

Supporting Information

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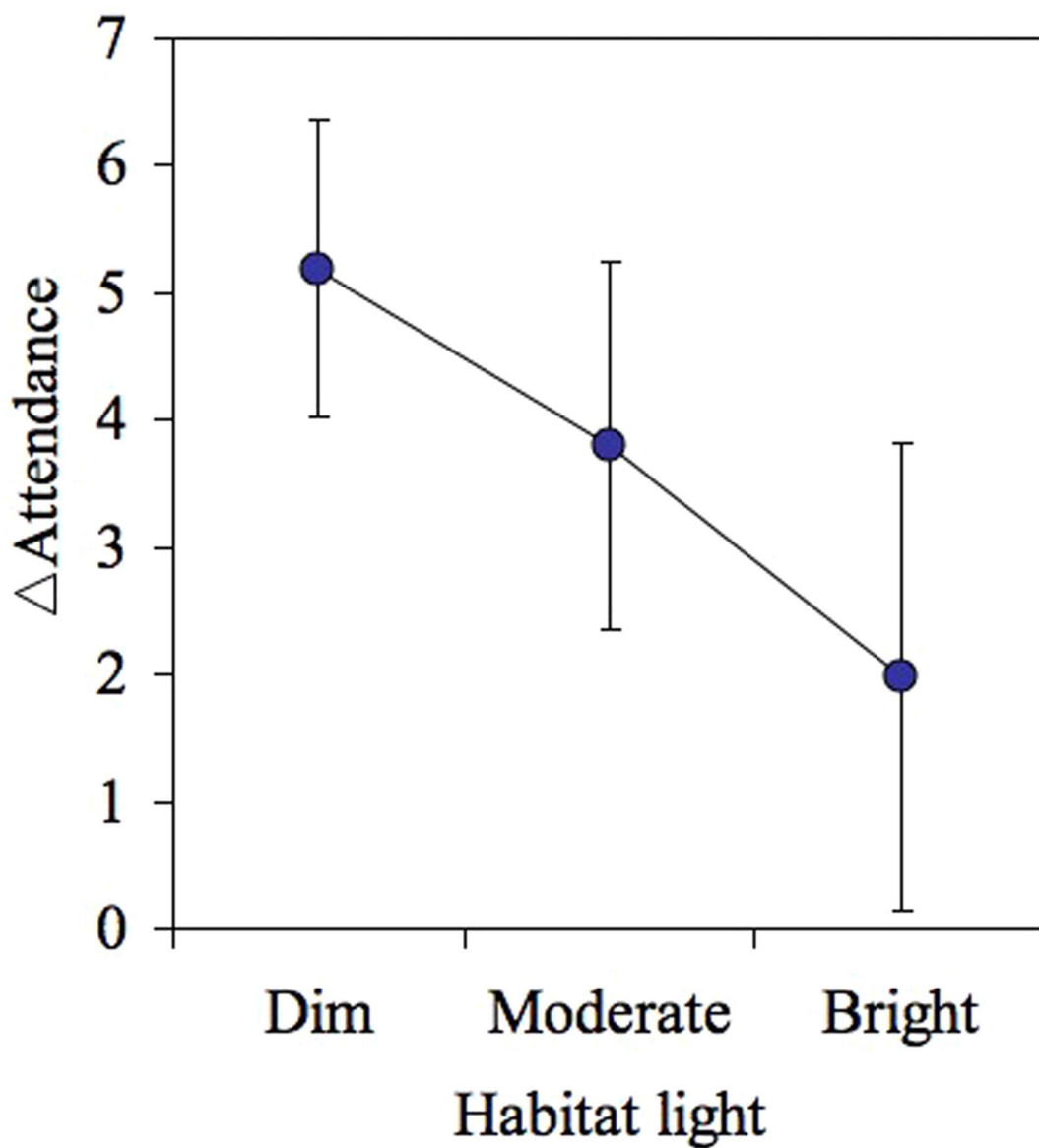


Fig. S1. Monitoring of a non-moving conspecific model, compared with that of a control stimulus. Delta attendance indicates the number of head movements by receivers ($n = 94$) toward the model minus the mean number of head movements toward the control ($n = 56$) in the corresponding light bin (defined by percentiles: dim ≤ 0.33 ; moderate = 0.33–0.66; bright ≥ 0.66). Values shown are mean \pm 1 SE.

