DIETARY BEHAVIOR OF DOGS AND CATS

BASES DU COMPORTEMENT ALIMENTAIRE DES CHIENS ET DES CHATS

By Hermann BOURGEOIS[1], Denise ELLIOTT[2], Philippe MARNIQUET[3], Yannick SOULARD[4]

SUMMARY

All pet food manufacturers claim their diets deliver exceptional palatability, but many companies offer limited support for that claim. Palatability is complex. Expertise, innovation and leadership in pet food palatability require an in-depth understanding of pet physiology and behavior, expertise in diet formulation and manufacturing, as well as the development of innovative tools and research methodologies for measuring diet palatability.

For veterinary therapeutic diets, palatability is essential. Pets are expected to eat veterinary diets exclusively and compliance is directly linked to palatability. Illness may reduce a pet's appetite, while the therapeutic diet's nutritional profile may make it inherently less palatable. Achieving exceptional palatability in diets which are restricted in protein, fat or sodium, or which contain protein hydrolysates (low molecular weight peptides which typically taste bitter), can be a significant challenge.

Royal Canin has always been at the forefront of palatability research. Years of study have led to an advanced understanding of the three essential components of palatability: the pet (species and individual), the environment (owner, home, lifestyle) and the food (smell, shape, texture, taste, nutritional composition).

Keys words: behavior, palatability, petfood.

RÉSUMÉ

L'appétence est une qualité universellement revendiquée par les fabricants d'aliments pour animaux de compagnie, à tel point que le mot s'en trouve un peu vidé de son sens… L'appétence recouvre en effet un domaine d'expertise complexe dont la maîtrise requiert une compréhension de la physiologie et du comportement animal, un savoir-faire en formulation et en fabrication, et enfin le développement d'outils innovants pour mesurer les préférences alimentaires des chiens et des chats.

Dans le domaine diététique, l'appétence est essentielle à l'observance de la prescription vétérinaire pour trois raisons : la maladie réduit souvent l'appétit de l'animal, celui-ci doit consommer le régime prescrit, à l'exclusion de tout autre aliment, la mise au point de formules "extrêmes" complique le travail de l'industriel : obtenir une appétence exceptionnelle avec des aliments aux teneurs réduites en protéines, en graisses ou en sodium, ou contenant des hydrolysats protéiques (peptides de goût amers) constitue un réel défi.

Royal Canin a toujours été à l'avant-garde de la recherche sur l'appétence. De nombreuses années d'études ont permis d'aboutir à une compréhension poussée des trois éléments-clés de l'appétence : l'animal (l'espèce et l'individu), l'environnement (le propriétaire, le lieu et le mode de vie) et l'aliment (odeur, forme, texture, goût, composition…).

Mots-clés : appétence, comportement, aliments pour animaux de compagnie.

1 DVM, Royal Canin Research Centre, BP 4, 30470 Aimargues (France).
2 BVSc, PhD, Royal Canin USA Inc; 500 Fountain Lakes - Suite 100 St, Charles MO 63301 – USA.
3 DVM, Royal Canin Research Centre, BP 4, 30470 Aimargues (France).
4 Eng., Royal Canin Research Centre, BP 4, 30470 Aimargues (France).

INTRODUCTION

There are many factors that influence food selection and preferences in dogs and cats ***(figure 1)***. This section will discuss those factors that are based on feeding behavior. These topics fall into three areas:

1) evolutionary palatability factors, i.e. the influence of species;

2) natural feeding behavior, including neophilia and neophobia;

3) learned feeding behavior, including maternal influence and dietary history.

EVOLUTIONARY PALATABILITY FACTORS I.E. THE INFLUENCE OF SPECIES

Cats

- ***Cats as hunters***

The cat has been domesticated for nearly 6000 years but has not lost his hunting behavior. Cats can easily return to the wild and survive without human intervention. This adaptive ability is linked to the cat's exceptional hunting skills. The feeding behavior of wild cats can help to explain the feeding behavior of domesticated cats.

Unlike dogs who hunt in packs, cats in the wild are solitary hunters, capturing small prey, which they eat alone ***(table 1)***. They eat a large number of meals each day and they eat day and night. Unlike dogs or humans, cats see no "social value" in food.

