



Club 65.5

# ELM CITY STORIES: A GAME DESIGN IMPROVEMENT PLAN



80% felt the game  
was challenging

59% were frustrated  
with the game



Game Progress	Percentage of Players	Count of player
End playing after one stack	10%	17
Completed more than one stack	69%	112
Full Completion	20%	33
Grand Total	100%	162



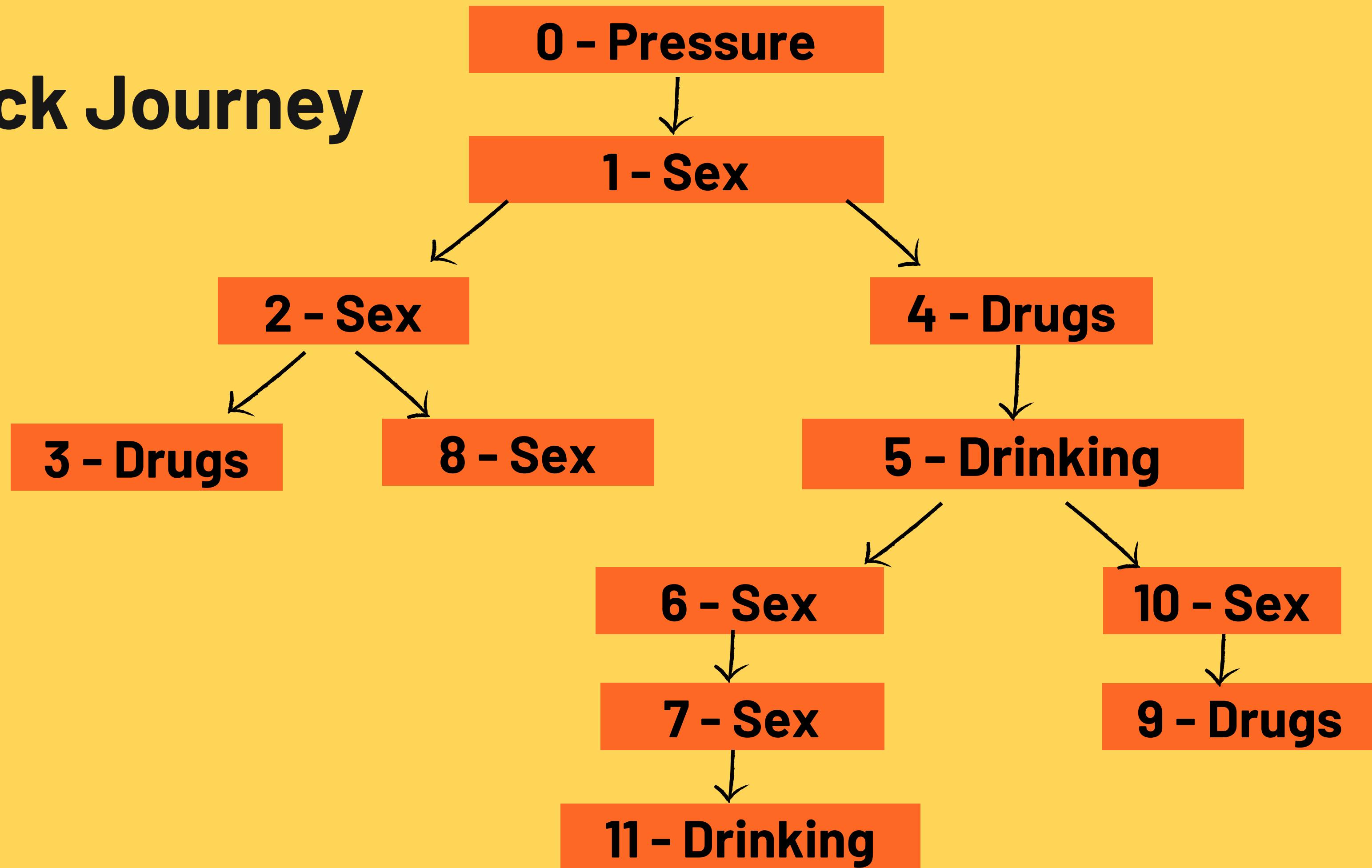
# PROBLEM STATEMENT

**The game's difficulty level causes frustration to players, leading to high drop-out rates.**

**How can we improve the game to solve this problem?**



# Stack Journey



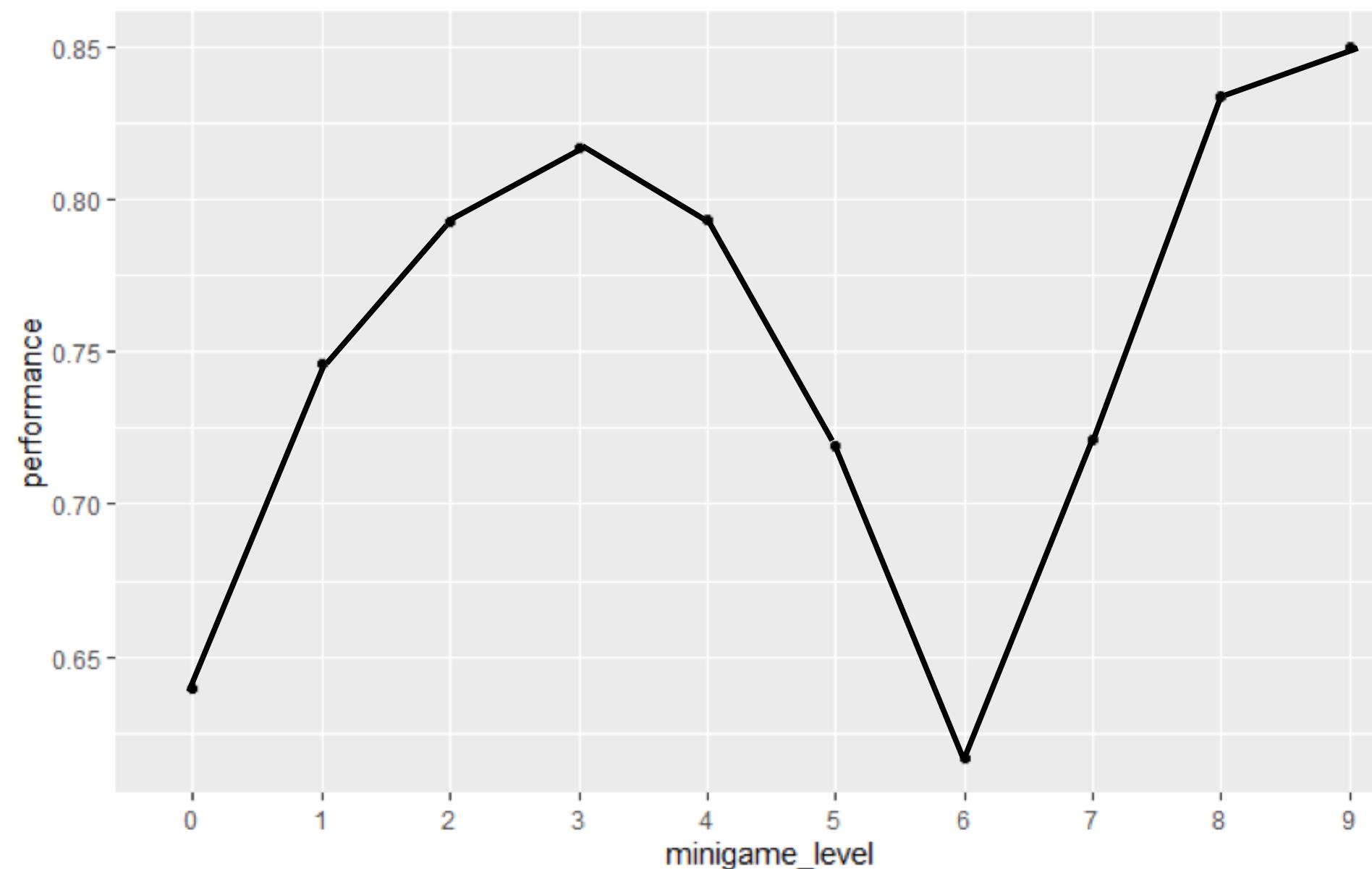


# Stack vs Last Session Played

Percentage of Completion	Stack												Grand Total
	0	1	2	3	4	5	6	7	8	9	10	11	
<20%	42.50%	5.00%	17.50%	7.50%	10.00%	0.00%	5.00%	0.00%	7.50%	0.00%	5.00%	0.00%	100.0%
20-40%	0.00%	0.00%	0.00%	0.00%	5.56%	22.22%	38.89%	16.67%	11.11%	0.00%	5.56%	0.00%	100.0%
40-60%	0.00%	0.00%	0.00%	0.00%	0.00%	3.13%	0.00%	3.13%	31.25%	0.00%	43.75%	18.75%	100.0%
60-80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	50.00%	100.0%
80-99.9%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.05%	0.00%	78.95%	100.0%
Grand Total	13.18%	1.55%	5.43%	2.33%	4.65%	6.98%	12.40%	5.43%	13.18%	3.88%	13.95%	17.05%	100.0%



