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Compared to What? Controls in Advertising Claims Substantiation

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Background: Monadic product efficacy claims occur quite frequently in claims support. Some of these claims may be termed 'puffery' among the legal community because the basis for the claim defies substantiation, such as "a natural fit" for an infant diaper[1]. Other claims may afford an opportunity for substantiation or refutation, especially if they include a quantification of the performance. For example, *"80% of consumers report that our toothpaste whitens your teeth"* or *"60% of consumers report that our product reduces the appearance of wrinkles."* In previous reports[2] we discussed how to substantiate comparative count-based and proportion-based claims. Similar statistical methods could be applied to monadic quantitative claims. In non-comparative tests, an issue arises concerning the meaning of the count and the meaning of the statement if a count is not used, such as *"reduces wrinkles."* These types of claims beg the question: ***Compared to what?***

In this technical report we consider when it is important to answer that question and provide support for claims that could be challenged in litigation brought by competitors, by the FTC, or challenged before the NAD, which is the self-regulatory body that adjudicates advertising in the USA.

The ASTM's Standard Guide for Sensory Claim Substantiation[3] contains general recommendations for collecting evidence to support a claim, from the data collection to the analytical approach and data interpretation. The Guide is primarily focused on comparative claims. One area not currently covered in depth in the Guide involves monadic efficacy claims with or without quantification of the claims. In this technical report, we describe a situation in which a control condition is necessary to provide proper evidentiary support for claims of this type.

Scenario: As brand manager in a personal care product company, your development team shares with you that they finalized the use of a new ingredient in your body cream. This ingredient, based on its chemistry and its known skin interactions, may prolong the moisturizing perception of the product over a full day of use. Your marketing team would like to design an advertising campaign that describes this benefit because it would resonate strongly with consumers according to claim concept work that they have completed. Your consumer product testing group recommends a home use product test to evaluate the veracity of this claim, while your internal sensory group have already found supportive evidence based on experienced panel testing. The consumer testing plan is to conduct the research among consumers broadly distributed throughout the USA and to recruit enough respondents to end with a sample size of at least 250 responses following expected attrition. About half the respondents are current users of body cream products, while the other half are prospective users of this type of product. The respondents will use the blinded body cream each day for a week. At the end of the 7-day period, respondents will go online to answer a single agree/disagree/don't know question about whether the body cream provided moisturization for the entire duration of each day. To support the claim, your decision standard is that a statistically significant majority of the respondents (excluding the *"Don't know"* responses) will report that they agree with the statement at the 95% level.

Response Bias and the Need for a Control: While it is tempting to rely on direct answers to survey questions, any question asked of a respondent has inherent bias. For instance, it is known that subjects will report smelling a fragrance about 15% of the time even when no fragrance is present. This could be due to noise in the olfactory system but also because respondents in product tests have expectations. This bias weakens the meaningfulness of any monadic measure and is especially important in an advertising claims context. Uncontrolled bias may confound an appropriate interpretation of the findings. Response bias can occur when the psychological criterion used by the respondent to report a perception is not accounted for. For instance, how much difference is required for a respondent to report that two samples are different?

In a 2-Alternative Forced Choice (2-AFC) experiment where the instruction is to choose one of two samples that is stronger, bias is controlled within the test and does not play a role in the outcome. When using a monadic design, response bias can strongly influence the test outcome. This is when a control is needed. Optimally, the control will be identical to the test product but without the active ingredient that drives the effect of interest. For tooth whitening, that would be a product without hydrogen peroxide or, for a fragranced product, the same product without the fragrance, such as distilled water for a plug-in product. But sometimes a control is very difficult to create. For example, suppose that the test product is nicotine gum with a flavor, where the interest is in the long-lasting effect of the flavor. The control

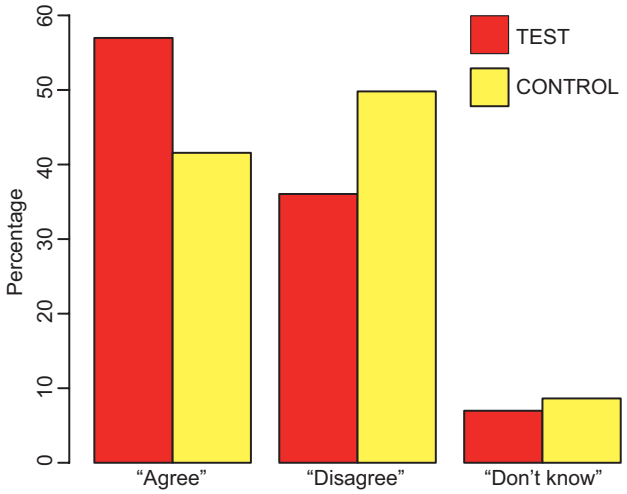

Figure 1. Results showing consumer evaluation of the *"Moisturizes all day"* statement.

gum without flavor is quite unpleasant and this introduces new sensory variables that can make it difficult to interpret the results. Fortunately, it is generally possible to find an appropriate control with neutral properties.

