

# The Effect of Jelly Sweetener on PB&J Taste

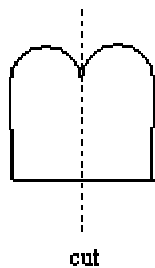
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Purpose and Hypothesis: The purpose of this experiment was to determine if the sugar content in Smuckers<sup>®</sup> Concord Grape jelly affects how "sweet" it is rated in a taste test of peanut butter and jelly sandwiches. We hypothesize that the regular jelly will be rated as "just right" in sweetness because it is what most people are used to eating. We propose that the no sugar jelly will also be rated as "just right" in sweetness since it includes the artificial sweetener NutraSweet<sup>®</sup>.<sup>1</sup> Finally, we propose that the low sugar jelly will be rated as not sweet enough since it contains half the sugar as the regular jelly and no artificial sweetener.

## Experimental:

### *Construction of peanut butter and jelly sandwiches:*

Using a butter knife, two tablespoons of Jif peanut butter was spread on a slice of Wonder bread to uniform thickness of 3 mm. Two tablespoons of jelly (Smuckers<sup>®</sup> Concord Grape jelly, Smuckers<sup>®</sup> Low Sugar Concord Grape jelly, or Smuckers<sup>®</sup> Sugar Free Concord Grape jelly)<sup>2</sup> were placed on the second slice of Wonder bread and spread with the butter knife to uniform thickness of 3mm. The two slices of bread were placed together so that the peanut butter and jelly sides were joined, forming a sandwich. The butter knife was then used to cut the sandwich in half perpendicular to its bottom edge as shown in the diagram below.



**Figure 1: Diagram of sandwich cut in half.**

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<sup>1</sup> <http://www.nutrasweet.com/> (Accessed September, 2005)

<sup>2</sup> <http://www.smuckers.com/fg/pds/default.asp?groupid=1> (Accessed September, 2005)

*Taste test:*

Tasters were recruited outside of the Michigan Union at the University of Michigan in Ann Arbor between 12:00 and 2:00 pm on Wednesday August 4, 2004 and Thursday August 5, 2004. They were randomly served one of the peanut butter and jelly sandwiches with their choice of 200 mL of beverage (2% milk, skim milk, or water.) Upon consuming at least one bite of the sandwich, they were asked to fill out the questionnaire included in Figure 2.

Thank you for participating in our taste test. Please fill out the following survey:

Please check or circle one:

1) Gender:  
 Male     Female

2) Age:  
 10-15     41-50  
 16-20     51-60  
 21-30     61-70  
 31-40

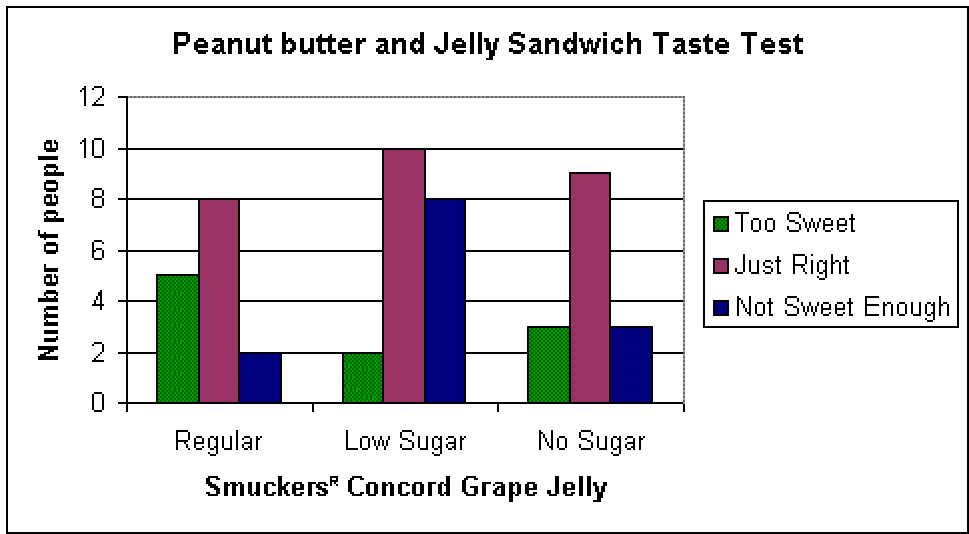
3) The peanut butter and jelly sandwich had a satisfying taste.  
Strongly agree                      Agree                      Strongly disagree

