To extend the results of a previous study on the effects of carbon dioxide (CO₂) and bioeffluents on humans, the new study reported in this paper was carried out. The purpose of this study was to examine, whether exposure to CO₂ at 5000 ppm would cause sensory discomfort, evoke acute health symptoms, reduce the performance of cognitive tasks, or result in changes in physiological responses. The outdoor air supply rate was set high enough in a low-emission stainless-steel climate chamber to create a reference condition with CO₂ at 500 ppm when subjects were present, and chemically pure CO₂ was added to the supply air to create an exposure condition with CO₂ at 5000 ppm (the measured exposure level was ca. 4900 ppm). Ten healthy college-age students were exposed twice to each of the two conditions for 2.5 h in a design balanced for order of presentation. The raised CO₂ concentration had no effect on perceived air quality or physiological responses except for end-tidal CO₂ (EtCO₂), which increased more (to 5.3 kPa) than it was in the reference condition (5.1 kPa). Other results indicate additionally that a 2.5-h exposure to CO₂ up to 5000 ppm did not increase intensity of health symptoms reported by healthy young individuals and their performance of simple or moderately difficult cognitive tests and some tasks resembling office work. These results accord well with the current occupational exposure limit recommendation for CO₂ and with many other reports published in the literature.