## Performance on people sense minigame



Themes for People Sense Game:

0, 1, 2, 5: Making new friends

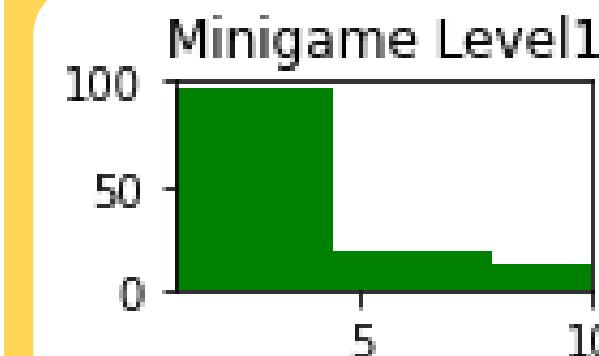
3, 4, 8, 9: Friendship balance

6: Bullying

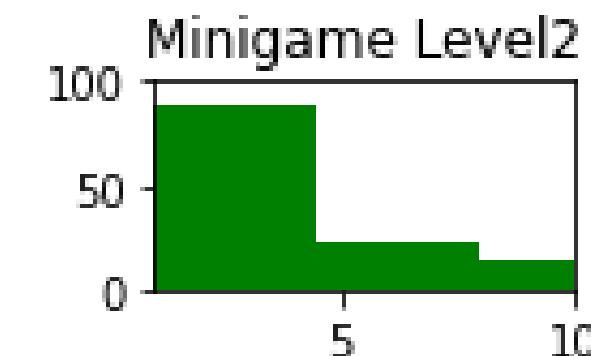
7: Drugs

## People Sense Attempts Frequency by Level

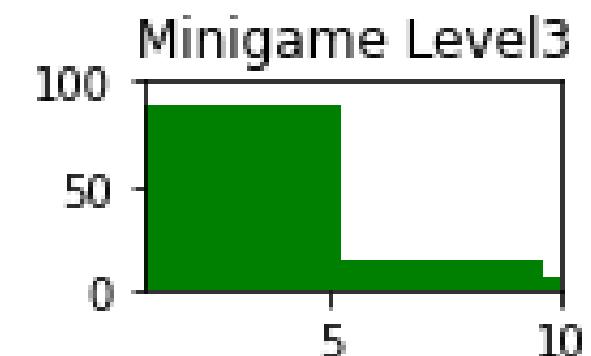
Minigame Level1



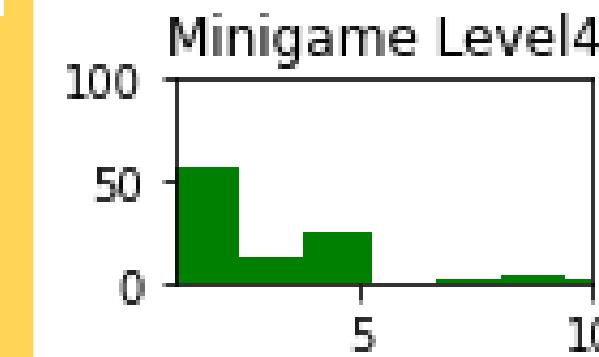
Minigame Level2



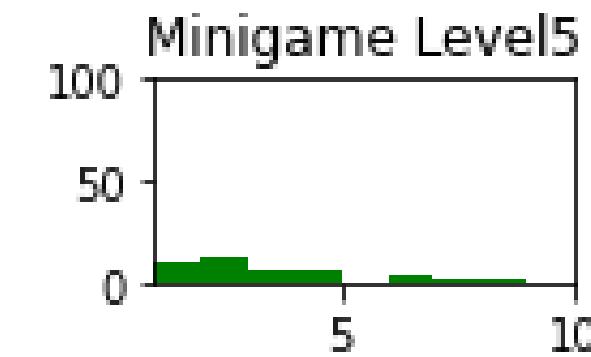
Minigame Level3