As solitary hunters, cats catch small prey, each catch representing only a small percentage of daily energy needs. Observations show that they often fail in their attempts to catch prey, every success representing 3-5 attempts (Fitzgerald & Turner, 2000). If cats waited until they were hungry before they started hunting, they would be at risk of starvation.

Cats completely dissociate their hunting behavior from their eating behavior. Prey drive is extremely pronounced in cats and they are strongly driven to chase moving objects. In the mid 1970s, Robert Adamec at Dalhousie University (Nova Scotia, Canada) used video cameras to study cat feeding behavior (Adamec; 1976). After two days of fasting, the six cats in his study were offered different foods. Precisely 45 seconds after the cats started eating, a rat was released into the room. All except one cat left their meals to stalk the rat.

Studies show that cats hunt a diverse selection of prey. Liberg (1984) studied the composition of nearly 1500 cat feces collected over a 6-year period in Sweden. Niewold (1986) analyzed the stomach contents of cats hit by cars in Holland. Both these studies showed a great diversity of diet: rabbits, small rodents, birds and even lizards. Liberg's study showed that even when properly fed, housecats allowed to go outdoors do catch and eat prey, although to a lesser degree than stray cats (66g/day vs 294g/day respectively).

The hunting instinct is strong in today's domestic cat. Providing extra food will not eliminate a cat's hunting behavior. Hunting behavior is dissociated from eating behavior in cats.

- ***Cats as carnivores***

Cats are carnivores with a higher requirement for protein than dogs or humans. Cats are anatomically adapted for meeting their specific nutritional needs. They have canine teeth for seizing prey and carnassials for shearing flesh. They typically find the nutrition they need in their prey (rodents, birds etc).

Unlike dogs, cats cannot survive on fruit or plants as an alternative to meat. The cat's inability to survive on a vegetarian diet increases the risk of starvation when prey is scarce.

Cats, as strict carnivores, have much more stringent nutritional requirements and yet seem less adapted than dogs to sense nutritional inadequacies or imbalances.

Dogs

The behavior of dogs in the wild is probably not as relevant to today's domesticated dogs as wild cats are to domesticated cats. Dogs were first domesticated over 12,000 years ago (Young, 1985) and their behavior has been influenced considerably by their breeding, selection and interaction with humans.

- ***Dogs as hunters***

Wild dogs live in hierarchical groups. Access to food corresponds to ranking within the group and favors animals in charge of reproduction and selects for the strongest individuals. Social rules are

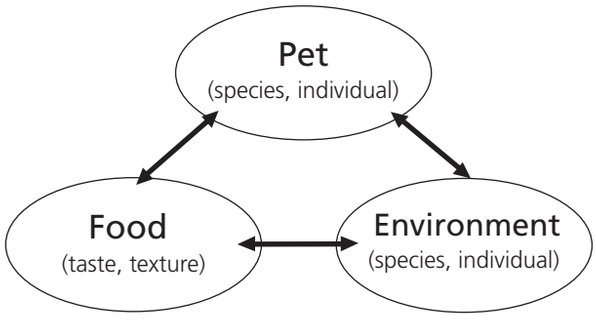

Figure 1: *Main factors involved in palatability.*

Cat	Dog
Strict carnivore	Omnivore
12 to 20 meals/day	1 to 3 meals/day
Feed during day and night	Feed during daylight
Regular eaters	Glutton feeders
No social value of the meal	Social value of the food

Table 1: *Main differences in feeding behavior.*

reinforced to avoid confrontation that would be costly to the group. Dogs hunt in packs: when prey is caught, the dominant animals eat first, in front of the others, choosing the best pieces.

It is important to understand the social value of food for dogs. Even when dietary resources are abundant, controlling food is a symbol of high rank and dietary rituals are very important in this species. Dogs will prefer food from the owner's table to equally palatable food in their bowl, since it has special social significance for dogs.

With dogs that are reluctant to eat a new diet or whose appetite is reduced due to illness, hand feeding by the owner may make a difference. Food from the master's table has a higher value for the dog than food in his own bowl, so feeding the dog in this context may help overcome initial reluctance.

