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Apprentissage semi-supervisé pour la segmentation du réseau vasculaire cérébral : une étude comparative

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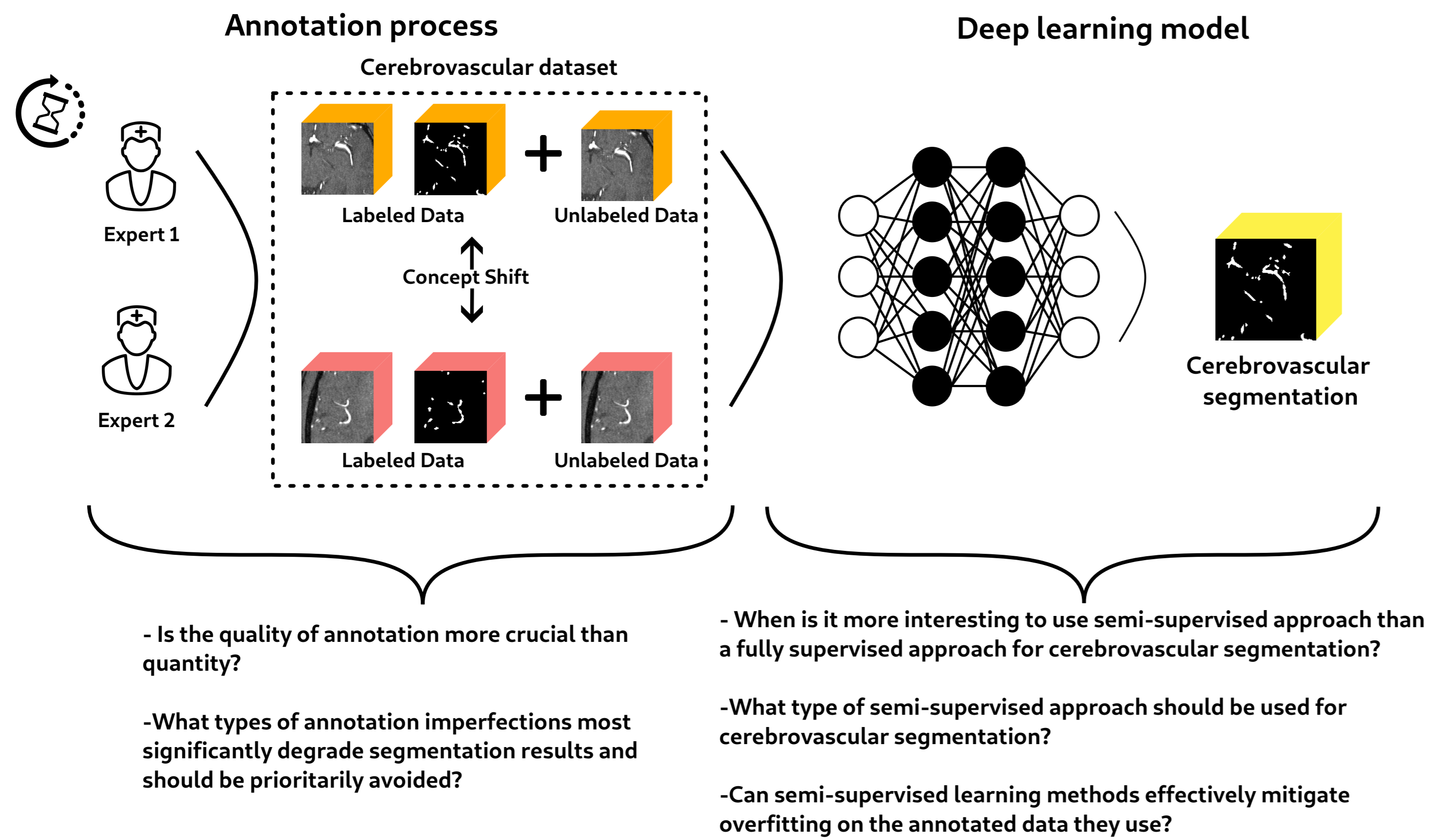
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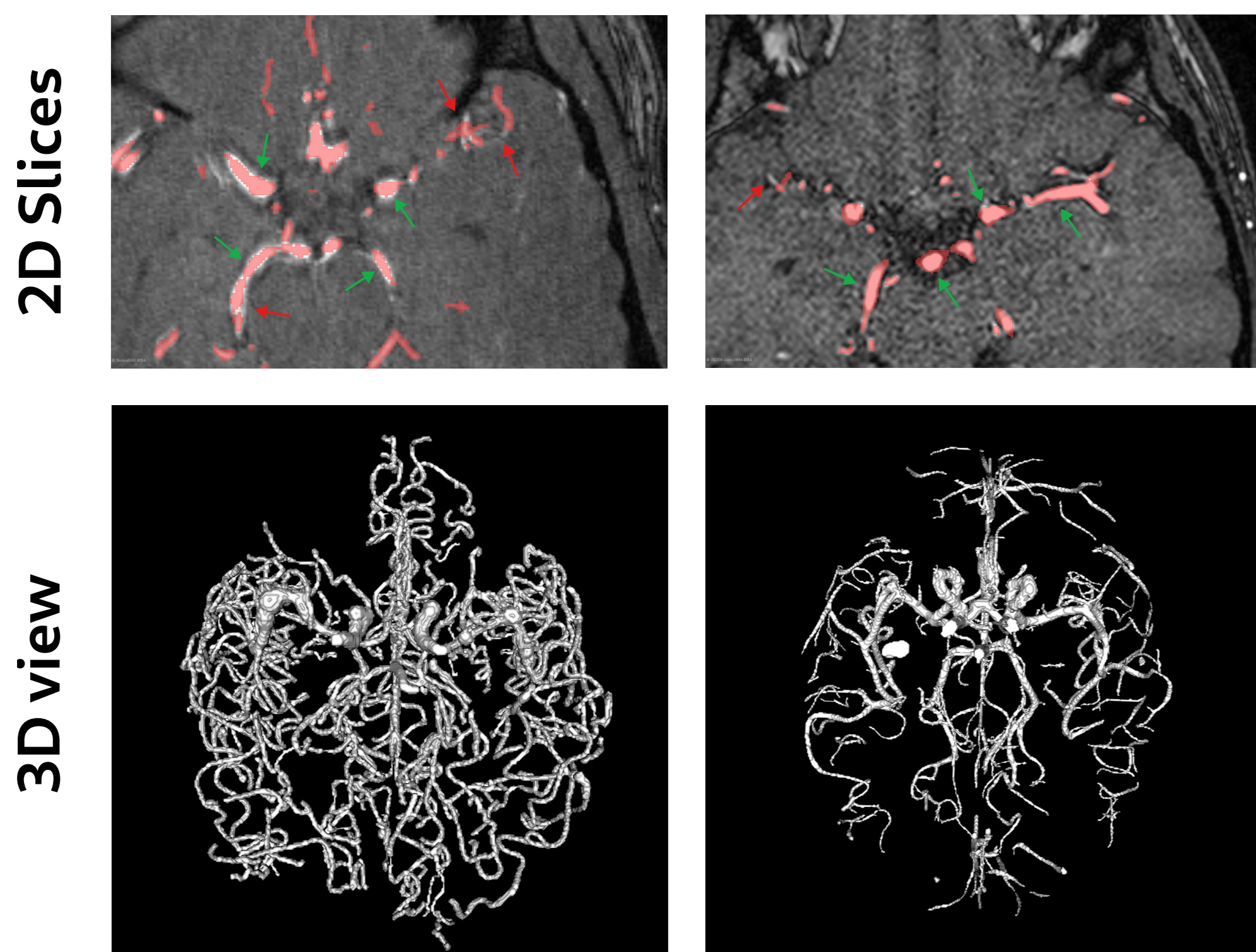
Medical context