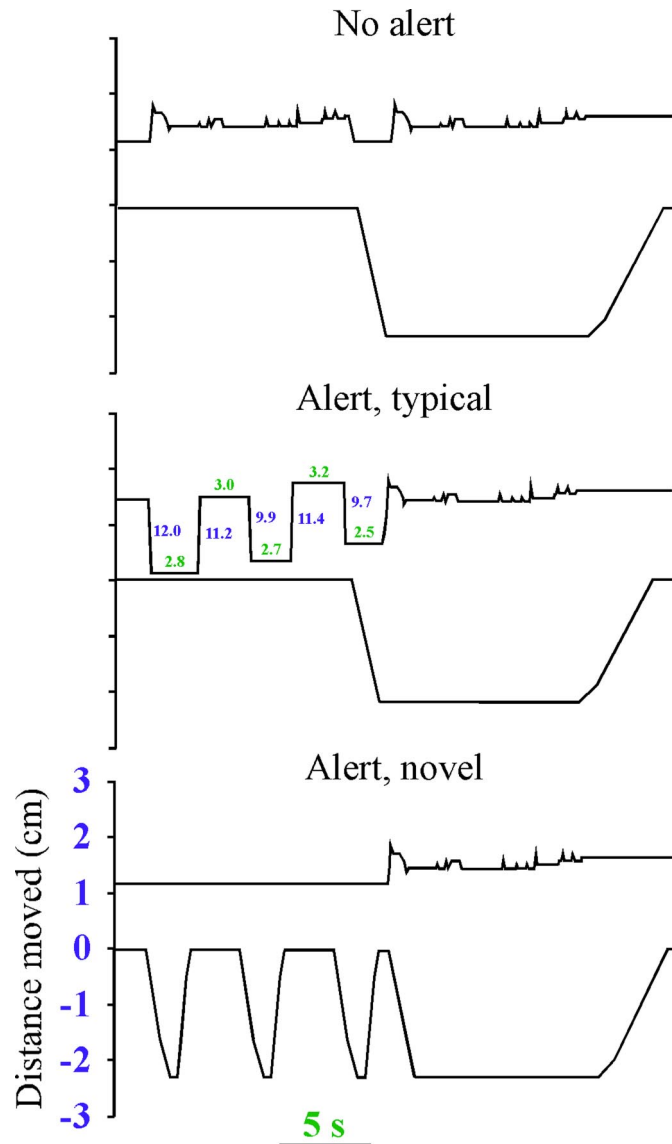


Fig. S2. Display-action-pattern graphs of robot display treatments. Plots depict the movement of the body (upper line) and extension of the dewlap (lower line) over time. "No alert" display consisted of the species-typical head bob sequence repeated twice to standardize display duration with "alert" treatments. Numbers on chart for "alert, typical" sequence correspond to the median population values of time (in green) and amplitude (in blue) for 4-legged pushups calculated from Tables S2 and S3. Introductory dewlaps for the "alert, novel" sequence were matched for the total number of movements and as close as possible to the timing and speed of pushup movements. Each display treatment can be seen in supplementary Quicktime Movies S3, Movie S4, and Movie S5.

