

# When Do Attribute Ratings Affect Overall Liking Ratings?

R. Popper, M. Schraidt, B.J. Kroll  
Peryam & Kroll Research Corporation  
6323 North Avondale Ave., Chicago IL 60631  
Richard.Popper@pk-research.com

## INTRODUCTION

In taste tests, respondents typically rate products on overall liking and on a number of attributes. The attribute questions usually take one of three forms:

- Attribute Intensity (e.g., degree of sweetness)
- Just-About-Right (JAR) Scales (e.g., too sweet, not sweet enough)
- Attribute Liking (e.g., liking of sweetness)

Attribute questions may bias overall liking by:

- Drawing attention to attributes that might otherwise be overlooked
- Leading respondents to rationalize their liking response on the basis of their attribute ratings
- Asking overall liking ahead of the attribute questions does not remove the potential for bias in tests where several products are rated in succession.

Past research has yielded mixed results:

- Popper, et al. (2004) and Earthy, et al. (1997) found effects of JAR scales on overall liking.
- Popper, et al. (2004), Vickers, et al. (1993) and Mela (1989) found no effect of intensity scales on overall liking.

The current research objectives were:

- To compare the effect of intensity and JAR scales on overall liking (Experiments 1 and 2).
- To determining the effect of asking multiple attribute liking questions on overall liking (Experiment 1).

**TABLE 1**  
Attributes Used to Construct Intensity, Just-About-Right, and Attribute Liking Questions

EXPERIMENT 1 (CHILI)	EXPERIMENT 2 (HOT DOGS)
Thick Appearance, Color, Aroma, Amount of Meat, Amount of Tomatoes, Overall Flavor, Sweetness, Saltiness, Spiciness, Meat Flavor, Tomato Flavor, Chunkiness, Thick Texture	Thick Appearance, Color, Overall Flavor, Saltiness, Seasoning Level, Beef Flavor, Firmness, Chewiness, Juiciness

**TABLE 2**  
Examples of Liking (Overall Liking or Attribute Liking), Intensity and Just-About-Right Scales

Liking	Intensity	JAR
Like Extremely	<input type="checkbox"/> Very Weak	Much Too weak
Like Very Much	<input type="checkbox"/>	A Little Too weak
Like Moderately	<input type="checkbox"/>	Just About Right
Like Slightly	<input type="checkbox"/>	A Little Too Strong
Neither Like nor Dislike	<input type="checkbox"/>	Much Too Strong
Dislike Slightly	<input type="checkbox"/>	
Dislike Moderately	<input type="checkbox"/>	
Dislike Very Much	<input type="checkbox"/>	
Dislike Extremely	<input type="checkbox"/> Very Strong	

## REFERENCES

- Earthy, P.J., MacFie, H.J.H. & Hedderley D. (1997) Effect of question order on sensory perception and preference in central location trials. *Journal of Sensory Studies*, 12, 215–237.
- Mela, D.J. (1989) A comparison of single and concurrent evaluations of sensory and hedonic attributes. *Journal of Food Science*, 54(4), 1098–1100.
- Popper, R., Rosenstock, W., Schraidt, M. & Kroll, B.J. (2004) The effect of attribute questions on overall liking ratings. *Food Quality and Preference*, 15, 853–858.
- Vickers, Z.M., Christensen, C.M., Fahrenholtz, S.K. & Gengler, I.M. (1993) Effect of questionnaire design and the number of samples tasted on hedonic ratings. *Journal of Sensory Studies*, 8, 189–200.

