In response to intruders into a honeybee (*Apis mellifera*) colony, guard bees located at the hive entrance sound the alarm by producing pheromones that recruit nest mates and elicit aggressive behaviors in these workers. Recently, alarm pheromone was shown in addition to inhibit appetitive learning in bees of foraging age [Urlacher et al. 2010]; an outcome that parallels effects of stress on learning behavior in vertebrates. As older bees in the colony are more likely to take part in colony defense than young bees, we examined whether the effect of alarm pheromone on learning was also age-dependent. Alarm pheromone had no significant effect on the appetitive learning behavior of young (< 1 week old) worker bees from queen-right colonies. Nor did it inhibit learning in young bees maintained from the time of adult emergence in cages supplied with synthetic queen mandibular pheromone (QMP). However, young bees maintained in cages without exposure to QMP showed impaired learning in response to alarm pheromone. Our results show that both age and exposure to QMP are important factors modulating the bee's responsiveness to stressful stimuli. Young bees are more likely to come into contact with the queen and they are exposed to higher levels of her pheromones than are older bees. Blocking the responsiveness of young bees to alarm pheromone might help to ensure that the queen has constant care, even when bees are recruited to defend the colony. Urlacher E, Francès B, Giurfa M and Devaud JM. An alarm pheromone modulates appetitive olfactory learning in the honeybee (*Apis mellifera*). Frontiers in Behavioral Neuroscience 2010 ; 4