Given a set of vertices V which have two attributes, A and B, we will have an edge between vertices $u, v \in V$ having opposing advantages in A and B. That is $uv \in E$ the set of edges $\iff$ $u_A > v_A$ and $u_B < v_B$ or $u_A < v_A$ and $u_B > v_B$. Suppose the attribute values are independently selected from a distribution of the integers from 1 to k inclusive. Then the probability of an edge forming is $2 * (\frac{1-\Pr[u_A=v_A]}{2} * \frac{1-\Pr[u_B=v_B]}{2}) = \frac{(1-\frac{1}{k})^2}{2}$. In the case where $k = 10$ this probability is 0.405.

This gives rise to an Erdos-Renyi graph with edge probability $\frac{(1-\frac{1}{k})^2}{2}$. The sharp boundary for connectivity in an Erdos-Renyi is an edge probability of $\frac{\ln n}{n}$ where $n = |V|$. Thus for a given k we must select an n s.t. $\frac{(1-\frac{1}{k})^2}{2} > \frac{\ln n}{n}$. Because $\frac{\ln n}{n}$ is monotonically decreasing for all $n > 1$ and $n = 1, 2$ fulfill this criteria all values of n will give a connected graph when $k = 10$.