Age as a possible explanatory variable

We focussed the discussion of our results on the main effects of group in all 3 experiments. Here, we examine the role of age as a possible alternative explanation for the between-group differences. To simplify the analysis, we summed over signal-to-noise ratios in the noise localization experiment and across sweep velocities in the sweep experiment. Correlations between this sum variable and group/age are shown in Table S1.

Table S1: Correlations between dependent variables and explanatory variables. Levels for group: 0 = healthy controls, 1 = autism spectrum disorder

| | Explanatory variable | | | |
| | Group | | Age | |
Dependent variable	Pearson r	p value	Pearson r	p value
Noise localisation				
Elevation (gain)	−0.513	0.021	−0.332	0.15
Elevation (correlation)	−0.561	0.010	−0.309	0.19
Sweeps				
Elevation (gain)	−0.250	0.13	−0.196	0.24
Elevation (correlation)	−0.370	0.022	−0.271	0.10
Precedence				
Onset difference with 50% response	−0.470	0.036	−0.430	0.06

As expected, the correlations for group were identical to those presented in the paper using analyses of variance or t tests. Age was not significantly correlated with any of the dependent variables and appeared to be a weaker predictor than group for all experiments. The correlation of age with the outcome of the precedence experiment was close to the $\alpha = 0.05$ threshold, but it should be noted that for the tested participants, age did not significantly correlate with group ($r = 0.338$, $p = 0.15$; see Table 1 in the main text).

The age difference between groups was significant only in the sweep experiment (see Table 1 in the main text). Based on this observation and the correlations in Table S1, we conclude that age is not likely to be an important contributing factor to localization performance in our experiments.

Table S2: Summary of mechanisms probed in different experiments

Experiment	Mechanism	Relation to connectivity
1. Horizontal and vertical localization of noise stimuli within background noise		
Noise localization (azimuth)	ITDs: coincidence detection	Dependent on long-range interhemispheric connectivity
	ILDs: detection by IE/EI-cells	
Noise localization (elevation)	Detection of pinna cues within lateralized pathway	Processing occurs within nuclei (short-range cross-frequency)
Noise localization (effect of SNR)	Discrimination between target and background stimuli based on auditory feature extraction and grouping	*
2. Vertical localization of sweep stimuli		
Sweep localization (elevation, effect of sweep velocity)	Spectral information is integrated temporally to perform provide broadband pinna cues	*
3. Precedence effect		
Precedence effect	Fusion of sounds with lateralized representation	Sensitive to changes in temporal binding, an aspect of long-range connectivity

EI = excitatory–inhibitory; ITD = interaural time difference; IE = inhibitory–excitatory; ILD = interaural level difference; SNR: signal-to-noise ratio.
*A pervasive change in connectivity patterns could certainly affect the process, but it is difficult to make a more specific statement.
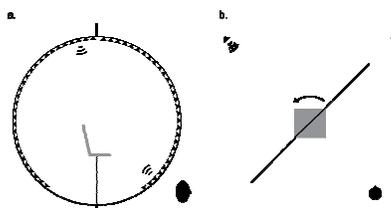

Fig. S1: Experimental setup (schematically) as seen from the side (A) and from the top (B). The hoop is shown without the speakers in side B. Stylized heads indicate the participant's viewing direction.