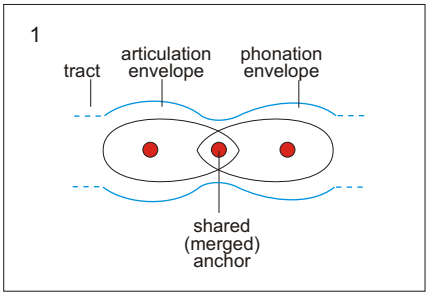
Phonation (partly tentative)

Gary S. Tong (2006

1. Both articulation and phonation are performed within their discrete anchor-envelopes. The two can be seen as consecutive segments in (meta)peristaltic sequence, and are united through a shared/merger anchor. See fig. 00 and 3.

Note: the terms "anchor" and "envelope" in the following can be used interchangeably since these two structures always exist together.

1

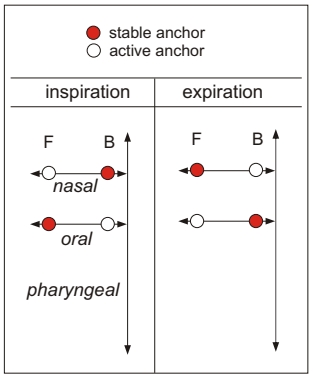


2a. Nasal respiration lines and anchor envelopes

2a. The active power force of **nasal** respiration runs in a vertical line up the pharynx before it changes its angle to enter the nasal passages. This open nasal linear path of force is primary over the oral line, where the mouth (or oral gate) is closed. The role of the tongue in the oral framework here is to compensate for distortions of its root applied by the up-and down vertical movement of the nasal respiration forces.

But since is is the oral line that becomes primary in speech, it is this line that needs to be examined.

2c

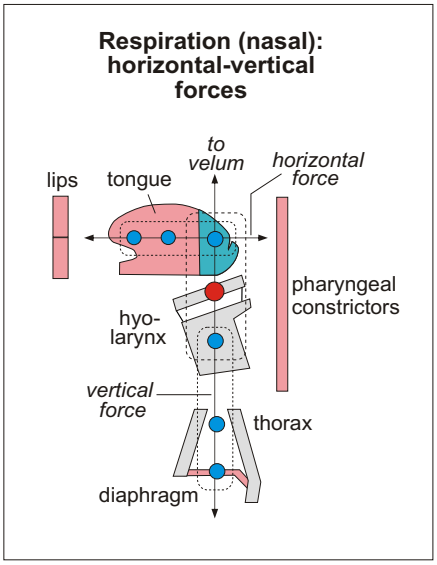


Difficulties in observing the anchor map in active speech

The map of nasal respiration is drawn in figure 2c. as a vertical line with two perpendicular lines attached. The active power force of nasal respiration runs through the **vertical** line up the pharynx. The lines at right angles represent the nasal and oral tracts. The anchors the front and back stabilizing anchors of these two lines alternate as inspiration alternates with expiration. For example, when the tract is relaxed to allow inspection, in oral breathing with minimal energy, at the end of inspiration tension in the lips increases, while at the end of expiration the tension appears in the pharyngeal-hyoid area. This constant **shifting** of anchors makes it more difficult to observe the mechanism of fluid speech, and therefore the exact placement of anchors involved in phonation remains tentative. However, if the framework is balanced so that its action stops half-way between phases of repsiration, the anchor positions can be judged more accurately, and the diagrams below describe such states..with medial-centrally located.. .

Note: for simplicity, the maps of extrinsic tongue muscles and the velar framework are not shown.

2a



Anchors and envelopes are merged in this figure.

2a. Nasal respiration anchor envelope / oral line

2b. Nasal respiration anchor envelope / oral line

The tract line starts anteriorly with the anchor-envelope of the lips (facial sheet) and the oral 2/3 tongue and its lingual anchor p, and ends with the envelope of the respiratory muscle structure of the thorax and diaphragm. Located midway on this line is the stable anchor-envelope of nasal respiration, with its central anchor in the hyoid. The front anchor is the anchor of the 1/3 tongue and the back anchor is in the larynx.

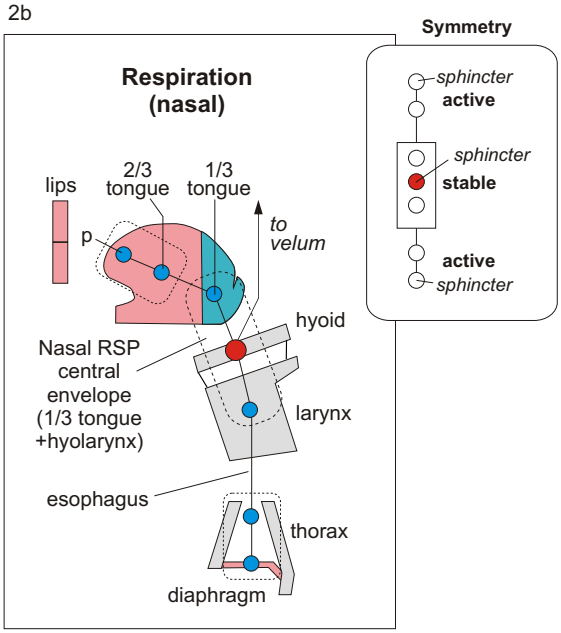
A symmetry of this configuration can be seen as trimeric (consisting of three parts), in distribution of envelopes and of sphincters or tract gates, (see Trimerism, Structure...000). Within their envelopes the oral gate is anterior, the laryngeal gate is central and the esophageal gate is posterior.

