirantized *g* became *ˀ* in modern Northeastern Aramaic.) Evidently, the ancestor of this modern Aramaic language had initial *št-*, *šd-*, and *šp-* clusters, but *šəb-* and *šəg-* with a reduced vowel, causing the spirantization of the following consonant. This reduced vowel was lost later, before the Neo-Aramaic stage.

This suggests the following history: in an early Aramaic ancestor of Syriac and modern Eastern Aramaic, there were initial *š-* clusters only in *štā* 'six' and its derivatives; all other initial *š*-plus-consonant combinations were pronounced with an inter-

[14] Kaufman, "Vowel Reduction," p. 91.

[15] Ellen Broselow, "Nonobvious Transfer: On Predicting Epenthesis Errors," in Larry Selinker and Susan Gass, eds., *Language Transfer in Language Learning* (Rowley, Massachusetts, 1983), pp. 271, 277–78. Broselow cites (in that paper and personal communication) similar facts from the pronunciation of English by speakers of Sinhalese, Persian, Turkish, Bengali, Hindi, Indonesian, and Telugu, as well as native-language facts pointing to the special character of initial sibilant-stop clusters in Old English, Old Norse, Gothic, Sanskrit, and Armenian. Broselow suggests that in many languages *s*-stop clusters are a kind of affricate in reverse, two consecutive articulations with the distribution of a

single consonant. In a survey of consonant clusters in over one hundred languages, Greenberg has observed that the most widespread kind of initial cluster are those containing dental or alveolar consonants. For instance, the only initial cluster in Chiricahua Apache, besides affricates, are *st-* and *sd-*; Joseph H. Greenberg, "Some Generalizations Concerning Initial and Final Consonant Clusters," in Greenberg, ed., *Universals of Human Language*, vol. 2 (Stanford, 1978), p. 269.

[16] Otto Jastrow, *Laut- und Formenlehre des neuaramäischen Dialekts von Mīdin im Ṭūr ʿAbdīn* (Wiesbaden, 1985), pp. 243, 66.

[17] Georg Krotkoff, *A Neo-Aramaic Dialect of Kurdistan*, AOS 64 (New Haven, 1982), pp. 46, 150.

vening (reduced) vowel. Subsequently, two changes took place, the deletion of reduced vowels (creating certain other *š*-consonant clusters) and the extension of epenthesis to new forms, but the relative chronology of the two changes differed in different dialects. In Syriac, many words lost the reduced vowel, acquiring initial clusters and hence epenthesis; this epenthesis is attested in old manuscripts, but in the standard language epenthesis was retained only in a few words: forms of 'six' and 'drink', *(e)štārā* 'written bond', Greek words with *(e)st-* and *(e)sp-*, and perhaps a few others.[18] (Many more words have initial clusters in the modern reading traditions of Syriac, but this has more to do with the readers' native languages than with classical Syriac.) In the ancestor of modern Eastern Aramaic, besides 'six', the reduced vowel was lost and epenthesis applied in several additional words, such as *ʾárxe* 'mill' (from the unattested absolute state corresponding to Syriac *raḥyā*) and perhaps a few others, but not, as it happened, in 'drink' or any other verb.[19]

Two conclusions follow from the facts presented in this paper. The first is that the phonetic reality of the Hebrew feminine numeral 'two' and the Syriac masculine 'six' was *štáyim, štā*. All other proposals for the reading of these words are less likely on both typological and comparative-historical grounds: typological grounds, in that sibilant-stop clusters are especially licensed in many other languages, and comparative-historical grounds in that the number 'two' had a stem with a *θn*-cluster in Proto-Semitic and 'six' shows the effect of epenthesis in modern Eastern Aramaic. Thus the transcription *šətáyim, šənáyim, tərēn* (cf. Neo-Aramaic *tre*), frequently seen in the literature,[20] present a completely false picture, however conventional. The words were *štáyim, šnáyim*, and *trēn*. The second, and more general, conclusion supports the major point of the article by Kaufman cited above, that the Aramaic shortening and reduction of vowels to *ə* is historically separate from and prior to the complete deletion of some of those vowels and that the deletion was conditioned by several factors including the adjacent consonants, differed in the various Aramaic dialects, and cannot be inferred directly from the orthography.

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[18] Theodor Nöldeke, *Compendious Syriac Grammar*, trans. James A. Crichton (London, 1904; repr. Tel-Aviv, 1970), p. 37.

[19] Arthur John Maclean, *Grammar of the Dialects of Vernacular Syriac* (Cambridge, 1895; repr. Amsterdam, 1971), p. 308. Most of the words in Maclean's list have more complex histories, and in many, epenthesis applied at a much later date and not in all the Neo-Aramaic dialects. Subsequently, reduced vowels were lost in nearly every context in Neo-Aramaic, so that nearly any pair of consonants can cluster initially, as documented by Solomon I. Sara, *A Description of Modern Chaldean*, Janua Linguarum, Series Practica 213 (The Hague, 1974), pp. 41–47.

[20] For instance, Brockelmann, *Grundriss*, pp. 230, 485.