Although some authors disagree with this hierarchical concept (Houpt & Zicker, 2003), seeing little relationship between life in a pack and today's civilized world, it remains certain that the social dimension of feeding affects dogs' eating behavior.

Dogs in the wild have irregular access to prey. Hunting in packs, they typically kill much larger prey than the solitary cat. Dogs are therefore adapted to a more "gluttonous" lifestyle. A wolf can eat up to 17% of his body weight in a single meal (Young, 1944).

- ***Dogs as omnivores***

Unlike cats, dogs are omnivores and in periods of famine dogs can vary their diet and resort to eating fruits and other plant material. The dog's jaw anatomy is also different from the cat's, allowing some lateral motion and mastication (Vollmerhaus & Roos, 1996).

Avoiding nutritional errors

When dogs are given a choice between foods with different protein concentrations, they adjust their consumption to receive 25-30% of their energy from protein (Torres *et al.* 2003; Hickenbottom *et al.* 2001). These recent observations confirm older comparative studies in dogs and rats (Romsos & Ferguson, 1983). Even when they are offered highly palatable protein-deficient food, dogs choose foods such that their protein intake never falls below 17% of metabolizable energy (Torres *et al.* 2003). Cats on the other hand, can be fooled by palatability and may prefer a protein-deficient food to a well balanced, but less palatable food (Cook *et al.* 1985).

In order to be effective hunters, cats must maintain an ideal body weight and level of fitness. Wild cats are able to self-regulate energy intake (Kane *et al.* 1981, 1987; Brandshaw *et al.* 1996), but the archetype domestic cat is neutered, lives indoors and does not need to hunt for food. Its energetic needs are reduced (50 kcal/kg of body weight) and it has an easy access to food, which can be adapted to its way of life. Cats that do not need to hunt to eat may lose the ability to self-regulate energy intake. The tendency to take advantage of available food, coupled with lack of physical activity, can contribute to an energy imbalance and weight gain in many housecats.

NATURAL FEEDING BEHAVIOR

The behavior of dogs and cats in selecting their food is extremely variable. In a situation where they must make a choice, dogs and cats rely on their senses to evaluate food. When the smell of one of the foods appeals to a cat, it will eat only that food. When the smell of both foods is found appealing, the animal tends to eat both and make a choice on the basis of taste (Hullar *et al.*, 2001) and how the food feels inside the mouth.

In addition to these purely sensory considerations, animals may or may not recognize the food on the basis of past experience. According to the foods available and their knowledge of food, animals choose through different strategies: neophilia, neophobia, aversion. When animals are already familiar with foods, the choice may be influenced by their relative availability. This is called apostatic or anti-apostatic selection.

Neophilia

Neophilia is preference for a food never encountered by the animal or a food that has not been recently accounted by the animal. This behavior is quite common in carnivores and has been identified in both dogs and cats. Neophilia enables animals to diversify their diet and achieve a better nutritional balance.

Five 6-week-old puppies were given the same food for 16 weeks. At the age of 22 weeks, they were given the choice between their usual food and a new food. This choice was available every day for ten days. The animals showed a preference for the new food in the first days ***(figure 2)***: this is the novelty effect or neophilia (Mugford, 1977).

The intensity of neophilic behavior depends on the foods' relative palatability. If the new food is less palatable than the usual food, the effect is short-lived. Obviously, if the new food is more palatable than the usual food, the neophilic effect will be more pronounced and persistent (Ferrel, 1984).

Equivalent observations were made in cats: 24 kittens received the same food for 16 weeks, then underwent a comparative test for several days with the usual food and a new food of equivalent palatability. The first day, the kittens systematically chose the new food. After the second day, the difference was no longer significant between the two foods (Mugford, 1977). The novelty effect lasted only a few days, after which dietary preference stabilized.