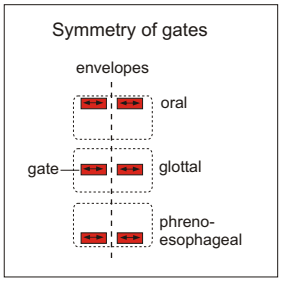
Note: although the air tract is tracheal, the line of force (besides those in the costal respiratory framework, runs through the **esophagus,** which bridges the hyolarynx and the diaphgragm.

Shown here: the anchors and envelopes as discrete elements. The pattern of their mergers is not mapped. The mergers are illustrated in fig. 2 0000

The velar and pharyngeal maps are not included as they as external to the main line.

2b





3. Speech RSP / Static

Speech employs its own particular sub-mode of respiration. The issuing of air during speech is itself the exhalation phase in active speech respiration, and air intake between phrases is the inspiration. In this static speech RSP mode the tract line is oral rather than nasal. Its anchor is centered in the hyoid. The front anchor-envelope is lingual, centered on the GS anchor. The central anchor of the central anchor-envelope is in the hyoid and its front anchor merges with the lingual 1/3 anchor, and its back anchor, which is in the larynx, merges with the thoraco-phrenic envelope.

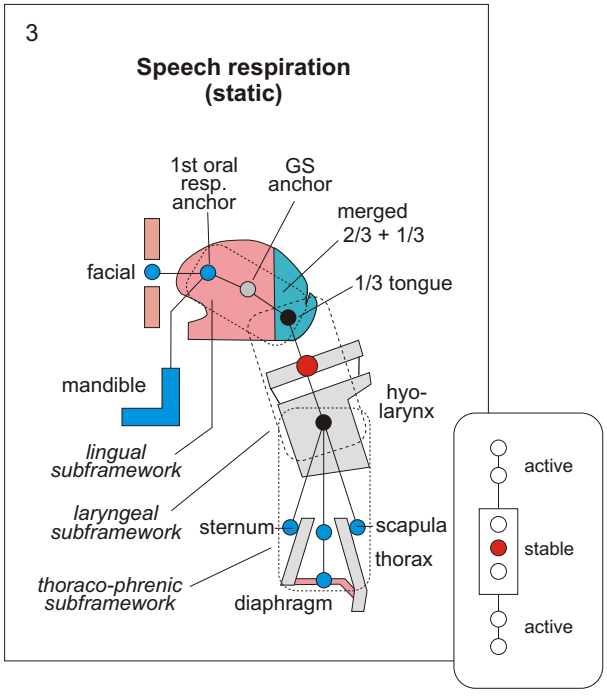
The back envelope is that of the respiratory muscles of the thorax and diaphragm. The lips are slightly open and the mandibular action is also included in the map.

Note: a more detailed anchor map is provided for the thoraco-phrenic region in the figure 3, in order to balance the number of anchors active in the facial and the associated hypobranchial regions, which are not shown.

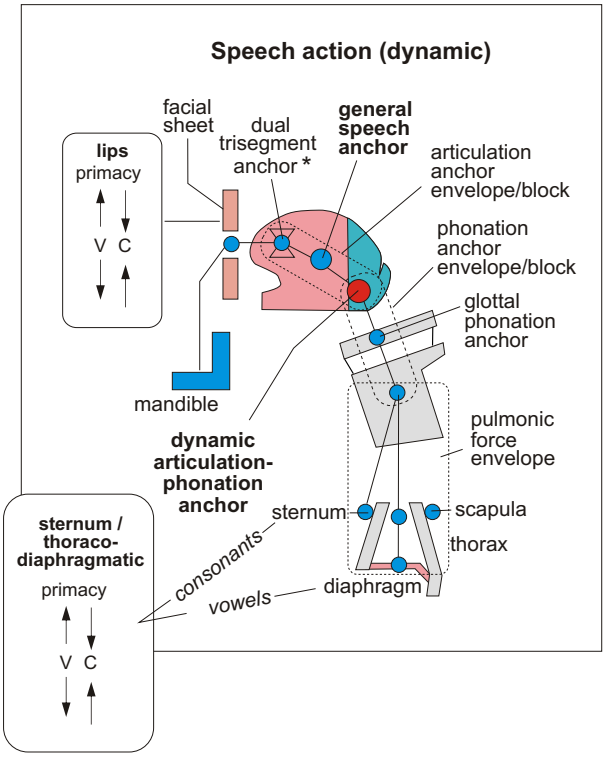
The symmetry diagram depicts the trimeric active-stable division of this configuration.

