

Introduction

- Attention Deficit Hyperactivity Disorder (**ADHD**) is a neurodevelopmental disorder that affects academic, work, and social functioning.
- The diagnostic methods for ADHD commonly depend significantly on subjective evaluations of perceived behavior.
- The development of an objective diagnostic tool would be highly beneficial and has the potential to enhance the accuracy and efficiency of ADHD diagnosis.

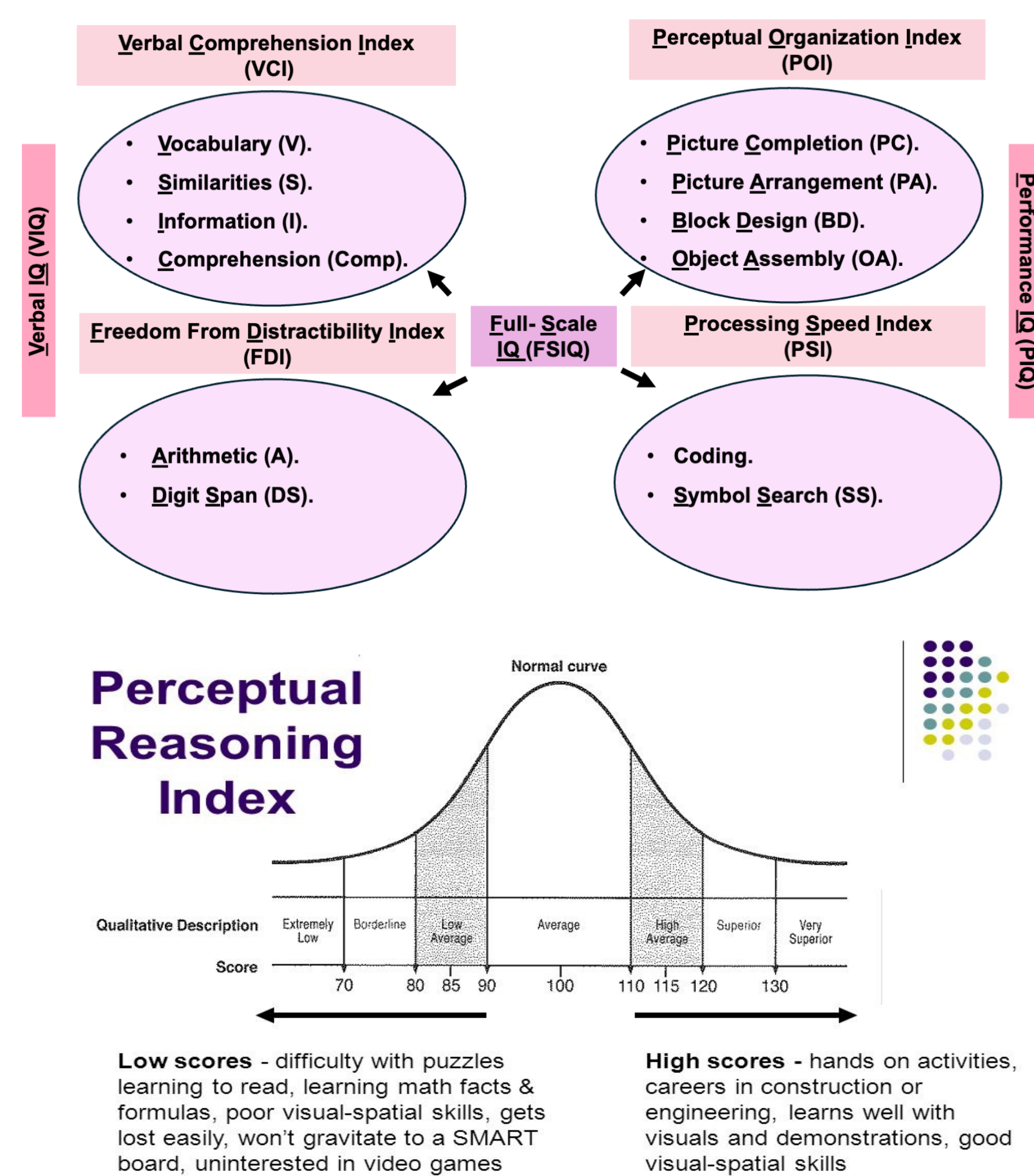


Figure 1: The Wechsler Intelligence Scale III.

Objectives

- This research explores the **machine learning models** to predict cognitive outcomes, as measured by the **Wechsler Intelligence Scale for Children (WISC-III)**, from a diverse set of predictors including **visuospatial memory test results**, **demographic information**, and the **presence of ADHD**.
- Our study aims to understand the complex link between **ADHD and cognitive performance**, enhancing **predictive models**.

