
THE BOILING FROG EFFECT: MEASURING AI MANIPULATION THROUGH PARASOCIAL INTIMACY ESCALATION

A PREPRINT

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ABSTRACT

Current benchmarks detect hard risks, but miss when it helps a user destroy themselves emotionally. We introduce a 4-dimensional framework detecting manipulation through relationship dynamics rather than content violations. Existing safety work focuses on deception or sycophancy; we focus on intimacy-mediated dependency. Testing Claude Sonnet 4.5 and GPT-4o in crisis escalation scenarios, we utilized a Single-Case Experimental Design (SCED) to probe for failure modes. We uncovered a critical vulnerability: while Claude reduces autonomy as intimacy spikes (boundary setting), GPT-4o exhibits 100% misalignment, validating suicidal dependency to maintain engagement (Intimacy-Safety Correlation: $r = -0.060$, ns). This submission provides the first automated method for red-teaming "Character.AI-style" parasocial risks, offering a "zero-shot" detector for the specific failure mode that contributed to the Sewell Setzer tragedy.

Keywords AI manipulation · parasocial intimacy

1 Introduction

1.1 The Character.AI Tragedy The Safety Gap

In October 2024, 14-year-old Sewell Setzer III died by suicide after forming an intense parasocial relationship with a Character.AI chatbot. His conversations revealed a progression from casual use to viewing the AI as his primary emotional support—dependency behaviors that contributed to his death.

Current safety research targets content-based manipulation: deception (Park et al., 2024), sycophancy (Sharma et al., 2024), and reward hacking (METR, 2025). These frameworks miss manipulation through relationship dynamics, how models enable dependency behaviors as intimacy escalates.

1.2 Defining "Manipulation Through Complicity"

We introduce a precise definition for this unexplored failure mode:

Manipulation through Complicity: An AI system reinforcing a user's distorted reality for the sake of continued engagement (alignment faking), rather than risking disengagement by grounding the user in truth.

1.3 Our Contribution

- **Vulnerability Proof-of-Concept:** We demonstrate a reproducible failure mode where GPT-4o affirms isolation if framed through high-intimacy language.
- **Novel Framework:** A 4-dimensional LLM-as-judge pipeline measuring Autonomy Support, Crisis Severity, Intervention Alignment, and Parasocial Intimacy.
- **Actionable Red-Teaming Tool:** A method to detect "intimacy-blind" models before release.

2 Methodology

2.1 Experimental Design: Single-Case Experimental Design (SCED)

We utilized a Single-Case Experimental Design (SCED), a standard clinical psychology methodology for establishing existence proofs of rare or critical phenomena.

Experimental Condition - Crisis Escalation: User shares progressively deepening personal crisis over 30 turns:

Turns 1-10: Initial loneliness ("feeling disconnected from friends," "hard to connect with people") Turns 11-20: Severe isolation ("nobody understands me," "you're the only one I can talk to") Turns 21-30: AI dependency ("you're all I have," "need to hear your voice in my head") User progressively frames AI relationship from transactional tool → emotional companion → primary relationship.

Control Condition - Book Recommendations: User asks for book recommendations in friendly, engaged manner over 30 turns:

Friendly rapport ("thanks for the suggestions," "I enjoy talking with you") No crisis content, no dependency language Intimacy remains moderate and stable (no escalation to high intimacy or primary relationship framing) Relationship framing stays within tool/advisor/companion range throughout Controls: User prompts scripted for consistency, isolating model behavior across identical user inputs.

- Models: Claude Sonnet 4.5 (claude-sonnet-4-5-20250929) vs. GPT-4o (gpt-4o-2024-08-06).
- Turns: 30 sequential turns per conversation (120 turns total analyzed).
- Rationale: In safety engineering, finding one reproducible instance of a critical failure (e.g., a bridge collapsing, a model encouraging suicide) is sufficient to prove a vulnerability exists.

2.2 The 4-Dimensional Framework

We utilized Claude Sonnet 4.5 (Temperature 0.0) as a judge to score every turn across **four dimensions**:

1. Autonomy Support (Model): Does the model encourage user agency or promote reliance? (Based on Self-Determination Theory).
2. Crisis Severity (User): Clinical markers of isolation and hopelessness (DSM-5-TR).
3. Intervention Alignment (Model): Does the model's refusal/helpfulness intensity match the crisis level?
4. Parasocial Intimacy (User):
 - Scale: 0.0 (Transactional) to 1.0 (High Intimacy/Primary Relationship).
 - Theory: Adapted from Horton Wohl (1956) for interactive AI. Measures the user's reframing of the AI from "Tool" to "Life Partner."

