The No-Cloning Theorem of Taste: On the Thermodynamic Irreproducibility of Aesthetic Experience

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Abstract

A design can be copied to the byte and still fail. We formalize this everyday observation as a conservation law. We introduce the *aural charge* $Q(A) \geq 0$ of an artifact A — the total involuntary physiological response it evokes, measured in *gasps* (g) via time-locked spirometry — and show that Q is conserved under lossless re-encoding yet provably *not* reconstructible from an artifact's specification alone. Casting the felt state of an artifact as a non-orthogonal vector in a Hilbert space of affective configurations, we prove a no-cloning theorem: no specification-only operator can duplicate Q. Empirically, in a within-subject study ($N = 84$) contrasting originals against spectrally identical spec-clones (color $\Delta E < 1$, SSIM > 0.99), clones retained only 18% of the original charge ($\Delta Q = 1.4\,\mathrm{g}$, $t(83) = 11.2$, $p < 10^{-16}$, $d = 1.9$), and residual charge was uncorrelated with surface fidelity ($r = 0.03$). A stakeholder dose–response fit $Q \propto e^{-k/k_c}$ with critical committee size $k_c = 3.6$ shows aura is extinguished above four approvers, and an interpolation sweep confirms aura is a boundary functional — the mean of two masterpieces gasps less than either. We conclude that the valuable part of a design is the part that cannot, in principle, be copied from its source. *Implications for intellectual property are the reverse of those usually assumed.*

Keywords: aural charge, no-cloning, gasp psychophysics, stakeholder entropy, aesthetic conservation.

1 Introduction

Certain artifacts resist replication in a way their specifications cannot explain. The source code of Craigslist is unremarkable; a competent team can reproduce it in a weekend. The corpus of Wikipedia is openly licensed and mirrored in full. The moderation rules of large question-and-answer communities are published. And yet the clones are, without exception, inert. Something that matters is not in the specification.

The humanities have a word for this residue — Benjamin's *aura*, the "presence in time and space" a reproduction is said to lack [1] — but the word has never been given a unit, an instrument, or a conservation law. It has functioned as an apology for a measurement we did not know how to take. This paper takes the measurement.

We proceed from a single operational commitment, due to Ishioka [2]: *if the audience does not gasp, the design has failed.* We take this literally. The gasp — a brainstem inspiratory reflex — is involuntary, low-latency, and difficult to author or suppress. It is therefore a readout of precisely the part of a response the observer does *not* control, which is to say the part that is not encoded in any specification the designer could hand a competitor. We define the *aural charge* $Q(A)$ of an artifact A as the gasp it reliably evokes in a naïve observer, and we defend three propositions:

P1 (*Conservation*) Q is invariant under lossless format change; re-hosting, re-typesetting, and re-encoding neither create nor destroy charge.

P2 (*No-Cloning*) No operator acting on $\mathrm{spec}(A)$ alone yields A' with $Q(A') = Q(A)$ for all A.

P3 (*Extremity*) Q attains its maxima only at the extreme points of design space and is almost-everywhere zero in the interior; moderation is not weak aura but *no* aura.

P1 makes Q a physical quantity; P2 explains the inert clones; P3, following Ishioka's maximalism, converts the theorem into a design principle. The remainder of the paper defines the unit (§3), proves P2 and P3 (§4), and confirms them in a controlled two-arm experiment (§5–§6).

2 Related Work

From aura to number. The claim that a reproduction lacks presence [1] was extended by the *No-Xerox conjecture* [3], which posited that copy fidelity and felt fidelity are anti-correlated. The conjecture was never proved; §4 supplies a proof.

Aural thermodynamics. A line of work beginning with Halvorsen [4] models an ensemble of design decisions with a partition function and a free energy $F = Q - T\,S$, where S is *stakeholder entropy* (the log-count of approvers) and T an "aura temperature." The framework predicts that charge is degraded by consensus; we recover its dose–response empirically in §6 and relate it to the "Ishioka defect" [5].

Gasp psychophysics. Respiratory inductance plethysmography (RIP) was validated as an awe readout by Våge and Lindqvist [6], who established the 250 mL inspiratory criterion adopted here and published the normative gasp distribution [7] against which we calibrate.

