



# SMARTLEARN



Ed Tech that solves the achievement gap for children with ADHD using a personalized learning program.



# Problem Statement

- **1 in 5** children in US face learning disabilities
- **3x** higher dropout rate
- **80%** of student's time wasted in classrooms



\* <https://nclld.org/news/newsroom/the-state-of-ld-understanding-the-1-in-5/>



# Methods of Measuring ADHD Progress

## ***Current Methods:***

Qualitative indicators of progression





# Technical Classification of Learning



Personality and Individual Differences

Volume 51, Issue 4, September 2011, Pages 472-477



## The Big Five personality traits, learning styles, and academic achievement

Meera Komarraju  , Steven J. Karau, Ronald R. Schmeck, Alen Avdic

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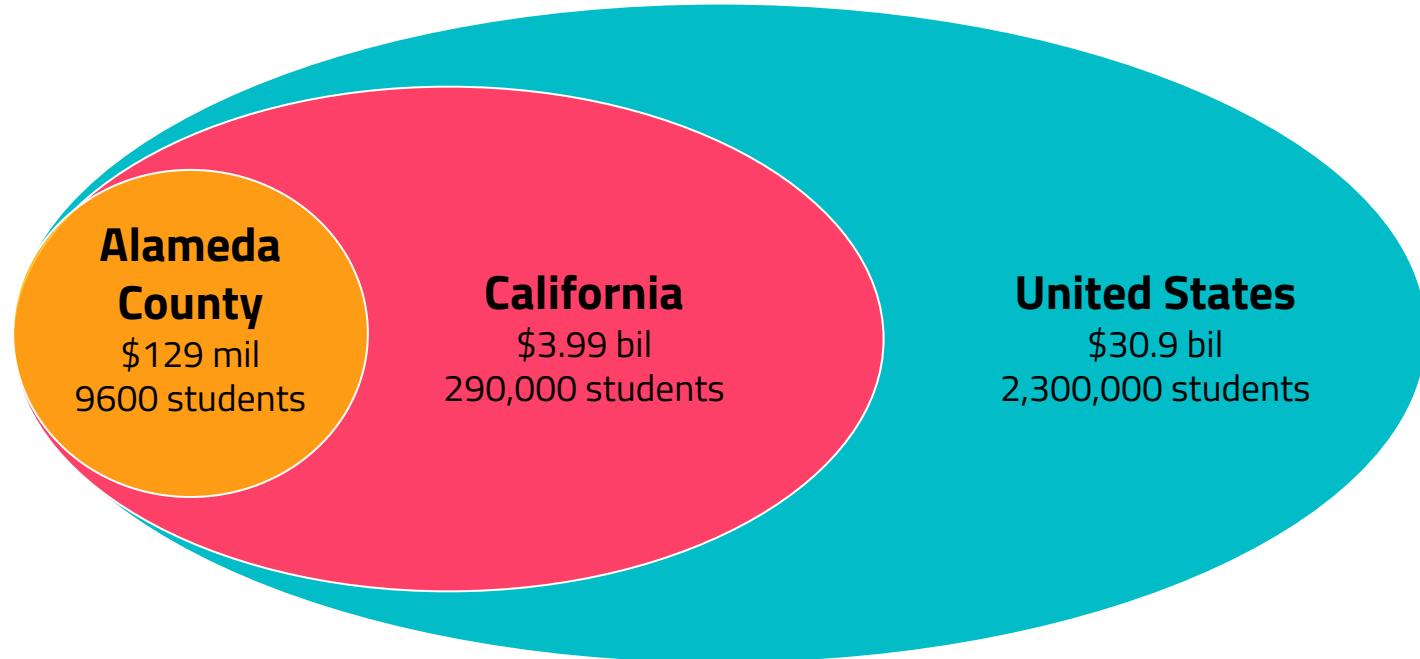
<https://doi.org/10.1016/j.paid.2011.04.019>

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### Abstract

Personality and learning styles are both likely to play significant roles in influencing academic achievement. College students (308 undergraduates) completed the Five Factor Inventory and the Inventory of Learning Processes and reported their grade point average. Two of the Big Five traits, conscientiousness and agreeableness, were positively related with all four learning styles (synthesis analysis, methodical study, fact retention, and elaborative processing), whereas neuroticism was negatively related with all four learning styles. In addition, extraversion and openness were positively related with elaborative processing. The Big Five together explained 14%

# Market Sizing



Source: kidsdata.org

A Program of Lucile Packard Foundation for Children's Health

<https://www.kidsdata.org/topic/96/special-needs-education-enrollment-disability/>

# Business Model

Public and private schools save more than  
**90%** per student.

