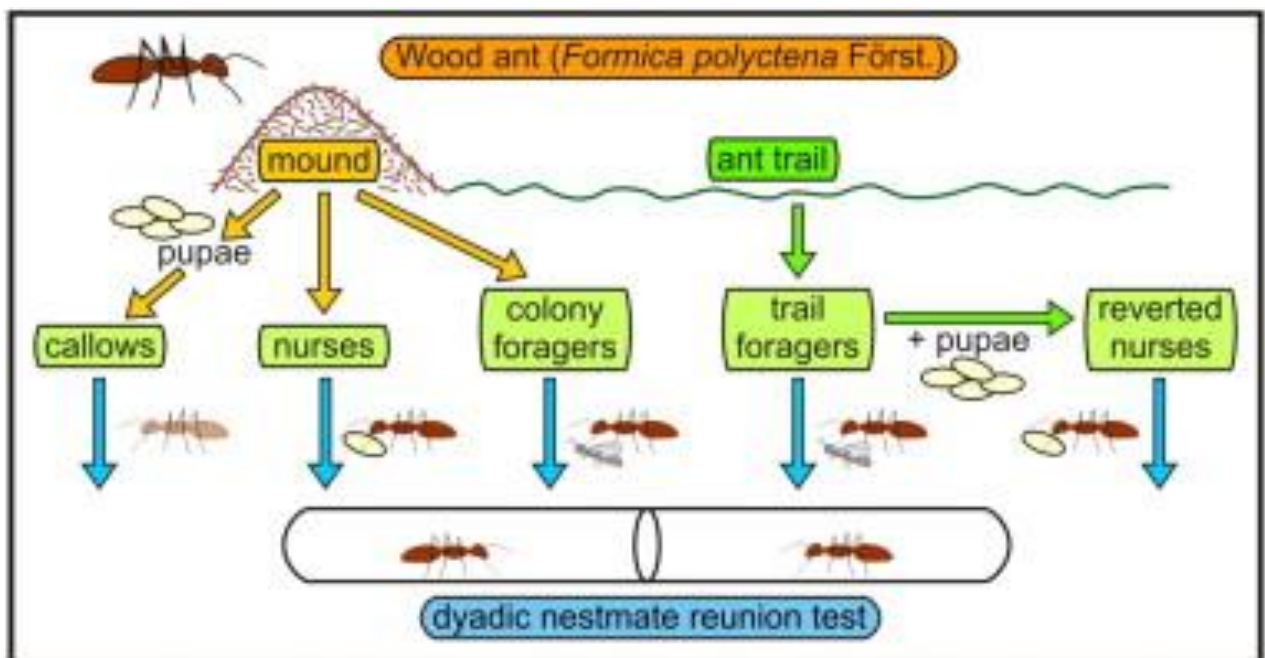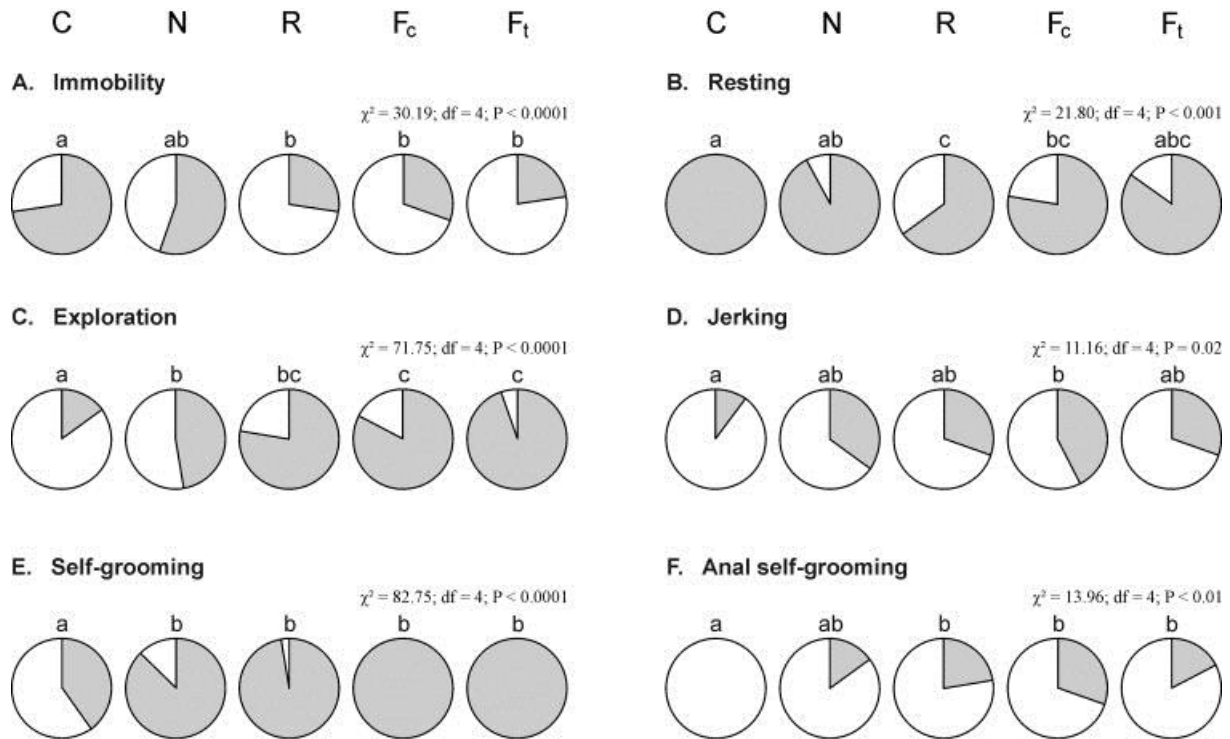# Graphical abstract