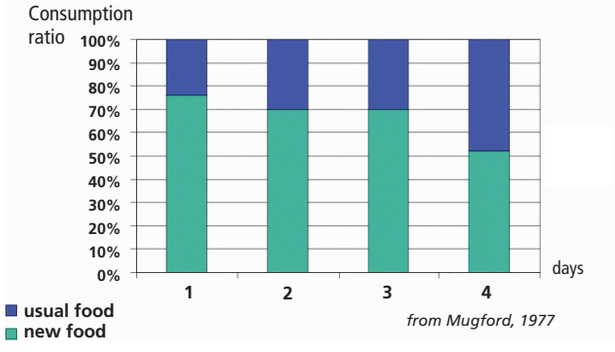

Figure 2: *Neophilia (tendency to prefer new food) depends on past experience. It is common in dogs and cats.*

Short-term palatability testing could yield misleading results. The novelty effect lasts a few days after which dietary preference is stabilized. Short-term palatability tests may reflect the novelty effect, with pets preferring the new diet for the test period but not in the long term.

Neophilia is only one selection factor for animals. It does not necessarily mean that preference will go to a new food that is not as good as the usual food.

To observe a preference for new food in dogs, it seems the food must be sufficiently different from the usual food, e.g. it should come from a different manufacturer (Griffin *et al.*, 1984).

The novelty effect is accompanied by temporary overfeeding. In the first month, cats may eat up to 95 kcal/kg. The effect then wanes and consumption stabilizes around 60 kcal/kg after two months (Nguyen *et al.*, 1996).

Finally, the duration of the expression of neophilic behavior depends on the duration of exposure to the usual food. In Griffin's study, the novelty effect was short-lived, waning after three days when the dogs were fed for 14 days with their usual food and persisting one week if the usual food had been given in the previous 6 months (Griffin *et al.*, 1984).

When changing a pet's diet, be prepared for the possibility of neophilia and the associated increase in energy consumption during the first month after the new diet is introduced. Whenever a change is made to a pet's diet, owners should take care to measure out the food to ensure proper caloric delivery.

Neophobia

Neophobia is the opposite of neophilia and corresponds to avoidance of a new food compared to the usual food. Also called "fixation of food habits", neophobia has been identified in both dogs and cats.

This behavior is part of a food selection strategy. Animals consume foods that provide a balanced diet and avoid taking the risk of eating new unknown foods.

In the wild, carnivores, unlike omnivores, display more neophilic than neophobic behavior (Thorne, 1982). Neophobia is more common when meals are served in unusual conditions (Thorne 1982) or if the animal is under stress (Bradshaw & Thorne, 1992).

Introducing a new diet under unusual circumstances or when the animal is stressed (by pain or illness, by being away from its owner, in a veterinary clinic etc) is more likely to result in neophobia than if the new food is introduced under familiar, positive circumstances. Always introduce a new diet under the least stressful conditions for the pet.

In the late 1960s Kuo revealed the fixation of food habits (Kuo, 1967). At birth, two groups of puppies were given the same food in the first six months of life. One group received soy-based food and the other a fruit and vegetable diet. When offered new food, these puppies refused to change their diet, even after being deprived of food.

Similar observations were made in cats. Kittens fed since weaning with the same cereal-based food preferred this type of food to more palatable canned food with tuna (Wyrwicka & Long, 1980).

Neophobia, the lack of recognition of food as being edible (Bradshaw *et al.*, 2000), exists in varying degrees. The more regular the diet, the more persistent the neophobia.

A few days are required to overcome neophobia and for an animal to experiment with the new food (Cheney & Miller, 1997). To overcome neophobia toward a new flavor, cats should not be exposed to the smell alone, they must also taste it (Bradshaw 1986).

Food transition is not only interesting for a better digestive tolerance: it is also a way to overcome neophobia.

One solution devised to overcome neophobia toward a flavor involves using drinking water as a support. In effect, although neophobia toward new foods is common in many species, neophobia toward flavored drinking water is rare. In rats, neophobia toward mint disappeared when drinking water was flavored with mint for 5 days (Cheney & Miller, 1997).

Another solution involves repeating exposure to new food several times. In a study of cats, Bradshaw (1986) showed that neophobia disappeared after the third day of presentation of food flavored with lamb. Neophobia reappeared three months later if the cat was not regularly exposed to the new flavor ***(figure 3)***.

Here are four approaches that may help overcome neophobia. These are just suggestions that may or may not work depending on the animal.

1 – Offer the new diet each day for at least three days (offering fresh food each time). Persistent exposure, even if the cat initially refuses the new food, may help overcome neophobia.