## Key Customers:

1. **Schools** - Subscription Model for Product
2. **Publishers** - Purchase data sources

# Go-to-Market



Google for Education

CollegeBoard

## 1. Textbook Publishers

- Pearson Education

*Largest Textbook Publisher in the World*

## 2. Big Tech Entering the Education Market

- Google, Coursera, EdX

*Google for Education & Online Learning*

## 3. Accessible Higher Education

- College Board

*Standardized test prep*



# Technology - Data Sources

- **Proprietary sources:**

1. Student progress & **academic metrics**
2. Student's **behavioral patterns**



- **External sources:**

1. Socioeconomic data
2. **SAT score data**
3. Weather

SAT®

achieve  
more®

# Categorize Games: Optimize Learning Path

## Learning Factors

- Synthesis Analysis
- Methodical Study
- Fact Retention
- Elaborative Processing

Research Studies,  
Correlation

How we do it:  
A Feedback Loop

## Game Metrics / External Data

- Attention Span / Focus
- Decisiveness
- Confidence
- Ability to avoid error
- Ability to learn from mistakes
- Socioeconomic data
- SAT score data
- Weather

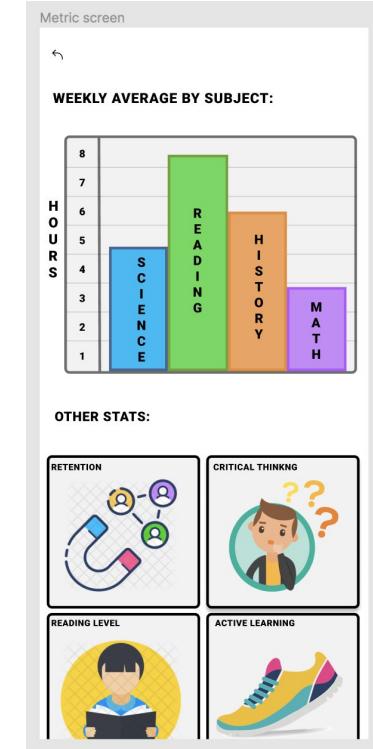
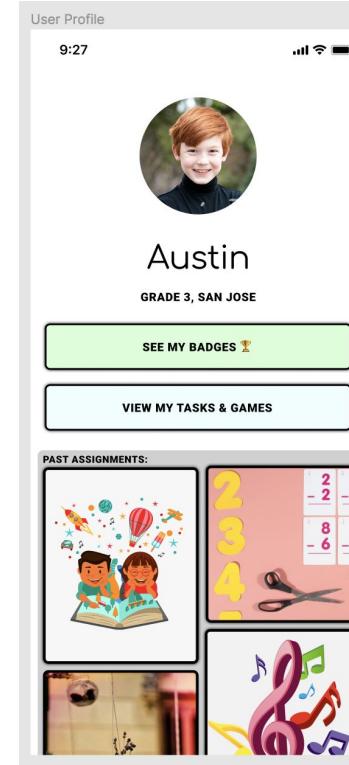
Reinforcement  
Model

