

# THE LIKING TEST: BRINGING NEW DIMENSIONS TO DOG AND CAT FOOD PALATABILITY MEASUREMENT



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## INTRODUCTION



The definition of pet-food palatability has grown complex over the past few years, taking into account new dimensions such as the pet-owner perception. Currently, two main methods are commonly used for the purpose of evaluating a pet food's palatability. The first one is the versus or two-pan test, designed to evaluate the preference of the animal for one or the other of the two products tested. This method is proven to be very efficient and reliable for discerning differences; it is a relevant and essential approach in product development. However, the versus test design is quite different from a real-life in-home situation, and therefore yields limited information as to the pet owner's perception. The second common approach is the acceptability measurement, also called monadic testing or one-bowl testing. The main purpose of this evaluation is to confirm the animal's appreciation of the diet, and it is often used in the final steps of product development. This method is also sometimes used to evaluate the palatability of a diet, but its very low sensitivity is a clear limitation to this usage.

In light of all these aspects, experts in palatability measurement from DIANA PET FOOD division developed the Liking test, an innovative methodology combining reliability, accuracy and pet-owner perception.



## METHODOLOGY

As preliminary work, a marketing survey was conducted to better understand how the pet-owner perceives the animal's satisfaction. The results of this survey led to the identification of a number of criteria listed by pet-owners that significantly impact their perception of the cat or dog's satisfaction. The Liking test method was designed in a way to allow measurement of these criteria.

In order to be as close as possible to in-home feeding conditions, a single bowl approach was used.

Finally and most importantly, the protocol was designed to maximize reliability and sensitivity. This is achieved by giving special care to key parameters:

- Counterbalanced orders to take into account order effects
- Meal size adjusted to individual needs
- Adapting to external parameters (seasonal effects, ...)
- Defining and applying a relevant quality control

The developed protocol was then applied to the evaluation of numerous diets, differing in kibble formulation, coating system, range, etc. In most cases, the diets were also tested with the versus methodology to establish the contribution of both methods to the palatability evaluation of the diets.

### The following criteria were measured:

- **The consumption ratio:** % of food consumed / initial ration.
- **The percentage of finished bowls:** a bowl is considered as finished if the amount of remaining food is less than 1g for cats or if the dog has consumed more than 97.5% of its individual ration.
- **The comparison of consumption with the reference level of consumption of each pet.** The reference consumption is also calculated by a specific formula based on a sufficient number of tests to take into account natural variations.
- **The percentage of refusals:** quantity consumed is equal to 0g.

The precise calculation of the ration for each individual is a prerequisite for being able to measure differences in palatability through the first three criteria.

### Statistical analyses

Most of the data is presented as mean  $\pm$  SEM (standard error of mean). When several products were tested in the same series, logistic regression and analysis of variance are performed to assess the product effect. The tested effects are considered statistically significant when  $p < 0.05$ .

## CONTRIBUTION OF THE LIKING TEST TO PALATABILITY MEASUREMENT – A FEW ILLUSTRATIONS

### Example 1: Evaluation of commercial cat diets recommended for weight management

In this experiment, three commercial diets were evaluated by cats. The first diet is a super premium maintenance diet (diet M) recommended for healthy cats in good body condition. The two other diets are usually recommended for weight management programs or for specific nutritional needs in cats: diet W1 is a low-fat diet, and diet W2 is a high-fiber diet. The palatability of these three diets was measured at Panelis, DIANA Pet Food division's expert center in palatability measurement, using the versus test and the Liking test.