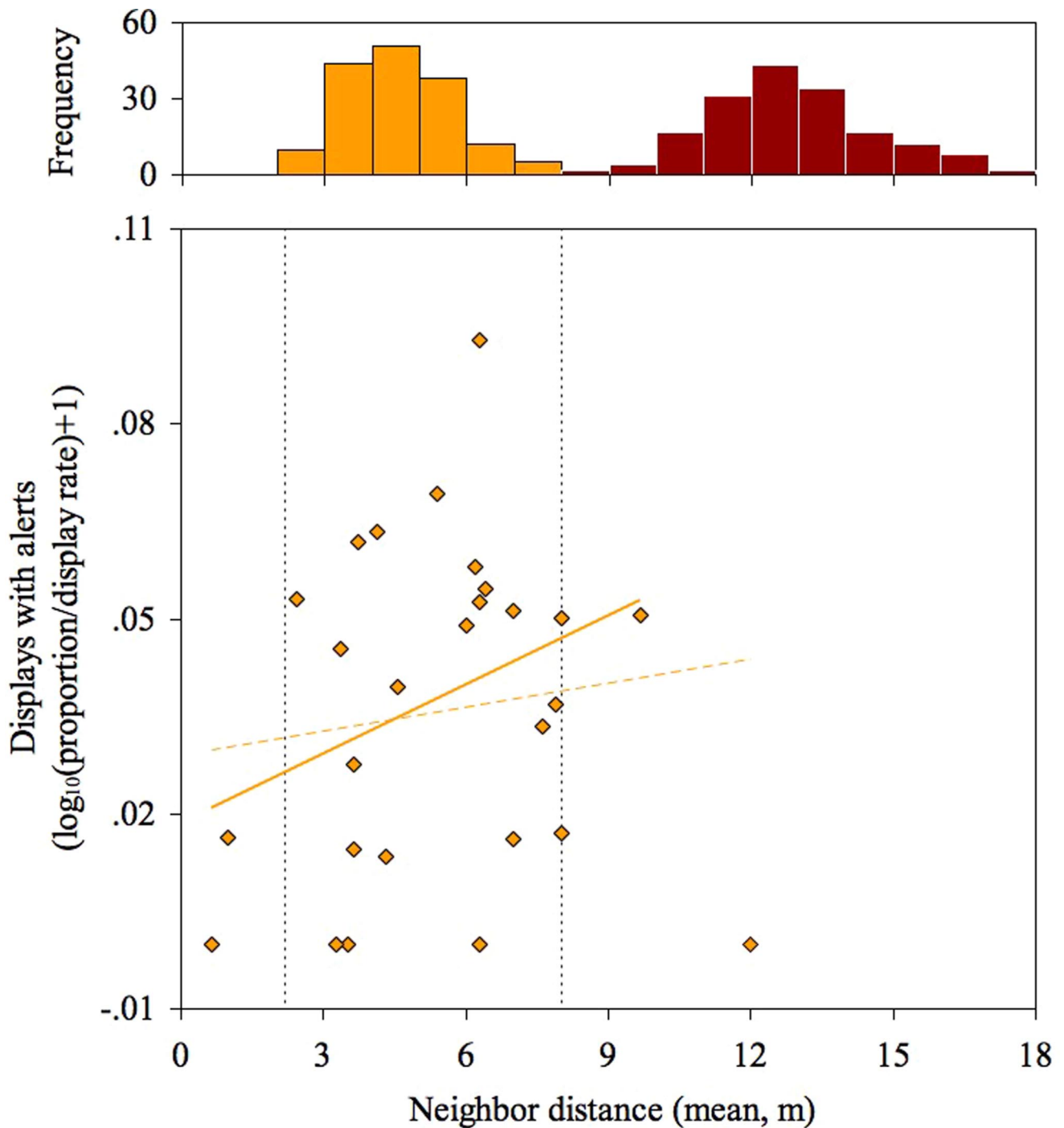


Fig. S3. Production of alerts by *A. gundlachi* as a function of neighbor distance. The proportion of displays by free-living lizards that began with exaggerated 4-legged pushups as a function of the average neighbor distance presented with the frequency distributions of robot presentation distances in playback experiments (upper panel; yellow, typical-receiver distance; red, extreme-receiver distance). Across all lizards, neighbors were from 0.7 to 12.6 m away, with an average distance of 5.5 ± 2.56 m (mean \pm 1 SD, $n = 26$ focal lizards). The dashed trend line included data from the outlier lizard at 12 m: this same lizard was the “light” outlier in Fig. 1 of the main text. Reference lines for the 10th and 90th percentiles of neighbor distances are also illustrated for comparison with frequency distributions of robot presentation distances.