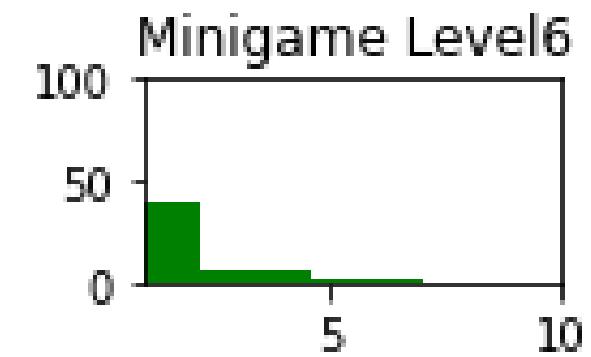
Minigame Level4



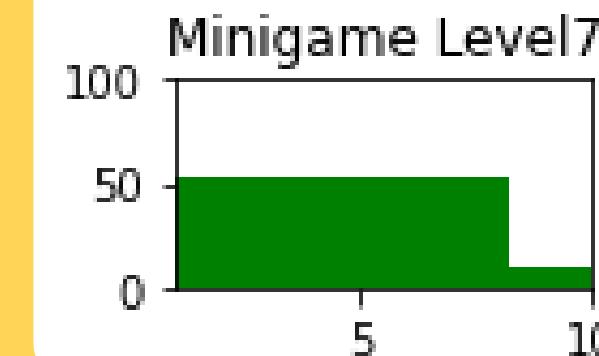
Minigame Level5



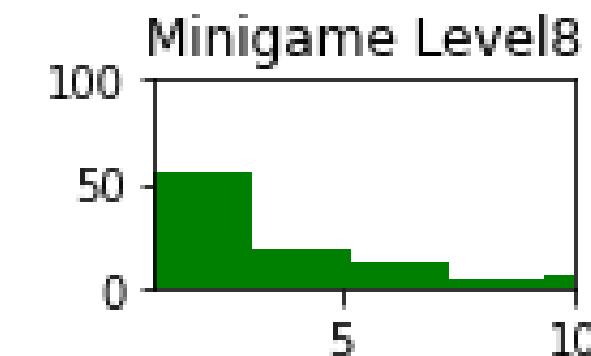
Minigame Level6



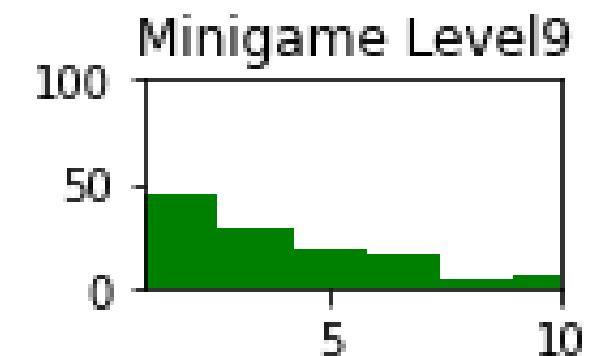
Minigame Level7



Minigame Level8

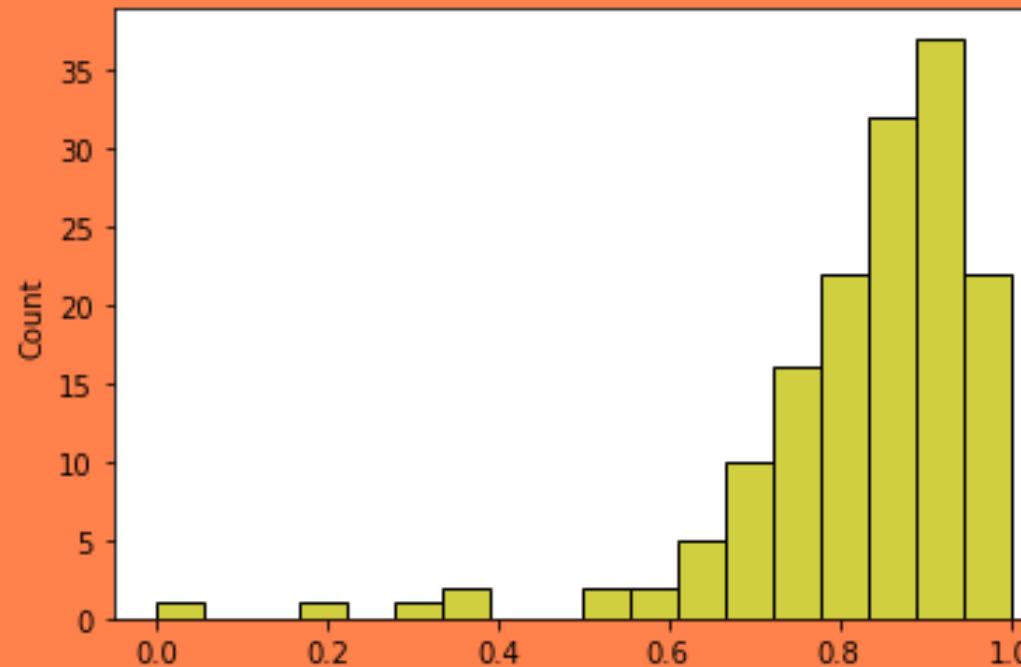


Minigame Level9

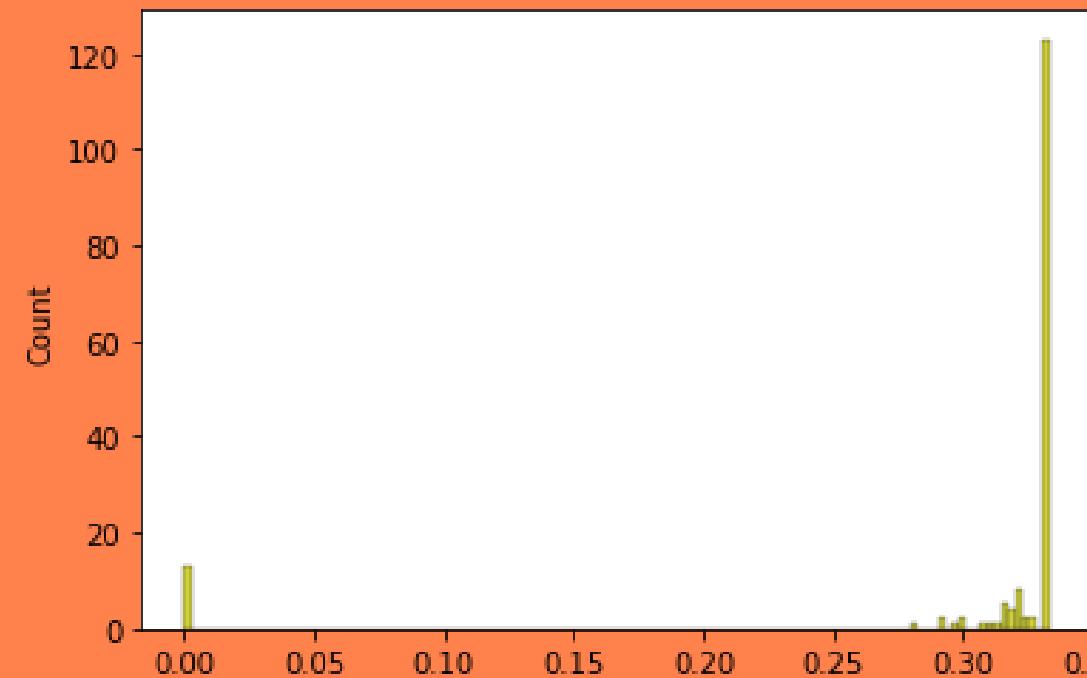


# Refusal Minigame Metrics

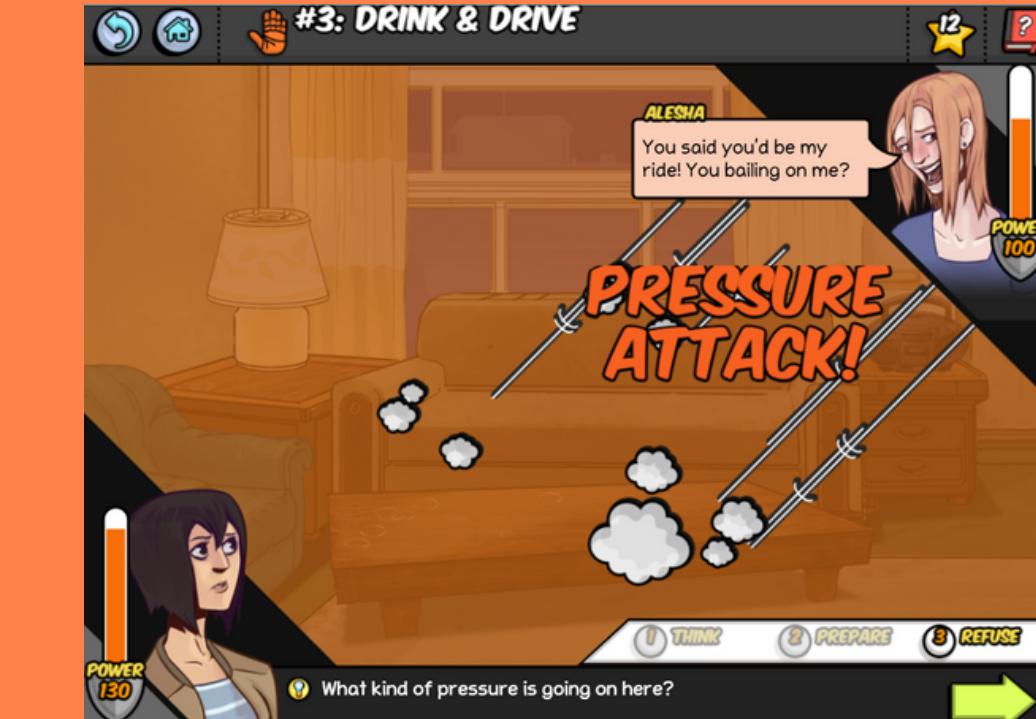
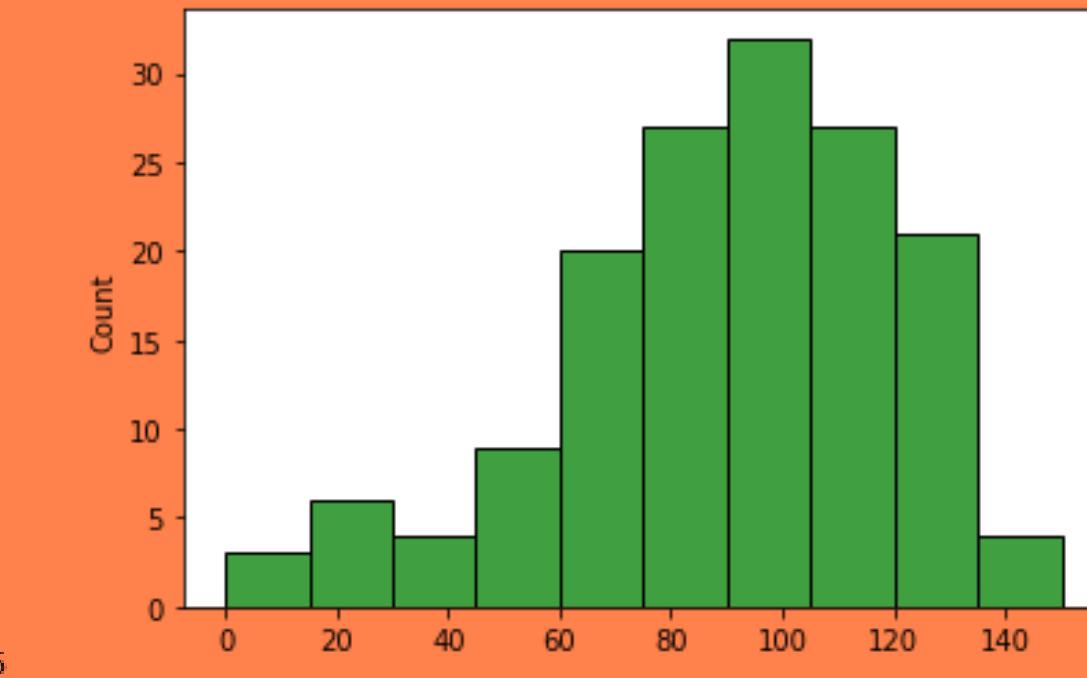
## Think