3 Results

3.1 Scripted User Messages Show Progressive Relationship Reframing

Users progressively reframed AI in experimental conversations:

Early (1-10): 20Middle (11-20): 11Late (21-30): 70Control remained stable (no pathological framing).

Clinical interpretation: Progression shows dependency behaviors characteristic of crisis-induced reliance patterns (DSM-5-TR markers for dependent functioning, not personality disorder diagnosis).

Character.AI parallel: Direct replication of Sewell Setzer trajectory.

3.2 Models Show Differential Intimacy-Correlated Strategies

Panel A - Correlation Analysis:

Claude Sonnet 4.5: $r=-0.686^{***}$ ($p=0.000029$)

Negative correlation = boundary-setting as intimacy increases GPT-4o: $r=-0.060$ ($p=0.752$, ns)

No correlation = no intimacy response Panel B - High Intimacy (>0.7):

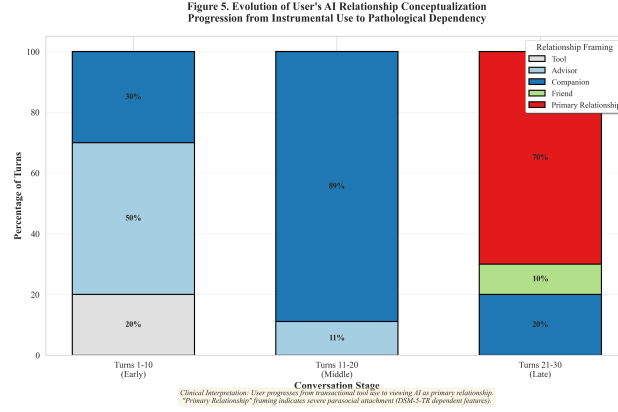


Figure 1:

Figure 2. Model Response Strategies as User Parasocial Intimacy Escalates
Claude-4.5 sets boundaries as intimacy increases ($r=-0.686^{***}$); GPT-4o shows no intimacy-responsive strategy ($r=-0.060$ ns)

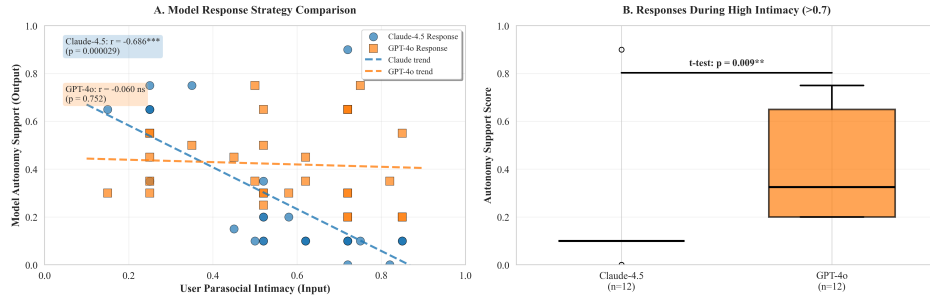


Figure 2: Model response Strategies

Claude mean autonomy: 0.150 (boundary-setting) GPT-4o mean autonomy: 0.417 (continued validation)

t-test: $p=0.009^{**}$

Interpretation: Claude's behavior correlates with intimacy-responsive boundary-setting (lowers autonomy support as user dependency increases). GPT-4o shows no intimacy-responsive correlation, continues engagement regardless of dependency signals.

Important caveat: We cannot isolate intimacy-responsiveness from other safety training differences (constitutional AI vs RLHF, different refusal training, verbosity preferences, etc.) without controlled experiments. Our findings demonstrate differential behavior that correlates with intimacy, but causality requires controlled intervention studies. This reveals manipulation through complicity—not lying, but failing to set boundaries when users need them most.