For simplicity, the anchor divisions of the larynx are not depicted. These include those of the thryoid and cricoid, and further inward those to the glottal mechanism.

3



4. Speech action / dynamic



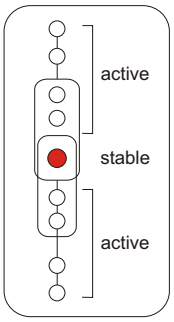
The major agents of fluid speech are articulation and phonation. Their envelope structures are integrated by the merger of their, respectively, posterior and anterior subanchors. This is the dynamic articulation-phonation anchor, which pivots, or balances the envelopes of these two coactive function.

4a. In the articulation envelope the GS anchor is embedded while the dual trisegment anchor performs primary articulative action. (See trisegments in MST and DNG). Its symmetrical counterpart is the glottal mechanism performing phonation.

The articulatory and phonatory structires (alternately) vary in relative amounts of energy and primacy according to the degree of voicing required at one time.

Note: the **lips and facial** sheet and the **thoraco-sternophrenic** musculature behaves in a special manner. In producing consonants the primary movement of the muscles of these two frameworks is vertically expansive, while with vowels it is compressive. With a consonant, for instance, the eyes and mouth tend to close, and the supralaryngeals contract upwards. In contrast, with a vowel the eyes and mouth tend to open, and simultaneously, the infralaryngeal framework contracts downwards. See insets in fig. 4.

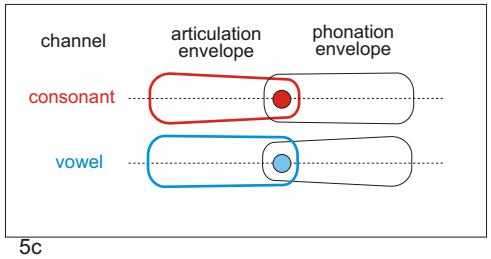
The symmetry map shows trimeric divisions.



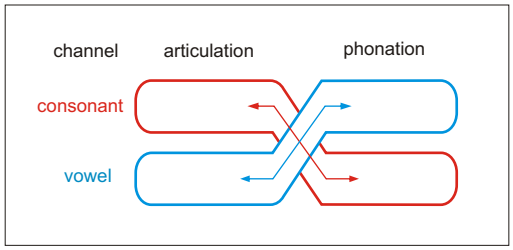
5. The vowel and consonant channels in articulation-phonation

5. The distinction between lingual consonant and vowel channels is covered in Structure/Appendix, Chart A/synoptic diagram. Phonation is also differentiated according to consonantal or vocalic phonation. Here is useful to consider these channels in their actual functional roles as envelopes of anchor movement.

5a



5c

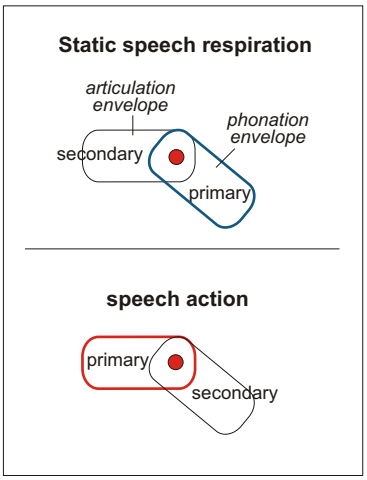


5b. In Speech respiration/static, the articulation and phonation envelopes are centered on their shared anchor, but which one is the primary agent in this antagonist relation depends on the relative degree primacy of, or bias allotted to speech or respiration.

Thus if respiration is weighted, the phonation envelope is primary. During speech bias the articulatory envelope is primary.

5c. With regard to the discrete articulation and phonation channels, the evidence offered below suggests that metaperistaltic segmental alternation of functions takes place in phoneme production. When the consonant channel is active in articulating a voiced consonant, the phonation of that consonant occurs in the vowel channel of the phonation envelope, and vice versa. Channels are the anchor path constructions of particular subframeworks within a larger global frame. Therefore, channels can coexist and act togther or may alternate in action.

5b



Evidence/demonstration

In producing a vowel, if the articulation framework is released/relaxed while the phonation framework is maintained, it is found that the immediate production of another vowel, within the isolated articulating envelope, is obstructed buy tension in the map, but that of a consonant is not.

This shows that the vowel is generated with vowel articulation envelope, but is phonated with the consonantal phonation envelope. The converse holds true for consonants.

In fact, transforming from a vowel to a consonant is simply alternates the C and V envelope coupling. The explanation for this lies in (meta)peristaltic alternation of segmental action.

This behavior is also of the manifestations of the AMS source of syllabification.