**Data and code used for making Fig. 3**

**Folder: Fig3a**

* CalciumSignalFrame: A maximum z-projection image of TN1 neurons in Fig. 3a.

**Folder: Fig3b-j**

Analysis

* Fig03\_Example\_TimeCourseRaw\_TN1dsx.m: Code for plotting the time courses of delta F/F for TN1 neurons and simultaneously recorded song in Fig. 3b.
* TS\_Img.mat: Time stamps of calcium imaging.
* TS\_OptStimImg.mat: Timings of optogenetic stimulation during calcium imaging.
* Fig03\_SongTypePref\_TN1dsx.m: Code for plotting the distribution of song-type preference for TN1 neurons in Fig. 3c.
* Fig03\_AveTimeCourseSongTrans.m: Code for plotting calcium signals and song probabilities during song type transitions in Fig. 3d,f.
* Fig03\_Bidir\_TN1dsx\_Normalized.m: Code for plotting the mean change in ΔF/F after song-type transitions relative to ΔF/F before the transitions in Fig. 3e,g.

Data/Summary\_GENOTYTPE

* EthogramComb.mat: File containing the time course of pulse/sine songs. Row: fly ID; Column: time bins at the resolution of microphone recording (1 kHz).
* EthogramCombImg.mat: Same as EthogramComb.mat but the time resolution of calcium imaging.
* FtimeCourseComb.mat: Mean calcium signals (F) in each ROI and the optogenetic stimulation strength in each trial. F\_comb: Time course of F for each ROI (ROI x Time bins x Blocks). Stim\_comb: Stimulation strength (from 1 to 6) in each trial (Column: block; Row: trial).
* SongExplorer: A folder containing audio data and song segmentation results for each recording.
* SongTypePrefIndex.mat: Song-type preferences for each neuron.
* ResponseIndex.mat: Response index, which characterizes if a neuron showed a response to optogenetic stimulation, for each neuron.
* Transitions.mat: Variables for running Fig03\_AveTimeCourseSongTrans.m.