What's age got to do with it?

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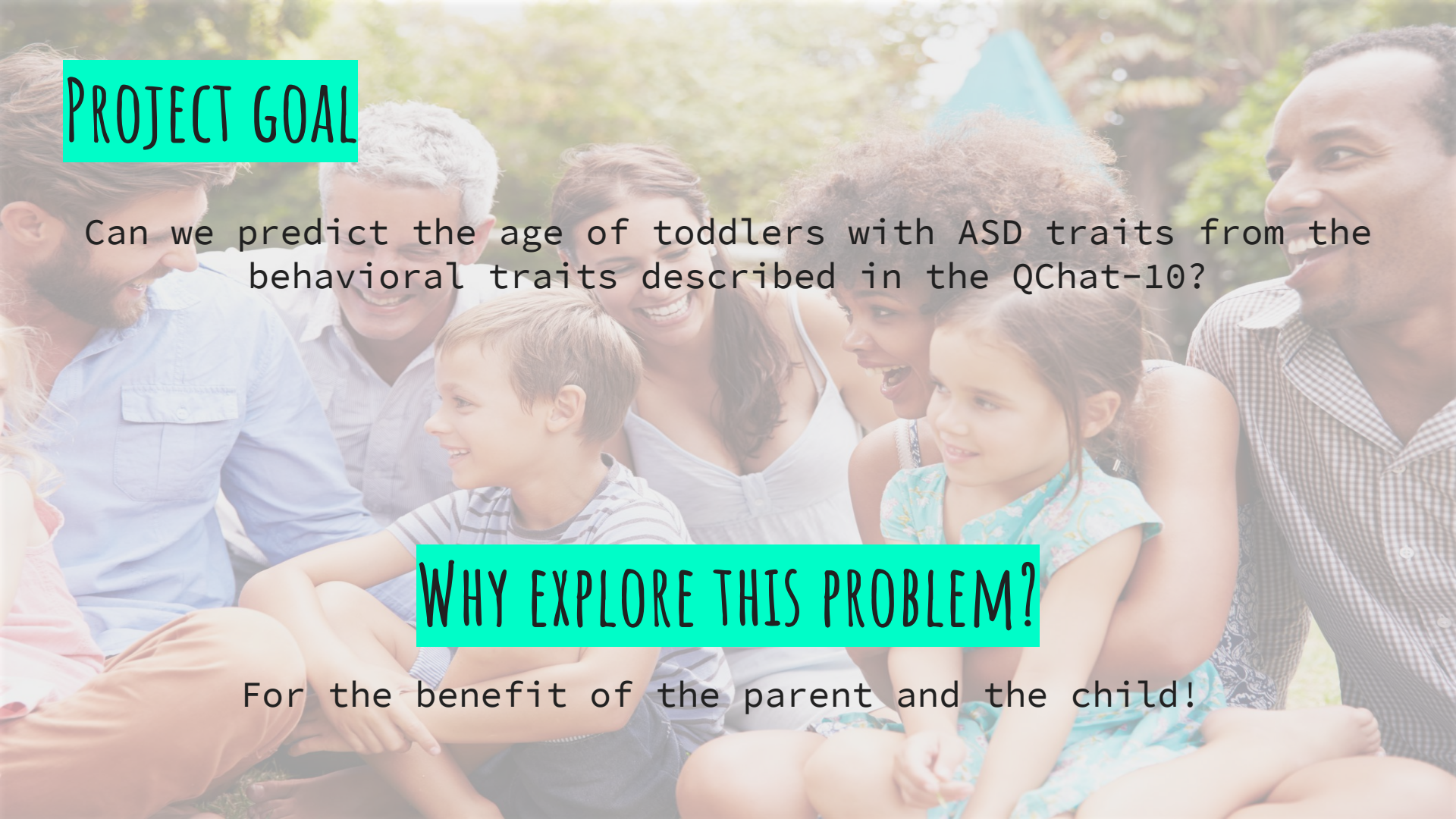
Project Data

- The dataset was developed by Dr Fadi Fayez Thabtah using a mobile app called ASDTests (ASDtests.com) to screen autism in toddlers.
  - Quantitative Checklist for Autism in Toddlers (QChat-10)
  - Sex
  - Age
  - Ethnicity
  - Jaundice
  - Immediate family member w/ASD
  - Who completed the test

- QChat-10 scores 4 or higher indicated that the toddler had ASD traits



Project goal

Can we predict the age of toddlers with ASD traits from the behavioral traits described in the QChat-10?