## Big 5 Personality Traits

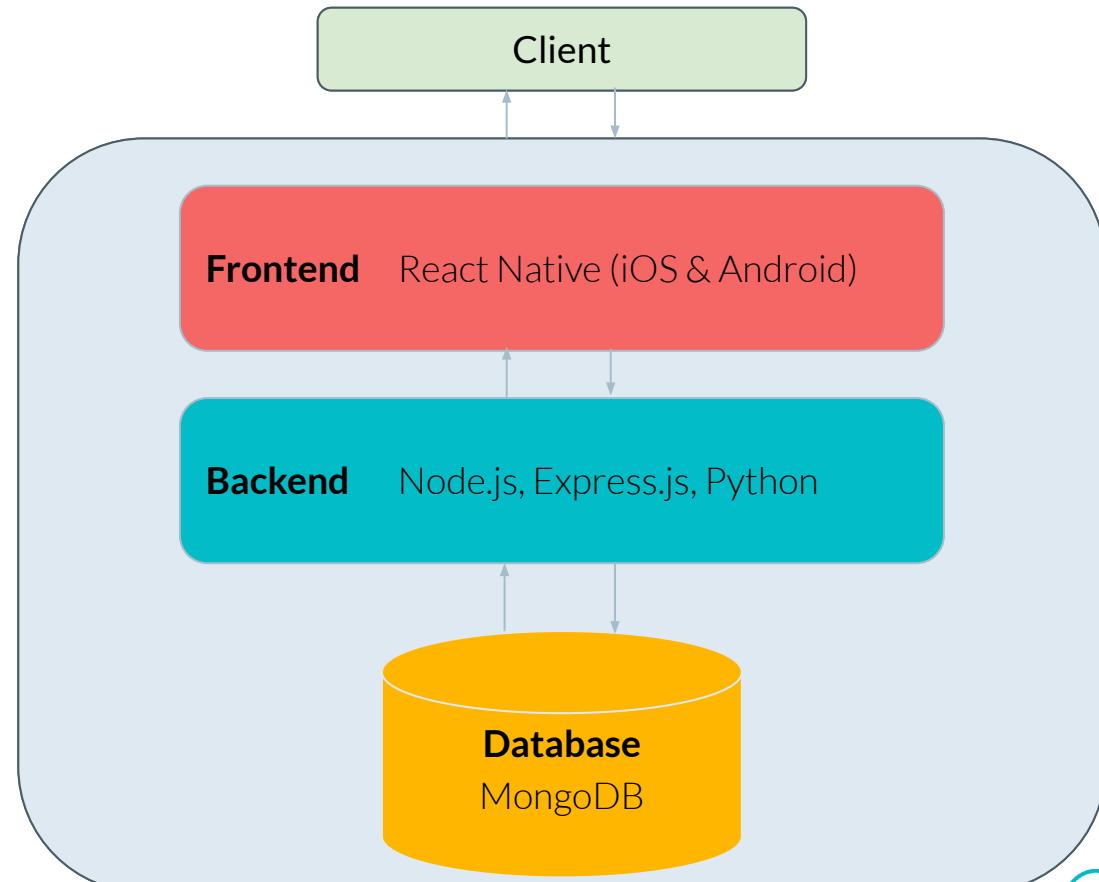
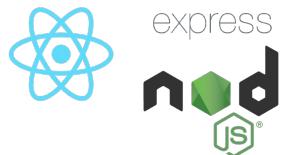
- Openness
- Conscientious
- Neuroticism
- Agreeableness
- Extraversion

# Behavioral Economics

1. Show progress on assignments
2. Badges & points system
3. Simple, clean design
4. Push Notifications
5. Overworking & Unlock new assignments daily



# Software Architecture: Tech Stack



# Financial Report

## ADHD Learning platform

### Profit and Loss (P&L) Statement

[USD thousands]

	Year 1	Year 2	Year 3	Year 4	Year 5	% Revenue
No of subscriptions	2,500.0	10,000.0	25,000.0	40,000.0	65,000.0	
Revenue	\$2,250.00	\$9,000.00	\$25,000.00	\$48,000.00	\$78,000.00	
<b>Total Net Revenue</b>	<b>\$2,250.00</b>	<b>\$9,000.00</b>	<b>\$25,000.00</b>	<b>\$48,000.00</b>	<b>\$78,000.00</b>	<b>100%</b>
Cost of operations	\$775.00	\$2,900.00	\$7,800.00	\$14,900.00	\$24,400.00	31.28%
<b>Gross Profit</b>	<b>\$1,475.00</b>	<b>\$6,100.00</b>	<b>\$17,200.00</b>	<b>\$33,100.00</b>	<b>\$53,600.00</b>	<b>68.72%</b>
<b>Expenses</b>						
Advertising & Promotior	\$1,800.00	\$3,900.00	\$5,659.00	\$6,750.00	\$13,500.00	17.31%
R & D	\$880.00	\$2,130.00	\$2,940.00	\$4,095.00	\$6,360.00	8.15%
General & Administratio	\$1,170.00	\$1,770.00	\$2,370.00	\$3,570.00	\$5,070.00	6.50%
<b>Total Expenses</b>	<b>\$3,850.00</b>	<b>\$7,800.00</b>	<b>\$10,969.00</b>	<b>\$14,415.00</b>	<b>\$24,930.00</b>	<b>31.96%</b>
<b>Net Income</b>	<b>-\$2,375.00</b>	<b>-\$1,700.00</b>	<b>\$6,231.00</b>	<b>\$18,685.00</b>	<b>\$28,670.00</b>	<b>36.76%</b>