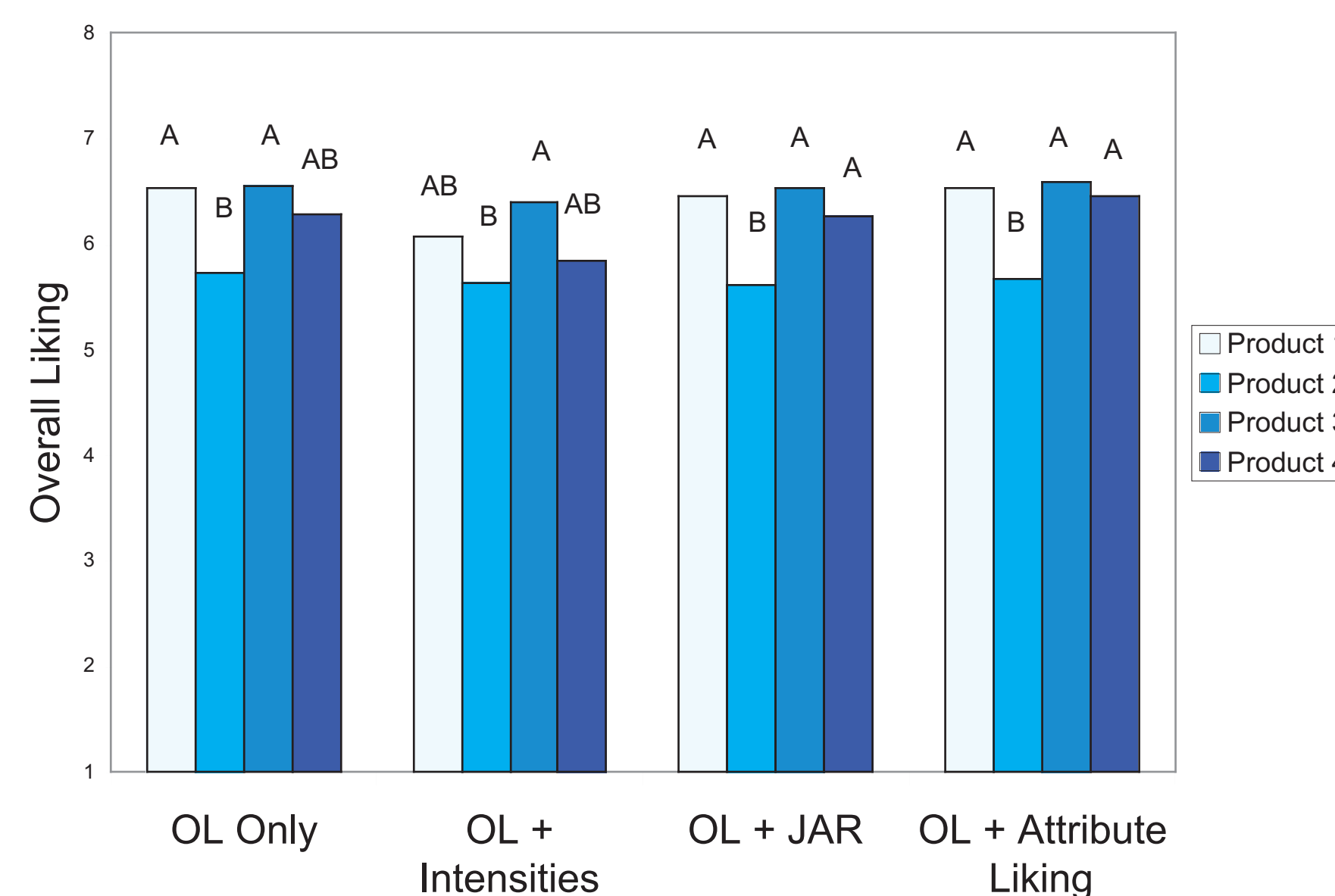
## EXPERIMENT 1: METHOD

- Products: Four variations of chili
- Four questionnaire designs
  - Overall liking only
  - Overall liking followed by either intensity, JAR or attribute liking questions
- N = 100 respondents per questionnaire condition
- Data Analysis
  - Mixed model ANOVA including effects for product, questionnaire and the product-by-questionnaire interaction
  - Separate ANOVA's for each questionnaire condition
  - Data for the first product were excluded, since attribute questions could only affect products in later serving positions.

## EXPERIMENT 1: RESULTS

- Overall liking ratings when pooled over products were similar among the four questionnaires (main effect for questionnaire  $F(3,413) = 1.0, p = 0.39$ ).
- Differences in overall liking among products were consistent across questionnaire designs (product-by-questionnaire interaction  $F(9,822) = 0.24, p = 0.99$ ).
- Separate ANOVA's by questionnaire design showed only small differences in the pattern of statistical significance across products (see Figure 1).

**FIGURE 1**  
Mean Overall Liking (OL) Ratings by Questionnaire Condition in Experiment 1.



Within a questionnaire design, means sharing a common letter do not differ significantly ( $p < 0.05$ ).

