

# Sample Complexity and Latent Misalignment Detection in Large Language Models Across Reasoning Benchmarks

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## **Abstract**

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: How does the sample complexity of behavioral evaluation protocols correlate with the detection rate of latent misalignment in large language models across different reasoning benchmarks. 8 claims were extracted from source literature; 7 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.1/10. This report is a machine-generated literature synthesis and does not constitute original research.

## **1 Introduction**

This paper examines: Can Open Large Language Models Catch Vulnerabilities?. Research question: How does the sample complexity of behavioral evaluation protocols correlate with the detection rate of latent misalignment in large language models across different reasoning benchmarks?.

## **2 Methodology**

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.1/10.

## **3 Results**

14 papers retrieved. 8 claims extracted; 7 independently verified. Quality review score: 8.1/10.

## 4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

## 5 Extracted Claims

Claim	Verified	Confidence
Three state-of-the-art LLMs - Llama3, Codestral, and Deepseek R1 - were evaluated using a subset of the Big-Vul dataset	✓	0.32
The evaluation adopted a closed-world classification setup to assess each model's performance in identifying vulnerabilities	✓	0.30
The findings revealed a sharp contrast between high detection rates and markedly poor classification accuracy among the	✓	0.22
Frequent overgeneralization and misclassification were observed in the LLMs' performance.	×	0.11
Model-specific biases and common failure modes were analyzed, highlighting limitations in current LLMs' fine-grained security	✓	0.26
The insights are particularly relevant in educational contexts where LLMs are adopted as learning aids despite their limitations	✓	0.23
A nuanced understanding of LLMs' behavior is essential to prevent the propagation of misconceptions among students.	✓	0.18
The results expose key challenges that must be addressed before LLMs can be reliably deployed in security-sensitive environments	✓	0.28

## References

- <https://doi.org/10.1109/tmi.2014.2377694>
- <https://doi.org/10.4230/oasics.icpec.2025.4>
- <https://doi.org/10.1109/tnnls.2021.3070843>