Inter-panel diagnosis, a comparison of palatability answers obtained in expert, semi-expert and in-home cat panels

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Abstract
Petfood manufacturers need to have a reliable evaluation of their products' palatability performance. Palatability assessment is classically run on three types of animal panels: in pet centers with animals trained to discriminate foods with different sensory properties (expert panel), in in-home environment with pets trained and qualified to perform preference tests (semi-expert panels), or in in-home environment with naïve pets (in-home panel). Below study aims at evaluating the consistency of answers obtained in different types of cats panel.

Three dry extruded cat diets were tested. Products differed by the nature of palatability enhancers (PE) applied by coating on the same base of kibbles. Five panels participated to the study: 2 expert panels of 40 cats *(expert 1 and expert 2)*, 1 expert panel of 360 cats *(expert 3)*, 1 semi-expert panel of 40 cats *(semi- expert)* and 1 in-home panel of 85 cats *(in-home)*. All the trials were conducted with a two day versus test methodology, using a complete pairewise comparison design. Consumption intake ratios were measured and then analyzed using a Bradley-Terry-Luce score.

Results first showed that whatever the final product classification obtained in the panels, differences were more pronounced in expert panels than in semi-expert or in-home. The day effect seemed to be similar between most of the panels: there was a slight decrease of the discrimination the second day. Moreover, if 4 out of the 5 panels tend to give similar answers with a preference trend for product 1, expert 2 panel showed a clear preference for product 2. This variation in preferences could possibly be linked with the panel feeding history, the panel characteristics or the environmental conditions.

The study demonstrated that palatability results can vary according to the type of panel. Answers obtained in in-home panels are generally less precise due to the lack of environment control while expert panels are usually more accurate, especially when small differences in product are sought. However, expert panels need to be exposed to a diversity of foods and a permanent quality follow up to ensure their accuracy in discrimination.

Keywords: cat, palatability enhancer, in-home panel, expert panel.

1. Introduction

Palatability can be defined by the capacity of a food or an ingredient to attract pet and stimulate its appetite, to motivate him to eat the food and to satisfy him during consumption.

In order to guide their developments and ensure successful launches, pet food manufacturers need a reliable evaluation of their products' palatability performance. When conducted properly, palatability testing is a useful scientific and marketing tool that can provide necessary information in order to make strategic decisions related to product development, formula optimization and positioning versus competitors.

Based on the type of information needed, different pet populations can be tested to assess their preference and acceptance for different food products.

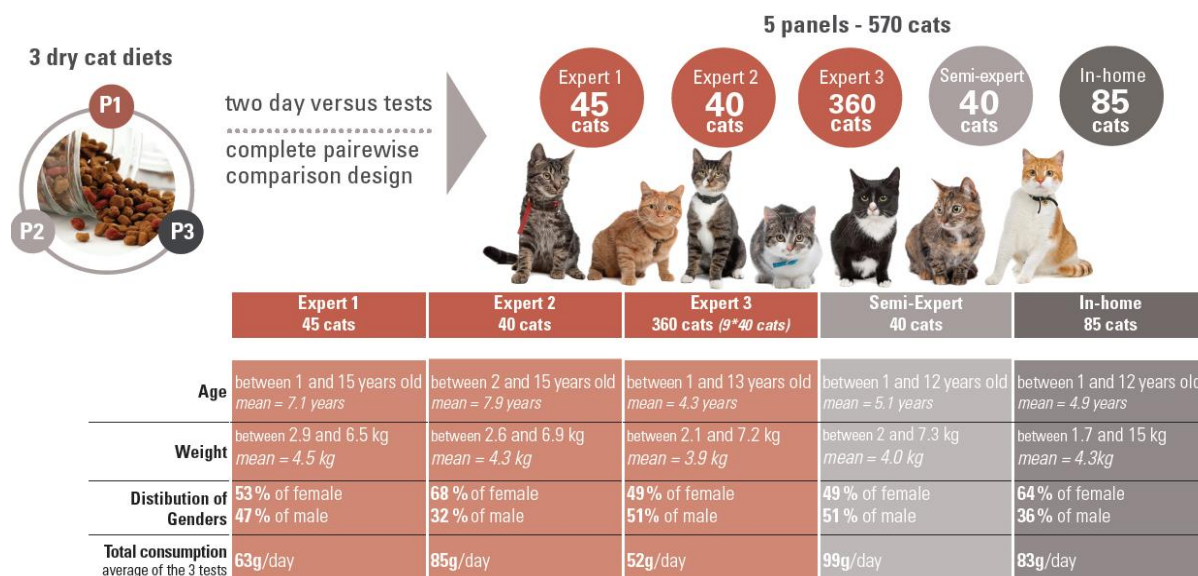Palatability evaluation is classically run on three types of animal panels:
-   Expert panel : in pet centers with animals trained to discriminate foods with different sensory properties, on a daily basis
-   Semi-expert : in-home environment with pets trained and qualified to regularly perform preference tests
-   In-home panel : in-home environment with naïve pets performing occasional tests

Present study aimed at evaluating the reliability of answers obtained when testing the same cat foods in these 3 categories of panels.

2. Materials & Methods

Three nutritionally balanced dry extruded cat diets (P1, P2 and P3), only differing by the palatability enhancers (PE) used in top coating, were used to compare the answer obtained in 5 cat panels : 3 expert panels (expert 1, expert 2 and expert 3), 1 semi-expert panel and 1 in-home panel (in-home). To ensure statistical robustness, a minimum of 40 cats were used for the expert and semi-expert panels while the number of cats for the in-home panel was increased to 85 according to consumer studies' good practices. Panels detailed characteristics including the number of cats, the gender distribution, the individual consumption level, and the age and weight of cats were recorded (Table 1) together with panels feeding history.

