

3 April 2006

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## [The Smell of Fear Boosts Cognitive Performance](#)

### *Chemical signals also work in humans*

Most people wrongfully believe that we humans have a poor sense of smell. This idea comes from both the fact that we tend to compare our olfactory abilities with those of dogs and from the fact that we obviously rely mostly on sight and hearing for orientation. However, scientists in the 1990s have discovered that we have hundreds of olfactory receptors and began to unravel the fact that our sense of smell is actually more sensitive than we tend to believe. In a new study, that may sound ridiculous at first, researchers from the Rice University in Houston discovered a connection between the smell of fear, as it is imprinted in men's sweat, and women's cognitive abilities. "It is well-documented in the research literature that animals experiencing stress and fear produce chemical warning signals that can lead to behavioral, endocrinological and immunological changes in their fellow animals of the same species, but we wanted to see if this applies to humans as well," said principal investigator Denise Chen, assistant professor of psychology at Rice. For the study, Chen collected samples of sweat from research volunteers who kept gauze pads in their armpits while they watched either videos of horror movies or non-threatening documentaries. The scientists found that women were *not* capable of consciously detecting any difference between the two types of smell. However, when subjected to word-association tasks, the women who were exposed to the smell of fear-induced sweat performed better than the ones exposed to smells of other types of sweat or no sweat at all. Chen had 75 female students between the ages of 18 and 22 respond to 320 pairs of words that flashed for three seconds each on a computer screen. The participants had to indicate whether the words were associated with each other (for example, arms and legs) or not (arms and wind). Each participant had a piece of gauze attached above their lips so that they were exposed to either chemicals from sweat or none at all during the tests. The answers from the participants exposed to the fear chemicals turned out to be 85 percent accurate, while those exposed to either the neutral sweat or the control (no-sweat) were 80 percent accurate. "The subjects in the fear condition were six percent more accurate, which is a statistically significant difference," Chen said. Moreover, when the pairs of words were ambiguous in threat content (such as one neutral word paired with a threatening word or a pair of neutral words) the subjects exposed to fear-induced sweat were 15 to 16 percent slower in responding than those in the neutral sweat condition. According to Chen, this result can be explained by assuming that the chemicals from the fear-induced sweat prompted subjects to be more cautious. Thus, although the participants were not aware of any difference between the smells, they nevertheless unconsciously perceived the difference and this influenced their performance. "We demonstrated that in humans, chemical signals from fear facilitated overall accuracy in identifying word relatedness independent of the perceived qualities of the smells," Chen said. "The effect may arise from a learned association, including greater cautiousness and changes in cognitive strategies."