

LEARNPOST: CONTINUED PRETRAINING LEARNING DYNAMICS FOR SOUTH AFRICAN LANGUAGES

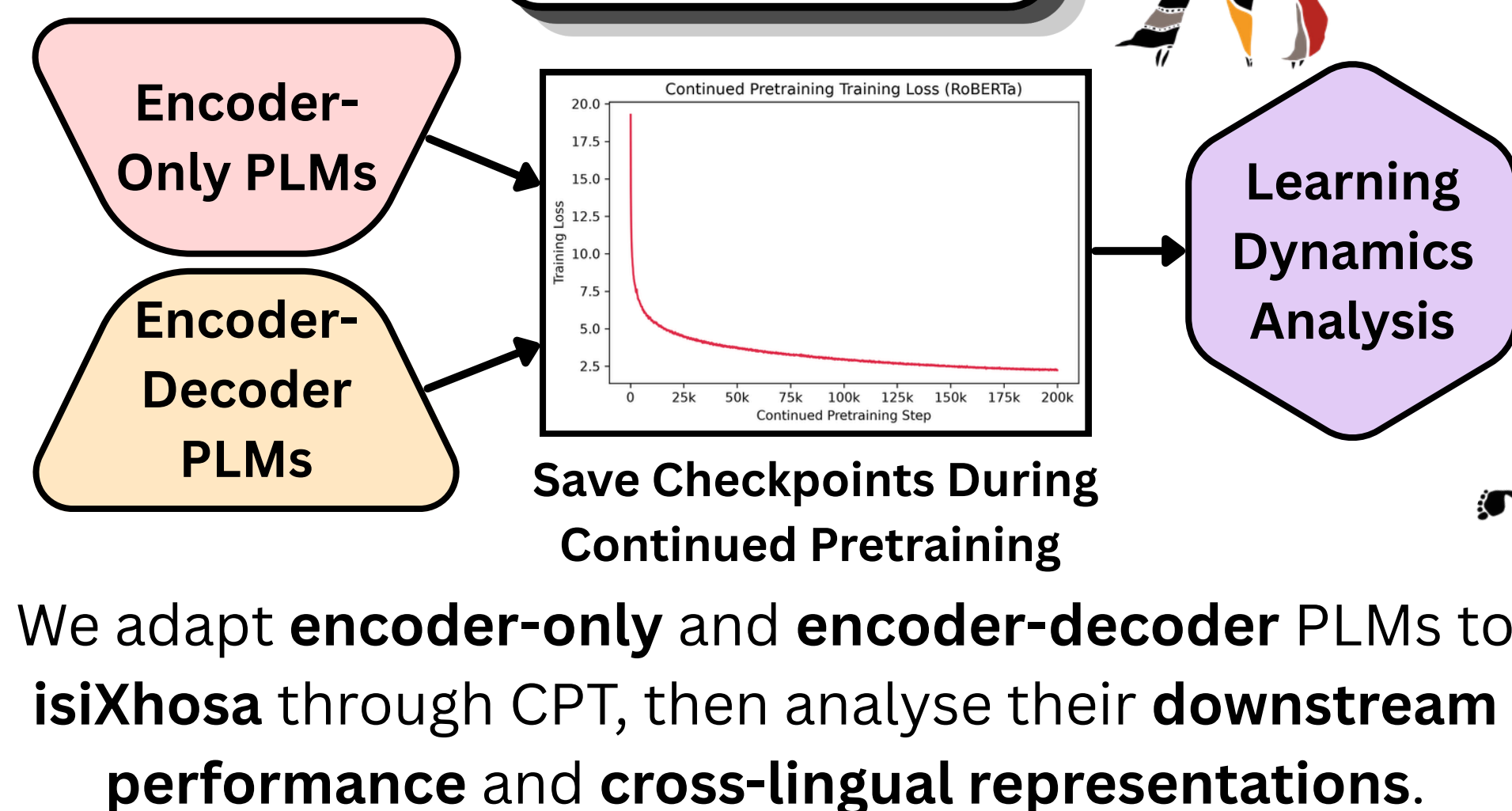
BACKGROUND

Continued Pretraining (CPT) is widely used to develop **state-of-the-art** language models for **low-resource languages**. However, how models adapt during CPT remains **poorly understood**.

OBJECTIVES

We aim to better understand the CPT adaptation process by analysing changes in **model performance** and **internal representations** during training.