Table 1: Panels characteristics

	Expert 1 45 cats	Expert 2 40 cats	Expert 3 360 cats (9*40 cats)	Semi-Expert 40 cats	In-home 85 cats
Age	between 1 and 15 years old *mean = 7.1 years*	between 2 and 15 years old *mean = 7.9 years*	between 1 and 13 years old *mean = 4.3 years*	between 1 and 12 years old *mean = 5.1 years*	between 1 and 12 years old *mean = 4.9 years*
Weight	between 2.9 and 6.5 kg *mean = 4.5 kg*	between 2.6 and 6.9 kg *mean = 4.3 kg*	between 2.1 and 7.2 kg *mean = 3.9 kg*	between 2 and 7.3 kg *mean = 4.0 kg*	between 1.7 and 15 kg *mean = 4.3kg*
Distibution of Genders	53% of female 47% of male	68% of female 32% of male	49% of female 51% of male	49% of female 51% of male	64% of female 36% of male
Total consumption average of the 3 tests	63g/day	85g/day	52g/day	99g/day	83g/day

Diets palatability assessment was conducted using versus test in all the panels. In this method, two diets are presented simultaneously and the quantities eaten are recorded. The percentage of consumption is classically used to assess preferences [1]. The two-pan test, particularly adapted to highlight small differences [2], enables a ranking between different products.

In the study, tests were repeated on 2 consecutive days in order to evaluate the robustness of the preference. A complete pairewise comparison design was applied and a total of 6 tests were performed by each animal. Consumption intake ratios were measured and analyzed using a Bradley-Terry-Luce (BTL) score in order to rank product according to their palatability perception for each cat panel. Post-hoc tests between products were performed, using Least Significant Difference (LSD) tests.

3. Results & Discussion

Ranking of products with BTL score requires a qualitative data. For each cat, the product with the highest consumption intake was considered as the winner and the other as the looser. Table 2 shows an example of data obtained for the first day test in the semi-expert panel.

Table 2: Example of data for BTL | semi-expert panel | day 1

	Product1	Product2	Product3
Product1		23	25
Product2	17		20
Product3	15	20	

Note : Cell$_{ij}$ = number of cats who prefer product i over product j

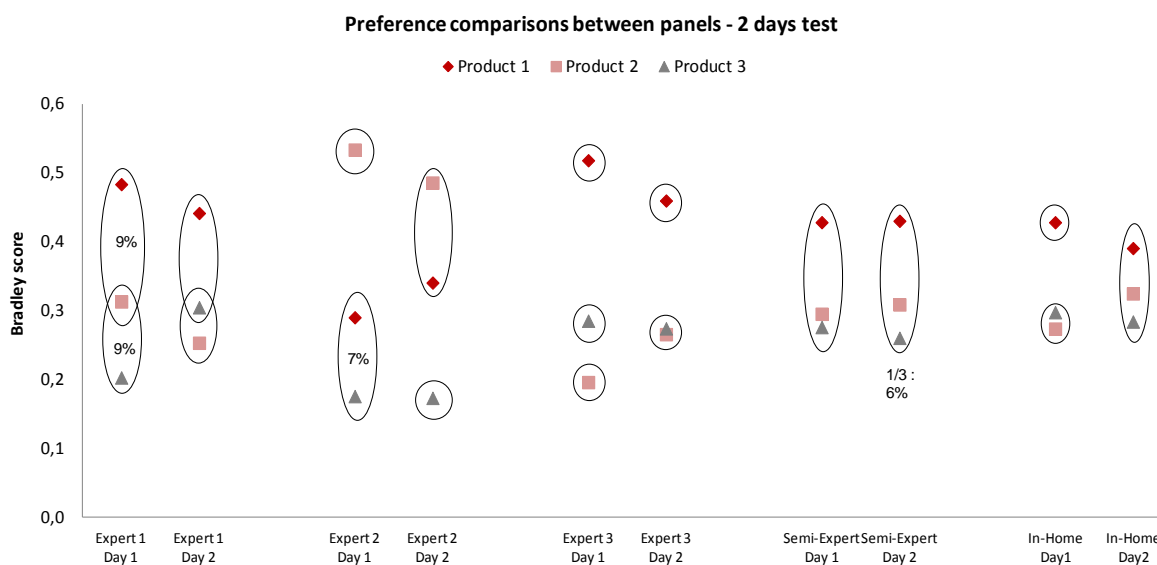Figure 2 shows the diets ranking obtained in each panel.

Figure 2: BTL scores for the 2 days test of each panel.
Significant differences at 5% level are represented in different circles

Whatever the final product classification observed in the panels, differences between products scores were more pronounced in expert panels than in semi-expert or in-home ones.

The "day effect" was similar between most of the panels: there was a slight decrease of the difference between products scores the second day, except for the semi-expert panel, which remained steady. This result confirmed the interest to repeat the tests at least on 2 days.

Moreover, if 4 out of the 5 panels tend to give similar answers with a preference trend for product 1, expert 2 panel showed a clear preference for product 2. This difference could possibly be due to a neophobia effect [3]. Indeed, the analysis of panels feeding past showed that the level of exposure of product 2 was higher in experts 1 and 3 panels than in expert 2 panel.

3. Conclusion

The study demonstrates that palatability results can vary according to the type of panel. Although in-home panel provides information based on "real-life" conditions, answers obtained are generally less precise. This could partially be solved by making sure that the test environment is well controlled. Expert panels are usually more accurate, especially when small differences between products are sought. However, cats from expert panels need to be exposed to a diversity of foods and a permanent quality follow up to ensure their accuracy in discrimination.

References

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