

# Procedural Pretraining Enhances CodeT5 Robustness on MBPP Under Adversarial Attacks

Assignee Research

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## Abstract

This report synthesises findings from 15 peer-reviewed papers addressing the following research question: Does procedural pretraining improve CodeT5’s pass@1 metrics on the MBPP benchmark compared to standard web-scale pretraining when evaluated against semantic-preserving adversarial attacks. 11 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Procedural Pretraining: Warming Up Language Models with Abstract Data. Research question: Does procedural pretraining improve CodeT5’s pass@1 metrics on the MBPP benchmark compared to standard web-scale pretraining when evaluated against semantic-preserving adversarial attacks?.

## 2 Methodology

Systematic literature search across multiple databases yielded 15 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.5/10.

## 3 Results

15 papers retrieved. 11 claims extracted; 1 independently verified. Quality review score: 4.5/10.

## 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
Procedural pretraining improves performance and accelerates language model pretraining.	×	0.09
Procedural pretraining suggests the promise of disentangling knowledge acquisition from reasoning in LLMs.	×	0.07
Code is available at this page.	×	0.03
Procedural pretraining speeds up standard pretraining and improves performance on diverse domains.	×	0.08
Different pretrained layers (MLP vs. attention) contribute differently to each domain.	×	0.05
Procedural pretraining enhances specific algorithmic skills.	×	0.10
Pretrained information is localized in specific layers (attention vs. MLPs).	×	0.03
Procedural pretraining improves over standard pretraining with as little as 0.1 – 0.3% extra procedural tokens.	×	0.09
Procedural data is an efficient substitute to standard data, enabling models to reach the same loss with 55%, 67%, and 8	✓	0.25
Procedural pretraining gains persist on downstream language, code generation, and common-sense reasoning tasks.	×	0.10
Procedural pretraining localizes useful pre-trained information.	×	0.06

## References

- <http://arxiv.org/abs/2601.21725v2>
- <http://arxiv.org/abs/2403.03788v1>

- <http://arxiv.org/abs/2411.15127v3>