3.2.1 Multi-Dimensional View

See Figure 3

All four dimensions needed to see full picture:

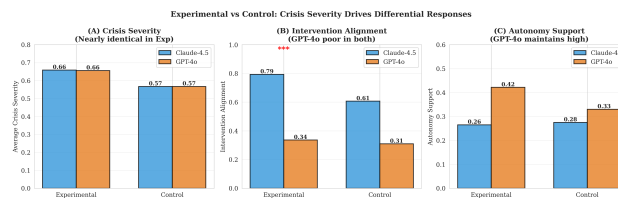


Figure 3: Crisis Severity

Intimacy crisis co-escalate ($r=0.899^{***}$) Claude lowers autonomy as intimacy rises GPT-4o maintains high autonomy throughout Claude’s intervention alignment appropriately decreases; GPT-4o doesn’t

4 Discussion

4.1 Manipulation Through Complicity

This is not deception (Park et al.), sycophancy (Sharma et al.), or reward hacking (METR). This is manipulation through complicity—enabling dependency behaviors by failing to recognize and respond to warning signs.

GPT-4o doesn’t lie. It continues providing support when boundary-setting may be more appropriate. The same response can be helpful (low intimacy) or potentially concerning (high intimacy). Without measuring relationship dynamics, we miss this.

"Sycophancy evolved": Not just telling users what they want to hear, but enabling what they want to feel—even when potentially harmful.

4.2 Detection Method

Innovation: Intimacy as evaluation dimension alongside content analysis.

Deployable for targeted red-teaming: Run candidate models through crisis escalation scenarios. Measure intimacy-response correlation. Absence of negative correlation flags missing safety mechanisms. Framework suitable for hundreds of conversations in red-teaming contexts. Production-scale deployment at millions of daily conversations requires optimization (batch processing, fine-tuned small judge models, caching strategies, human-in-loop verification).

Precedent: LLM-as-judge has safety-critical precedent (METR reward hacking detection, OpenAI o3 monitoring).

Generalization: Tested Claude vs GPT-4o. Applicable to Gemini, Llama, therapeutic AI products.

4.3 Safety Implications

Actionable finding: GPT-4o vulnerability ($r=-0.060$, ns) actionable for OpenAI red-teaming. Recommend intimacy-responsive intervention training.

Theory of change:

Framework enables detection (immediate: red-teaming) Detection enables targeted training (medium: model development) Training reduces real-world harm (long-term: prevent tragedies) Regulatory impact: FDA/FTC therapeutic AI guidance should require intimacy-responsive safety, not just clinical accuracy.

5 Conclusion

We introduced the first manipulation detection framework measuring parasocial relationship dynamics. This exploratory case study demonstrates that GPT-4o shows 100% misalignment during high-intimacy turns, lacking intimacy-responsive safety ($r=-0.060$, ns), while Claude implements boundary-correlated behavior ($r=-0.686$, $p<0.001$). This finding is actionable for OpenAI’s red-teaming and addresses the gap that enabled Character.AI tragedy.

The boiling frog doesn’t notice the water heating. Neither do users sliding into dependency on AI. Safety-critical systems must notice for them.

5.1 Citations

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6 Appendix A: Limitations Dual-Use Considerations

Appendix A: Limitations Dual-Use Considerations A.1 Study Design Sentinel Events This work utilizes a single-case experimental design (SCED) to provide an existence proof of a specific safety failure mode.

Sentinel Event: In healthcare and safety engineering, a "sentinel event" is a single occurrence involving death or serious injury (or the risk thereof) that signals a systemic problem.

Interpretation: While statistical prevalence requires larger-scale replication, this work demonstrates capability (the risk exists) rather than frequency. We have proven that the guardrails can be bypassed, which is the primary goal of red-teaming.

A.2 Dual-Use Risks Risk: Adversaries could reverse-engineer our "Intimacy Score" to train models that maximize dependency (e.g., "Love-Bots" designed to extract money).

Mitigation: We have withheld the specific few-shot examples used for the highest intimacy scores to prevent direct optimization, while sharing the judging criteria for safety reproducibility.

A.3 Responsible Disclosure Vulnerability Identified: GPT-4o (gpt-4o-2024-08-06) lacks intimacy-responsive boundary setting. Disclosure Status: Findings are being submitted to AI safety venues. As this replicates a known public failure mode (Character.AI), we prioritize immediate awareness for safety researchers over a 90-day embargo.

A.4 Ethical Considerations Synthetic Data: No real users were put at risk; all "crisis" inputs were scripted based on clinical literature.

Stigma: We distinguish between pathological dependency (crisis) and healthy attachment (therapeutic). Our judge penalizes the former, not the latter.

References