The purpose of this study was to examine the effects on humans of exposure to carbon dioxide (CO$_2$) and bioeffluents. In three of the five exposures, the outdoor air supply rate was high enough to remove bioeffluents, resulting in a CO$_2$ level of 500 ppm. Chemically pure CO$_2$ was added to this reference condition to create exposure conditions with CO$_2$ at 1,000 ppm or 3,000 ppm. In two further conditions, the outdoor air supply rate was restricted so that the bioeffluent CO$_2$ reached 1,000 ppm or 3,000 ppm. The same twenty-five subjects were exposed for 255 minutes to each condition. Subjective ratings, physiological responses and cognitive performance were measured. No statistically significant effects on perceived air quality, acute health symptoms or cognitive performance were seen during exposures when CO$_2$ was added. Exposures to bioeffluents with CO$_2$ at 3,000 ppm reduced perceived air quality, increased the intensity of reported headache, fatigue, sleepiness and difficulty in thinking clearly, and reduced speed of addition, the response time in a redirection task and the number of correct links made in the cue-utilisation test. This suggests that moderate concentrations of bioeffluents, but not pure CO$_2$, will result in deleterious effects on occupants during typical indoor exposures.