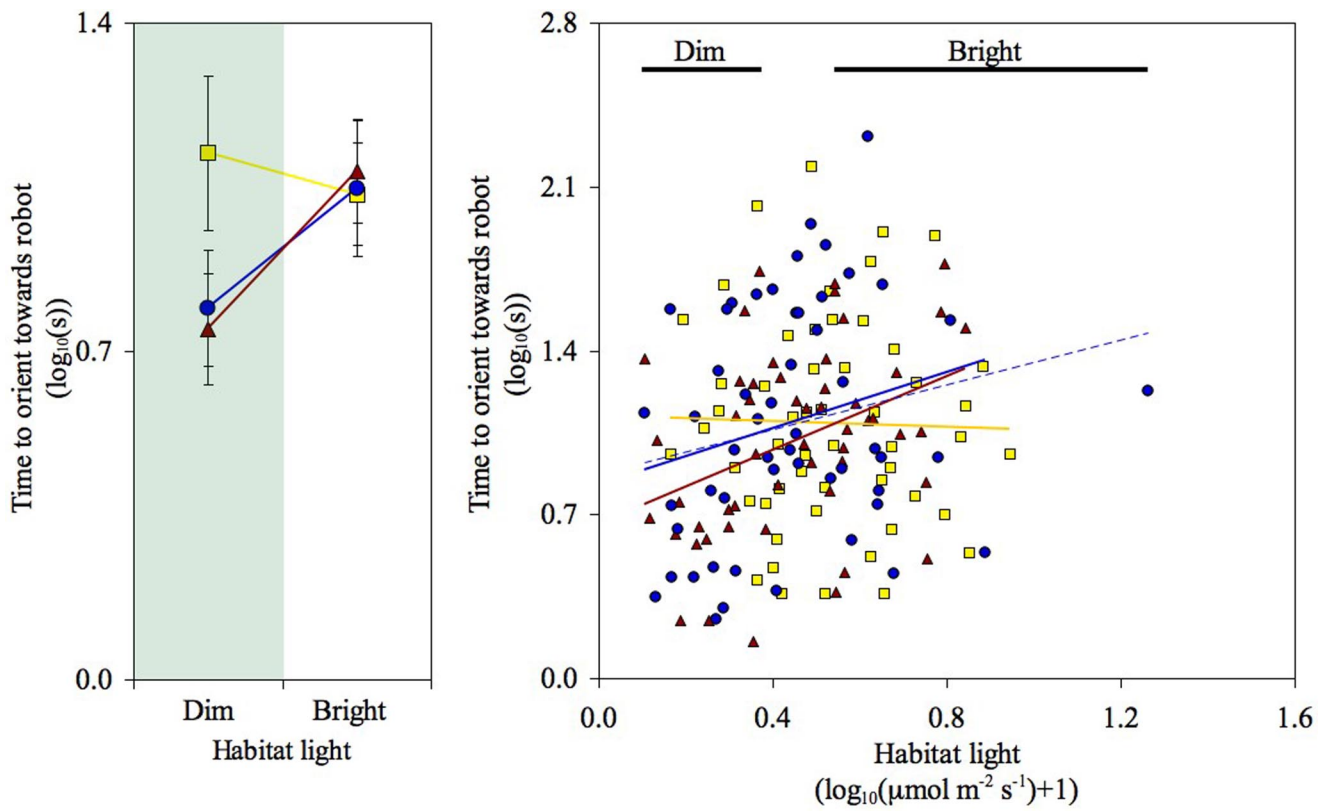


Fig. S4. Detection of territorial displays by *A. gundlachi* with and without alert components over typical-receiver distances. The scatter-plot illustrates the time each focal lizard required to orient to a robot after that robot began to move (“no alert” in yellow; “alert, typical” in blue; “alert, novel” in red). The dashed blue trend line was calculated with the inclusion of the light outlier for “alert, typical” and presented for comparison with the effect of its removal illustrated by the solid blue line. The results for the univariate general linear model reported in Table 2A of the main text include this outlier and its removal resulted in no qualitative changes to our findings. The plot to the left corresponds to the mean \pm 1 SE time lizards took to first orient toward the displaying robot in poor light (“dim”, below the 33 percentile) and bright (>66 percentile) conditions (percentile bins are shown above the scatter-plot; see also Fig. 2 of the main text).

