Evolutionarily, humans are predisposed to acquire phobias of stimuli that once imposed survival threats to our primate ancestors in predator encounters. Having large capacities of this innate fear may initially appear advantageous compared to relying primarily on learning fear, which requires encountering predators before developing a strong avoidance response. However, a large, nonspecific innate fear response is not easily adaptable for dynamic environments. Additionally, too strong of an innate response may result in excess avoidance behavior, which may hinder an individual’s mating success. While we know that humans have acquired capacities for both innate and learned fear, how the benefits and risks of each strategy influence their evolution has not been formally modeled. Using a population genetic one-locus haploid model, we modeled the evolution of two competing alleles with varying frequencies of innate and learned fear under changing environmental conditions. As predicted, higher frequencies of the learning strategy evolve with greater predator densities, while higher frequencies of the innate strategy evolve with greater predator threat levels. To our surprise, the reproductive cost of excess fear did not appear to hinder the evolution of the innate strategy as predicted.