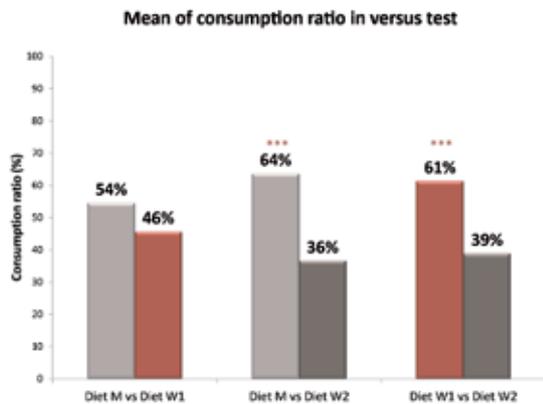


Figure 1. Relative preference of the three diets evaluated in versus conditions

The versus tests show a strong preference of the cats for the maintenance diet (diet M) or the low fat diet (diet W1) compared to the high-fiber diet (diet W2) (Figure 1). It is quite commonly observed that maintenance diets are preferred by cats to weight management diets, and this preference is not necessarily a problem. What is important for the success of a weight management program is that the diet is perceived as palatable by the pet-owner and eaten in adequate quantities by the cat. For these aspects, the versus test only gives limited information.

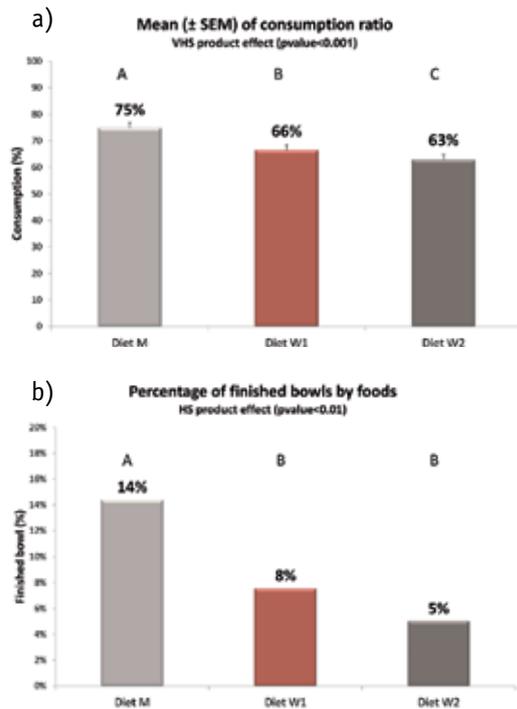


Figure 2. Consumption ratios (a) and finished bowls (b) of diets M, W1 and W2 evaluated by the Liking test at Panelis (n=38). Differing letters identify significant differences between the products.

The results of the Liking test also show strong differences between the products. The consumption ratios of all three products are significantly different, with 75% of diet M eaten, 66% of diet W1 and 63% of diet W2 (Figure 2a). For diet M, the percentage of finished bowl is significantly higher (14%) than for diets W1 and W2 (8% and 5% respectively) (Figure 2b).



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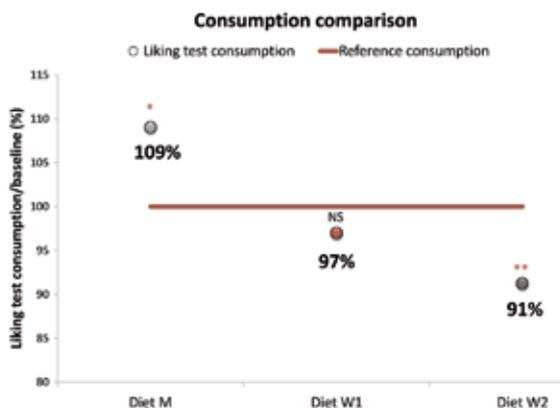


Figure 3. Consumption of 3 diets relative to a reference consumption, measured by the Liking test.

Finally, diets M and W2 show significant differences in consumption compared to the reference consumption, with diet M being 9% higher than the reference and diet W2 9% lower. The consumption of diet W1 is equivalent to the reference consumption (Figure 3).

