

# AIRSTREAM MECHANISMS

## Ingressive and egressive pulmonic airstream

As we have seen, speech results from the displacement of air through the airways (**trachea, larynx, pharynx**) and the mouth and nose cavities. The air that is used for speech is referred to as an **airstream**. There are, however, several ways of initiating an air displacement through the throat, mouth, and nose. The most common - and most effective - way is that in which lung air is pushed through the **vocal tract** in the **respiratory mechanism**, or breathing process, which we have already discussed in some detail.

The **airstream** which originates in the lungs is called a **pulmonic airstream**, and since the air flows **outward**, it is said to be **egressive** (i.e. outgoing). However, the air can also flow **inward**, in which case we talk of an **ingressive airstream**. As we have seen, this kind of airstream is not conducive to speech, but it is nevertheless used for **paralinguistic** purposes (i.e. sounds conveying a recognized meaning within a given speech community) in various languages. In some Scandinavian languages, a [ə] is sometimes produced on an **ingressive pulmonic** airflow when people wish to signal their empathy with the speaker. In Dutch and French the respective words for 'yes' - [ja] and [wi] - are also pronounced in this way in order to express mildly reluctant confirmation, or resignation.

## Ejectives

While all the known languages have **egressive pulmonic** sounds, many of them also use other, **non-pulmonic airstream** mechanisms as well in order to produce speech sounds. The second-most frequently used mechanism in the world's languages is that in which air contained in the **pharynx** is used. The air is trapped in the **pharynx** through a simultaneous closure of the **glottis** and a total obstruction elsewhere in the **vocal tract** (usually somewhere in the mouth). When the **larynx** then moves upwards, the air in the **pharynx** is compressed, and then expelled by 'releasing' the obstruction. Sounds made by means of this **egressive airstream mechanism** are known as **ejectives**, and are said to be **glottalic** (since it is the **glottis** that initiates the movement of air), or **pharyngeal** (in reference to the cavity in which the air is contained). The latter term is, however, slightly misleading since the air can be held in the mouth and/or pharynx, which is why **oropharyngeal** would probably be a more

appropriate term. **Ejectives** are represented by means of a small superscript comma after the symbol: e.g. [p<sup>ʰ</sup>].

An easy way of producing this ejective is to breathe out all the air from your lungs and then to say the sound /p/ (as in *pin*, for instance) as many times as you can before you have to take in air again. The series of rapid puffs you hear at the end are ejectives. **Ejectives** are found in approximately 18 % of the world's languages. Among them we find Zulu (South Africa), Hausa (Nigeria), Amharic, Tigre (Ethiopia), as well as a number of Caucasian languages (e.g. Georgian). **Ejectives** are commonly associated with North American Indian languages (e.g. Navajo). For obvious reasons, these sounds are always **voiceless**, whereas the majority of them are **velar** (though other articulations like **alveolar** or **uvular** are also used by some languages). In English, some people (especially those with a very traditional RP accent) may use ejectives at the end of words.

### **Implosives**

A third airstream mechanism is closely related to that of the **ejectives** as it involves speech sounds relying on the air in the vocal tract (and with a **closed glottis**), with the larynx making a **downward** movement. The principle is the following. After a complete closure of the glottis and a simultaneous obstruction at some point in the vocal tract, there is a sudden downward movement of the larynx. This results in the air pressure inside the **vocal tract** dropping below **atmospheric pressure**. When the obstruction further up in the vocal tract is released, air is sucked in to equalize the two pressures. This gives rise to a sort of 'gulping' sound – a bit like the sound of a liquid being poured out of a narrow-necked bottle. These types of sounds are said to be **ingressive glottalic** (after the initiator of the mechanism) or **ingressive pharyngeal** (in reference to the cavity that contains the air), and are commonly called **implosives**. They are found in 10% of the world's languages. Although these are mostly African languages (e.g. Zulu, Swahili, Hausa, Igbo, Maasai), this mechanism is also used by Vietnamese, Khmer, and Sindhi (spoken in Pakistan and India). In the IPA, **implosives** are marked by a hook at the top of the symbol: e.g. [b̥] (voiced bilabial implosive) [ɗ̥] (voiced velar implosive).

Most implosives are **voiced**, but some languages (e.g. Igbo in Nigeria) do have **voiceless** implosives. Though they can occur in all places of articulation, **bilabial implosives** are the most frequently used.

## Clicks

A fourth and final airstream mechanism is that which involves the use of air trapped inside the oral cavity (i.e. the mouth). The process relies on two simultaneous closures inside the mouth, one of which is always caused by the velum being lowered, the other being more forward (e.g. tongue-palate, tongue-alveolum, the lips). Then, the front of the tongue is hollowed as much as possible (by lowering the centre and/or pulling the tongue tip back), which results in an enlargement of the **chamber** (or **pocket**) of air inside the mouth. As we know, this causes a drop in the pressure of air, and once the forward closure is released, the atmospheric air (which now has a higher pressure than the air inside the mouth) is sucked in to equalize the two pressures. This airstream mechanism is called **ingressive velaric** (or **oral**), whereas the resultant sounds are commonly known as **clicks**. Clicks can be **voiceless**, **voiced** and/or **nasalized**. This **ingressive velaric airstream** mechanism is very rare, and is only used in languages in southern Africa like Xhosa; the largest number of recorded clicks are found in a language called !Xóõ (spoken in parts of Botswana and Namibia), which has no fewer than 48!

It should be added that **clicks** are used **paralinguistically** in many languages. In English, for instance, the **voiceless dental click** (represented in the IPA as [t̺]) is used to mark annoyance or disapproval and is represented in spelling as *tut-tut* (which is even a verb in English!). The sound people make to get a horse to move (faster) – to so-called *gee-up* sound – is, in fact, a **voiceless alveolar-lateral click**, which is represented by the IPA as [l̪]. The symbol [!] denotes a **voiceless post-alveolar** (or **retroflex**) **click**, and is the sound people make when they imitate the clip-clop sound of a horse's hooves. Finally, the rather cryptic [ʘ] represents the **voiceless bilabial click** – also known as ... a kiss!