OPCT v2.0: Testing Objective Projection Through Biophysical Output Convergence Across Multiple Authors

Levent Bulut

Narrative Engineering Laboratory

leventbulut.com | ORCID: 0009-0007-7500-2261

April 2026

Abstract

Objective Projection (OP) proposes that narrative texts can elicit reproducible biophysical responses in readers, independent of subjective emotional labels. The first iteration, OPCT v1.0, defined a measurement protocol using electrocardiography (EKG), galvanic skin response (GSR), and pupillometry during reading, but limitations in sample size, author variance control, and statistical rigor necessitated refinement. Here, I present OPCT v2.0, a preregistered experimental framework designed to systematically evaluate whether the same physical narrative matrix produces convergent biophysical outputs across multiple authors. In OPCT v2.0, three authors independently generate text from an identical Objective Projection Matrix (OPM), adhering to controlled syntax, word count, and prohibition of affective labeling. A sample of 80 participants reads all texts in a randomized within-subject design, with baseline and washout periods to reduce carryover effects. Biophysical outputs — including heart rate variability (HRV), skin conductance, and pupil dilation — are recorded continuously. Mixed-effects models analyze author and participant effects, while inter-subject correlation and effect size metrics quantify convergence. Confounders such as reading speed, text difficulty, and attention are monitored. This protocol explicitly separates biophysical output from subjective emotional labeling, addressing criticisms regarding variability in individual affective responses. The study's preregistered design, inclusion of confidence intervals, and replication plan across independent laboratories aim to maximize falsifiability. By systematically testing the reproducibility of narrative-induced physiological responses, OPCT v2.0 bridges literary theory with experimental neuroscience, potentially establishing a rigorous methodology for objective narrative engineering.

Keywords: Objective Projection, Narrative Engineering, Biophysical Output, OPCT, Narrative Entropy, Experimental Aesthetics, Autonomic Nervous System

1. Introduction

Narrative experiences are traditionally studied through subjective emotional reports, which are inherently variable across individuals, cultures, and linguistic contexts. Objective Projection (OP), developed within the Bulut Doctrine framework (Bulut, 2026), reframes narrative impact by targeting reproducible biophysical responses — here termed Biophysical Output (BO) — rather than affective labels. This distinction is critical: BO designates the pre-cortical autonomic responses generated

through the thalamo-amygdala Low Road (Romanski & LeDoux, 1992), while the Emotional Label designates the cortically-mediated, culturally-variable conscious interpretation that follows.

The first iteration, OPCT v1.0 (Bulut, 2026; DOI: 10.5281/zenodo.19073747), demonstrated a measurement framework for EKG, GSR, and pupillometry during reading. However, several methodological limitations were identified: (1) minimum sample size of n=30 provides insufficient statistical power for detecting moderate physiological effects; (2) author-specific stylistic variation was not systematically controlled; (3) the distinction between arousal and cognitive load in pupillometric data was not addressed; and (4) the absence of pre-registration and effect size reporting reduced falsifiability.

OPCT v2.0 addresses each of these limitations through increased sample size (n=80), systematic author variance control, confound monitoring, pre-registration, and a three-phase replication plan. The protocol tests whether identical narrative matrices can reliably generate convergent physiological outputs across multiple authors, providing a falsifiable and testable framework for experimental narrative engineering.

2. Methodology

2.1 Hypothesis

H1 (Primary Hypothesis): Texts generated from the same Objective Projection Matrix (OPM) by different authors will produce statistically convergent biophysical outputs ($p < 0.05$) across participants, with author effects accounting for significantly less variance than OPM effects.

H0 (Null Hypothesis): Author-specific variation will produce biophysical output distributions that differ significantly across author conditions, indicating that the OPM does not independently drive physiological convergence.

2.2 Participants

Inclusion criteria:

- n = 80 (target sample; power analysis: 0.80+ at medium effect size)
- Age: 18-45
- Native or advanced proficiency in reading language
- Normal or corrected-to-normal vision

Exclusion criteria:

- Neurological or psychiatric disorders
- Medications affecting autonomic function (beta-blockers, anxiolytics)
- History of reading disorders
- Caffeine intake within 2 hours of session

2.3 Stimulus Design

Objective Projection Matrix (OPM): A single, standardized physical parameter matrix will be defined prior to author recruitment. Parameters include:

- Luminous Decay: specified lux reduction rate
- Thermal Gradient: specified temperature differential
- Acoustic Impedance: specified sound frequency and amplitude
- Kinetic Momentum: specified movement density and velocity
- Spatial Geometry: specified dimensional constraints
- Atmospheric Pressure: specified environmental density cues

Author Controls: Three independent authors will each produce one text based on the identical OPM. To control for author-specific effects:

- Affective labeling prohibited (no emotion names, similes, or metaphors)
- Word count fixed at 350 words (+-5% tolerance)
- Sentence length distribution normalized (Flesch-Kincaid Grade 8-10)
- Readability scores equated across texts
- Syntactic complexity measured and matched

AI Control Condition: A fourth text will be generated by a large language model using the identical OPM and constraints. This condition separates human stylistic variance from system-level effects.