2 – Try putting a small piece of the new food in the cat's mouth, so that the cat tastes the new food.

3 – If the diet is a wet food (can or pouch), try smearing a little of the food onto the pet's front legs. Most pets will lick off the food and this can habituate the pet to a new food.

4 – Mix a little of the new canned food into the cat's drinking water to help habituate the cat to the new taste.

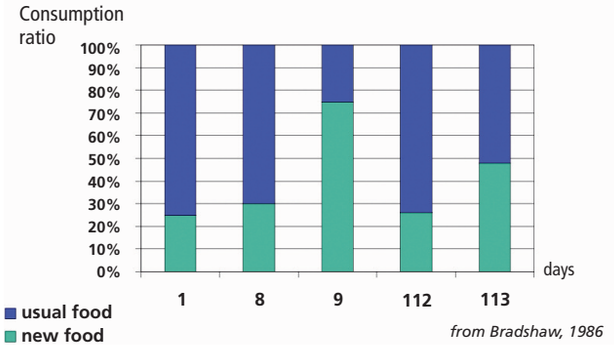

Figure 3: *Neophobia (tendency to reject new food) decreases but can reappear after several months. It is more common in cats.*

Aversion

When smell or food is associated with positive consequences, the food will be eaten again. Conversely, if the smell or the food is associated with distress, an unpleasant experience (hospitalization) or a digestive problem (poisoning), the food will be avoided in the future. This phenomenon is known as aversion (Cheney & Miller, 1997).

Aversion is a strategy used by animals to avoid foods that are unsuitable for them. It is a form of negative conditioning.

In cats, aversion sets in very quickly. A single meal associated with unpleasantness leads to a refusal to eat. Such aversion can persist for 40 days (Bradshaw *et al.*, 1996) or more (Mugford, 1977). The smell alone of a food associated with digestive disorders is enough to elicit aversion. Cats even go so far as to show aversion for their usual food if it is served in the presence of an air current bearing the odor of a food to which they have developed an aversion (Mugford, 1977).

Be careful when preparing foods for pets being boarded at the hospital. Odors may travel and could trigger an aversion reaction even in cats being fed their usual diet. It is best to prepare the pets' food in a place where food odors cannot reach the pets.

Aversion techniques have been studied as a way of preventing predator attacks on sheep. Sheep carcasses impregnated with lithium chloride (which causes nausea) were distributed in the wild. After eating the meat and experiencing the unpleasant effects of lithium chloride, the coyotes were expected to develop an aversion to the sheep and prefer other prey (Ellins & Catalano, 1980).

Anti-apostatic selection

The selection of food may be influenced by its novelty as described above. The relative availability of food, i.e. its rarity, also influences animals in their choice (cats in particular).

Selection of prey according to their density in the environment has been described in several species, particularly birds (Allen, 1988). Predators may choose prey that is either the most common in their environment (apostatic selection) or, on the contrary, the rarest species (anti-apostatic selection). Anti-apostatic behavior has been observed in cats accustomed to hunting. It is more developed in cats with a rich feeding experience (Church *et al.*, 1996).

Anti-apostatic selection has also been reported in cats being fed commercial cat food. Church and his team showed that cats receiving mixtures of different proportions of two types of food of identical palatability (i.e. the same formulation but a different kibble shape) consumed more of the rarer kibble.

The reasons advanced to explain anti-apostatic selection may include easier identification and location of rarer forms, or a preference for rarity linked to the nutritional advantages of a diversified diet (Church *et al.*, 1994).

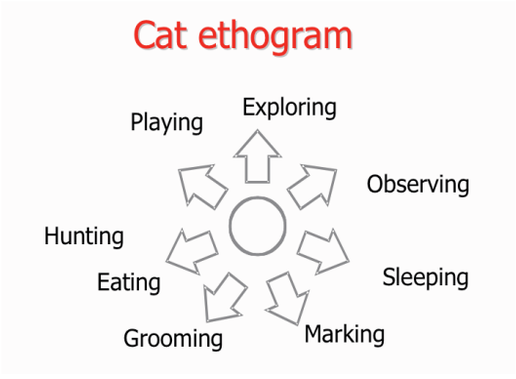

Figure 4: *Sleeping is the more time-consuming activity for a cat (14-18h/24h i.e 60-75% of a 24h period), whereas a cat eats less than 1 hour per day, i.e. less than 3% of a 24h period.*