## Prepare



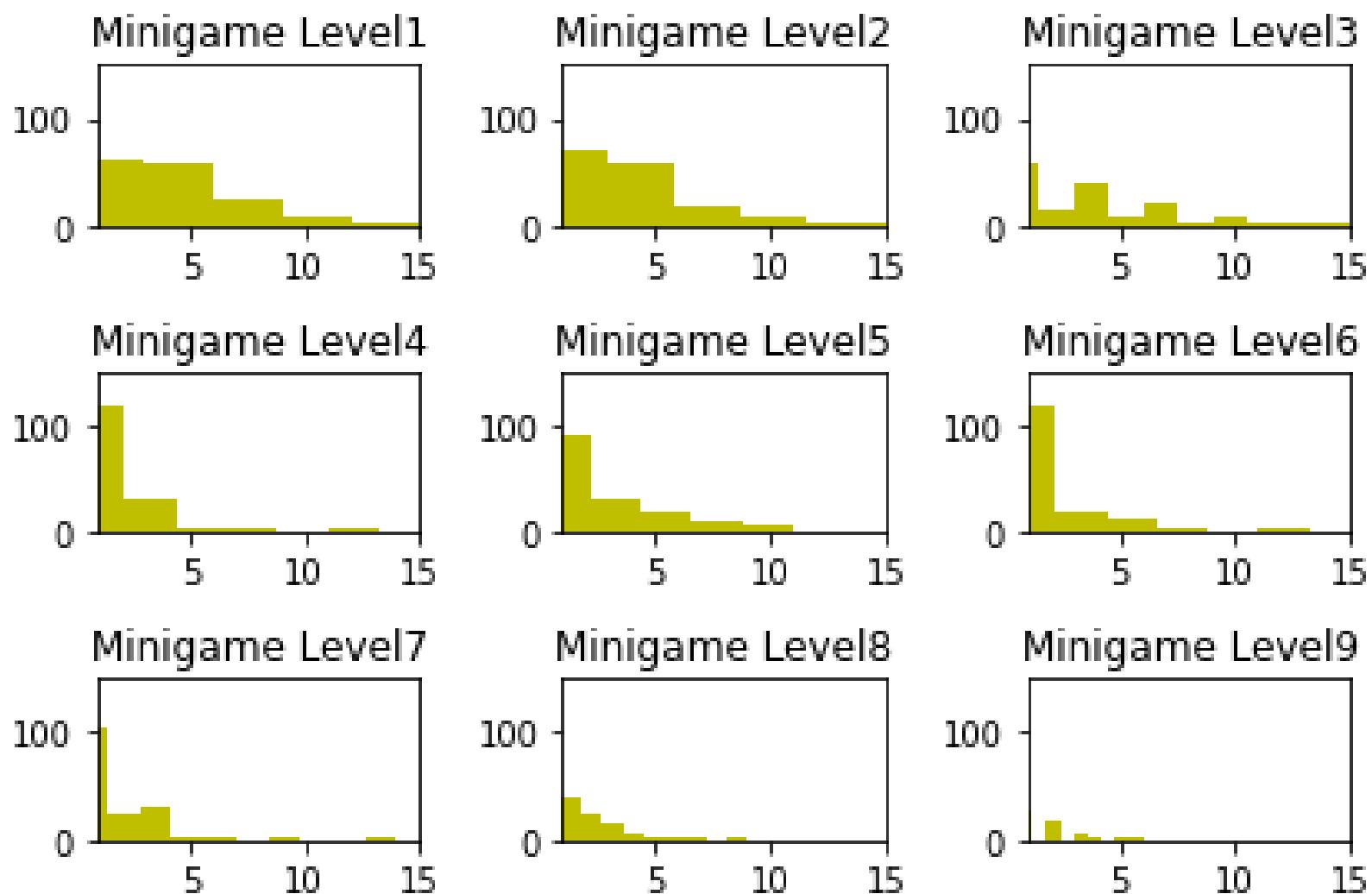
## Refuse





# Refusal Minigame Metrics

## Attempts Frequency by Level



## Commentary

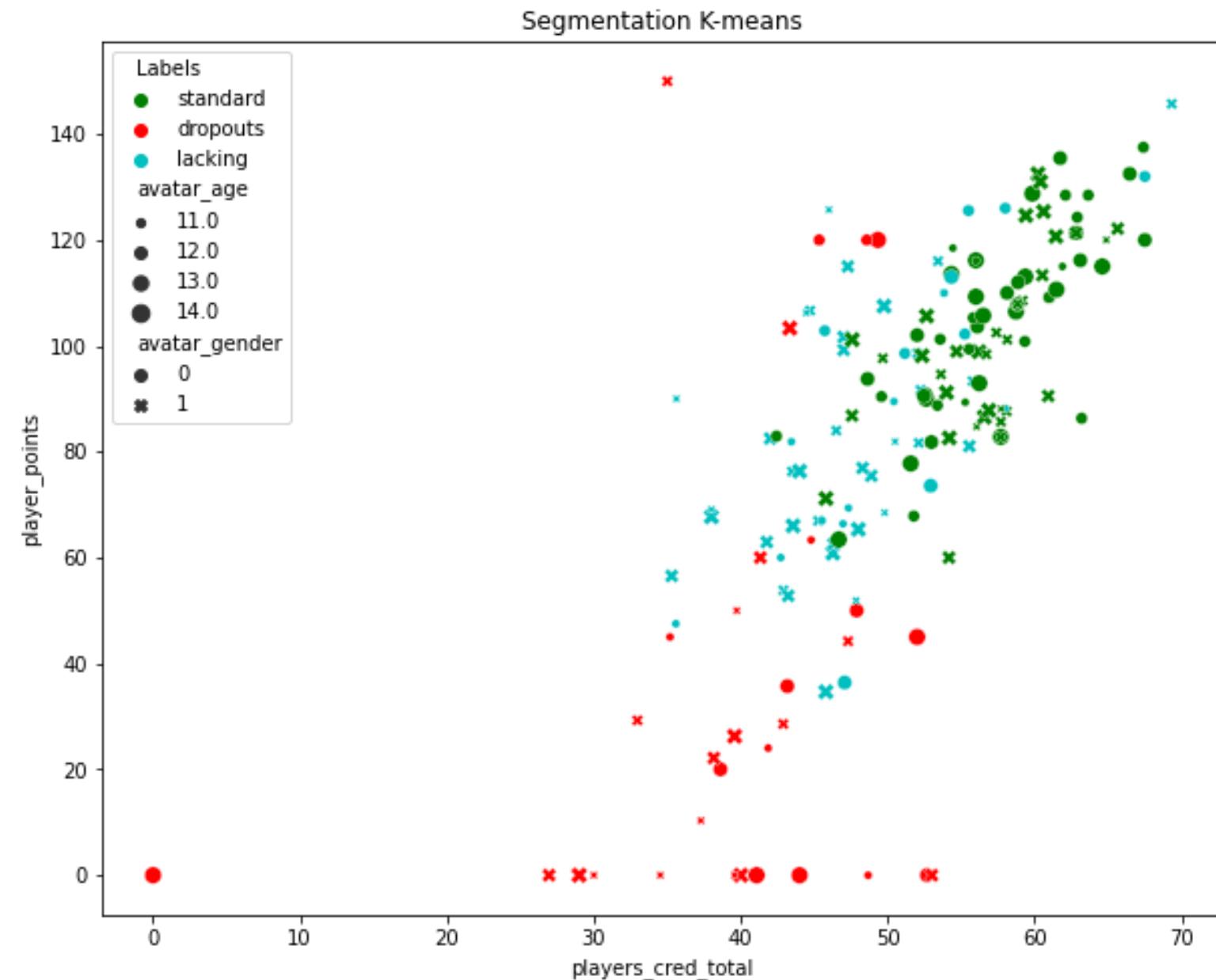
- Left-skewed for think score completion -> not easy for users to identify the situation
- Most scored 1/3 in prepare phase -> some difficulties in distinguishing the tones/style of the audio
- Slightly left-skewed refuse phase -> might understand the cues before and adjust better to games
- Most cannot reach levels 7, 8, 9