# Our Ask

- We are looking for an **initial fund raise of \$400,000.**
- According to our financial report we will require this money to **get our first 2500 subscribers.**
- This money is going to sustain us for the next **14 months**

## ADHD by the Numbers

**6.1M**

American children  
have ADHD

**5 in 10**

children with ADHD have a  
behavior or conduct problem

**62%**

of children with ADHD  
take medication

**4.4%**

percent of American  
adults have ADHD





# SmartLearn Team

Product  
Management



Lily Li

Junior  
Data Science

Financial  
Engineering



Neel Desai

Senior  
Mech. Engineering

Data Science  
& Product



Soham Mandal

Senior  
Data Science

Full-stack  
Engineering



Akshat Jain

Freshman  
Computer Science

Optimization &  
Supply Chain



Nikita Boddu

Sophomore  
IEOR

PM & Product  
Design



Jillian Criscuolo

Sophomore  
Data Science



# SmartLearn Summary

- Big Market - \$31B in United States
- Predictive optimal learning path for ADHD students
- Teaching not as a *transaction*, but as *interaction*



x



# Future of SmartLearn

- Solve the problem of insufficient learning for **ALL** students
- By collecting data about the **PROCESS** of learning
- **Applications:** Remote Distance Learning: COVID-19





Demo



# 4 Step Plan

1. For each game, determine **target** metrics for each Big 5 trait
  2. Using **actual** game metrics, determine user Big 5 Traits relative to targets
  3. Establish **success/improvement** Learning Factors
  4. Optimize student's **future Learning Path**
- 



$$P_A = (0.01 * \int(A)) + (1.5 * \int(1/U)) + (1.3 * \int(1/D)) + 2.3 * I_D + 0.28 * I_M$$

$$P_C = (0.7 * \int(A)) + (9.6 * \int(1/U)) + (0.2 * \int(1/D)) + 1.6 * I_D + 5.4 * I_M$$

$$P_N = (2.1 * \int(A)) + (7 * \int(1/U)) + (1.2 * \int(1/D)) + 1.89 * I_D + 0.01 * I_M$$

$$P_E = (0.6 * \int(A)) + (0.9 * \int(1/U)) + (5.2 * \int(1/D)) + 1.7 * I_D + 1.2 * I_M$$

$$P_O = (1.4 * \int(A)) + (3.8 * \int(1/U)) + (0.2 * \int(1/D)) + 2.4 * I_D + 4.1 * I_M$$



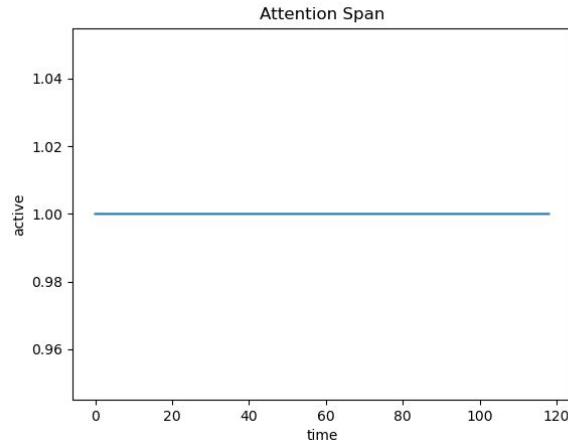
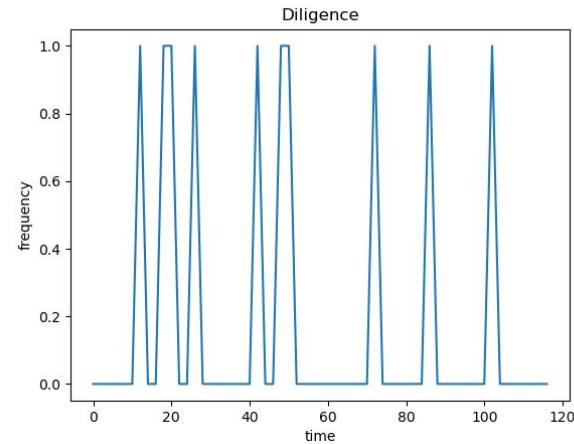
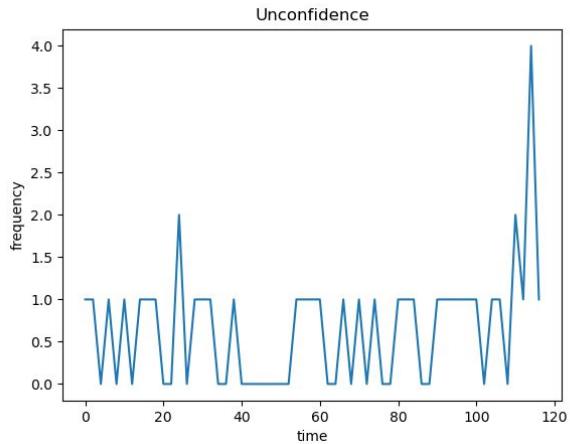
Target Metric Equations - (Crude Approximations)



