HVC is activated by the production of the gargle call in the black-capped chickadee (*Poecile atricapillus*)

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Unlike many songbirds, black-capped chickadees are characterized by the production of highly complex vocalizations used in several contexts. One of these is the *fee-bee* song, which is produced by males during the breeding season in order to try and attract a mate. It has been shown that the song control system is instrumental for learning, production and maintenance of song (such as the *fee-bee*) in songbirds. These include brain regions such as the HVC, the robust nucleus of the arcopallium (RA) and area X. Previous studies have found that the volume of these brain nuclei increases during the breeding season. However the nuclei in the chickadee do not exhibit this change seasonally. This may be due to the production of complex learned vocalizations throughout the year (e.g. the *gargle* and the *chick-a-dee* call). In this study, wild black-capped chickadees were caught and subjected to behavioural manipulations in order to elicit the *fee-bee* song, *gargle*, *chick-a-dee* and *tseet* calls. The birds were then sacrificed and their brains were collected and processed by immunohistochemistry in order to examine ZENK expression (which is used to identify areas of the brain that are activated by specific stimulus or behaviour). The birds that produced the gargle call consistently showed significantly more ZENK activation of the HVC than birds that had produced the *fee-bee* song, *chick-a-dee* and *tseet* calls, indicating that the song control system is not only involved in song learning and production, but in the production of learned vocalizations as well.