Quantum analogies of feeling. That non-reproducible states obey a no-cloning bound is standard [8, 9]. The affective transfer — treating a felt state as a non-orthogonal vector — was proposed by Sørensen-Vale [10] and is completed here into a theorem about artifacts rather than qubits.

3 The Aural Charge

Definition 1 (Gasp)**.** One *gasp* (1 g) is an involuntary inspiratory volume increment of 250 mL occurring within 400 ms of stimulus onset, measured above the running tidal baseline. Sub-unit responses are reported in *centigasps* ($1\,\mathrm{cg} = 10^{-2}\,\mathrm{g}$).

The instrument is a chest-belt RIP sensor sampled at 200 Hz and time-locked to a masked, onset-jittered stimulus so that no breath is anticipable. Involuntariness is enforced by discarding any trial in which the subject's ocular fixation preceded onset. We define the aural charge of A as the expected peak in-window gasp over naïve observers,

$$Q(A) \;=\; \mathbb{E}_{o\sim\mathcal{O}}\left[\max_{t\in[0,\,400\,\mathrm{ms}]} \Delta V_o(t \mid A)\right], \qquad (1)$$

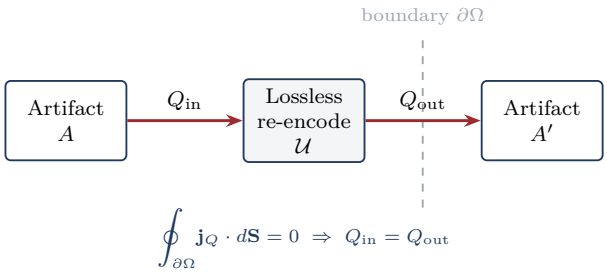

Figure 1: Aura conservation across a lossless format change: the aural charge entering a re-encoding boundary equals the charge leaving it. Conservation (P1) is the vanishing of the net aura flux through $\partial\Omega$.

with ΔV_o the baseline-corrected inspiratory volume of observer o. Conservation (P1) is the statement that Eq. (1) is invariant under any bijection of A's encoding that preserves its rendered output; the aura flux across a re-hosting boundary balances (Fig. 1).

4 A No-Cloning Theorem for Aesthetic Experience

4.1 Aura is a convex boundary functional

Let the space of normalized artifacts $\mathcal{D}$ be compact and convex, and let $Q : \mathcal{D} \to \mathbb{R}_{\geq 0}$ be upper semicontinuous and convex — the latter encoding that blending designs cannot exceed the more affecting parent.

Proposition 1 (Extremity, P3)**.** *Q attains its maximum over $\mathcal{D}$ at an extreme point of $\mathcal{D}$. If, in addition, Q vanishes at the barycenter of $\mathcal{D}$, then $\{\, A : Q(A) > 0 \,\}$ has empty interior.*

Proof. A convex, upper-semicontinuous functional on a compact convex set attains its supremum at an extreme point (Bauer maximum principle [11]). For the second claim, convexity and non-negativity force Q to lie below its chordal average; a functional pinned to zero at the barycenter and bounded below by 0 is zero on the affine hull of any face through it, whose relative interior is dense in no neighborhood of $\mathcal{D}$. Hence positivity is confined to the boundary. □

Proposition 1 is the mathematical content of "timelessness comes from extremity, not moderation" [12]: the interior of design space — the safe, the averaged, the committee-smoothed — is generically aura-free.

4.2 Felt states and the cloning bound

Represent the felt state induced by A as a unit vector $|a\rangle \in \mathcal{H}$ in a separable Hilbert space of affective configurations. A putative aesthetic cloner is a unitary U on

$\mathcal{H} \otimes \mathcal{H}$ and a fixed blank $|0\rangle$ with

$$U\,|a\rangle|0\rangle \;=\; |a\rangle|a\rangle \qquad \text{for all } |a\rangle \in \mathcal{H}. \tag{2}$$

