Wars are hostile conflicts in which members of one society coordinate their efforts to kill or injure members or disrupt the normal functioning of another. Animal wars seem to arise from changes to social context or circumstance instead of primarily from the inherent aggressive tendencies of individuals and are examples of how cooperation within a society can lead to aggression between members of opposing societies. Ants live in societies, called colonies, and it has been argued that they are the only other animal to war like humans. The pavement ant (*Tetramorium caespitum*) is a tramp species well known for its ant wars in which thousands of workers from two colonies fight. Fighting appears to be ritualized; ants fight by grabbing another ant’s mandibles with its own and pairs undergo what can be described as a ‘push-of-war’ while other ants recruit more workers to the battle and few, if any, ants die during the battle. What are the rules that influence the collective-organization of these ‘wars’ and how are cooperative and agonistic behaviors modulated by brain monoamines? We report that workers discriminate nestmates and non-nestmates by detecting cues coded relative abundance of methyl-alkane and alkene hydrocarbons on the cuticle of ants. Detection of non-nestmate cues is not sufficient to stimulate fighting in and of itself; social context influences aggressive decisions as a recent history of high interaction rate with nestmate ants increases the probability workers will fight. Workers respond to interactions with heterospecific ants using rules that do not depend on density of nestmates. We also report how patterns of monoamines (serotonin 5-HT, dopamine, and octopamine) in pavement ant brains correspond to interactions with live nestmates and non-nestmates as well as cuticular hydrocarbons from nestmates and non-nestmates.