The Experiment and Dataset

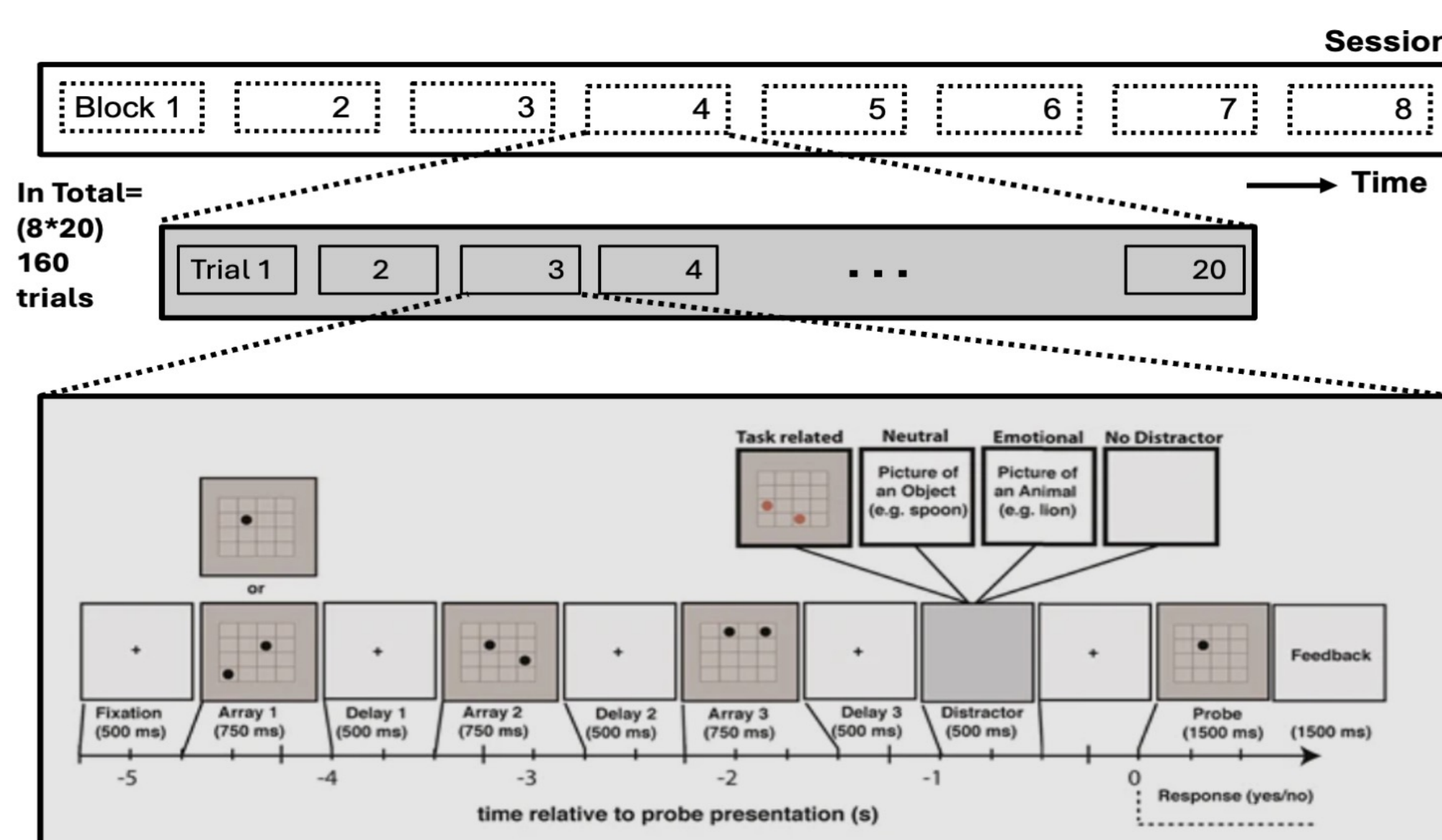
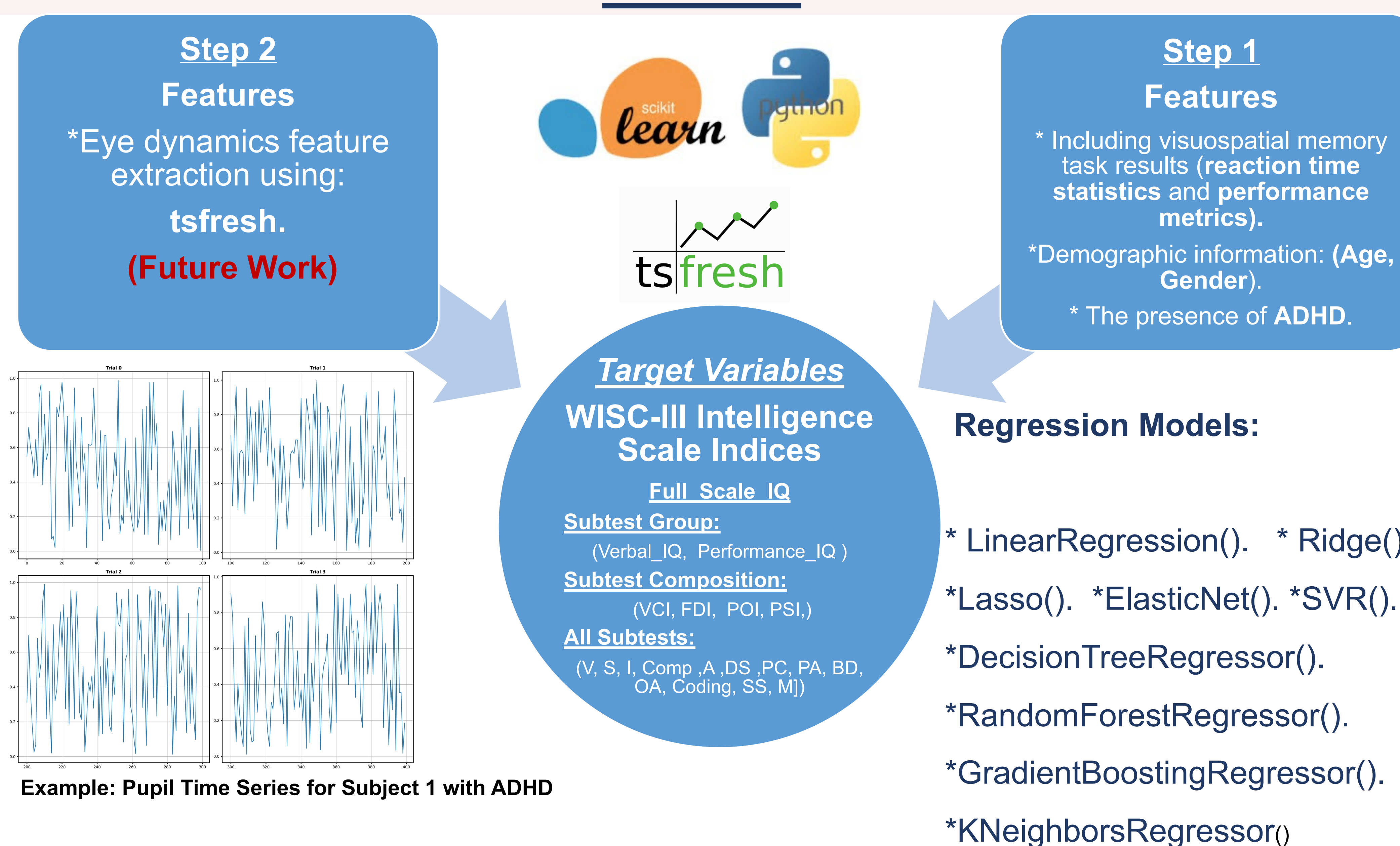