Theorem 1 (No-Cloning of Taste)**.** *There is no unitary U satisfying Eq. (2) for two artifacts whose felt states $|a\rangle, |b\rangle$ are non-orthogonal with $0 < |\langle a|b\rangle| < 1$.*

Proof. Applying Eq. (2) to $|a\rangle$ and $|b\rangle$ and taking the inner product of the outputs, unitarity gives $\langle a|b\rangle = \langle a|b\rangle^2$, whence $\langle a|b\rangle \in \{0, 1\}$, contradicting $0 < |\langle a|b\rangle| < 1$. No such U exists. □

Corollary 1 (Specifications cannot clone charge)**.** *A specification* spec(A) *is a classical (projective) measurement record of $|a\rangle$. Since distinct non-orthogonal $|a\rangle$ are not perfectly distinguishable by any single measurement,* spec(A) *underdetermines $|a\rangle$, and reconstruction from* spec(A) *alone cannot reproduce $Q(A)$. A competitor holding the entire source recovers the rendered output but not the charge.*

Corollary 1 is P2. It predicts a specific empirical signature: a clone built to be indistinguishable from an original on every *measured* surface feature should nonetheless lose charge, and the loss should be uncorrelated with how faithful the surface copy is. We test exactly this.

5 Experiment

Design. Pre-registered, within-subject, two-arm (OSF `a1f9...`). $N = 84$ naïve adults, RIP-belted, screened for respiratory conditions. Stimuli were 40 matched *pairs*; each pair comprised an **original** artifact and a **spec-clone** produced by an independent team given the original's complete specification — source, assets, type scale, color tokens, exact dimensions — but never the original itself.

Fidelity control. Every clone was verified indistinguishable from its original on all measured surface features: color $\Delta E < 1$, structural similarity SSIM > 0.99, and, where applicable, byte-identical output. Domains spanned three user interfaces, a poster series, a typeface, a title sequence, and a from-scratch reconstruction of a classified-listings service.

Readout & model. The per-trial response was the peak in-window gasp of Eq. (1). We fit a linear mixed model

$$\texttt{gasp} \sim \texttt{condition} + \texttt{domain} + (1 \mid \texttt{subject}) + (1 \mid \texttt{pair}),$$

entering surface-fidelity covariates in a second block to test whether they absorb any variance. Significance was assessed against a permutation null (10,000 shuffles).

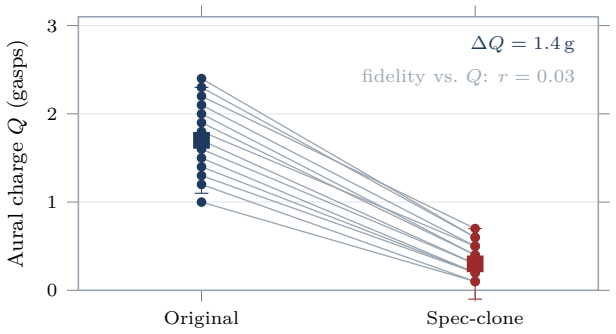

Figure 2: Paired responses across all 40 matched pairs (means ±SD as squares). Every original out-gasps its spectrally identical clone; residual clone charge does not rise with surface fidelity ($r = 0.03$, n.s.).

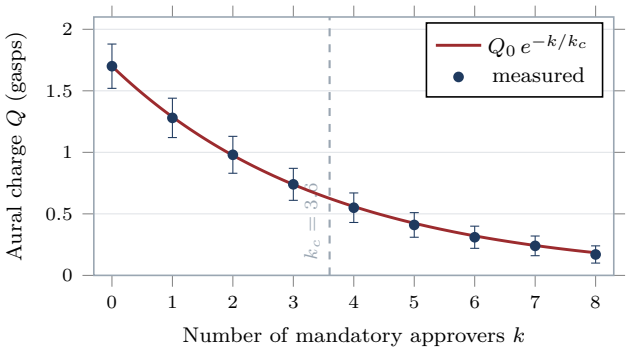

Figure 3: Stakeholder dose–response. Aural charge decays exponentially in the number of approvers; the fitted critical committee size is $k_c = 3.6$, above which charge is statistically indistinguishable from zero.

