



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

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<b>Project Title</b> Telling the Difference: How the Placebo Effect Changes Perception of Organic and Nonorganic Food	
<b>Abstract</b> <b>Objectives/Goals</b> With increasing demand for organic food, we sought to determine if human senses are capable of distinguishing organic from nonorganic food. Based on background research, we hypothesized that when subjects were given nonlabeled foods, they would be unable to tell the difference. Similarly, if we mislabeled food as organic, then we hypothesized they would find it would taste better. <b>Methods/Materials</b> Our experiment had two phases: Phase 1, a blind test and Phase 2, a placebo effect test. Consent was obtained from 40 human subjects, who agreed to eat apples, bread, carrots, cheese, and yogurt. In Phase I, subjects ate organic and nonorganic variants of the foods and were asked which they believed to be organic. Phase II consisted of subjects being placed into groups. Group 1 was given organic food, Group 2 was given organic food that was mislabeled as nonorganic, Group 3 was given nonorganic food, and Group 4 was given nonorganic food mislabeled as organic. Subjects rated the food's taste on a scale of 1-5. <b>Results</b> In the blind test, only 45.4% of subjects correctly identified the organic food, even though 67.5% of subjects preferred organic food. Subjects were thus unable to determine the identity of the food through taste alone. In the placebo effect test, Group 1's average rating on a scale of 1-5 was 3.5, Group 2's was 3.1, Group 3's was 3.0, and Group 4's was 3.4. Group 4, which was told that nonorganic food was organic, had data with standard deviation of 0.11, 0.38 lower than that of the next lowest group. As the average rating for each food was consistent with the overall average, we proved our hypothesis about improved perception. <b>Conclusions/Discussion</b> Subjects were unable to reliably distinguish organic from nonorganic foods when they were not labeled. However, labeling a food as organic yielded improved taste perception, regardless of its true identity. It can be seen how the placebo effect, traditionally used in medicine, can be extended to the field of marketing. Organic food sales for 2012 were worth \$28 billion, organic food typically costs double the amount of nonorganic food, and there is no scientific test to determine if a food is organic. Since there is a financial incentive to mislabel food as organic, it is important to develop a test to determine if a food is truly organic.	
<b>Summary Statement</b> First, we administered a blind test to determine if subjects could distinguish organic from nonorganic food, and then we used the placebo effect to assess if subjects' taste perception of food could be changed through mislabeling.	
<b>Help Received</b> Test subjects participated in experiment; parents helped purchase food; teacher helped improve presentation.	