Association Between Player's Knowledge and Video Game Performance

Nicholas Susanto, Joyce Nguyen, Anisha Huq
Department of Statistical Sciences, University of Toronto St. George

1. Background and Introduction

High-risk behaviors are common among teenagers between the ages of 11 and 14. The Elm City game was developed at the Play2Prevent Lab to prevent negative situations by increasing the perception of risk and acquiring healthy skills to prevent adolescents from engaging in risky behavior. Primarily, this report focuses on the "Knowledge sense", "People sense", and "Refusal" games to investigate the linear association between the player's existing knowledge of risky behaviors and their performance in the game.

2. Methods

Total points scored was used as a measure of a player's knowledge about risky behaviors. Initially, we considered a linear model against age and various success indicators (such as average points, accepted unsafe invitations, etc.) from "People Sense" and "Refusal Sense" minigames which are aggregated from all sessions played by each player. The final model using a subset of the original predictors was chosen based on a stepwise algorithm that accounted for various criteria, e.g., R^2 , Mallow's Cp, and AIC. Then, we drew predictions between their existing knowledge and their ability to manipulate those tools in other scenarios, such as in different age groups, or in the face of safe/unsafe invitations to further understand the association being investigated.

3. Results

We found that ultimately, average points loss in the "Refusal Sense" game, total missed safe invitations, and total accepted unsafe invitations, were the significant predictors all at the 0.05 significance level. In contrast, age was not a significant predictor and neither was average total points in the "People Sense" game. More specifically, the model indicates that all of the three significant predictors are negatively associated with average total knowledge score as they all had negative coefficient estimates.

4. Discussion

We found that certain behaviors in the game, such as the amount of lost points in the "Refusal Sense" game, and the total number of missed safe invitations and accepted unsafe invitations, are important in potentially determining knowledge of risky behaviors. On the other hand, potentially demographic data like age does not play a significant role. This is important because the models suggest that the game would be more effective if the researchers could shift their focus from certain demographic features like age to behaviors that possibly minimize point loss in the "Refusal Sense" game, and missed safe and accepted unsafe invitations.

5. Conclusion

Overall, it was found that bad decisions made by teenagers are potentially a result of a lack of fundamental knowledge. Looking more closely, we notice that sometimes even with better knowledge, average points in "People Sense" game, point loss in "Refusal Game", and total missed safed and accepted unsafe invitations do not change much. These performances might indicate the player's tendency of encountering risky behaviors regardless of their knowledge of its consequences. Our analysis is primarily preliminary and is not generalized to a larger population beyond the sample, but it may lead to a better focus on early education on unhealthy behaviors and subsequently allocate proper resources to improve them. Hence, further investigation should be conducted to make accurate inferences.