The importance of accounting for the temperature dependence of air properties in numerical simulations of air flows over pinned heat sinks is demonstrated by comparisons with recently published experiments. Numerical simulations, based on a conjugate heat transfer analysis, using the RANS-based modified k-ω turbulence model, with temperature-dependent air properties, are shown to be in significantly better agreement with experimental measurements of pressure drop, heat transfer coefficient, and heat sink base temperature, than those which employ constant air properties