

Airstream Mechanisms

Natural languages make use of four airstream mechanisms: pulmonic egressive, glottalic egressive, glottalic ingressive, and oral ingressive. The terms *egressive* and *ingressive* refer to the direction of the airflow, outward or inward, respectively. The other term (*pulmonic, glottalic, oral*) refers to the major controller of the airflow – the lungs (pulmonic), vocal folds and glottis (glottalic), or parts of the mouth (oral).

All of the sounds of English and the western European languages you are likely to be familiar with are produced with the pulmonic egressive airstream. All human languages make use of pulmonic egressive sounds; some languages use one or more of the other airstream mechanisms in addition.

Glottalic egressive sounds are produced in the following way: A complete closure is formed in the oral cavity (mouth), just as for other stop consonants. At the same time, the vocal folds form a complete closure, in such a way that no air can get through the glottis. The larynx (i.e. the vocal folds + glottis) is then pushed upward, causing the air to compress between the oral closure and the larynx. The oral closure is then released, as for other stops. The compression causes the air to explode out of the mouth, creating the sounds referred to as **ejectives**. Sounds created in this way must be voiceless, because it is physically impossible for the vocal folds to be completely closed, in the way required for an ejective, and at the same time be able to vibrate, in the way that creates voicing. An ejective may be articulated at any place of articulation where a stop is possible, including bilabial, alveolar, palatal, velar, and uvular. Ejectives can be stops or affricates, but ejective fricatives are physically impossible. Ejectives are written as the stop or affricate symbol followed by an apostrophe, e.g. [p', t', k', q', tʃ'].

Glottalic ingressives are produced as follows: A complete closure is formed in the oral cavity and another at the glottis. The larynx is then forced downward, creating a partial vacuum. When the oral closure is released, the air rushes inward, giving **implosives** their characteristic sound. This action causes the vocal folds to vibrate, so all implosives are voiced. Implosives are written as the corresponding voiced stop combined with a hook to the right at the top, e.g. [ɓ, ɗ, ɠ].

Oral ingressives are produced in a way similar to the glottalic ingressives, but without the involvement of the glottis. A closure is formed somewhere in the oral cavity and a second with the back of the tongue against the soft palate. The latter closure is pulled backward, again creating a partial vacuum. When the forward closure is released the air rushes in. The difference between the sound of the glottalic ingressive and the oral ingressive (**click**) is due primarily to the difference in the size of the chamber in which the partial vacuum is created; the chamber involving the larynx is much larger than that involving the oral cavity alone. A variety of symbols are used to transcribe the clicks produced at various places of articulation, and there is not complete agreement on them – [ɠ, |, !, ||].