Why explore this problem?

For the benefit of the parent and the child!

Features used : QCHAT-10

A1 Does your child look at you when you call his/her name?

A2 How easy is it for you to get eye contact with your child?

A3 Does your child point to indicate that s/he wants something? (e.g. a toy that is out of reach)

A4 Does your child point to share interest with you? (e.g. pointing at an interesing sight)

A5 Does your child pretend? (e.g. care for dolls, talk on a toy phone)

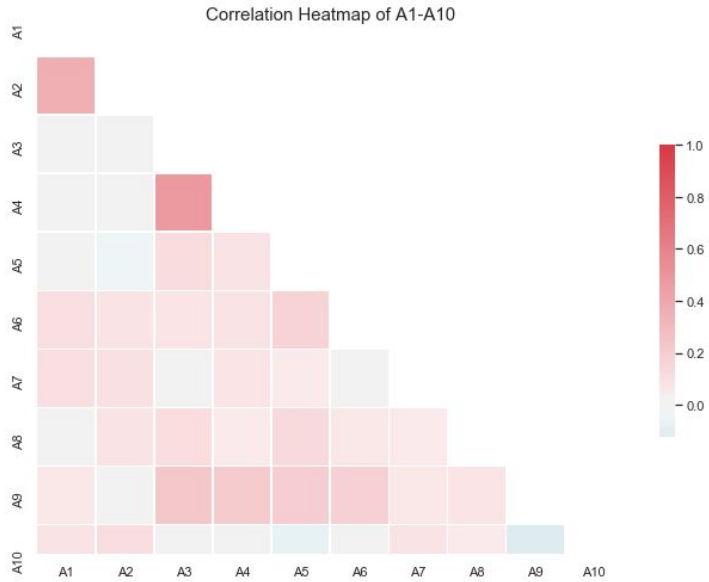
A6 Does your child follow where you're looking?

A7 If you or someone else in the family is visibly upset, does your child show signs of wanting to comfort them? (e.g. stroking hair, hugging them)

A8 Would you describe your child's first words as: (0:My child doesn't speak 1:Very typical)

A9 Does your child use simple gestures? (e.g. wave goodbye)

A10 Does your child stare at nothing with no apparent purpose?



Regression model: Features A1-A10

FINAL MODEL

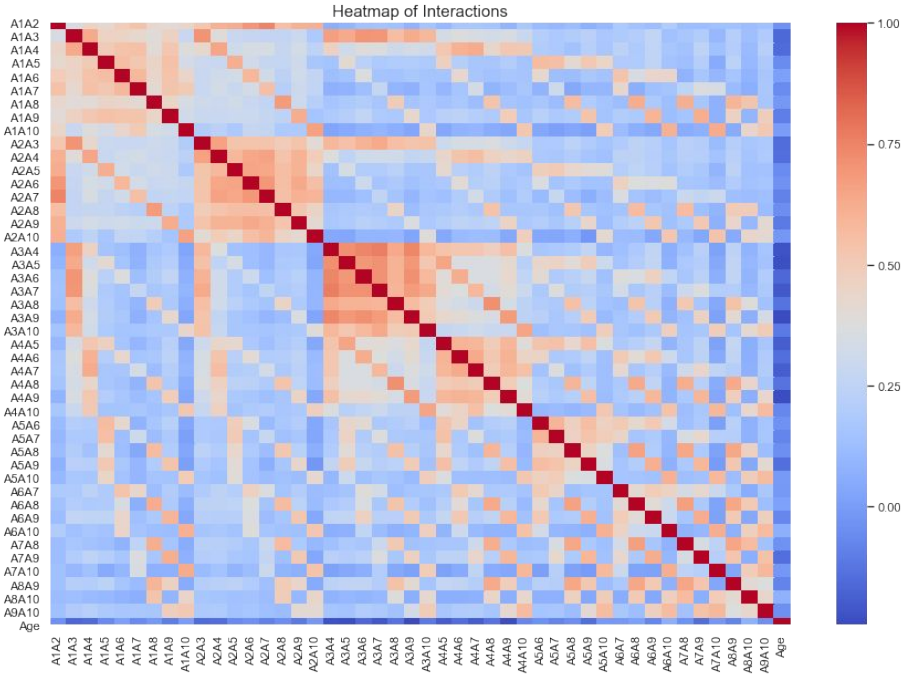
Features	Coefficients
A3	- 2.78
A4	- 1.75
A9	- 1.40

Conclusion:

- Our final model overestimates age by 7.39 months
- Question A3 had the biggest influence on age the most (Does your child point to indicate that s/he wants something? (e.g. a toy that is out of reach)

	RMSE	R^2
Baseline	+ 7.58 Months	0.089
Final	+ 7.39 Months	0.084

Regression Model- Interactions



Features	Coefficients
A3A4	- 0.03
A3A5	- 1.91
A3A7	- 0.35
A3A9	- 1.02
A4A9	- 1.95

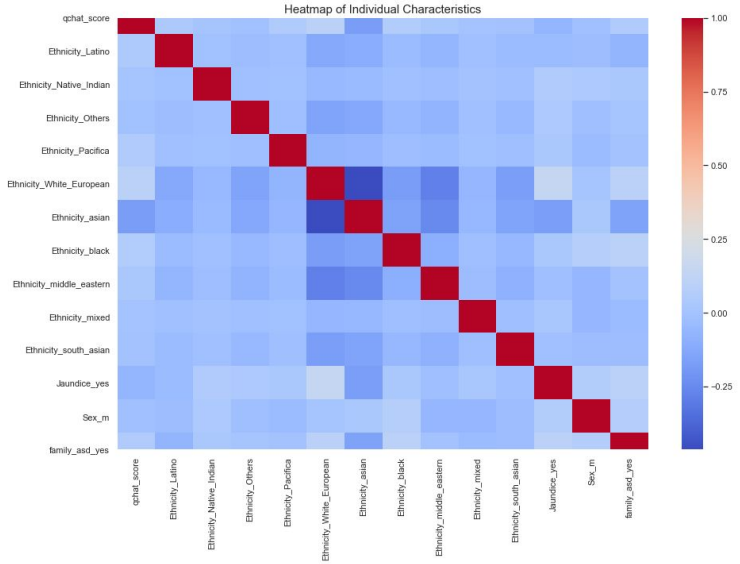
	RMSE	R^2
Baseline	+ 7.80 Months	0.131
Final	+ 7.34 Months	0.086

Conclusion: Questions A4 and A9 had the biggest influence on predicting age (Does your child point to share interest with you? (e.g. pointing at an interesting sight and does your child use simple gestures? (e.g. wave goodbye)

Regression model - Individual Characteristics + QChat-10 Score

Features	Coefficients
QChat-10 Score	- 1.30
Ethnicity-Asian	+ 0.89
Jaundice-Yes	- 0.74

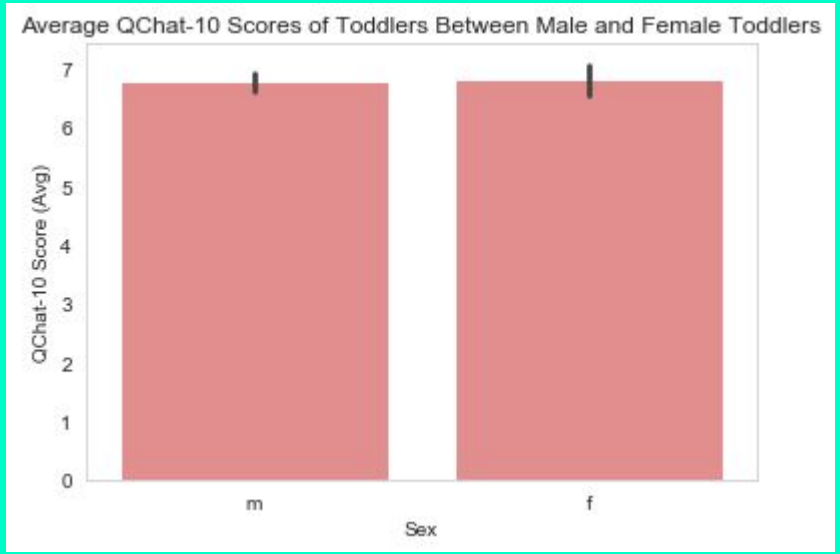
	RMSE	R^2
Baseline	+ 7.32 Months	0.073
Final	+ 7.17 Months	0.062



Conclusion: Our final model overestimates age by 7.17 months, QChat-10 scores has the greatest influence in predicting age.

