

# Machine Learning can help identify treatment predictors and moderators

## Using Machine Learning to Predict Treatment Outcome for Youth with Anxiety

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### INTRO:

- Machine learning is a promising approach to identifying predictors & moderators for youth anxiety treatments

### METHODS

- Harmonized data from 9 RCTs ( $N = 1362$ ;  $M_{age} = 10.59$ ,  $SD_{age} = 2.47$ ; 48.9% female; 71.9% White, 5.9% Black, 1.0% Asian; 10.8% Hispanic)
- Supervised ML algorithms predicted treatment outcomes
- ML models were built separately for ICBT, FCBT, COMB and SRT
- Models were then externally validated in an outpatient clinic ( $N = 50$ ;  $M_{age} = 12.04$ ,  $SD_{age} = 3.22$ ; 56% female; 76% Caucasian, 10% Black, 6% Asian, 2% Other; 6% Hispanic)

Model	Harmonized RMSE	Outpatient RMSE
L1	1.40	1.40
Bayesian Ridge	1.43	1.44
ARD	1.44	1.45
OMP	1.45	1.45
Random Forest*	1.45	1.46
L2	1.46	1.47
Gradient Boosting*	1.48	1.49
Extra Trees*	1.51	1.50
Elastic Net	1.51	1.51
Bagging with Elastic Net	1.51	1.51
AdaBoost with Elastic Net*	1.51	1.51
KNN	1.51	1.57
Decision Tree*	2.15	2.05

Note. \* indicates ensemble method; L1 = Lasso Regression; Bayesian Ridge = Bayesian Ridge Regression; ARD = Automatic Relevance Determination; OMP = Orthogonal Matching Pattern; L2 = Ridge Regression; KNN = K-Nearest Neighbors.