METHODOLOGY



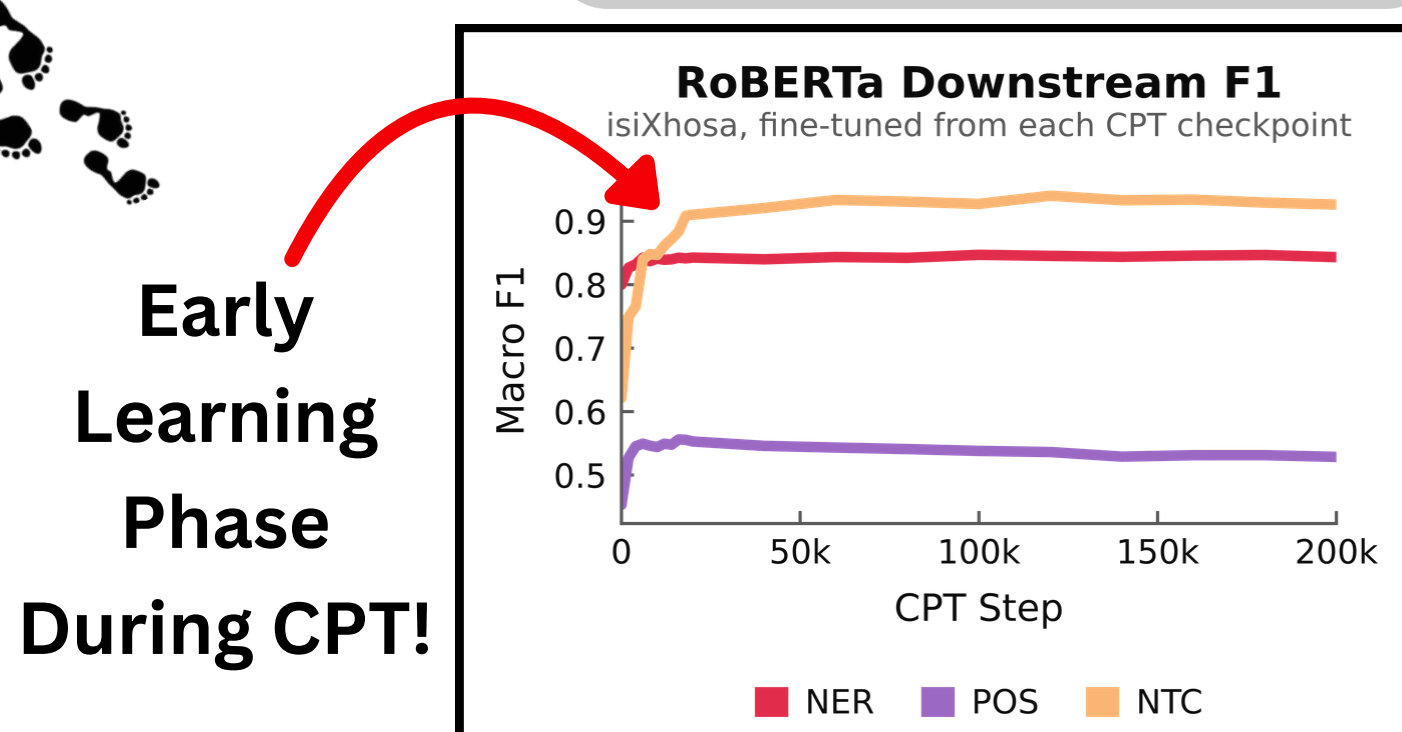
MODELS

We select PLMs with **different levels of prior exposure** to our target language.

- English-Only Models
- Massively-Multilingual Models
- Nguni-Specialised Models

Finding: Models with less prior exposure show the largest changes during CPT.