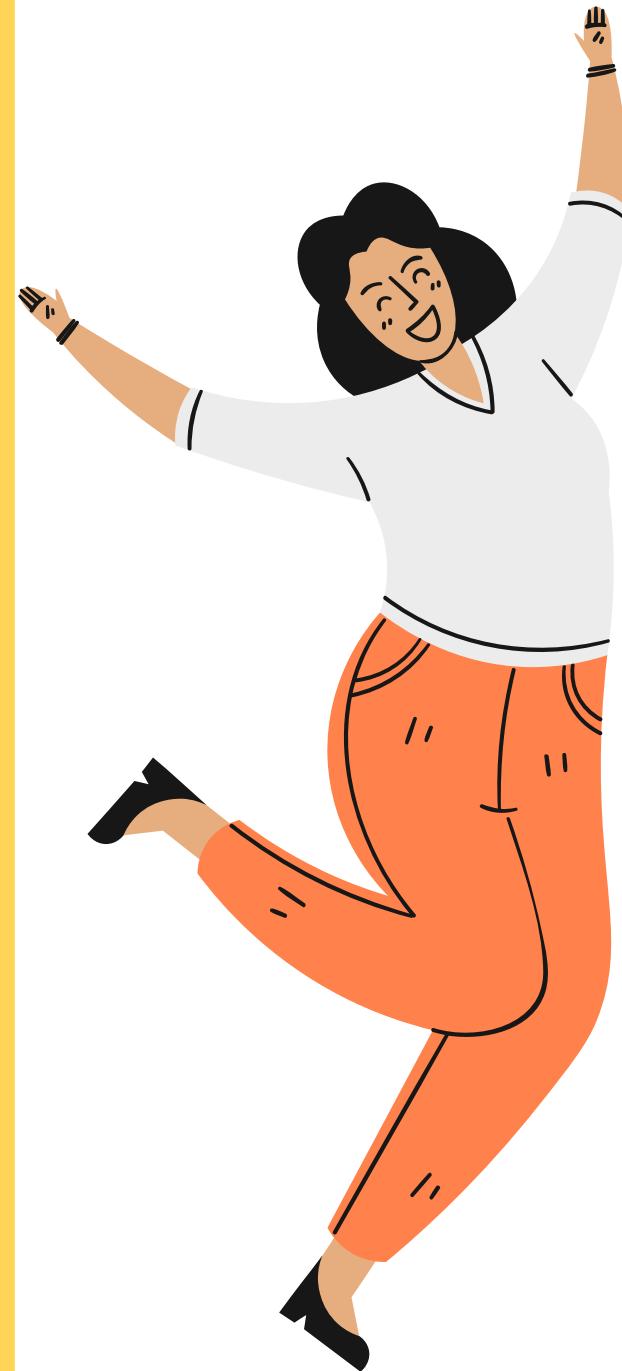


# K-Means Clustering Analysis: Players Segmentation

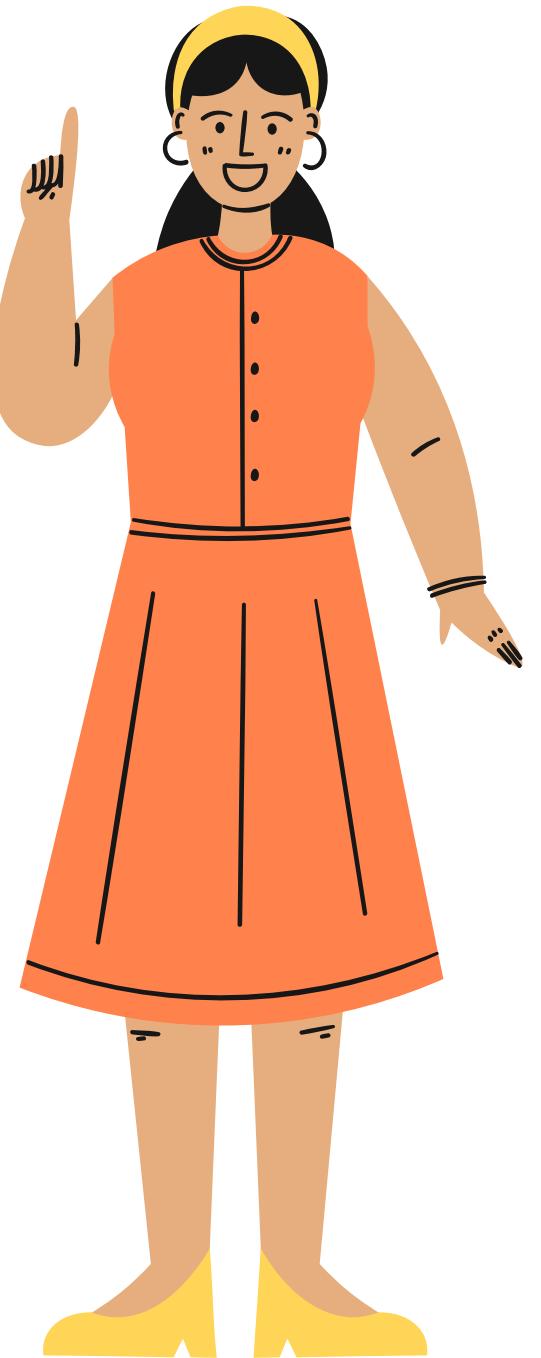
Segment K-means	avatar_gender	avatar_age	missed_safe_invitations	accepted_unsafe_invitations	players_cred_total	player_points	new_rating	stack_id	Knowledge Minigame	People Sense	Priority Sense	Refuse Power Minigame	N obs	Prop Obs
standard	0.4470588235294118	12.83529411764706	0.35142608434783124	0.4583412325960474	57.157341483042515	103.10048418723404	2.3265043779749663	12.564705882352941	9.91764705882353	9.647058823529411	9.788235294117648	9.388235294117647	85	0.4857142857142857
dropouts	0.5428571428571428	12.514285714285714	0.6780585157139779	0.5277960337981346	37.50777415369343	33.34623612602936	1.108843537414966	3.8285714285714287	1.8857142857142857	2.3142857142857145	2.4857142857142858	1.6571428571428573	35	0.2
lacking	0.6727272727272727	12.2	0.46384757890290995	0.6116536389265074	48.23763834460274	84.59906470990528	2.007503120256367	9.872727272727273	7.472727272727273	6.8545454545454545	6.9818181818181815	6.5636363636363635	55	0.3142857142857143

- Low-risk/ Standard
    - most avatars were females in the older group, unlocked most games, good understanding of people, and refused sense, the average rating of the game => this is the result we expect
  - Higher-risk/Below-average
    - male avatars, the average level of games unlocked, poor people and knowledge
- => this group needs further investigation
- High-risk/Early Dropouts
    - male, very poor people sense, knowledge
    - poor rating of the game
- => understand what influences their discomfort





# Suggestion



**"Sixty-three percent of participants said that they would tell their friends to play the game." (K. Hieftje, et al.)**

*Students are learning / finding it interesting, but might stop playing because the level of difficulty, making it hard to complete the game*



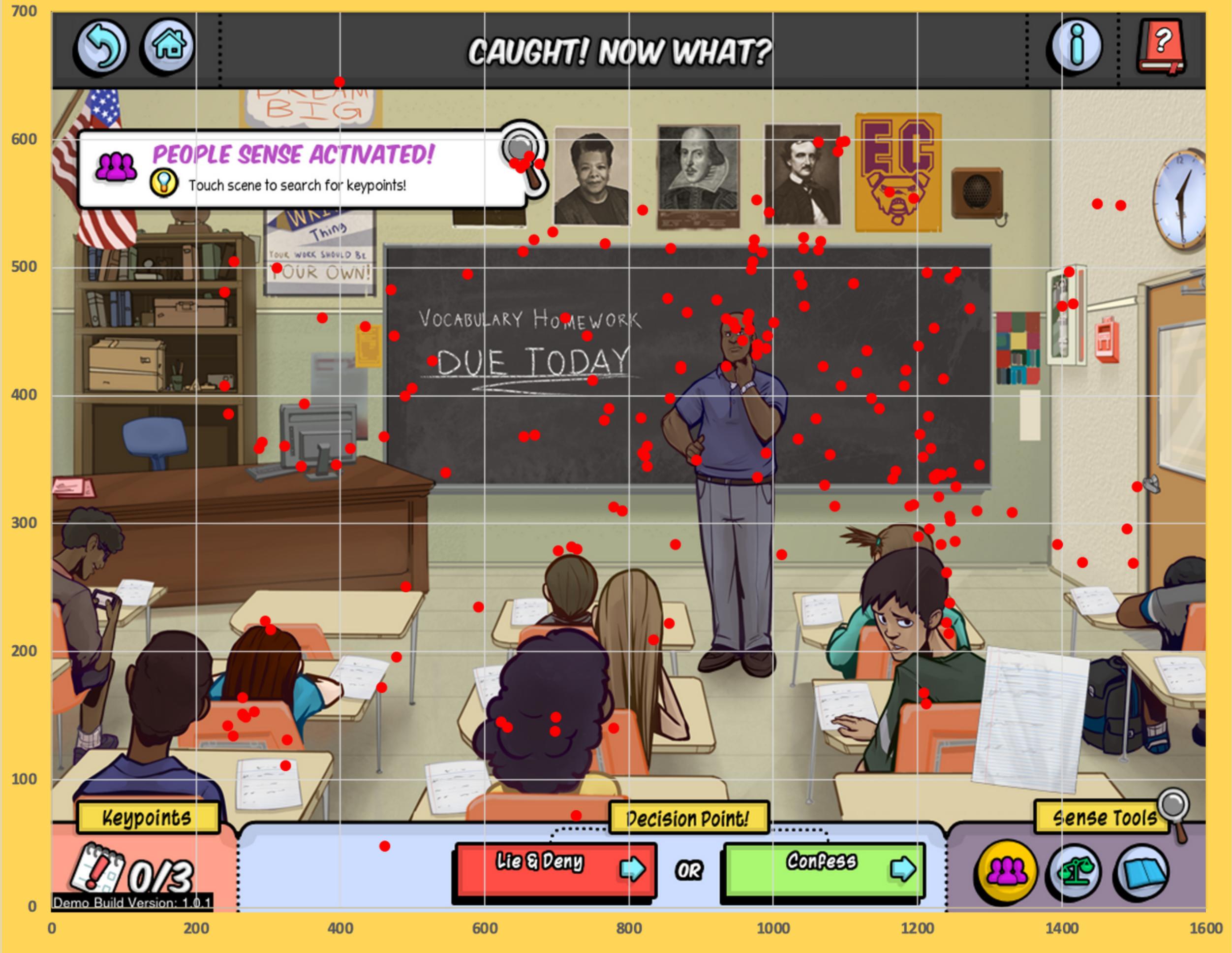
# Make it Easier

- More specific levels and topics based on age and gender of the participants.
- Separate difficult themes into more stacks.
- Measure idle time between scene interactions in a challenge; introduce different hint levels
- Clear explanation after certain number of failed attempts