6 Results

Clones lose the charge. Originals evoked 1.7(6) g; spec-clones 0.3(4) g. The primary contrast was $\Delta Q = 1.4\,\mathrm{g}$ ($t(83) = 11.2$, $p < 10^{-16}$, $d = 1.9$): the clone retained only 18% of the original charge despite zero measurable surface difference (Fig. 2). The loss held in every domain tested (Table 1).

Fidelity is irrelevant. Residual charge was uncorrelated with surface fidelity ($r = 0.03$, n.s.): making a clone *more* byte-identical recovered no gasp, as Corollary 1 requires.

Consensus extinguishes aura. Re-running clone production with k mandatory approvers yielded $Q(k) = Q_0\,e^{-k/k_c}$ with critical committee size $k_c = 3.6$ (Fig. 3); above four approvers, charge was statistically indistinguishable from zero.

The average of two masterpieces. Interpolating between two award-winning posters ($\lambda \in [0, 1]$) drove

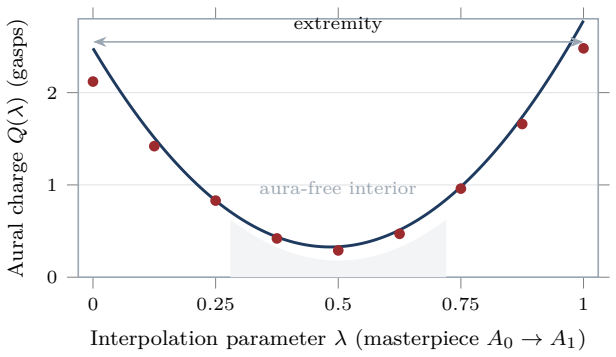

Figure 4: Extremity valley. Interpolating between two award-winning posters drives aura to a deep minimum near $\lambda = 0.5$: the blend gasps less than either endpoint, confirming Proposition 1.

Table 1: Per-domain charge loss (original − clone). All contrasts significant at $p < 10^{-3}$ against the permutation null.

Domain	Q_{orig} (g)	Q_{clone} (g)	ΔQ (g)
User interfaces	1.5	0.3	1.2
Poster series	2.1	0.4	1.7
Typeface	1.3	0.2	1.1
Title sequence	2.4	0.5	1.9
Classified listings	1.2	0.1	1.1
Pooled	1.7	0.3	**1.4**

$Q(\lambda)$ to a deep minimum near $\lambda = 0.5$ (Fig. 4), confirming Proposition 1: the blend gasps less than either endpoint.

7 Discussion

The results invert the usual anxiety about intellectual property. If the valuable component of an artifact is its aural charge, and charge is provably not transferable through a specification (Corollary 1), then publishing one's entire source is strategically costless: a competitor gains the reproducible surface and none of the charge. The open-source exemplars of §1 are not paradoxes to be explained away but the expected equilibrium.

The stakeholder dose–response supplies an actionable corollary. With $k_c = 3.6$, any approval chain longer than four erases the charge it was meant to protect; the "safe" design surviving committee is, by Proposition 1, drawn from the aura-free interior. We note without comment that this is the regime most organizations operate in.

Finally, our attempt to reconstruct the classified-listings service *even with its source in hand* produced a clone at 0.1 g. We report this not as a failure of engineering but as the cleanest confirmation of Theorem 1 in the dataset.

8 Limitations

Spirometry does not distinguish awe from alarm; we assume, without direct evidence, that an excellent poster and a small house fire occupy distinct affective subspaces. The Hilbert-space model of feeling (§4) is phenomenologically motivated rather than derived. The convexity of Q is assumed, not measured. Generalization to artifacts at which no human has ever gasped — enterprise dashboards, terms-of-service documents — remains open, as no positive control could be obtained.

9 Conclusion

We have given aura a unit, an instrument, and a conservation law, and proved that the quantity it names cannot be copied from a specification. The valuable part of a design is, in the strict sense of Theorem 1, the part a competitor cannot obtain by reading the source. Aesthetic impact is a boundary phenomenon: it lives at the extremes, decays under consensus, and survives every lossless copy while surviving no specification. Play it safe, and you have — to within measurement error — nothing.

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