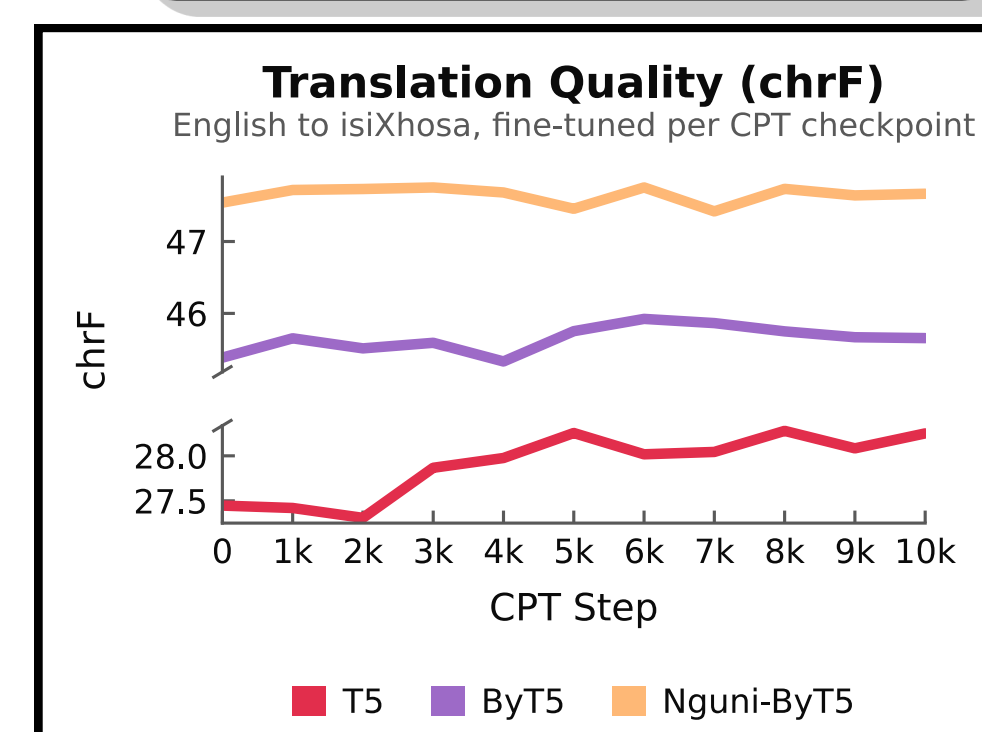
ENCODER-ONLY



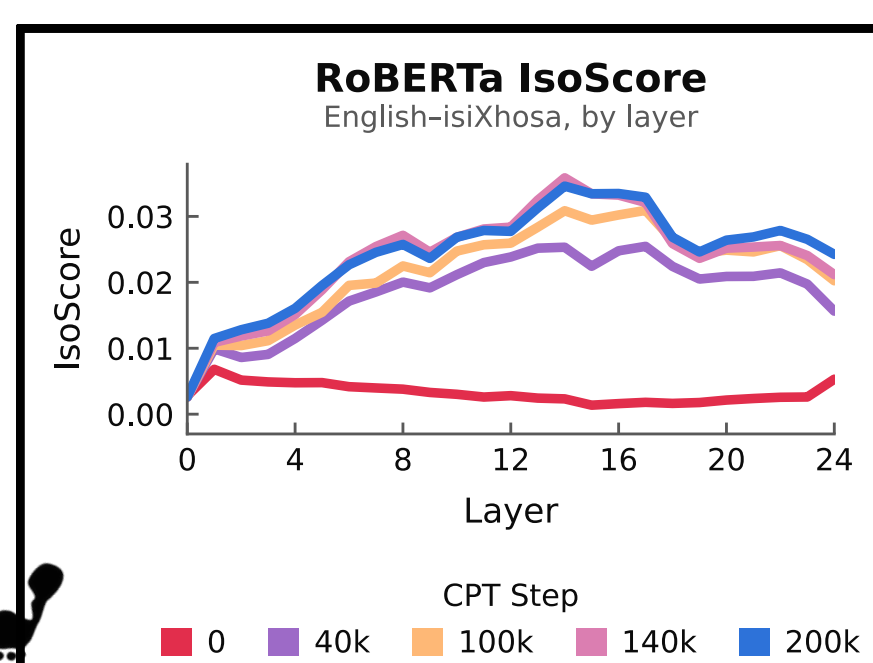
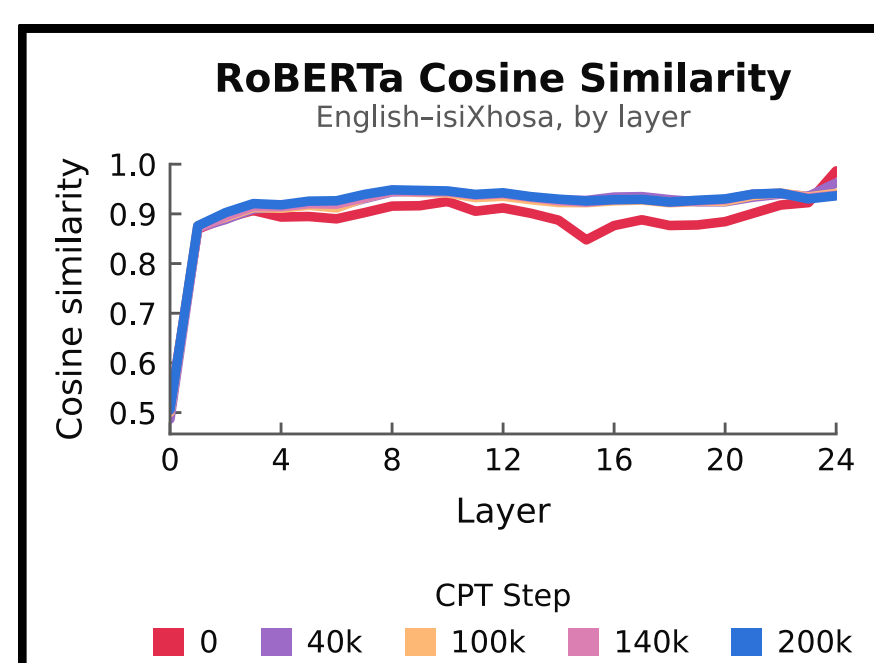
Downstream Analysis Results