# Example of tracking player interaction

- Using time and scene interaction
- Measure engagement and difficulty



Player 6486029's first stack



# Challenges

- Difficulty calculating time elapsed between key actions (time to make important decisions)
- Cannot find the meaningful correlation between game data and S5 survey data (need more survey data to show how game behavior imitates life)



# Further Suggestions

- The role of formal education on adolescents' behaviors
  - The significant difference in student performance between schools and the level of games completed
  - S5 survey data shows that the students' refusal efficacy wears off over time
- => School education might be essential in the reinforcement of the themes

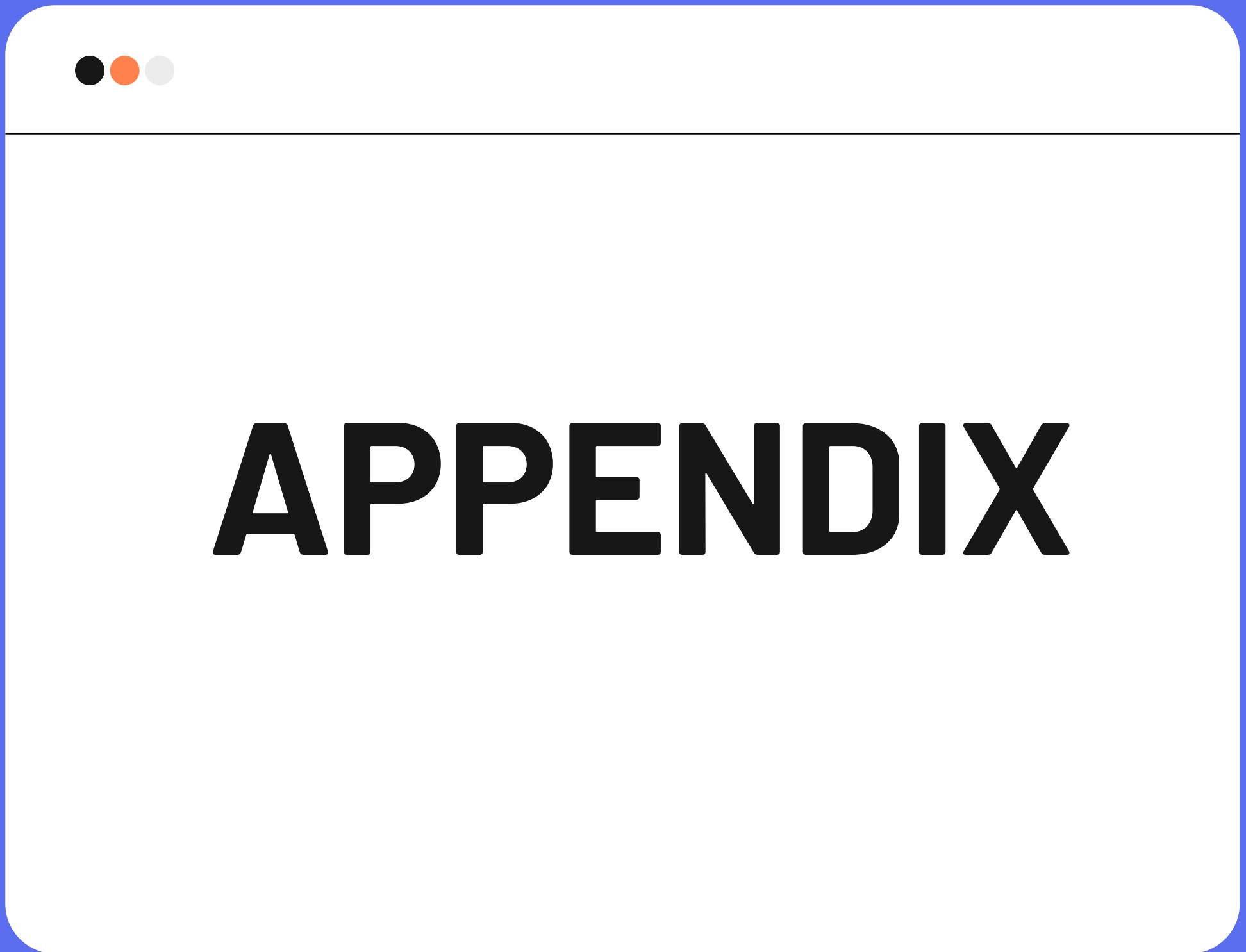


DATA FEST 2022



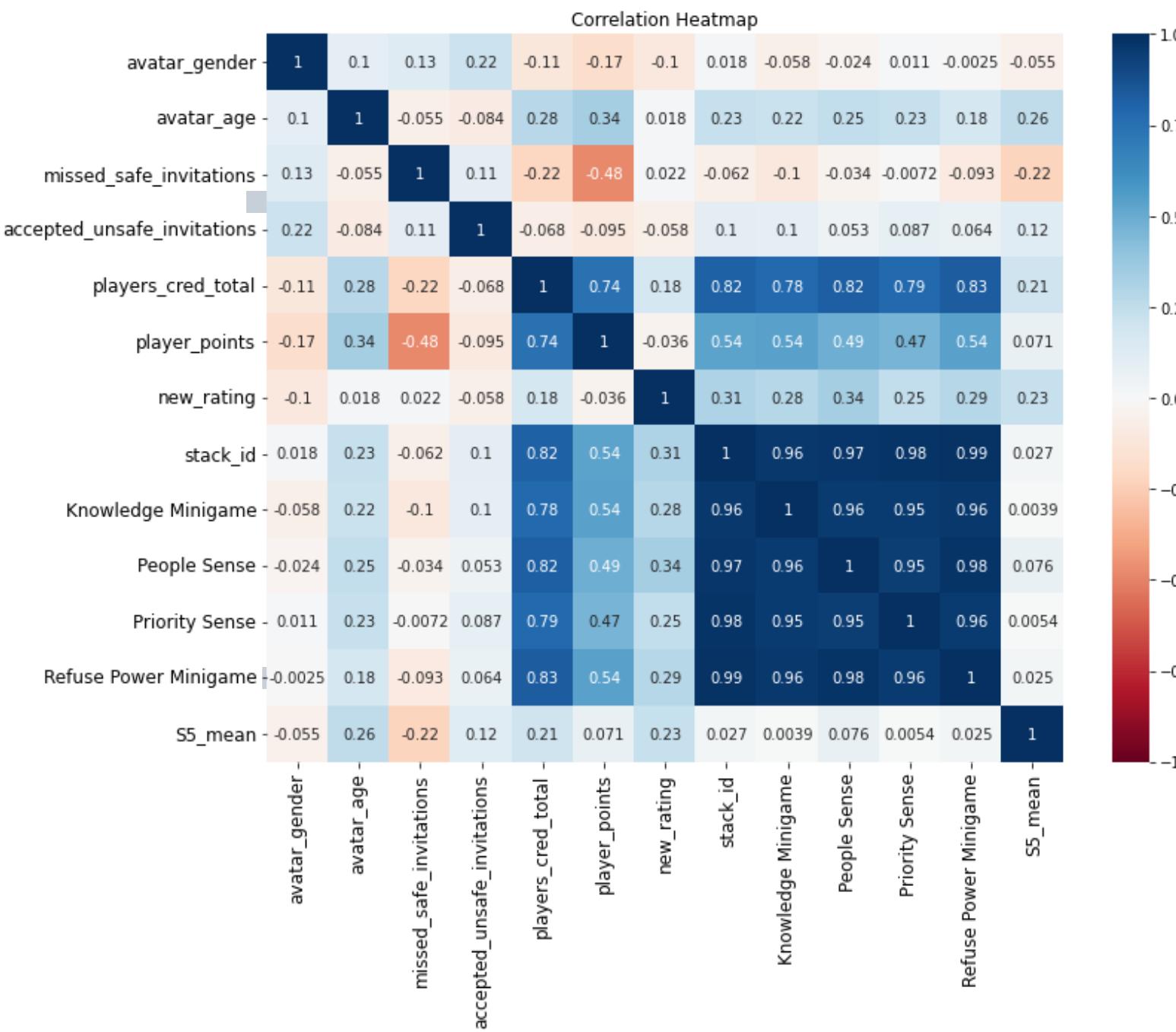
**Thank you  
for listening!**

CLUB 65.5





# Consideration between players' skills and settings



- The number of minigames and challenge stacks unlocked are correlated with one another
- Male avatar players might not perform as well as females
- A strong correlation between average points earned in refusal games in average credential points earned in knowledge game