Hypothesis tests

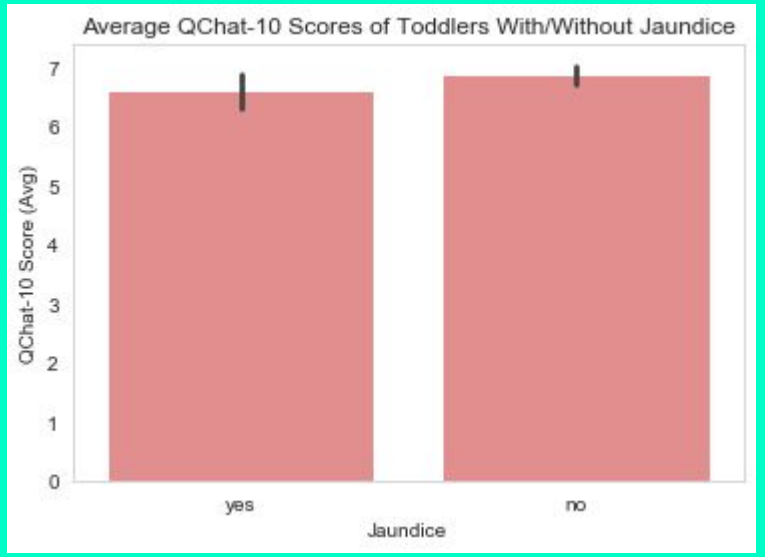
Are there significant differences in age amongst groups in our dataset?



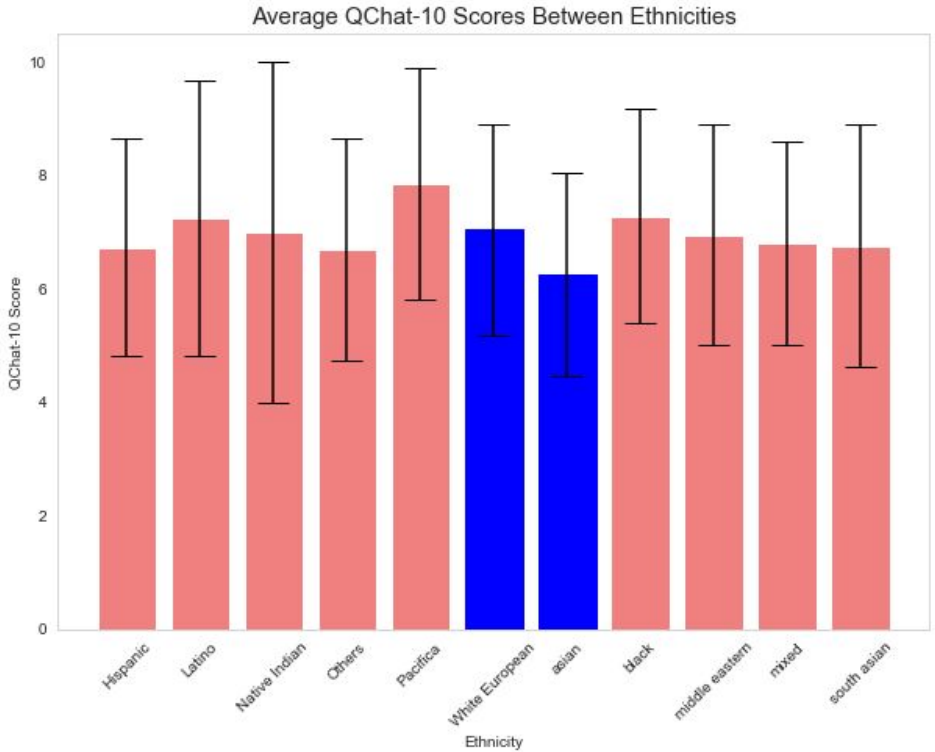
- There is no significant difference in average QChat-10 scores between sex of toddlers, $p = 0.72$.

Hypothesis tests

Are there significant differences in QChat-10 scores amongst toddlers who were/were not born with Jaundice in our dataset?



- There is no significant difference in average QChat-10 scores between toddlers who were/were not born with Jaundice, p = .09



Hypothesis tests

Are there significant differences in QChat-10 scores amongst groups in our dataset?

- There is a significant difference in average QChat-10 scores between Asian and White Europeans, $p < .05$.

Conclusions

- individual characteristics predicts age better than questions A1-A10 with an RMSE of 7.17

- No differences in qchat-10 scores between sex and between those born with/without Jaundice

- Qchat-10 scores are significantly different between ethnicities

Limitations

- Who was filling out the survey
- Responses used for the survey

Future Research

- Include additional data:
    - Preterm babies
    - Other disorders
    - Parental information
        - Age
        - Obesity
        - diabetes

Thank you for your time :)

Questions?