Fig. A.1. Inter-group comparisons of the rate of occurrence of various subcategories of non-social behavior displayed by workers of the red wood ant *Formica polyctena* during dyadic nestmate reunion tests. C: callows, N: nurses, R: reverted nurses, F_c: colony foragers, F_t: trail foragers, number of analyzed tests: n = 40 in each group. Grey/white: presence/absence of behavior in question. Statistics: χ^2 test followed by *post-hoc* pairwise comparisons carried out by means of the two-tailed Fisher Exact Probability Test taking into account Bonferroni correction for multiple comparisons. The groups that do not differ significantly from each other are marked by the same letter.

Pairwise comparisons: Immobility: $P \leq 0.001$: C vs R, C vs F_c, C vs F_t; Resting: $P \leq 0.001$: C vs R, $P \leq 0.05$: C vs F_c, N vs R; Exploration: $P \leq 0.001$: C vs R, C vs F_c, C vs F_t, N vs F_t, $P \leq 0.05$: C vs N, N vs F_c; Jerking: $P \leq 0.05$: C vs F_c; Self-grooming: $P \leq 0.001$: C vs N, C vs R, C vs F_c, C vs F_t; Anal self-grooming: $P \leq 0.01$: C vs F_c, $P \leq 0.05$: C vs R.
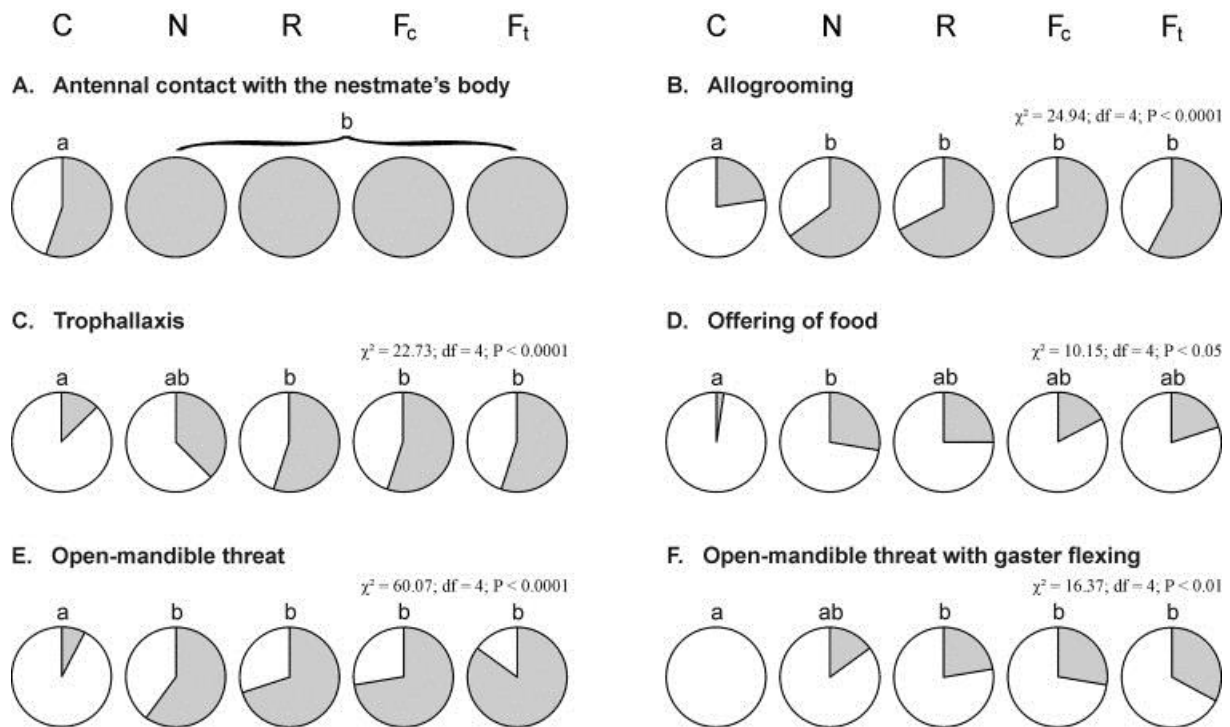
Fig. A.2. Inter-group comparisons of the rate of occurrence of various subcategories of social behavior displayed by workers of the red wood ant *Formica polyctena* during dyadic nestmate reunion tests. C: callows, N: nurses, R: reverted nurses, F_c: colony foragers, F_t: trail foragers, number of analysed tests: n = 40 in each group. Grey/white: presence/absence of behavior in question. Statistics: see Fig. A.1. The groups that do not differ significantly from each other are marked by the same letter.