- Cerebrovascular annotations are **time-consuming** and **error-prone**.
- Also, **no guidelines exist for cerebrovascular annotations**. Thus, **concept-shift** between different dataset is a big bottleneck for the conception of robust segmentation methods.

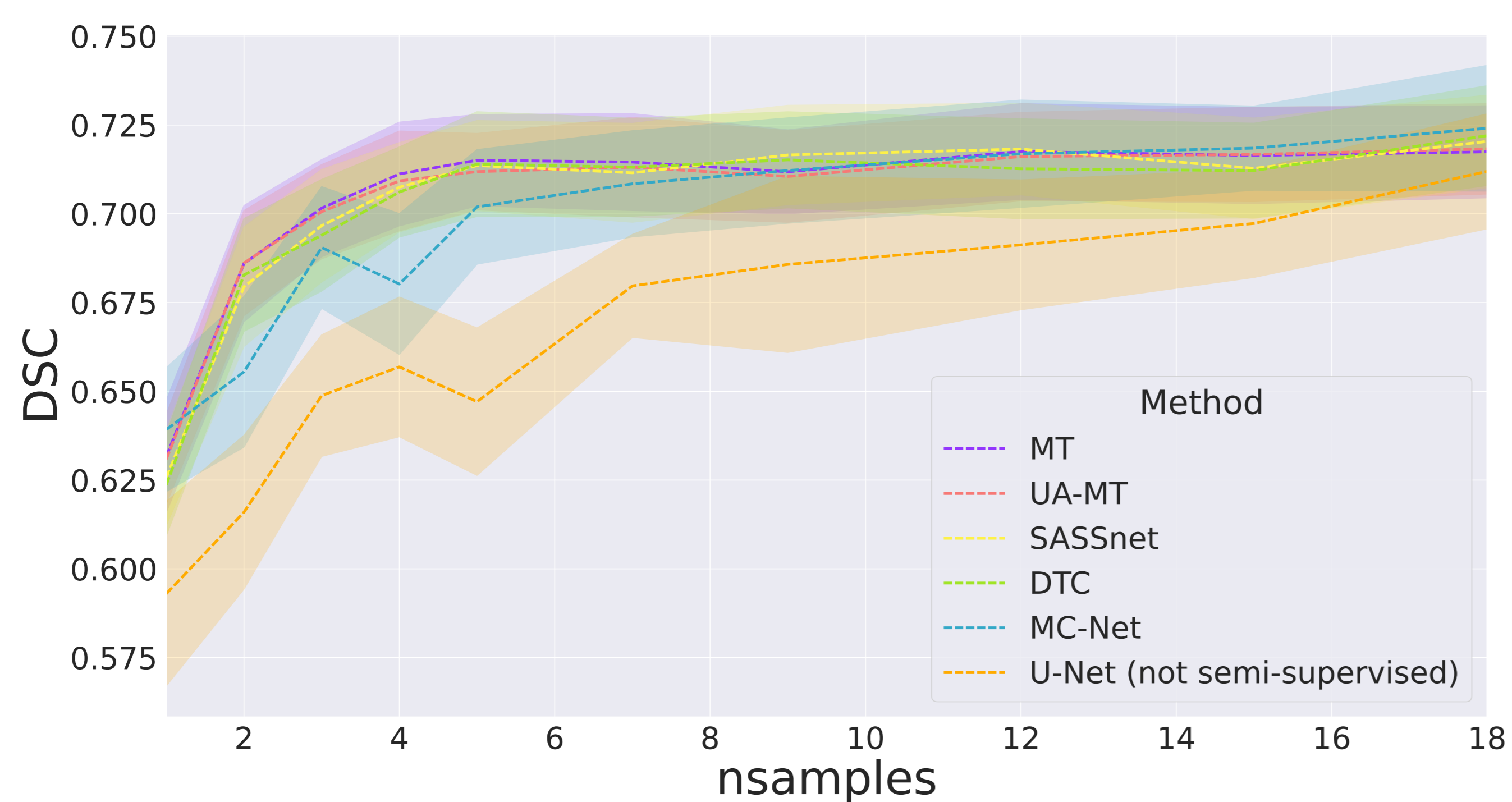
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Exp. 1: Methods comparison and impact of the data availability