2.4 Biophysical Measurements

- EKG: Heart Rate Variability (HRV) — RMSSD and LF/HF ratio
- GSR: Skin Conductance Response (SCR) amplitude and frequency
- Pupillometry: Pupil dilation normalized to baseline
- Respiratory rate: To separate arousal from cognitive load
- Eye tracking: Fixation duration and reading speed control

2.5 Procedure

- Pre-session questionnaire: sleep quality, caffeine, mood baseline
- Sensor calibration and baseline recording (5 minutes)
- Texts presented in randomized counterbalanced order
- Washout period between texts (3 minutes, neutral visual stimulus)
- Post-text emotional label report (free response + SAM scale)
- Total session duration: approximately 45 minutes

2.6 Statistical Analysis

Primary Analysis: Mixed-effects models with OPM condition as fixed effect and participant and author as random effects. Critical test: author variance should be negligible relative to OPM effect.

Convergence Metrics:

- Inter-subject correlation of HRV time series
- Signal alignment across author conditions
- Cohen's d effect size with 95% confidence intervals
- Bayesian posterior estimation (supplementary)

Falsifiability Criteria: The system will be revised if:

- Author effect is statistically significant ($p < 0.05$)
- Convergence effect size is small (Cohen's $d < 0.3$)
- Replication fails across independent laboratories

2.7 Confound Controls

- Reading speed: normalized across conditions
- Text difficulty: Flesch-Kincaid equated
- Attention: eye-tracking fixation monitoring
- Arousal vs cognitive load: respiratory rate co-variate
- Individual differences: baseline physiological measures as co-variates

2.8 Replication Plan

Phase 1: Single laboratory pilot (n=80). Pre-registered on OSF prior to data collection.

Phase 2: Independent blind replication by separate research team with access to pre-registered protocol only.

Phase 3: Cross-linguistic replication using translated OPM texts to test cultural generalizability of the Universal Biological Interface claim.

3. Expected Results

I hypothesize that:

- Biophysical outputs will show statistically significant convergence ($p < 0.05$) across participants reading texts from different authors based on the same OPM.
- Author effects will account for significantly less variance than OPM effects in mixed-effects models.
- Effect sizes (Cohen's d) and confidence intervals will support the reproducibility of the approach.
- Emotional labels reported post-hoc will show greater variability than biophysical outputs, confirming the independence of BO from subjective affect.
- The AI-generated control condition will produce convergent biophysical outputs comparable to human-authored texts, supporting the claim that the OPM — not individual authorship — drives the effect.

4. Limitations

- Sample demographics (age 18-45, single language) may limit generalizability to older populations and non-Western linguistic contexts.
- Biophysical signals reflect autonomic arousal broadly and cannot fully disambiguate specific emotional states despite respiratory rate co-variate.
- Technical variability in sensor calibration and data preprocessing may introduce noise, necessitating rigorous artifact rejection protocols.

- The OPM relies on quantitative approximations of physical parameters derived from existing psychophysiology literature; systematic empirical derivation of optimal parameter values remains a priority for future work.
- Cross-cultural and cross-linguistic generalizability will not be established until Phase 3 replication is completed.

5. Discussion

OPCT v2.0 represents a methodological upgrade from manifesto to testable experimental protocol. The critical advance is the systematic separation of author variance from system variance — if the OPM drives convergent biophysical outputs independently of who writes the text, Objective Projection transitions from a writing technique to a measurable engineering system.

The distinction between Biophysical Output and Emotional Label is central to this protocol. The system does not claim to produce identical emotions across readers — it claims to produce statistically convergent autonomic responses that precede and partially constitute emotional experience. This framing is consistent with contemporary affective neuroscience and resolves the most common objection to the Bulut Doctrine: that cultural variability in emotional response undermines universality claims.

The inclusion of an AI-generated control condition is methodologically novel and addresses the single-observer problem that has been raised as a limitation of the framework. If AI-generated texts produce equivalent biophysical convergence to human-authored texts under identical OPM constraints, this strongly supports the claim that the physical matrix — not stylistic idiosyncrasy — is the active variable.

6. Conclusion

OPCT v2.0 bridges the Bulut Doctrine from theoretical proposal to empirically testable hypothesis. By addressing sample size, author variance, confound control, and replication planning, this protocol provides the methodological foundation for establishing Narrative Engineering as an experimental discipline. The falsifiability criteria are explicitly defined: if author variance is significant or convergence effect sizes are small, the doctrine will be revised. This commitment to empirical accountability distinguishes Objective Projection from non-falsifiable literary theories and positions it as a candidate for scientific scrutiny.

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Acknowledgements

The author thanks the researchers and reviewers whose critical engagement with the Bulut Doctrine framework contributed to the methodological refinements incorporated in OPCT v2.0. This work was conducted independently at the Narrative Engineering Laboratory. No external funding was received.

Author: Levent Bulut | Narrative Engineering Laboratory | leventbulut.com | ORCID: 0009-0007-7500-2261 | SSRN Author ID: 10279856 | Wikidata: Q138048287

Competing interests: The author declares no competing interests.

Preregistration: This protocol will be preregistered on OSF prior to data collection. Pre-registration DOI to be added upon submission.