Purr Frequencies and Their Correlation with Graduate Student Productivity

Cheeto,[1,*] Dr. Biscuit Pawsworth III,[1] Dr. Shadow McVoidface[1]

[1]Laboratory for Feline Physics Research, Dept. of Physics, University of California, Davis, CA 95616

[*]cheeto@ucdavis.edu (author is currently purring; do not interrupt)

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Abstract. We present a controlled double-blind study ($n = 312$ graduate-student work sessions) of the effect of ambient purr frequency on academic productivity, measured in lines of code written, pages of thesis produced, and mid-session snack consumption. We identify a resonant productivity peak at $f^* = 25.5\,\mathrm{Hz}$ — the *Purr Productivity Resonance* — at which graduate student output increases by $38 \pm 4\%$ relative to a silence baseline. Above $f > 120\,\mathrm{Hz}$, the purr transitions into a trill and productivity collapses entirely as students stop working to describe the cat as "adorable." Implications for academic supervision are discussed.

Keywords: bioacoustics, purr frequency, productivity, graduate students, resonance, stress reduction, adorableness threshold

1. Introduction

It has been informally observed by generations of cat-adjacent researchers that working in the presence of a purring cat is pleasant. Prior work has documented the physiological effects of feline purring on human stress markers [1], but no study has rigorously characterised the frequency-dependent effect on *academic output* specifically.

This is a significant gap. Graduate students are a delicate instrument: too much stress reduces their output; too little, and they watch online videos of cats. The present study tests the hypothesis that there exists an optimal purr frequency f^* that maximises productive output while minimising the risk of workflow abandonment in favour of ear-scratching.

Co-author Dr. Biscuit Pawsworth III conducted acoustic measurements and served as secondary purring source during high-demand sessions. Dr. Shadow McVoidface provided the control condition (silent presence in a dark corner), which several students found more alarming than helpful.

2. Background: Feline Purr Acoustics

Domestic cat purrs are produced by rhythmic laryngeal dilations occurring at 20–150 Hz during both inhalation and exhalation [2]. The resulting acoustic signal is quasi-periodic with harmonics at $2f$, $3f$, etc. Purr intensity (sound pressure level, SPL) ranges from approximately 50–80 dB at 1 m, comparable to a quiet office fan — but substantially more warm.

Definition 1 (Purr Productivity Resonance)**.** *The* Purr Productivity Resonance *(PPR) is the fundamental frequency f^* at which graduate-student productivity $\Pi(f)$ achieves a local maximum relative to the silence baseline Π_0:*

$$f^* = \arg\max_{f} \left[\Pi(f) - \Pi_0 \right]. \tag{1}$$

3. Methods

3.1. Subjects and Setting

Twelve Physics PhD students (7 male, 4 female, 1 declined to specify; mean year of study: 3.8 ± 1.4) participated across 312 work sessions of 90 minutes each. Sessions were conducted in the graduate student office (Room 112B) under controlled lighting and temperature.

The study was single-blind in the sense that students were told they were participating in a "focus and productivity study." The role of the cat was described as "ambient." Students were not told that the cat was also a co-investigator, as the IRB form did not include a checkbox for this.

3.2. Purr Delivery

The lead author (Cheeto) delivered purrs across six frequency conditions via voluntary laryngeal modulation. Dr. Biscuit Pawsworth III provided supplementary purring in conditions requiring sustained output above 60 Hz, as the lead author finds higher registers tiring and prefers to delegate. Frequency was verified by a calibrated contact microphone placed on the cat's sternum (Pawsworth's; lead author declines to wear equipment).

Conditions: silence (control); 20 Hz; 25.5 Hz; 40 Hz; 80 Hz; >120 Hz (trill).

3.3. Productivity Metrics

Three productivity metrics were recorded per session:

1. **Code lines**: lines of code written or edited (programming students only; $n = 7$);
2. **Thesis pages**: net pages added to dissertation document;
3. **Snack index**: number of distinct snacks consumed, normalised by session length (snacks/hr).

Metric 3 serves as an inverse proxy for sustained focus; high snack index indicates displacement behaviour and low genuine productivity.

4. Results

4.1. Frequency–Productivity Curves

Table 1 reports mean productivity indices relative to the silence baseline (relative productivity, RP, where RP = 1.00 denotes baseline performance).

Table 1: Relative productivity (RP) and snack index by purr condition.

Condition	RP (code)	RP (thesis)	Snack idx
Silence (control)	1.00	1.00	3.1 ± 0.6
20 Hz	1.11	1.08	2.9 ± 0.5
25.5 Hz (PPR)	**1.38**	**1.37**	$\mathbf{1.8 \pm 0.3}$
40 Hz	1.21	1.19	2.2 ± 0.4
80 Hz	1.03	1.01	3.0 ± 0.6
>120 Hz (trill)	0.61	0.58	5.4 ± 0.9

The 25.5 Hz condition produces peak productivity gains of $38 \pm 4\%$ in code output and $37 \pm 5\%$ in thesis pages, with a simultaneous 42% reduction in snack consumption, indicating genuine deep-work engagement.

4.2. The Adorableness Threshold

At $f > 120$ Hz (trill condition), productivity falls to 61% of baseline. Post-session interviews revealed the mechanism: all twelve students stopped working to describe the cat as, variously, "absolutely precious," "the best boy," "a little motor," and "I need to pet it right now." Three students failed to resume work at all during the session. We term the frequency above which work cessation probability exceeds 50% the *Adorableness Threshold*, estimated at:

$$f_{\mathrm{threshold}} = 112 \pm 8 \ \mathrm{Hz}. \tag{2}$$

Dr. Shadow McVoidface's silent control condition produced a different effect: three students reported being "watched" and became mildly paranoid, with a 12% productivity *decrease* relative to baseline. This result was not predicted and is not fully understood, though Shadow appears undisturbed by it.

4.3. Modelling Productivity

Productivity as a function of frequency is well described by a modified Lorentzian with an exponential trill-collapse term:

$$\Pi(f) = \Pi_0 \left[1 + \frac{A \, (\Gamma/2)^2}{(f - f^{*})^2 + (\Gamma/2)^2} - B \, e^{(f - f_{\mathrm{threshold}})/\lambda} \right], \tag{3}$$

where $A = 0.42$, $\Gamma = 18$ Hz (resonance width), $B = 0.61$, and $\lambda = 15$ Hz. Equation (3) fits the data with $R^2 = 0.97$.

5. Discussion and Conclusion

A Purr Productivity Resonance exists at $f^{*} = 25.5$ Hz, boosting graduate student output by approximately 38%. The resonance is narrow ($\Gamma = 18$ Hz), suggesting that careless purring at non-optimal frequencies wastes acoustic energy. Supervisors should ensure their lab cat is calibrated. The trill regime ($f > 112$ Hz) should be deployed only outside work hours, or strategically when a student needs to be distracted from a meeting they are not supposed to leave.

Corollary 1. *A well-calibrated purr at 25.5 Hz is a more effective productivity intervention than either a standing desk or a motivational poster.*

Future work: Dr. Biscuit Pawsworth III will investigate whether the kneading of armrests (2–4 Hz mechanical stimulation) produces an independent productivity effect, or merely a different kind of distraction.

Contributions

Cheeto: study design, purr generation (low–mid frequency), analysis. Biscuit: purr generation (high frequency), acoustic calibration. Shadow: silent control condition, data logging, being watched.

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