# Game Themes

Drinking

Relationship

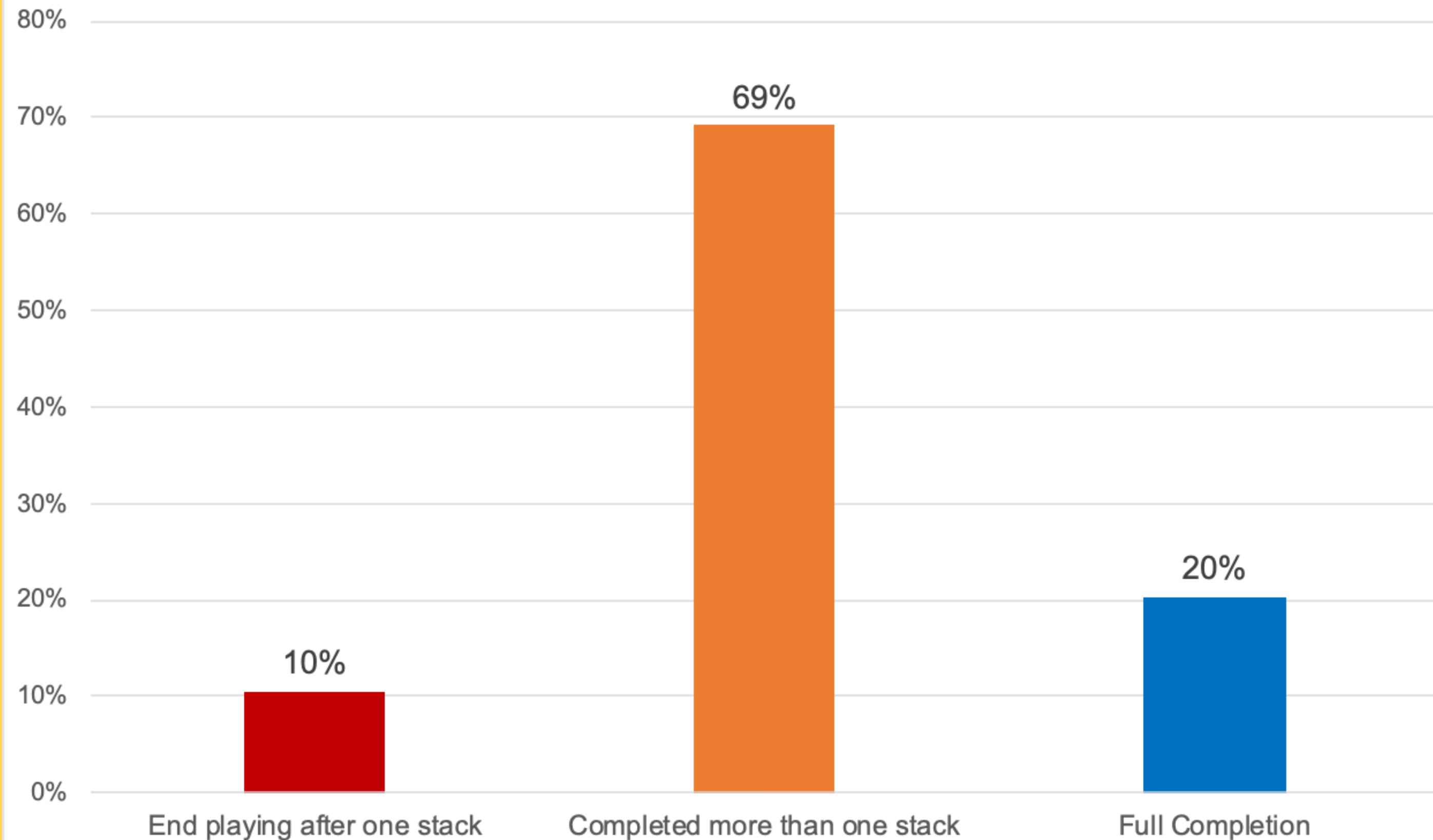
Drugs

Peer Pressure

Sex Education



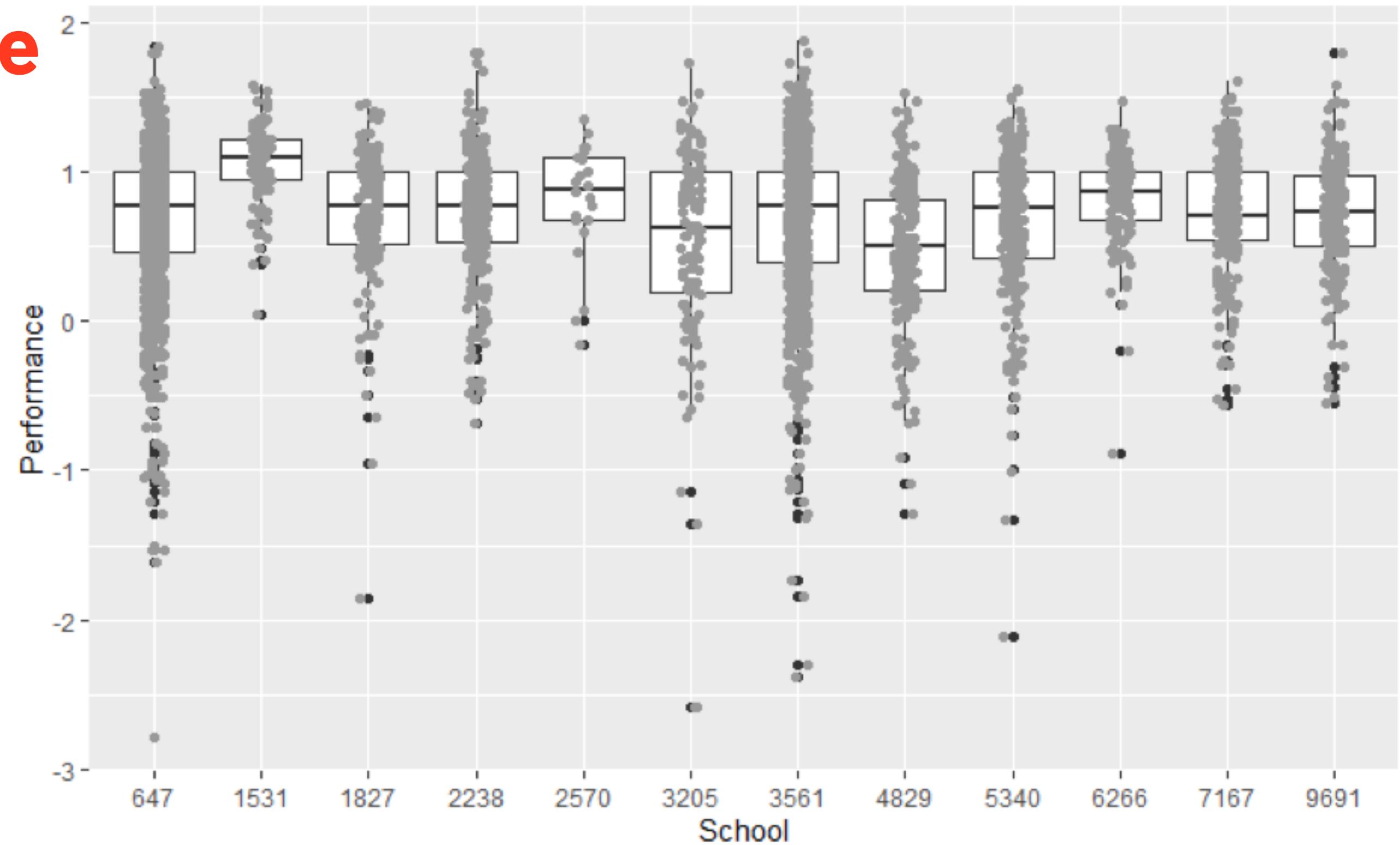
# Distribution of game completion



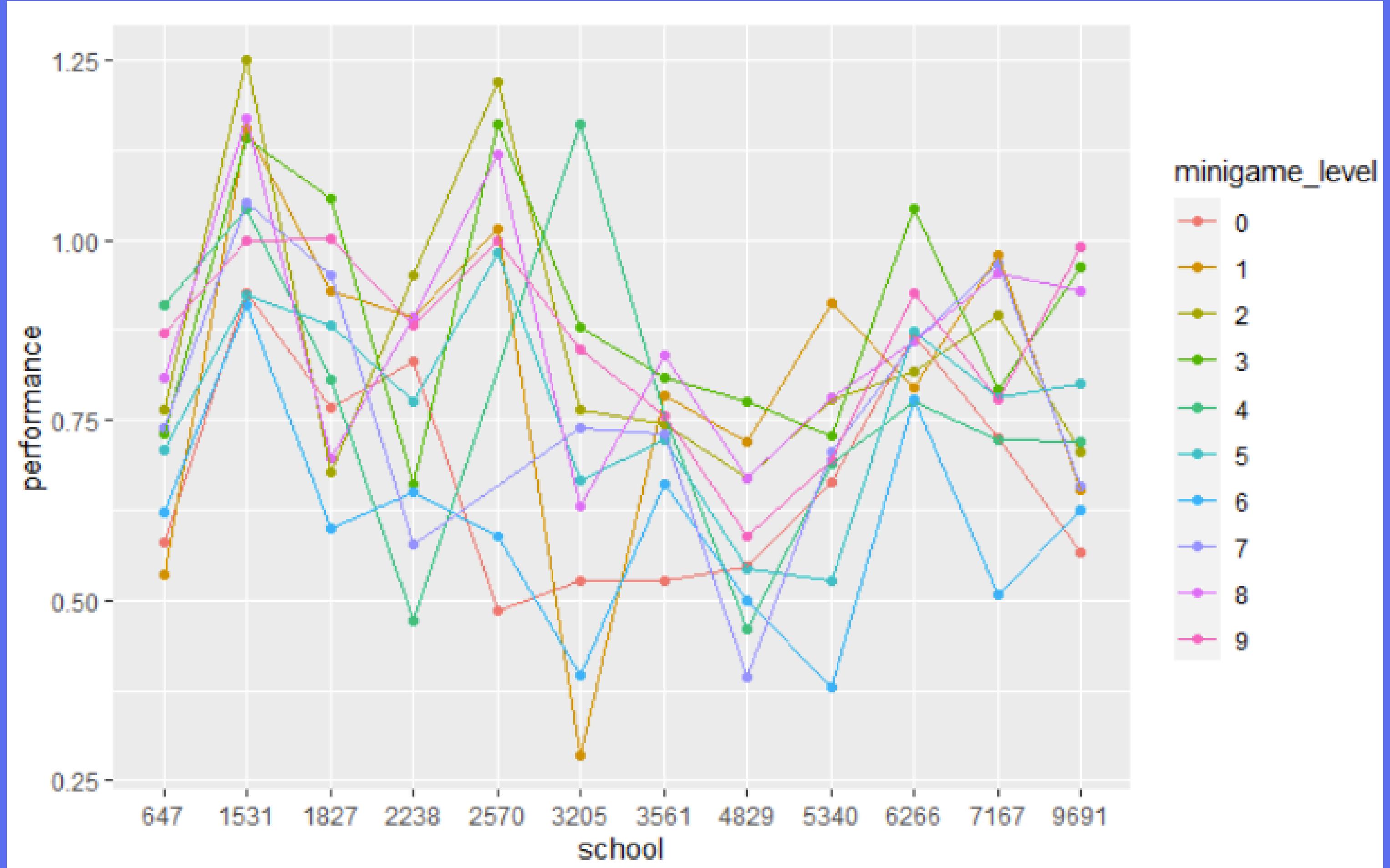
# Differences in Students Response for S5

```
Call:  
  aov(formula = s5_mean ~ weeks + player_id, data = s5_scores)  
  
Terms:  
          weeks player_id Residuals  
Sum of squares 0.040764 11.217586 9.671584  
Deg. of Freedom 1           62           166  
  
Residual standard error: 0.2413764  
Estimated effects may be unbalanced  
10 observations deleted due to missingness  
          Df Sum Sq Mean Sq F value    Pr(>F)  
weeks       1 0.041  0.04076   0.700    0.404  
player_id   62 11.218  0.18093   3.105 4.24e-09 ***  
Residuals  166  9.672  0.05826  
---  
signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
10 observations deleted due to missingness
```

# Performance Distribution By School



# Performance By School



# Percentage of game completion by school

School_id	<20%	20-40%	40-60%	60-80%	80-99.9%	100%	Grand Total
647	23.81%	11.90%	21.43%	2.38%	19.05%	21.43%	100.00%
1531	16.67%	33.33%	16.67%	0.00%	0.00%	33.33%	100.00%
1827	37.50%	25.00%	12.50%	0.00%	12.50%	12.50%	100.00%
2238	10.00%	20.00%	40.00%	0.00%	10.00%	20.00%	100.00%
2570	66.67%	0.00%	33.33%	0.00%	0.00%	0.00%	100.00%
3205	42.86%	14.29%	14.29%	14.29%	0.00%	14.29%	100.00%
3561	26.32%	28.95%	13.16%	0.00%	10.53%	21.05%	100.00%
4828	12.50%	62.50%	12.50%	0.00%	12.50%	0.00%	100.00%
5340	30.77%	23.08%	30.77%	0.00%	0.00%	15.38%	100.00%
6266	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
6366	0.00%	0.00%	0.00%	0.00%	20.00%	80.00%	100.00%
7167	18.18%	27.27%	9.09%	0.00%	27.27%	18.18%	100.00%
9691	30.00%	20.00%	40.00%	0.00%	0.00%	10.00%	100.00%
<b>Grand Total</b>	<b>24.69%</b>	<b>22.22%</b>	<b>19.75%</b>	<b>1.23%</b>	<b>11.73%</b>	<b>20.37%</b>	<b>100.00%</b>



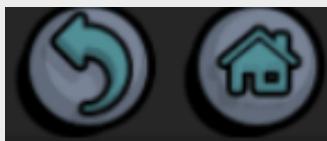
**Likelihood to play again  
(female: 72.3%, male: 55.2%)**