Video of Game Playing

## Metrics Collected

INCORRECT DIRECTIONS  
0  
INCORRECT MATH  
2





## \*\* Data Sources \*\*

- [Median Household Income \(2006 - 2010\)](#)
- [Educational Attainment Over 18 years old](#)
- [School Enrollment over 3 years old](#)
- [County Level Education and Income](#)
- [California SAT Scores 15-16](#)

```
edu = pd.read_excel('Education.xls')
edu.head()
```

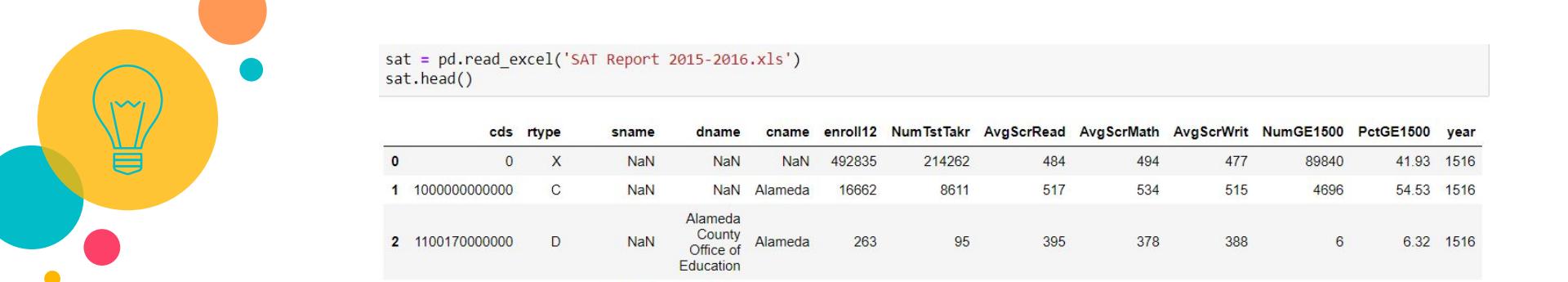
FIPS Code	State	Area name	Less than a high school diploma, 2014-18	High school diploma only, 2014-18	Some college or associate's degree, 2014-18	Bachelor's degree or higher, 2014-18	Percent of adults with less than a high school diploma, 2014-18	Percent of adults with a high school diploma only, 2014-18	Percent of adults completing some college or associate's degree, 2014-18	Percent of adults with a bachelor's degree or higher, 2014-18
0 0	US	United States	26948057.0	59265308.0	63365655.0	68867051.0	12.3	27.1	29.0	31.5
1 1000	AL	Alabama	470043.0	1020172.0	987148.0	822595.0	14.2	30.9	29.9	24.9
2 1001	AL	Autauga County	4204.0	12119.0	10552.0	10291.0	11.3	32.6	28.4	27.7
3 1003	AL	Baldwin County	14310.0	40579.0	46025.0	46075.0	9.7	27.6	31.3	31.3
4 1005	AL	Barbour County	4901.0	6486.0	4566.0	2220.0	27.0	35.7	25.1	12.2

```
inc = pd.read_excel('Income.xls')
inc.head()
```