RESULTS

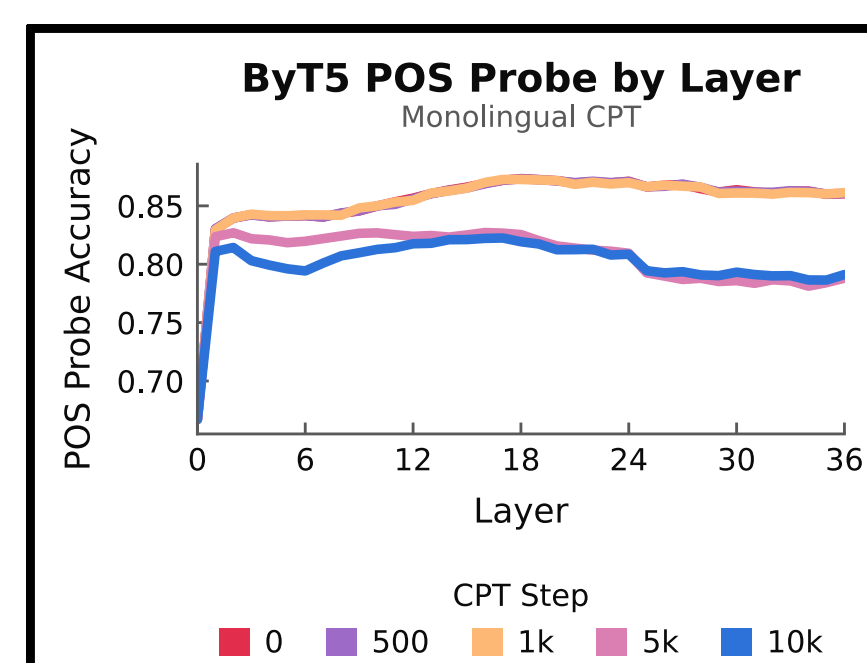
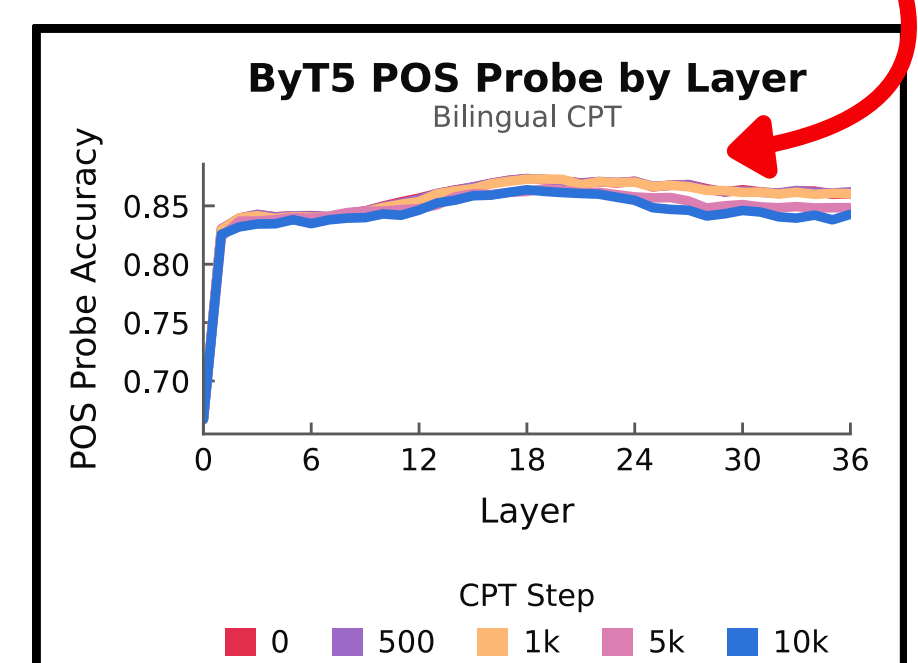
ENCODER-DECODER



Machine Translation Results



Cross-Lingual Geometry Analysis Results



Part-of-Speech Tagging Probing Results

FINDINGS

- Performance improves most during **early CPT** for encoder-only models. Encoder-decoder models show **limited gains** during CPT.
- Monolingual CPT improves **cross-lingual alignment** but can cause **final-layer representational degeneration** in encoder-only models.
- Bilingual CPT **preserves grammatical knowledge** in encoder-decoder models.

CONCLUSIONS

- CPT adaptation depends on **model architecture**, **prior language exposure**, and **training setup**.
- We **extend learning dynamics research**, which we hope helps **inform more efficient adaptation** to other African and low-resource languages.
- Future work could explore **actionable interpretability**, **additional architectures**, and **languages**.