	DOGS	CATS
Aversion	YES	YES
Neophilia	YES	YES
Neophobia	YES	YES
Anti-apostatic selection	UNKNOWN	YES
Defined spatial requirement for comfort in eating	NO	YES

Table 2: *Main types of eating behavior reported in dogs and cats.*

Spatial requirements of cats

Cats need to feel safe and secure within their home environment. To this end owners need to provide facilities for the main behavioral functions of eating, sleeping and playing ***(figure 4)*** and also ensure that the cat has the ability to control its own stress through the natural mechanisms of hiding and retreating. One of the problems with tidy modern homes is that feline hideouts on the tops of wardrobes and bookcases are often lost by the installation of fitted furniture and, in a home where everything has its place, secure bolt holes are often in short supply. As a result the cat often finds itself constantly on display and correspondingly vulnerable. Taking steps to provide the cat with a constant and predictable environment, both in terms of physical structure and scent profiles, will help to increase the cat's security; while the provision of access to high up resting platforms, secure bolt holes and hideaways will decrease the use of oral appeasing behaviors, such as overgrooming and overeating. If all of the furniture in the house is fitted it may be necessary to put up shelves for the cat to rest on, or clear out part of a cupboard or wardrobe to offer a safe hideout.

Cats that are boarded in standard cat cages in clinics may be uncomfortable eating because a lack of space results in the cat's spatial requirements not being respected. Moving these cats to larger dog cages, which permit the separation of food, lodging and litter, may restore the appetite of some cats.

Although the behaviors listed in ***table 2*** have been demonstrated in cats and dogs, not all individuals express all types of beha-

vior. Some of these behaviors, e.g. neophobia and neophilia, are mutually exclusive. Past experience contributes to the animal's preferential development and their dietary preferences.

LEARNED FEEDING BEHAVIOR

Various studies have evaluated the food preferences of dogs and cats based on their life experiences and dietary history.

Influence of dietary history

Dietary history can play a role in determining food preferences. This is true for dogs or cats raised in different circumstances, but may also apply to animals raised in similar conditions.

- ***Kennel dogs versus house dogs***

Griffin *et al.* (1984) compared food preferences in 191 dogs living in homes versus 240 pedigree dogs living in kennels. He compared two dry foods, two canned foods and two semi-moist foods. He found different preferences between the two groups of animals for the two dry foods and the two semi-moist foods He concluded that these differences could be explained by the two groups' different experiences.

- ***Housecats versus farm cats***

Five different foods (canned meat, canned fish, raw beef, cooked beef, dry food) were offered in a series of two bowl tests to 64 cats, 28 living in homes and 36 living freely on farms. The housecats showed a much stronger preference for dry food. Conversely, while the housecats were barely attracted by the raw beef, it was the farm cats' favorite food (Bradshaw et al, 2000). Way of life and prior dietary experience explain the differences in dietary preferences between these two groups of cats.

- ***Pre-natal experience***

The acquisition of certain preferences may occur very early in life, as early as during gestation. Fetuses are surrounded by amniotic fluid, which contains compounds they assimilate in utero (Thorne, 1994). A dog's gustatory system is functional in the final days of gestation (Ferrell, 1984) and the same is true of a cat's (Tichy, 1994).

During lactation, the composition of milk varies with the mother's diet. Puppies and kittens may develop certain preferences at this time in their lives (Thorne, 1994). Few articles describe this for cats and dogs. Weaning has been more seriously studied.

- ***Weaning experience***

Weaning is an important time in an animal's dietary history. The moment a cat eats its first solid food is probably the most crucial in terms of influence, especially if it happens in their mother's presence.

When eating their first solid food, kittens do not choose the most palatable food according to innate criteria. They choose what their mothers eat, even if this food is unusual for cats (Wyrwicka, 1978). Dietary preferences are not innate; they are acquired through social influences after birth (Wyrwicka, 1993).