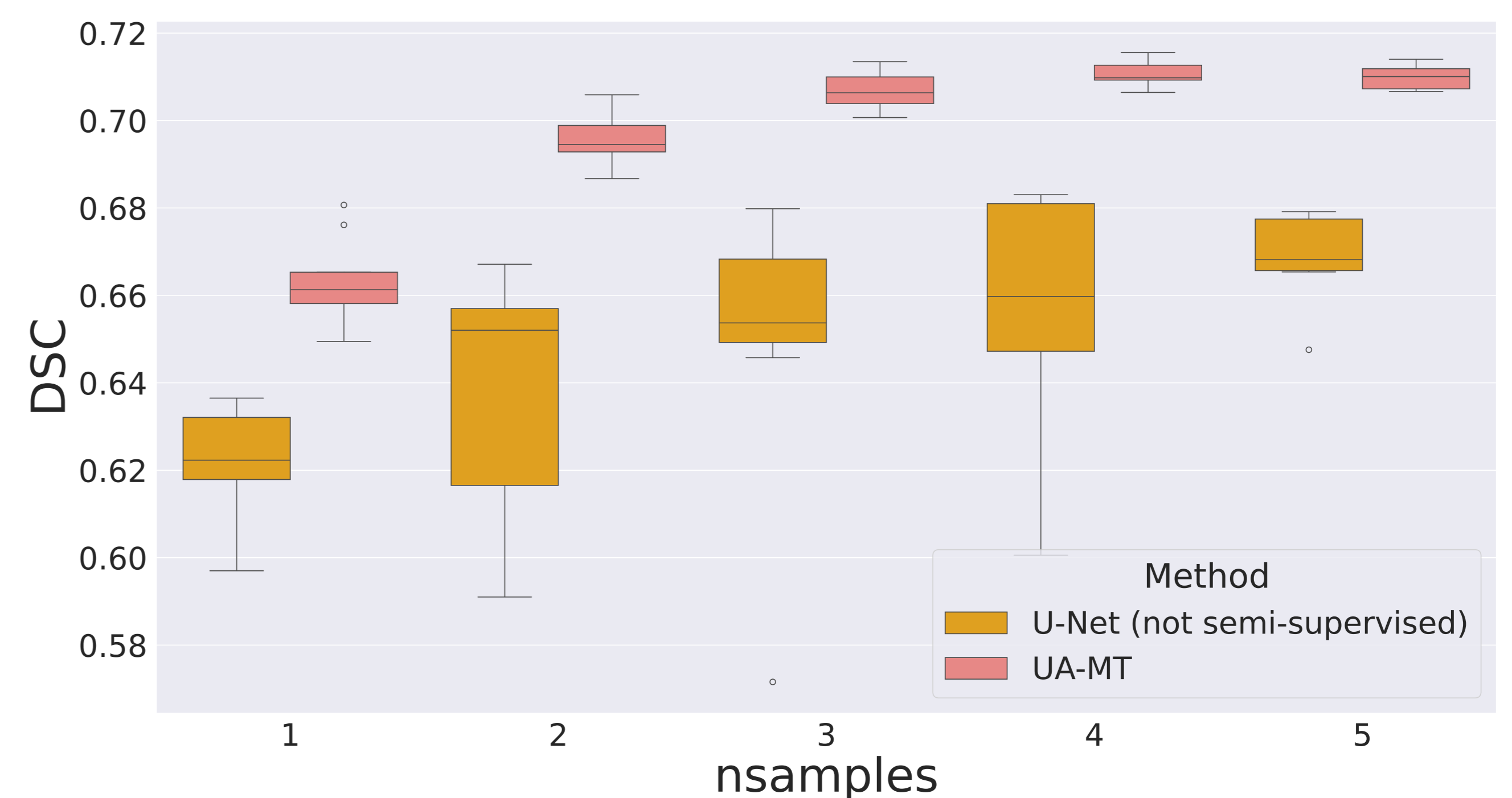
- The goal of this experiment is to conduct a comparative analysis among various **semi-supervised learning** methods and assess their performance in comparison to a supervised baseline.



- All semi-supervised methods perform similarly.
- **Semi-supervised methods outperform supervised method only for very low data setup.**
- Semi-supervised methods are more regularized.

