We present a large scale study where a nationally representative sample of 1,000 participants were asked to make real purchases within an online supermarket platform. The study captured the effect of price changes, and of the signposting of such changes, for breakfast cereals and soft drinks. We find that such taxes are an effective means of altering food purchasing, with a 20% rate being sufficient to make a significant impact. Signposting represents a complementary nudge policy that could enhance the impact of the tax without imposing severe welfare loss, though the effectiveness may depend on the product category.