Selecting Cat Names:
A Scientific Approach

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Phonetic Analysis

The motivation for this type of analysis comes from the fact that the name chosen for a pet will be constantly used at various volumes. On one hand, it has to be repeated without much change for the animal to memorize and be able to recognize it, and on the other hand it has to be easy enough to be constantly pronounced by humans, under various conditions and volumes. For example, the name needs to be voiced in a certain manner so as to still be distinguishable when whispered, as whispering a cat's name is a frequent action. Thus we require the name to be constructed such that it is articulated in a certain manner so as not to lose auditory clarity when the voicing volume is changed.

Another important requirement comes from Columbia University's Michael Slepian and Adam Galinsky (2016), who argued that female names and male names differ in fundamental ways based on how they are pronounced. Their research associated the 'harshness' of name sounds with the voicedness of phonemes in that pronunciation. A phoneme is the smallest unit of speech. The difference between voiced and unvoiced phonemes can be observed by pronouncing "this" and "thin". Notice the vibration of your vocal chords when pronouncing the 'th' sound by placing your fingers on your throat and speaking both those words. Names with voiced phonemes have a harsh sound, while names with unvoiced phonemes have softer sounds. Names with initial unvoiced phonemes are thus more likely to be female (with some exceptions of course). For example, "Barry" starts with a voiced phoneme /b/, while "Tracy" starts with an unvoiced phoneme /t/.

Some consonants are just inaudible at low volume, and they could also silence the following vowels. That happens because when trying to whisper, only words

that contain unvoiced phonemes remain unchanged. Any words starting with or containing voiced phonemes require the resonance of the vocal chords, which just doesn't happen when whispering.

There exists several manners of articulation in phonetics, some of which will be discussed below. Manner of articulation is the way the air stream is affected as it flows from the lungs and out of the mouth. Re-iterating, voiceless sounds are those produced with the vocal chords apart so that air flows freely through the glottis (non-vibrating chords). Voiced sounds on the other hand are those produced when the vocal chords are together and vibrating as the air passes through. To fulfill the requirement of an unchanged audio signature in the name when pronounced at different volumes, we must look for names that contain voiceless phonemes only, or at least start with one.

1.1 Plosives

Plosives are consonant sounds that involve a constricting the mouth to prevent any air from escaping from the vocal tract (also a manner of articulation called 'stops'), and then compressing and releasing that air. The six plosive phonemes in English are p, t, k, b, d, g. Further classification of these is also possible. /p/ and /b/ are bilabials (require the pressing of lips together). /t/ and /d/ are alveolar. /k/ and /g/ are velar (back of tongue pressed between hard and soft palate. Of those phonemes, /p/, /t/, /k/, /g/ are voiceless. This can be tested by checking vocal chords vibration when pronouncing the plosives.

	Bilabial	Alveolar	Velar
Voiceless	p	t	k
Voiced	b	d	g

1.2 Fricatives

Fricatives are produced by severely obstructing the airflow so as to cause friction. They are characterized by 'hissing' sounds that are produced by the air escaping through a small passage in the mouth. Voiceless fricatives have the effect of shortening the preceding vowels in the same way as voiceless plosives. The table below classifies the fricatives as voiced or unvoiced. The θ is pronounced as the /th/ in "thin", while the ð is pronounced as the /th/ in "this". The $\int$ is pronounced as the /sh/ in "shirt", while the ʒ is pronounced as the 'sio' sound in vision (/viʒon/).

	Labiodental	Dental	Alveolar	Palato-Alveolar	Glottal
Voiceless	f	θ	s	$\int$	h
Voiced	v	ð	z	ʒ	

1.3 Affricates

Affricates are produced by a stop closure that is released with alot of friction. They begin as plosives and end as fricatives. The affricates are both palato-alveolar, one voiced and one voiceless. The ʧ is pronounced as the /tch/ in 'chad' while the ʤ is pronounced as the /ʤ/ in 'john' or 'jump'.

	Palato-Alveolar
Voiceless	ʧ
Voiced	ʤ

1.4 Vowels

To cover the choice of vowels, one is lured to look at one kinds of classifications of vowels: tension. Vowels are divided into tense vowels and lax vowels.

Tense vowels are produced with greater tension in the tongue, and may occur at the end of words. Lax vowels are produced with less tension in the tongue, and may not occur at the end of words. Examples of tense and lax vowels are listed in the following table.

Tense Vowels		Lax Vowels	
i	beat	I	bit
e	bait	ϵ	bet
u	boot	ʊ	put
o	boat	ɔ	bore
a	hah	ɔɪ	boy
ai	high	ae	hat
au	how	ʌ	hut
		ə	about

1.5 Conclusion

Re-stating our requirements for an easy to pronounce and identify name, we group all voiceless consonants and lax vowels in the table below.

Voiceless Consonants		Lax Vowels	
p	please	ɪ	bit
f	five	ϵ	bet
θ	thirty	ʊ	put
t	ten	ɔ	bore
s	sir	ɔɪ	boy
ʃ	she	ae	hat
ʧ	cheers	ʌ	hut
k	king	ə	about

An optimal name would be one that starts with and possibly only contains voiceless consonants from the table above, and contains more lax vowels than tense vowels so that the tongue stays relaxed when pronouncing the name. This allows for a smooth sound, with relaxed muscles and avoiding vocal chord vibration, while also forcing a continuous flow of air without any stops other than possibly the first phoneme, before which no flow was present anyways.

Psychological Analysis

The way a name sounds can have effects on how it can be used. A single syllable name like "Max" for example is halting, as one cannot express emotion with it. A two syllable name however is a better choice, as it allows for inflection, making it easier to convey emotion. With a name like Timmy, the "Tim" can be pronounced with a high note, and the "my" can be pronounced with a low note, sliding, conveying affection. To convey displeasure, reverse the order. The differences in pitch between both syllable pronunciations can also convey differences in urgency.

More importantly, the name chosen should be one that the caretaker is comfortable with and comfortable with repeating over and over again, in different settings and in front of all types of people. For this, choosing goofy names as a joke is discouraged, as it will result in uncomfortable situations.

In case major behavioral change is required, this rare scenario allows for name changing at a later point in the pet's life. This allows them to break the negative associations, or maybe just previous associations (not necessarily negative), between their old name and whatever old lifestyle they were living, helping them get over the past and start anew (Adoption is one example of this scenario).

Auditory Analysis

Speech occurs when air is forced out of the vocal chords, which may or may not be vibrating. A fundamental tone is generated for every phoneme pronounced. Vowels are lower frequency phonemes, while consonants are high frequency phonemes. While the vowels create the sound volume of speech, the consonants bear the information, making the signal distinguishable from others. This can be demonstrated simply by removing all vowels while whispering, one can notice that the information can still be heard in its entirety.

The frequency of the vowels lies in the range of 250-2000 Hz, and that of the voiced consonants in the range 250-4,000 Hz. Unvoiced consonants, which interest us, lie in the range 2,000-8,000 Hz, varying considerable in strength. This is because the vocal chords here do not vibrate, and thus the air vibrations come from the mouth and tongue positioning and a quick continuous (and in some cases compressed) stream of air.

We are concerned with whether cats are annoyed by any of the above frequencies, so as to try to avoid such phonemes from our name choice. Humans can hear frequencies ranging from 20 Hz to 20,000 Hz. Cats on the other hand can hear frequencies in the range of 55 Hz to 79,000 Hz. What is usually irritating to the ears is frequencies towards the higher boundary of one's hearing, and thus cats will have no problem with frequencies ranging from 250-8,000 Hz, and all phonemes can be used without any need to worry.