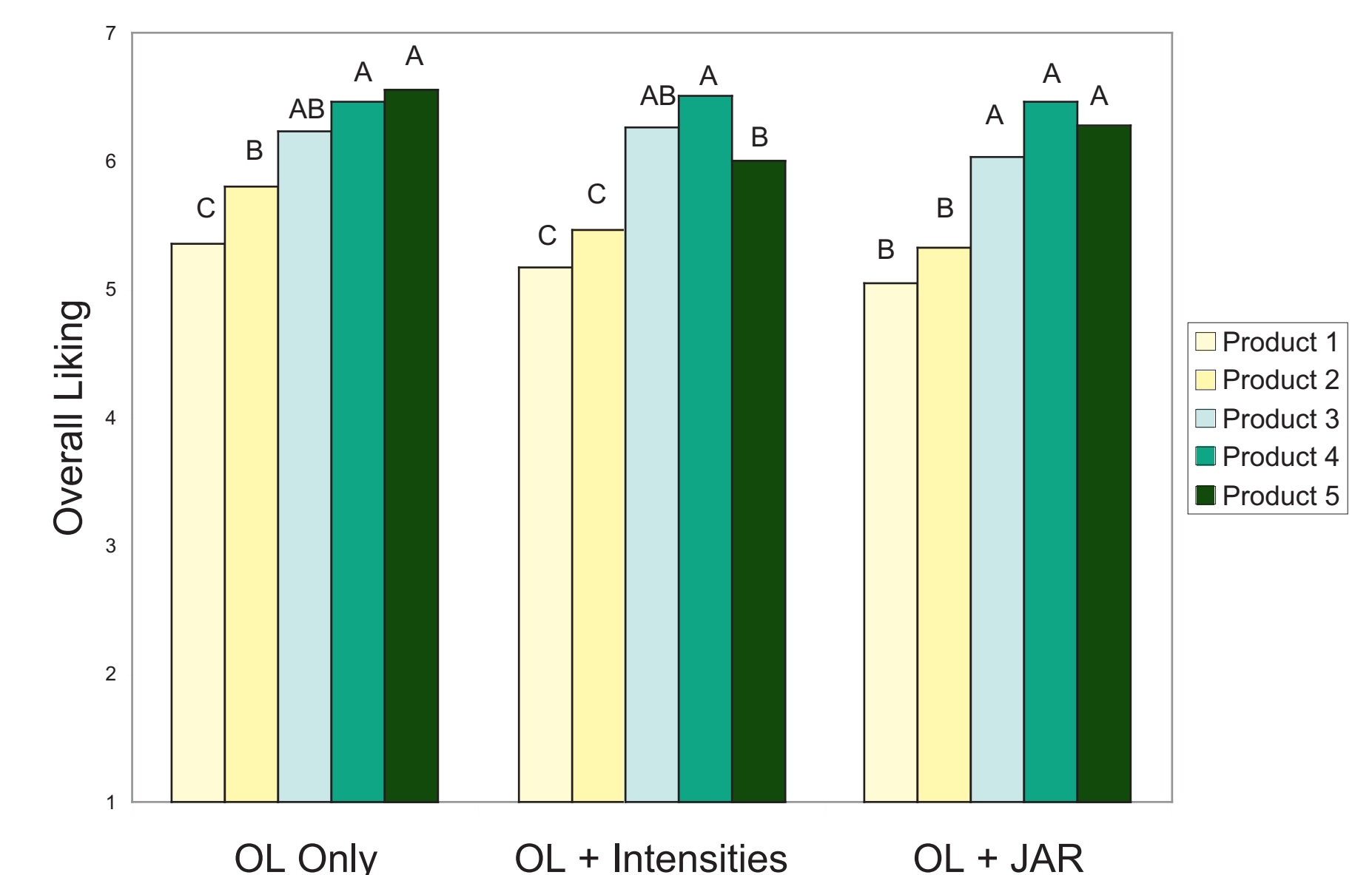
## EXPERIMENT 2: METHOD

- Products: Five brands of hot dogs
  - Products 1-2 formulated with chicken, turkey and/or pork
  - Products 3-5 formulated with beef
- Three questionnaire designs
  - Overall liking only
  - Overall liking, followed by either intensity or just-about-right questions
- N = 200 respondents per questionnaire condition
- Data Analysis
  - See Experiment 1