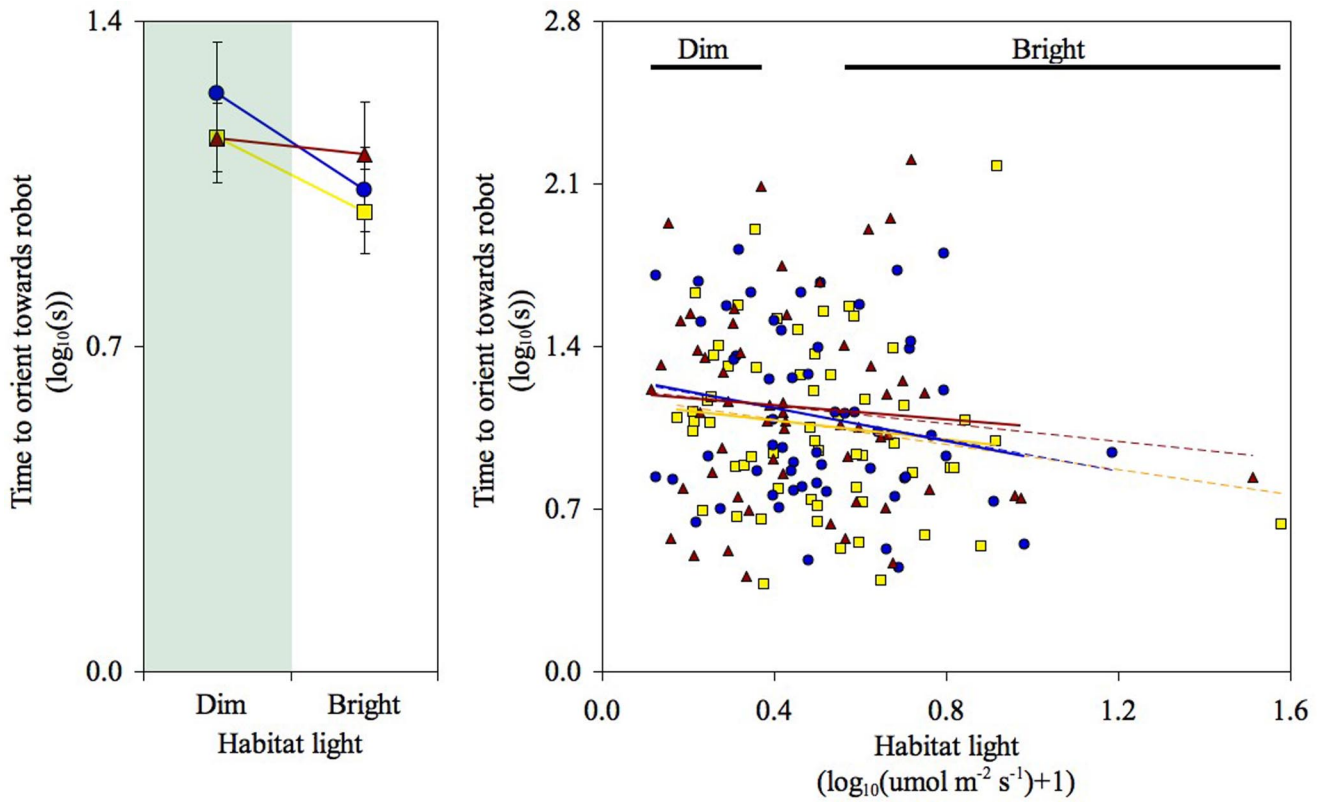


Fig. S5. Detection of territorial displays by *A. gundlachi* with and without alert components at extreme-receiver distances. The scatter-plot illustrates the time each focal lizard required to orient to a robot after that robot began to move (“no alert” in yellow; “alert, typical” in blue; “alert, novel” in red). The dashed lines were calculated with outliers. The results for the univariate general linear model reported in Table 2B of the main text also include these outliers; their removal resulted in no qualitative changes to our findings. Plots to the left correspond to the mean \pm 1 SE time for lizards to first orient toward the displaying robot in poor/dim and bright light.