FIPS	State	Area_name	Civilian_labor_force_2018	Employed_2018	Unemployed_2018	Unemployment_rate_2018	Median_Household_Income_2018	Med_
0 0	US	United States	161640488.0	155344043.0	6296445.0	3.9	61937.0	
1 1000	AL	Alabama	2198837.0	2112347.0	86490.0	3.9	49881.0	
2 1001	AL	Autauga County, AL	25957.0	25015.0	942.0	3.6	59338.0	
3 1003	AL	Baldwin County, AL	93849.0	90456.0	3393.0	3.6	57588.0	
4 1005	AL	Barbour County, AL	8373.0	7940.0	433.0	5.2	34382.0	

## External Data Collected





```
sat = pd.read_excel('SAT Report 2015-2016.xls')
sat.head()
```

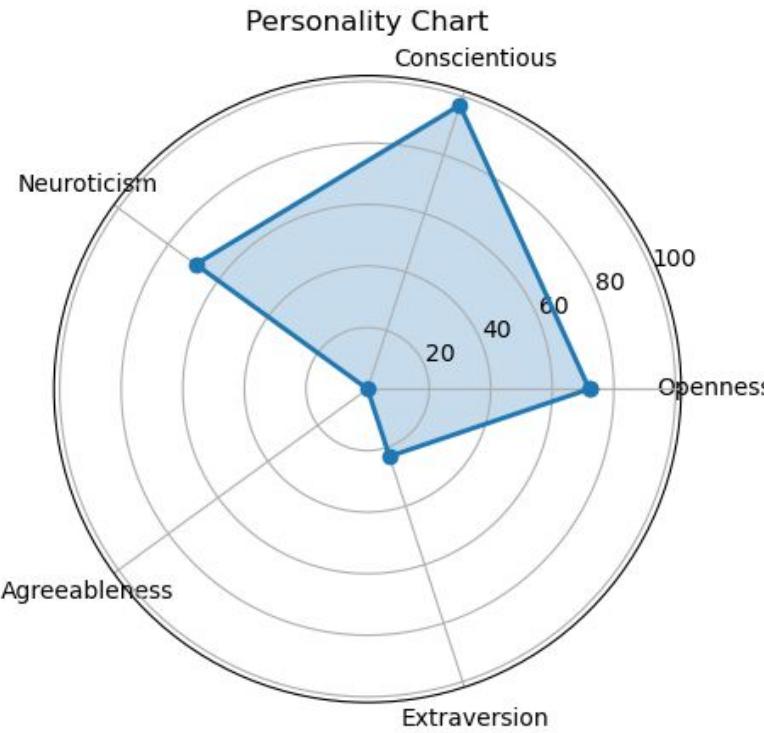
	cds	rtype	sname	dname	cname	enroll12	NumTstTakr	AvgScrRead	AvgScrMath	AvgScrWrit	NumGE1500	PctGE1500	year
0	0	X	NaN	NaN	NaN	492835	214262	484	494	477	89840	41.93	1516
1	10000000000000	C	NaN	NaN	Alameda	16662	8611	517	534	515	4696	54.53	1516
2	11001700000000	D	NaN	Alameda County Office of Education	Alameda	263	95	395	378	388	6	6.32	1516
3	1100170112607	S	Envision Academy for Arts & Technology	Alameda County Office of Education	Alameda	88	92	391	376	386	5	5.43	1516
4	1611190000000	D	NaN	Alameda Unified	Alameda	858	472	527	543	514	301	63.77	1516



```
{'coord': {'lon': -122.27, 'lat': 37.87}, 'weather': [{"id": 804, 'main': 'Clouds', 'description': 'overcast clouds', 'icon': '04n'}], 'base': 'stations', 'main': {'temp': 284.7, 'feels_like': 282.73, 'temp_min': 283.15, 'temp_max': 286.48, 'pressure': 1016, 'humidity': 81}, 'wind': {'speed': 2.29, 'deg': 247}, 'clouds': {'all': 100}, 'dt': 1588754124, 'sys': {'type': 3, 'id': 2013579, 'country': 'US', 'sunrise': 1588770415, 'sunset': 1588820660}, 'timezone': -25200, 'id': 5327684, 'name': 'Berkeley', 'cod': 200}
```

Temperature (in kelvin unit) = 284.7  
atmospheric pressure (in hPa unit) = 1016  
humidity (in percentage) = 81  
description = overcast clouds

## External Data Collected Cont.



Big 5 Traits Prediction



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## Prediction:

- Specializes in **Elaborative Processing**.
- Could improve on **Fact Retention**.

# SMART LEARN

THANK YOU  
*Questions?*

