Our general hypothesis is that tonal commands in different languages may be correlated with (1) syllable division and (2) different syllable constituents. Preliminary results show heterosyllabification tendencies as well as vowel-like insertions between intervocalic consonant clusters, especially in Greek. We assume that syllabification and derived syllable structure constituents are key prerequisites in the analysis of intonation in languages with different prosodic structures, such as Greek and Swedish. One specific hypothesis is that the L tonal targets of LH commands in focus contexts are correlated with consonant onsets in both standard Athenian Greek and standard Stockholm Swedish and hence respective syllabifications. Another specific hypothesis is that the HL tonal fall of the word accent II in Swedish is confined within the nucleus vowel. A major theoretical issue is whether and under which conditions this HL tonal fall may also encompass the syllable consonant coda. In current Autosegmental-Metrical (AM) theory, the word accent II fall is assumed to have a bitonal H*+L pitch accent. The star (*) denotes stressed syllables and the AM approach implies thus a variety of tonal correlations throughout syllable. On the other hand, our results show that the L tonal target of the LH focal rise is correlated with the consonant onset of the post-stressed syllable, which is a syllabification correlate, whereas AM theory assumes a monotonal H¯ phrase accent. In light of the above findings in Greek and Swedish, we claim that specific tonal targets seek specific syllable constituents, which may, however, vary in different languages.