Pairwise comparisons: Antennal contacts with the nestmate's body: χ^2 test could not be used to compare the data obtained for all tested groups, as expected frequencies were not sufficiently high (< 5), therefore, the data obtained for callows and the pooled data obtained for nurses, reverted nurses, colony foragers and trail foragers were compared by means of two-tailed Fisher Exact Probability Test ($P \leq 0.0001$); Allogrooming: $P \leq 0.001$: C vs R, C vs F_c, $P \leq 0.01$: C vs N, $P \leq 0.05$: C vs F_t; Trophallaxis: $P \leq 0.001$: C vs R, C vs F_c, C vs F_t; Offering of food: $P \leq 0.05$: C vs N; Open-mandible threat: $P \leq 0.001$: C vs N, C vs R, C vs F_c, C vs F_t; Open-mandible threat with gaster flexing: $P \leq 0.001$: C vs F_t, $P \leq 0.01$: C vs F_c, $P \leq 0.05$: C vs R.
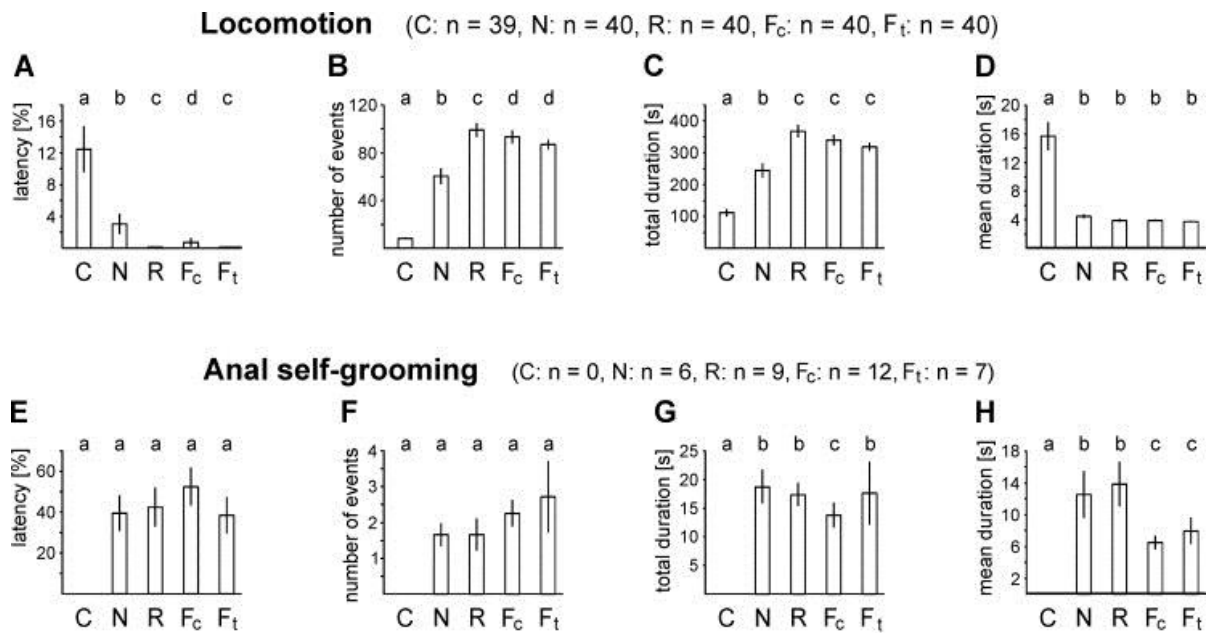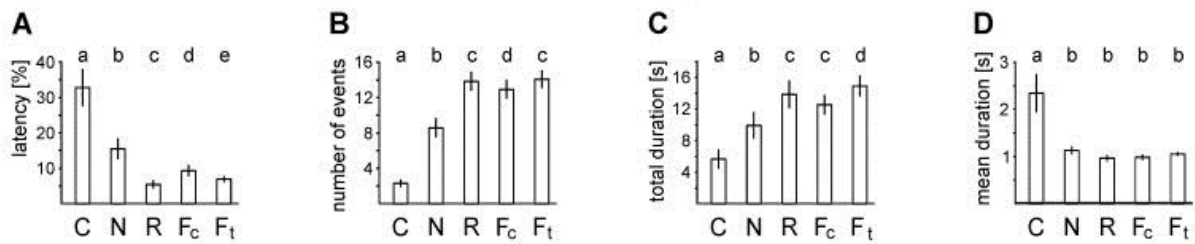
Fig. A.3. Inter-group comparisons of four variables quantifying two subcategories of active non-social behavior (locomotion and anal self-grooming) displayed by workers of the red wood ant *Formica polyctena* during dyadic nestmate reunion tests. A, E: latency to the first episode; B, F: number of episodes; C, G: total duration; D, H: mean duration. C: callows, N: nurses, R: reverted nurses, F_c: colony foragers, F_t: trail foragers, n: number of analyzed tests. The groups that do not differ significantly from each other are marked by the same letter.