Movie S1. Movie of an adult male *A. gundlachi* performing a territorial display without introductory movements.

[Movie S1 \(MOV\)](#)



Movie S2. Movie of an adult male *A. gundlachi* performing a territorial display with introductory 4-legged pushups.

[Movie S2 \(MOV\)](#)



Movie S3. Movie of a robot *A. gundlachi* performing a territorial display without introductory movements (“no alert”; species-typical part of the display is repeated twice).

[Movie S3 \(MOV\)](#)



Movie S4. Movie of a robot *A. gundlachi* performing a territorial display with introductory 4-legged pushups (“alert, typical”).

[Movie S4 \(MOV\)](#)



Movie S5. Movie of a robot *A. gundlachi* performing a territorial display with introductory dewlaps (“alert, novel”).

[Movie S5 \(MOV\)](#)

Table S1. A general linear model showing how the monitoring by *A. gundlachi* of a non-moving conspecific model compared to that of a control stimulus (factor, F) is influenced by habitat light (covariate, C)

Overall model, $F_{(3,146)} = 7.81, P < 0.001$

Independent variable	d.f.	F	P
Intercept	1	770.27	<0.001
Stimulus (F)	1	14.02	<0.001
Light (C)	1	11.30	0.001
Stimulus light	1	4.70	0.032

Table S3. Calculation of amplitude parameters for robot “alert, typical” display

Lizard	Upward movement, mm								Downward movement, mm							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
P9	14.0	10.2	12.7						14.1	10.4	9.7					
P14	5.3	5.3							5.6	0.8						
P17	8.7								8.0							
P20	11.6	14.3	12.2	13.1					7.8	11.6	—	—	21.4			
P21	13.4	14.6	14.3						11.8	14.4	14.3					
P23	4.8	9.7	12.4	11.0					12.0	9.2	9.6	13.1				
P25	1.8	6.9							5.1	4.8						
P32	10.9	8.0	12.9						8.7	9.1	1.5					
P55	—								—							
P61	—								—							
P62	13.9	11.9	21.2	11.9					22.7	17.0	20.1	18.6				
P63	8.9	12.3							11.2	10.0						
P65	14.6	6.7							12.0	8.7						
P66	9.8	13.4	8.6						12.0	11.6	11.0					
P67	20.5								16.3							
P70	—								—							
P74	4.8	4.1	6.2	4.6					3.6	2.8	7.5	2.3				
P86	—								—							
P87	—								—							
P88	13.6	14.2	8.1	10.6					13.0	8.0	9.6	7.4				
P90	—								—							
P91	7.7	10.5							12.3	9.9						
P106	11.2	11.4	9.9						12.7	8.1	9.9					
P151	5.2	7.2	6.2	6.7	13.4	0.5	11.9	5.1	4.7	3.1	6.7	8.3	8.7	5.2	7.2	5.6
P185	—								—							
P186	14.9	17.2							18.4	15.0						
P220	6.8	10.2	9.1	9.6	7.3	0.6	9.7		9.7	12.5	9.1	7.3	8.5	4.0	6.3	
P221	13.0	12.7	11.4						13.7	10.4	10.1					
P253	12.5	14.9							22.4	8.1						
P254	14.7	15.6	12.5						10.6	11.5	18.0					
P255	—								—							
Median	11.2	11.4	11.8	10.6	10.4	0.6	10.8	5.1	12.0	9.9	9.7	7.4	8.6	5.2	7.0	6.8
<i>n</i>	23	21	14	7	2	2	2	1	23	21	13	7	4	3	3	2

Values are median amplitude of sequential up and down movements of introductory 4-legged pushups compiled from video footage collected in 2006. Those in bold were used to program the robots. Table cells with no entries were lizards that either produced broadcasts without introductory pushups or moved out of view for a period during observations.