Let $L_0$ contain the origin and be an $s$-dimensional hypercubic sub-lattice of the $d$-dimensional hypercubic lattice $\mathbb{L}$ ($2 \leq s < d$). Percolation at densities $(p, \sigma)$ is set up by declaring edges in $L_0$ open with probability $\sigma$, and edges in $\mathbb{L} \setminus L_0$ open with probability $p$. We prove existence of a critical curve $\sigma^*(p)$ such that the model is subcritical if $\sigma < \sigma^*(p)$. We show $\sigma^*(p)$ is strictly decreasing with $p \in (0, p_c(d))$, and $\sigma^*(p) = 0$ if $p \in (p_c(d), 1)$ (with $p_c(d)$ the critical density for homogeneous percolation in $\mathbb{L}$). Results about the critical point and cluster distributions will also be given.