This example clearly demonstrates the benefit of combining different approaches to evaluate the palatability. Overall, the palatability measured by both methods gives a similar ranking of the products, but the use of the Liking test sheds additional light on the product performance. Diet W1, equivalent to diet M in the versus test, is however eaten less than diet M in a Liking test situation. This indicates an overall good level of palatability combined with a noticeable decrease in intake, which are key success factors for a weight management program. Diet W2, although nutritionally adapted to these programs, may be perceived by the pet-owners as not sufficiently palatable, thus decreasing the chances of success over time.

## Example 2: Study of the coating effect in dogs

In this second example, two different dry dog diets were manufactured, using a super premium kibble base and two different palatability enhancers. Diet D1 was coated with 2% of a super premium liquid palatability enhancer, and diet D2 was coated with 2% of a standard liquid palatability enhancer.

The palatability of both products was measured at Panelis using the versus test and the Liking test.

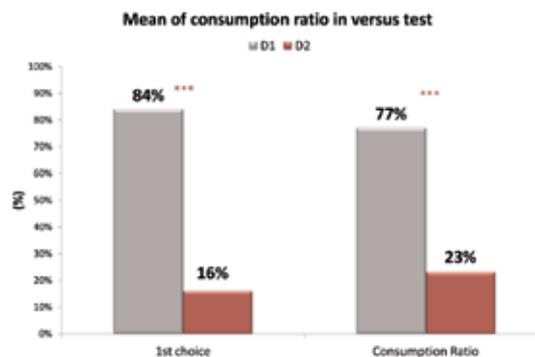


Figure 4. Relative preference of the diets D1 and D2 evaluated with a versus test (n=32). Diet D1 is significantly preferred to diet D2, based on the first choice and the consumption ratio (p<0.001).

The results of the versus test (Figure 4) show a very significant preference of the dogs for diet D1 when compared to diet D2, which was the expected result as the diets are respectively coated with a super premium and a standard palatability enhancer. This preference is also strongly reflected in the first choice, indicating the strong role of olfactive drivers in the product evaluation.

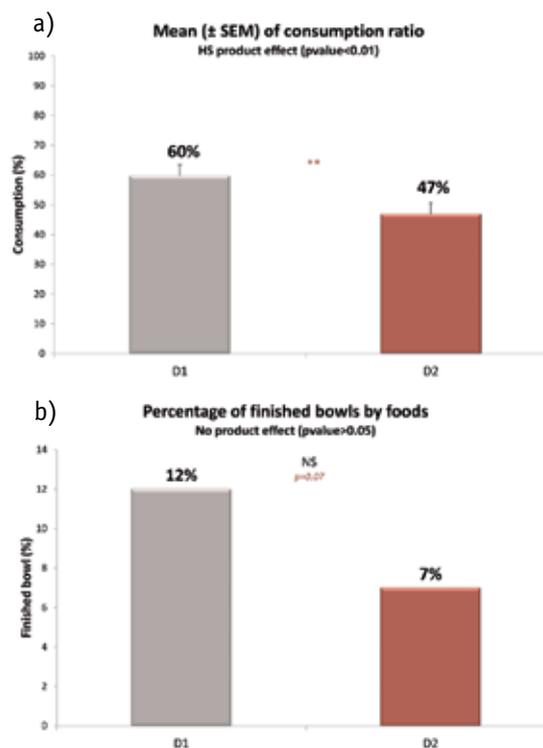


Figure 5. Consumption ratios (a) and finished bowls (b) of diets D1 and D2 evaluated by the Liking test (n=32).

The results of the Liking test also show a strong preference for diet D1: the dogs ate on average 60% of the distributed ration when given D1, and only 47% of the ration when given D2 (Figure 5a). Although the difference is statistically non significant, the percentage of finished bowl is higher for diet D1 than for diet D2 showing a trend in the preference for D1 ( $p=0.07$ ) (Figure 5b). These results show us that even if the dogs didn't evaluate the products simultaneously, the differences between the 2 diets were strong enough for them to express their preference through the criteria of the Liking test. Thus, these two products could be perceived as significantly different by pet-owners in in-home feeding conditions. These results also illustrate the fact that on average, the versus test shows a higher sensitivity; the discrimination of products using methodologies based on one bowl requires strict control of numerous parameters, such as what is done within the Panelis Liking test.