Locomotion: (A) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs R, N vs F_c, N vs F_t, R vs F_c, F_c vs F_t; (B) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs R, N vs F_c, N vs F_t, R vs F_c, R vs F_t; (C) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_t, N vs R, $P < 0.001$: C vs F_c, $P < 0.01$: N vs F_t; (D) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t.

Anal self-grooming: (E) GLM: NS; (F) GLM: NS; (G) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs F_c, F_c vs F_t, $P < 0.001$: C vs N, C vs R, N vs F_c, R vs F_c, $P < 0.01$: C vs F_t; (H) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: N vs F_c, R vs F_c, $P < 0.001$: R vs F_t, $P < 0.01$: C vs R, C vs F_t, N vs F_t, $P < 0.05$: C vs N, C vs F_c.

Antennal contact with the nestmate's antennae (C: n = 19, N: n = 38, R: n = 40, F_c: n = 40, F_t: n = 40)

Antennal contact with the nestmate's body (C: n = 22, N: n = 40, R: n = 40, F_c: n = 40, F_t: n = 40)
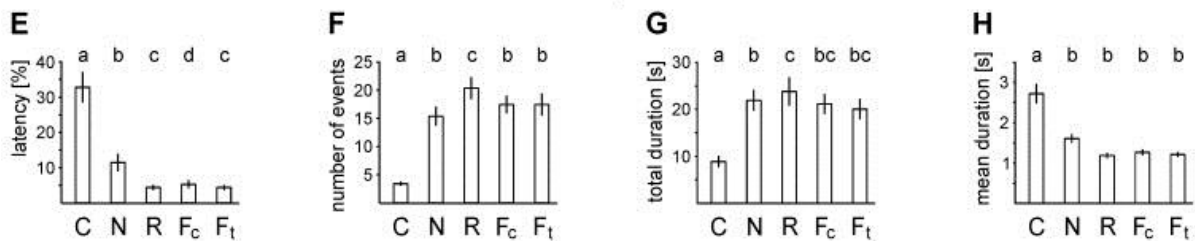
Fig. A.4. Inter-group comparisons of four variables quantifying two categories of social behavior (antennal contacts with the nestmate's antennae and antennal contacts with the nestmate's body) displayed by workers of the red wood ant *Formica polyctena* during dyadic nestmate reunion tests. A, E: latency to the first episode; B, F: number of episodes; C, G: total duration; D, H: mean duration. C: callows, N: nurses, R: reverted nurses, F_c: colony foragers, F_t: trail foragers, n: number of analyzed tests. The groups that do not differ significantly from each other are marked by the same letter.

Antennal contacts with the nestmate's antennae: (A) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs R, N vs F_c, N vs F_t, R vs F_c, $P < 0.001$: F_c vs F_t; $P < 0.01$: R vs F_t; (B) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs R, N vs F_t, $P < 0.001$: N vs F_c, R vs F_c, $P < 0.05$: F_c vs F_t; (C) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs R, N vs F_t, $P < 0.001$: N vs F_c, F_c vs F_t, $P < 0.05$: R vs F_t; (D) GLM: $P < 0.001$, pairwise comparisons: $P < 0.0001$: C vs R, C vs F_c, $P < 0.001$: C vs N, C vs F_t.

