**Supplemental Table 1.** *A priori* developmental and functional modules of modularity tested in this study.

|  |  |
| --- | --- |
| Model | Description |
| [4-14,19,43,47,58,61]  [1-3,14-18, 20-60,62] | Early vs late ossification- bones in the anterior region of the jaws tend to ossify first along with parts of the opercular region (Cubbage and Mabee 1999) |
| [1-19,39-41,44-46][20-33,48-54][59,61][34-38,55,56,57,60][58][62] | Breathing seeing feeding- regions are divided based on their function in respiration, eye muscle attachment, feeding (the oral jaws), the anterior of the head also comprises a module here |
| [59,61,1-47] [48-58,60,62] | Movable vs fixed- regions are defined based on their ability to move, or as a muscle attachment point |
| [34-38,40,41,45,46,55-58,60,62] [1-34, 39, 42-44, 47-54, 59, 61] | Dermal vs cartilage bone- Regions are defined by how bone develops, either through cartilage to ossified bone, or directly to dermal bone (Cubbage and Mabee 1999) |
| [1-9,34-42,45-46,55-62][10-33,47-54] | Lateral line bones- Bones that are innervated by the lateral line are delineated as a module |
| [34-38,55-58,60-62][10-19,43-46,59][1-9,20-33,39-42,47-54] | Epaxial/hypaxial- regions where groups of hypaxial muscles lie ventral to the spine are delineated from expaxial muscles of the head |
| [1-19,40-47] [48-62] | Preorbital 1- the region anterior to the eye is defined as module (Cooper et al. 2010; Parsons et al. 2011) |
| [1-19,40-47][48,20-25,28-29,34-38,48-50,55-57,60][26,27,30-33,51-54,58,59,61,62] | Preorbital 2- the region anterior to the eye is defined as a module, as are the eye region itself, and opercular region. |