### Example 3: Evaluation of 4 commercial dry dog foods

In the third example, several commercial dry dog food references were evaluated. As part of a quality control program, the purpose wasn't to compare products to a target, but to make sure that the selected products will be perceived as sufficiently palatable by both the pet and the pet-owner.

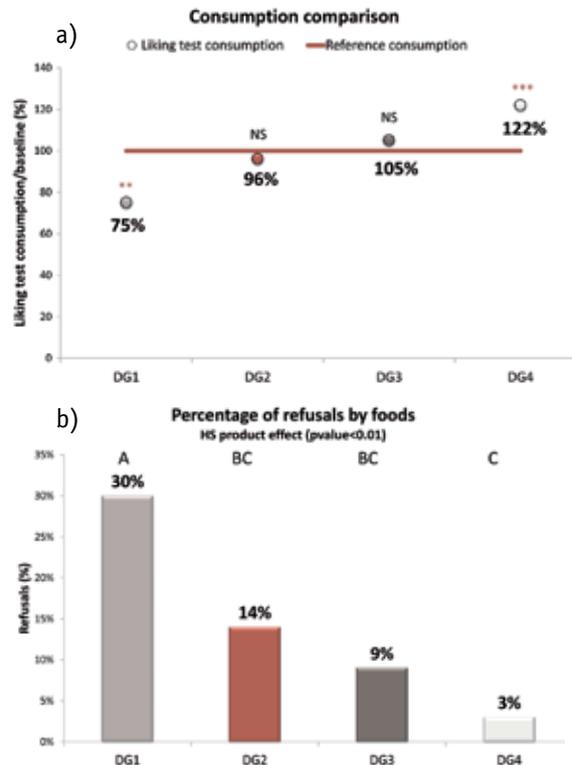


Figure 6. Results of the Liking test evaluation for diets DG1 to DG4; consumption compared to a reference consumption (a) and percentage of refusals for diets DG1 to DG4 (b). Differing letters identify significant differences between the products.

Figure 6a illustrates that two of the diets led to consumption levels significantly different than the panel's reference consumption. Diet DG1 was consumed 25% less than the reference level, whereas diet DG4 was consumed 22% more than the reference level. The consumption levels of diets DG2 and DG3 were similar to the reference level. The number of refusals (Figure 6b) was significantly impacted by the diets ( $p=0.003$ ). Diet DG1 showed the strongest level of refusals, with 30% of the distributed meals not being eaten. On the contrary, Diet DG4 showed the best score with only 3% of refusals. These results allow a clear ranking of the products, and are very useful in the process of selecting products with a homogeneous level of palatability. Product DG1 will not meet the requirements in terms of palatability; the high level of refusals and the low level of consumption indicate that the dogs do not like this diet as much as they like other diets on average. Furthermore, the high level of refusals will probably be perceived by the pet-owner as an indication of lower palatability.

## CONCLUSIONS

Over the past year, more than 200 Liking tests were run at Panelis, DIANA Pet Food division's expert center in palatability measurement. The current database shows a good correlation between the preference measured by the versus test and the criteria measured with the Liking test. Thus, the use of an expert panel and a standardized methodology brings additional criteria to characterize palatability, such as refusals or finished bowls. These encouraging results demonstrate the fact that pet-owner perception can be evaluated using an expert-panel, and that different palatability measurements can be combined for an in-depth evaluation of the food's overall palatability. These methods give additional information such as food attractivity, which is meaningful for the owner in his perception of pets' enjoyment; they can also be of interest for the evaluation of foods dedicated to weight management.

IF YOU NEED FURTHER INFORMATION, DO NOT HESITATE TO CONTACT THE AUTHORS



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