Kittens whose mothers have been conditioned to eat bananas (usually unpalatable for cats) will eat bananas during weaning even if they have access to more conventional food for cats ('meat pellets'). Kittens imitate their mother's eating behavior down to the smallest detail. They begin by eating from the same plate, at precisely the same spot, as their mother takes its food. There is a correlation between the mother's dietary consumption and that of the kittens. The kittens that eat the least amount of banana are those whose mothers eat the least. The kittens' banana consumption patterns mimicked the original results in all litters, even after weaning and separation from their mothers (Wyrwicka, 1993).

The importance of mothers in the acceptance of food is fundamental for kittens. Nineteen kittens from four litters were studied. Ten kittens ate in their mother's presence, while nine were without their mother during meals. The time it took kittens to accept a new food was very different between groups. For the kittens eating in their mothers' presence, it took an average of 5 hours for them to eat a new food. In contrast, the kittens separated from their mothers took 4.8 days before eating a new food (Wyrwicka & Long, 1980). Food preferences acquired during weaning in their mother's presence persisted in kittens until the age of 4 to 5 months (Wyrwicka & Long, 1980).

Being deprived of dietary experience also influences learned feeding behavior. Kittens fed by stomach tube have very limited gustatory experience compared to kittens fed normally. During conditioning tests in which success is rewarded with food, the kittens fed by stomach tube took longer to succeed and even refused to eat the reward (Stasiak & Zernicki, 2000).

- ***Post weaning experience***

Dietary experience has a clear influence on food aversion, and broad dietary exposure is one of the main factors orienting cats toward neophilic rather than neophobic behavior, two seemingly opposite dietary strategies.

It is certain that the animals' way of life and type of diet influence their choice. In Bradshaw's study, housecats' behavior seemed rather neophobic; they were less opportunistic than farm cats since they had a more regular, more complete diet (Bradshaw *et al.*, 2000). Animals may have more or less diversified dietary pasts. The animals' wealth of experience is one of the main factors in dietary history that orients animals toward neophilic or neophobic behavior.

Studies on the effect of past experience on eating preferences do not all lead to the same conclusion. Some authors were able to "fix" an animal's dietary habits by raising them with the same food from birth. For others, animals developed no special preference for the food with which they grew up (Mugford, 1977).

A recent study attempted to reconcile divergent points of view

on the impact of a cat's dietary history on food preferences. Kittens raised with one diet since weaning were challenged with conditioning tests in which the reward was a portion of food (Stasiak, 2001). The speed with which the kittens succeeded in the tests and the number of their failures were compared. The response to tests was influenced by the kittens' dietary history. Kittens with the most diversified past responded indifferently to the tests regardless of the reward. Conversely, kittens whose dietary experience was limited to one food responded to differences in reward value between foods. Limiting the diversity of a kitten's diet can reveal differences in reward value between foods that other cats do not seem to notice (Stasiak, 2001).

THE INFLUENCE OF FOOD CHARACTERISTICS ON PALATABILITY

As well as the behavioral aspects of food selection and preference, food characteristics and the animal's perception of these characteristics also influence food choices.

Food selection by the animal involves several sequential steps:

1 – First, the animal will ***smell*** the food, assessing its aroma and temperature.

2 – If the aroma is appealing, the animal will attempt to pick up the food, assessing the ease of ***prehension*** (grasping by the mouth).

3 – Once the food is in the animal's mouth, the animal will assess the ***taste*** as well as the ***physical properties*** of the food, i.e. the ***feel*** of the kibble in its mouth, how easy it is to break and chew the food, the size and shape of the kibble

4 – Lastly, the animal will assess any post-ingestion effects of the food.

CONCLUSION

Palatability is an expertise with as much depth and complexity as any other science. Pet food formulation is only one component of palatability. Aroma, ease of prehension, taste, kibble size, shape, density and texture, manufacturing practices, quality assurance practices and packaging technology all affect food acceptance. Species evolution affects dog and cat feeding behaviour and this must be understood and taken into account when designing pet foods. The only way to know if the goal has been achieved is to submit pet foods to rigorous evaluation and testing, using a diverse and sophisticated series of tests which reliably indicate animal preferences when fed to pets in the home.

For the veterinarian and the pet who is ill, palatability is not just something that is nice to have. Palatability is linked to com-

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