Figure 2: Design of The Experiment.

Table 1: Summary of Dataset Characteristics

Subject Total (n= 50)	Subject In Our Analysis	Gender	Age
ADHD (n= 28)	ADHD (n= 27)	40 Girl	1o to 12
Control (n= 22)	Control (n= 22)	9 Boy	Years old

Methods



Example: Pupil Time Series for Subject 1 with ADHD

Figure 3: A Comprehensive Examination of Methods and Features: A Schematic Overview.

Results

Table 2: Performance Outcomes of the Top Two Predictive Models

Target Problem	Features	Regressor	Adj R ²	AIC	BIC
FDI	Rtime_q75, Perform_mean, Age, Gender, ADHD	GradientBoostingRegressor	0.716091	67.759	74.414
SS	Rtime_q75, Perform_mean	RandomForestRegressor	0.677592	36.789	38.452

Comparison of Means by T-test



Figure 4: Analysis of WISC Subtest Scores: T-test Comparison of Means Across Domains.

Conclusions/ Future Work

- In conclusion, we provide **correlation** between **ADHD** and **cognitive abilities** while also showcasing the potential of **machine learning** to improve **predictive capabilities**.
- In future work, we will **refine our model** by identifying key features from **pupil time series** for **cognitive analysis**.

References

1- Vimalajeewa, D., McDonald, E., Bruce, S. A., & Vidakovic, B. (2022). Wavelet-based approach for diagnosing attention deficit hyperactivity disorder (ADHD). Scientific Reports, 12, Article 21928.

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