4) The jelly on the sandwich was:  
Too sweet                      Just right                      Not sweet enough

5) I would like to eat this jelly again :  
Yes    No

**Figure 2: Questionnaire used to evaluate sweetness.**

**Results:** Fifty people (23 male, 27 female) all aged 16-30 participated in the taste test. As shown in Figure 3, of the fifteen participants who tasted the regular jelly, five (33%) found it to be too sweet, and eight (53%) found it to be "just right," while two (14%) found it to be not sweet enough. Of the twenty participants who tasted the Low Sugar jelly, two (10%) found it to be too sweet, ten (50%) found it to be "just right," and eight (40%) found it to be not sweet enough. Of the fifteen people who tasted the No Sugar jelly, three (20%) found it to be too sweet, nine (60%) found it to be "just right," and three (20%) found it to be not sweet enough.



**Figure 3: Results of the Peanut Butter and Jelly Sandwich Taste Test**

All but two of the 27 female testers rated their jelly as "just right" or not sweet enough. Eight of the ten of the “too sweet” responses came from the group of 23 male taste testers.

**Discussion:** Taste is complex physiological process and varies with individual, thus the responses by the testers were just a matter of opinion. While this study only included fifty people spread across three different types of jelly, the results indicate that most of the taste testers (37 out of 50) thought that their peanut butter and jelly sandwiches tasted “just right.” Having no current sandwich to compare theirs to, the tasters were satisfied with the sandwich that they were given.

Our hypothesis that the use of regular grape jelly would result in a response of “just right” was proven true. However, 1/3 of the testers responded that this jelly was “too sweet.” The “two

sweet” response may have been elicited by a disproportionate amount of jelly (higher than the tester usually uses when preparing a peanut butter and jelly sandwich) or by the increased use of low sugar or no sugar jellies by those testers so that regular sugar sweetened jelly is sweeter than the jelly that they typically use.

Again, the hypothesis that the low sugar jelly (which had Nutrasweet® added) would elicit mostly “just right” responses was not substantiated as only 10 out of 20 testers chose this designation. Eight of the twenty testers chose the “not sweet enough” designation. This group of testers may be used to regular jelly or the amount of artificial sweetener added may not make for the sweetness lost from reduction in natural sugar.

The final prediction that the no sugar jelly would elicit mostly “not sweet enough” responses was disproven as nine of the fifteen testers chose the “just right” designation. One possible explanation of this result is that the testers use low sugar jelly and thus the test sandwich had the expected taste.

It was observed that male testers tended to find the sandwiches “too sweet” while females found them “not sweet enough.” This trend was not initially anticipated, but is not surprising based on a study by Lisa Eckel which showed the promotion of sweet cravings by the female hormone estradiol in rats.<sup>3</sup> The increased desire for sweets by females may also lead to a desire for sweeter jellies and thus the perception that the jellies they tasted were not sweet enough.

In the future, testers should be asked what kind of jelly they typically use in order to obtain a calibration point for their response. It may also be helpful for testers to try all three jellies and rank them in order of sweetness.

**Conclusion:** There was little effect of the sugar content on the perceived sweetness of a peanut butter and jelly sandwich; 74% of tasters thought the sweetness of the jelly in their sandwich was “just right.” The study does suggest that there are differences in taste perceptions between males and females with females preferring sweeter tastes.

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<sup>3</sup> Eckel, L.A., Moore, S. R. *Am J Physiol Regulatory Integrative Comp Physiol*, **2004**, *11*, R1080 - R1085.