Antennal contacts with the nestmate's body: (E) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs R, N vs F_c, N vs F_t, $P < 0.05$: R vs F_c, F_c vs F_t; (F) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, R vs F_c, $P < 0.001$: N vs R, $P < 0.01$: R vs F_t; (G) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, $P < 0.05$: N vs R; (H) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs R, C vs F_c, C vs F_t, $P < 0.01$: C vs N.
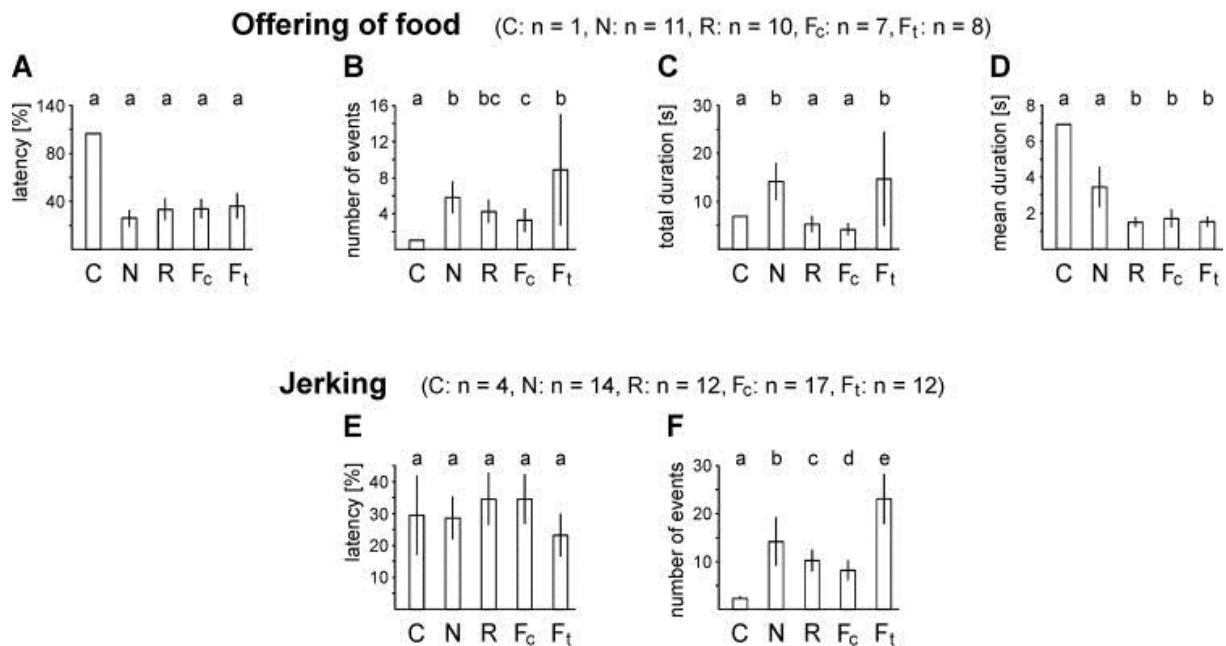
Fig. A.5. Inter-group comparisons of four variables quantifying two categories of ant's behavior (offering of food and jerking) displayed by workers of the red wood ant *Formica polyctena* during dyadic nestmate reunion tests. A, E: latency to the first episode; B, F: number of episodes; C: total duration; D: mean duration. C: callows, N: nurses, R: reverted nurses, F_c: colony foragers, F_t: trail foragers, n: number of analyzed tests. The groups that do not differ significantly from each other are marked by the same letter.

Offering of food: (A) GLM: NS; (B) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, $P < 0.001$: N vs F_c, F_c vs F_t; (C) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs F_t, F_c vs F_t, $P < 0.001$: N vs R, $P < 0.01$: N vs F_c, R vs F_t; (D) GLM: $P < 0.001$, pairwise comparisons: $P < 0.01$: C vs R, C vs F_c, C vs F_t, N vs R, N vs F_t, $P < 0.05$: N vs F_c.

Jerking: (E) GLM: NS; (F) GLM: $P < 0.0001$, pairwise comparisons: $P < 0.0001$: C vs N, C vs R, C vs F_c, C vs F_t, N vs F_c, N vs F_t, R vs F_t, F_c vs F_t, $P < 0.001$: N vs R, $P < 0.05$: R vs F_c.