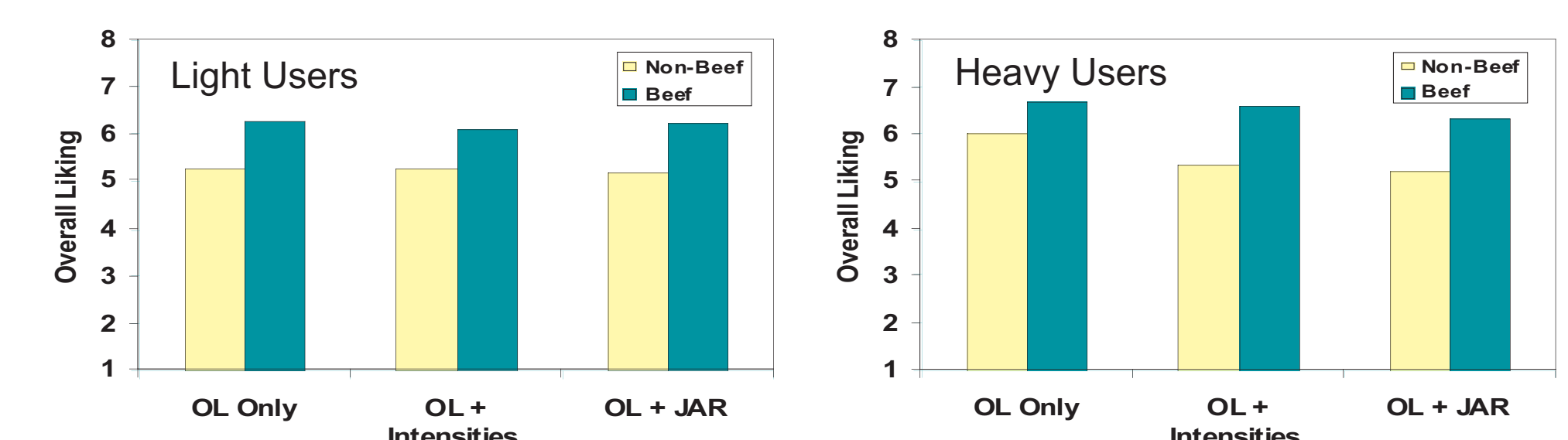
## EXPERIMENT 2: RESULTS

- For the total sample, the questionnaire designs yielded similar results (see Figure 2).
  - Ratings in OL+ JAR condition tended to be lower than in the OL Only condition ( $F(2,600) = 2.1, p = 0.12$ )
  - The product-by-questionnaire interaction was not significant ( $F(8,1797) = 0.87, p = 0.53$ )
- Respondents were identified as “light” (N = 125 per questionnaire design) or “heavy” (N = 80) users of hot dogs based on reported consumption.
- Heavy users responded more to the questionnaire manipulation than light users (see Figure 3).

**FIGURE 2**  
Mean Overall Liking (OL) Ratings by Questionnaire Condition in Experiment 2.



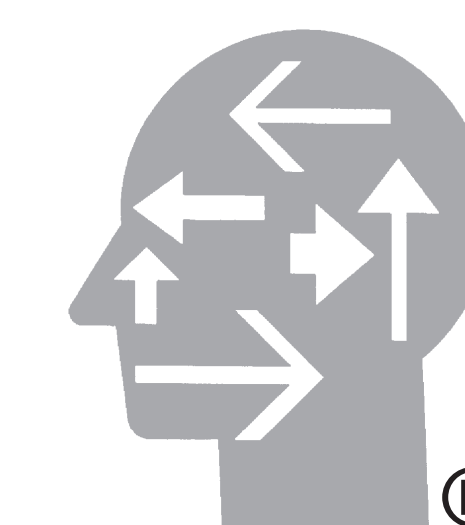
**FIGURE 3**  
Difference in Liking between Beef and Non-Beef Hot Dogs in Experiment 2.



- Both user groups liked beef more than non-beef hot dogs.
- For light users, there was no significant effect of questionnaire design.
- For heavy users, including attribute questions lowered the ratings for non-beef hot dogs ( $p < 0.05$ ).

## CONCLUSIONS

- Attribute questions had a subtle effect on overall liking.
- The disparity among current and past research findings suggests that the effect of attribute questions may be consumer, product and attribute specific.
  - Both Popper et al. (2004) and Earthy, et al. (1997) used desserts to demonstrate the effect of JAR scales.
- Product usage may be an important variable in mediating the effect of attribute questions and should be included in future research.



Peryam & Kroll<sup>SM</sup>

Research Corporation