Exp. 2: Dependency to annotated data

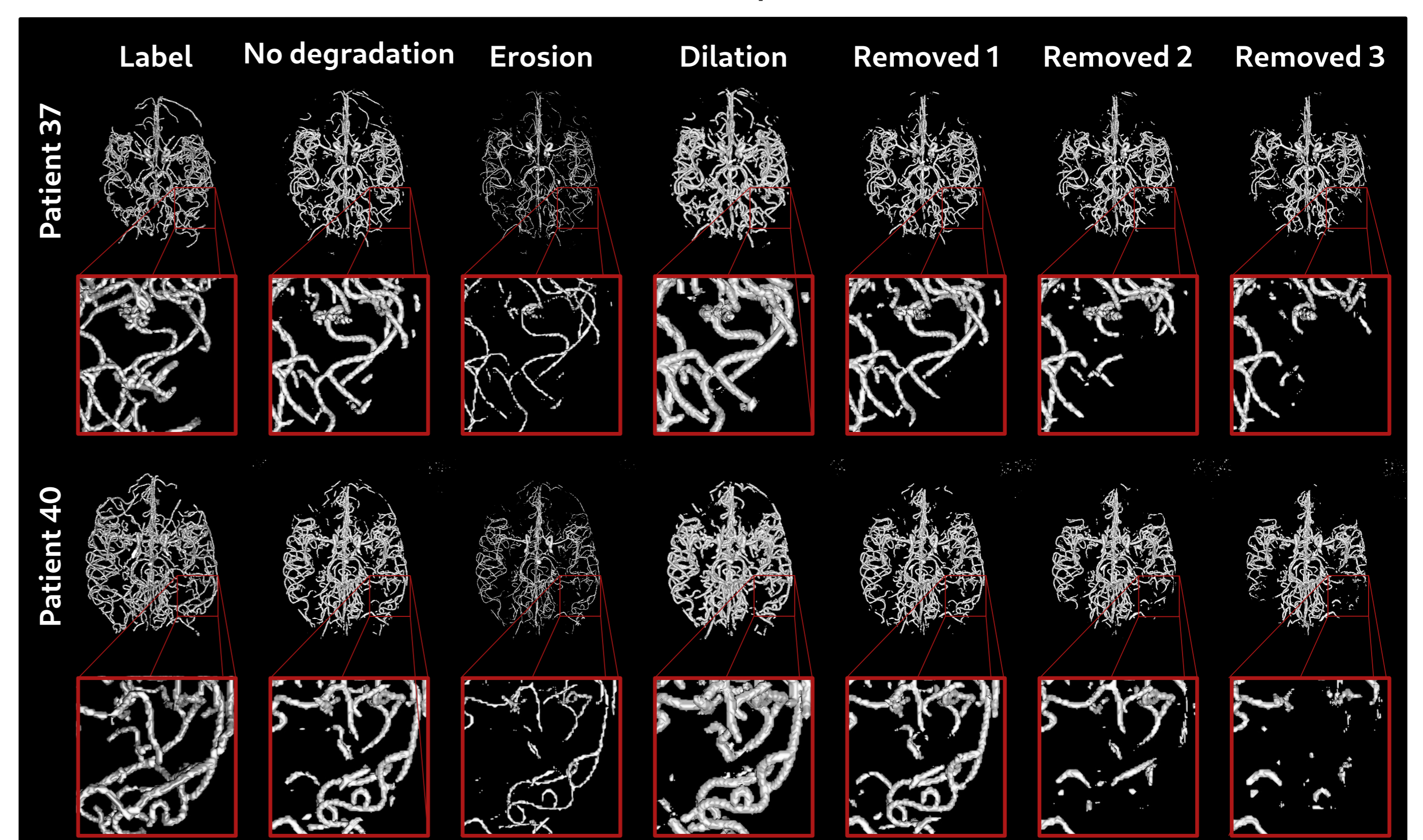
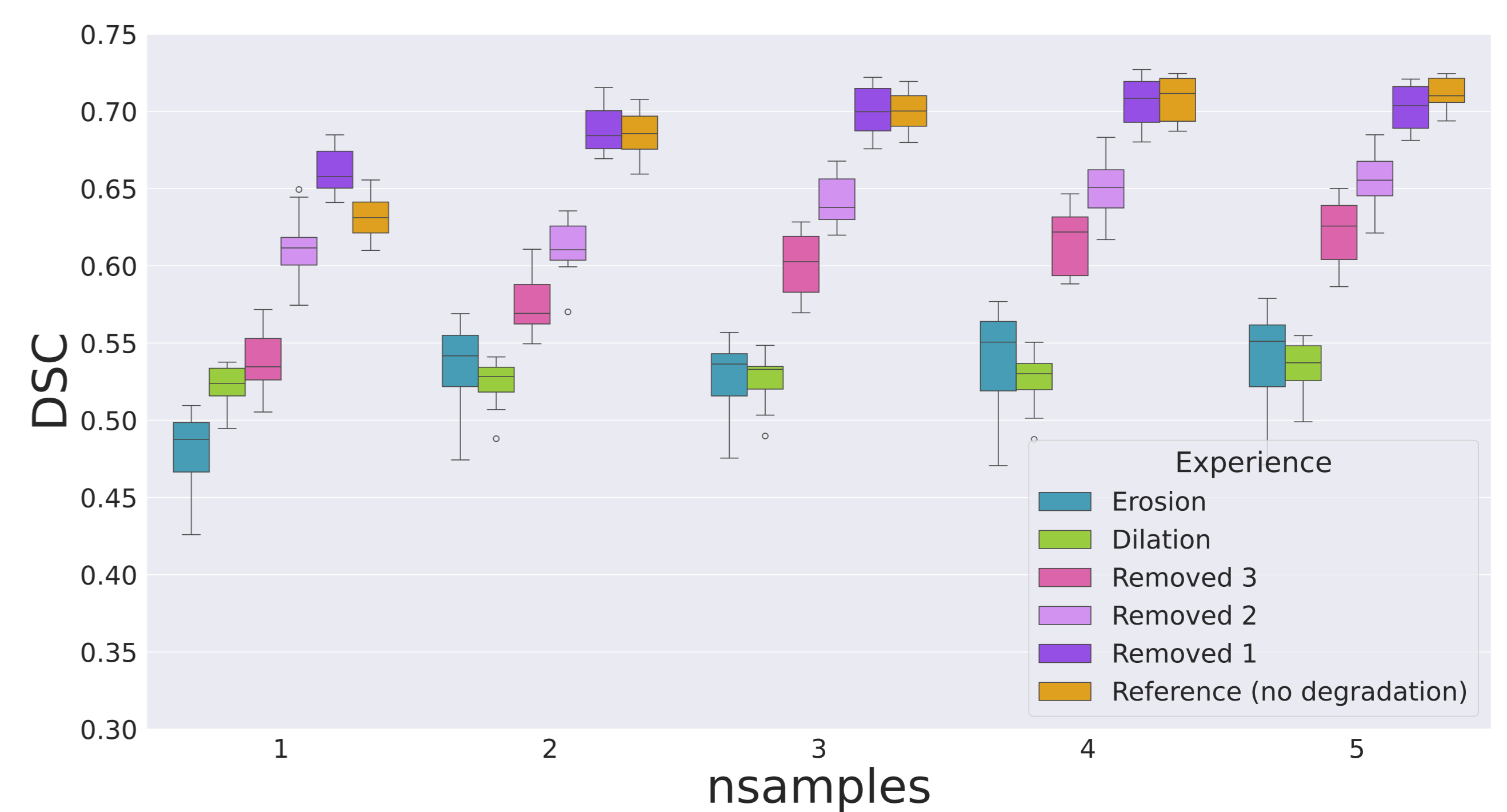
- In **low data regime** scenario the risk of overfitting is very high and the performance of the model highly depends on the data used for training.
- The aim is to study the **impact of the training data seed** for semi-supervised and supervised method.



- **Semi-supervised methods highly reduce the variability between data seeds.**

Exp. 3: Impact of the annotation quality

- In this experiment, our objective is to study the **impact of both type and degree of label imperfection** on the segmentation results.



- **Erosion and dilation generate a systematic error leading to strong results degradation.**
- **Missing vessels** in the annotations deteriorate less the results and can be partially compensated with more data.
- **Missing vessels** can also lead to a systematic error.