Rethinking the Design: Concerned about the possibility of bias in which respondents may provide support for your claim based on factors unconnected with your product's sensory efficacy, your team rethinks the product testing plan. In this case it is not difficult to remove the active ingredient that promotes the longevity of your product. The development team prepares the control sample, and it is included in the protocol. For marketing to make the claim, two criteria must be met: a) The test product must perform so that a majority of respondents agree with the claim proposition, and b) the test product must exceed the performance of the control product in the agreement count concerning moisturization longevity. Based on the criteria, the hypotheses to be tested are:

a) Do a majority of respondents indicate that they agree with the claim statement?

- **Null Hypothesis, H_o:** $\mu_{test} \leq 1/2$
- **Alternative Hypothesis, H_a:** $\mu_{test} > 1/2$

b) Is the probability of agreeing with the claim statement (μ) for the test product greater than the corresponding probability for the control product?

- **Null Hypothesis, H_o:** $\mu_{test} \leq \mu_{control}$
- **Alternative Hypothesis, H_a:** $\mu_{test} > \mu_{control}$

where μ is the probability of agreeing with the claim statement.

Results: Two identically recruited double blind cells, each involving about 250 consumers, are recruited. One cell contains the test product and the second cell contains the same product without the active ingredient. After over-recruit and attrition, your ending sample for the test product is 258 and the control product is 255. Your consumer test results are illustrated in Figure 1 and summarized in Tables 1 and 2. Based on these results, you conclude that a significant majority of respondents reported that they agreed that your newly formulated body cream provides all-day moisturization. It is also necessary to show that your new product provides significantly greater moisturization longevity than the control. Figure 1 and Table 2 provide those findings.

You also notice that even without the active ingredient, some respondents report that the body cream provides all-day moisturization. However, they do so to a significantly lower degree than your new product. You share these results with the marketing team and confirm that you have the evidence to support the claim that your new product provides all-day moisturization for the majority of consumers.

Conclusion: Controls are always needed when a cognitive bias may influence the outcome of an experiment. This situation arises frequently in consumer product testing and survey research. Examples include most monadic tests conducted in advertising claims support where a closed-ended question is asked. To interpret this type of data it is necessary to know what the experimental results would be in the absence of the experimental variable of interest. Participants in tests have expectations about how to answer questions and these expectations, and other sources of bias, need to be considered in the test design and analyzing the results. Including controls in the test design will considerably improve the quality of the data and lead to more competent and reliable results that will be less likely to mislead consumers.

References

1. Procter & Gamble Company, Plaintiff, v. Kimberly-Clark Corp., et al. 569 F. Supp. 2d 796 (E.D. Wis. 2008).
2. Ennis, D. M. and Rousseau, B. (Eds.). (2020). *Tools and Applications of Sensory and Consumer Science* (pp.70-71,76-77). Richmond,VA: The Institute for Perception.
3. ASTM E1958-18, *Standard Guide for Sensory Claim Substantiation*, ASTM International, West Conshohocken, PA, 2018, www.astm.org

Statement	Completes	"Agree"	"Disagree"	"Don't know"	p-value
Moisturizes all day	N=258	**147 (57%)**	93 (36%)	18 (7%)	< 0.001

Table 1. Data summary and statistical results of the *Moisturizes all day* statement. The *p*-value refers to the probability of obtaining the results under the null hypothesis of 50%. The analyses were conducted ignoring the *"Don't know"* responses.

Condition	Completes	"Agree"	"Disagree"	"Don't know"	p-value
TEST	N=258	**147 (57%)**	93 (36%)	18 (7%)	< 0.001
CONTROL	N=255	**106 (42%)**	127 (50%)	22 (9%)	

Table 2. Data summary and statistical results of the *Moisturizes all day* statement for the control and test cells. The statistics comparing the data from each cell were conducted ignoring the "Don't know" responses. The *p*-value refers to the one-tailed probability of obtaining the results under the null hypothesis that the probability of an "Agree" response for the test product is less than or equal to the control.