

Supplementary Material

Stick insects disregard visual cues about obstacle height, irrespective of the visual pattern

The results of Fig. 1 showed that stick insects did not take account of the visual landmark, i.e., the horizontal black bar below the edge of the stair. Since this landmark had no connection to the walkway, we wanted to make sure that animals behaved the same way if the visual pattern did not apparently ‘hover above the ground’ but extended all the way from the edge to the ground. Specifically, we wanted to test whether the observed effect of antennectomy disappeared if the visual landmark was either presented vertically, as if standing on the ground, or in conjunction with a high-contrast pattern below the horizontal bar. To test this, we extended experiment 1 with an additional cohort of 5 animals that were confronted with two new visual patterns, a vertical bar and checker board pattern below the horizontal bar.

The vertical bar had the same width as the horizontal bar (8 mm), was high as the stair (24 mm) and centred on the front surface of the stair. The checker board pattern filled the previously white 16×40 mm² surface below the horizontal bar with 2×5 black and white squares. With cohort 3 we filmed 32 trials per animal, with 8 trials per pattern (vertical bar vs checker board) and condition (intact vs no antenna).

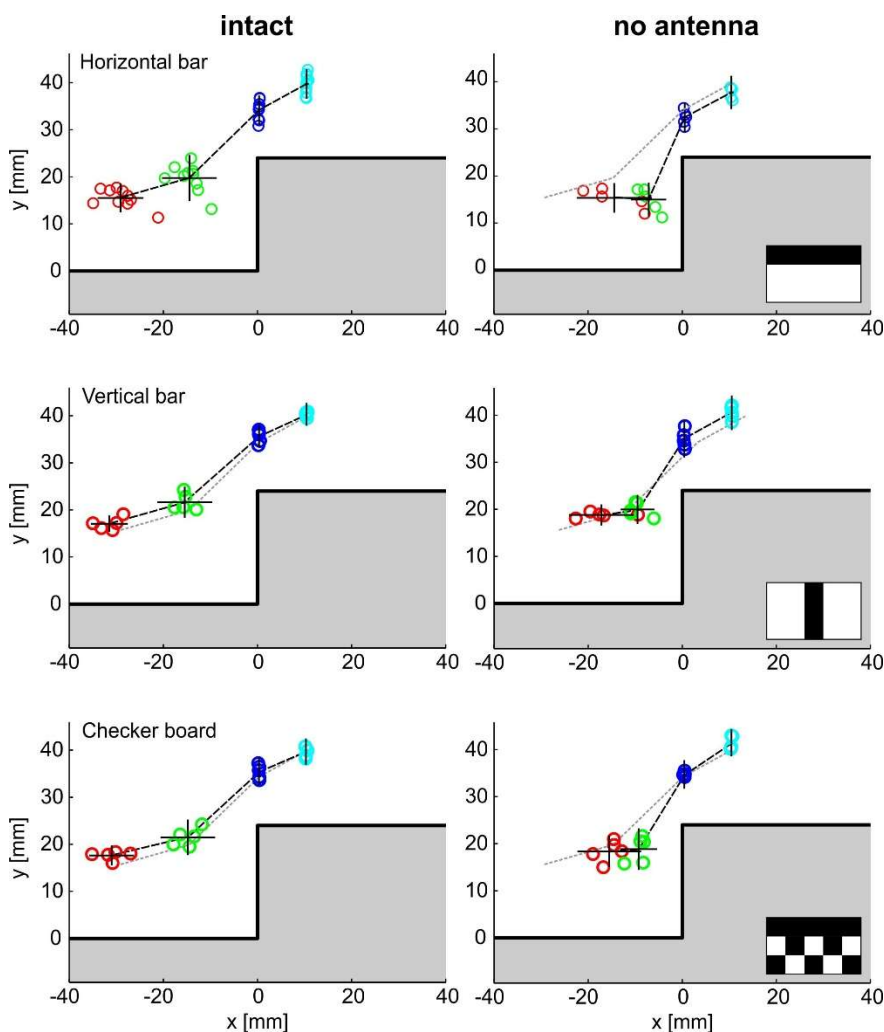


Figure S1: The effect of antennectomy is independent of the kind of visual pattern used. Left panels: intact animals; right panels: after antennectomy. Rows show mean trajectory positions for three different visual patterns on the front side of the stair (see inserts). Top: horizontal bar beneath the edge (same data as in Fig. 1); Middle: vertical bar; Bottom: Checker board below horizontal bar. Coloured circles show the mean position per animal at the time of 1st contact with the stair (red), at the closest point to the lower corner (green), above the edge (blue) and 10 mm behind the edge (cyan). Same graph details as in Fig. 1.

If the effect shown in Fig. 1 had been specific to the ‘hovering’ horizontal bar, we expected that sighted but antennectomized animals would not approach the stair any more than intact animals. Alternatively, if the effect had been due to a general disregard of visual cues about obstacle height, it should remain for both new patterns tested. The latter was the case (Fig. S1). Sighted animals that were deprived of their antennal tactile sense behaved the same way for each one of the three visual patterns: They contacted the stair later (Table 1, *Dist. to 1st contact*), approached the stair significantly more after antennectomy (Table 1, *Closest dist. to corner*) and reared significantly less (Table 1, *Rearing*) than before antennectomy. In contrast, the head height above the edge, the clearance on top of the stair, and the mean velocity during the climb remained unaffected by antennectomy (Table 1).

Table S1: Paired t-tests on per-animal means, p-values

comparison intact -> no antenna	Cohort 1, N=5 (n=10)	Cohort 3, N=5 (n=8)	
	Horizontal Bar	Vertical Bar	Checker board
Dist. of 1 st contact	0.00042	0.00309	0.00009
Closest dist. to corner	0.00490	0.00020	0.00301
Height above edge	0.27091	0.28419	0.43594
Clearance on top surface	0.05202	0.91705	0.09808
Velocity	0.33575	0.45819	0.97958
Rearing	0.00771	0.02460	0.01228