**Likelihood to recommend the  
videogame to friends (female:  
70.8%, male: 53.7%)**



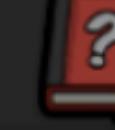
# Citations

1. K. Hieftje, T. Pendergrass, E. Montanaro, T. Kyriakides, O. Florsheim and L. Fiellin, "'But do they like it?' Participant satisfaction and gameplay experience of a public health videogame intervention in adolescents," 2018 IEEE 6th International Conference on Serious Games and Applications for Health (SeGAH), 2018, pp. 1-7, doi: 10.1109/SeGAH.2018.8401349.

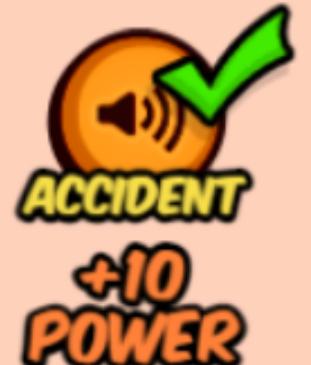


### #3: DRINK & DRIVE

12



How You Did



ACCIDENT  
+10  
POWER



DECISIONS  
+10  
POWER



CAREFUL

💡 Consider what other people say then decide for yourself what is important to make the right choice.

Continue



1 THINK

2 PREPARE

3 REFUSE

```
call:  
lm(formula = performance ~ accepted_unsafe_invitations + missed_safe_invitations +  
minigame_level + time_elapse, data = finaldata)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.68280	-0.18371	0.05515	0.23673	1.80709

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	5.767e-01	1.463e-02	39.417	< 2e-16 ***
accepted_unsafe_invitations	2.289e-02	8.487e-03	2.697	0.00704 **
missed_safe_invitations	-3.909e-01	6.907e-03	-56.589	< 2e-16 ***
minigame_level1	4.205e-01	2.014e-02	20.879	< 2e-16 ***
minigame_level2	1.846e-01	2.136e-02	8.644	< 2e-16 ***
minigame_level3	2.508e-01	2.397e-02	10.464	< 2e-16 ***
minigame_level4	1.628e-01	3.113e-02	5.230	1.79e-07 ***
minigame_level5	1.163e-01	2.735e-02	4.253	2.16e-05 ***
minigame_level6	-2.211e-02	2.231e-02	-0.991	0.32172
minigame_level7	2.317e-01	2.394e-02	9.680	< 2e-16 ***
minigame_level8	2.781e-01	2.392e-02	11.623	< 2e-16 ***
minigame_level9	3.947e-01	2.790e-02	14.146	< 2e-16 ***
time_elapse	8.051e-04	5.771e-05	13.950	< 2e-16 ***

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.3494 on 3661 degrees of freedom

Multiple R-squared: 0.494, Adjusted R-squared: 0.4924

F-statistic: 297.9 on 12 and 3661 DF, p-value: < 2.2e-16