

Restaurant Rockstar: A Mobile Game that Teaches
Students How to Read Nutritional Fact Labels
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INTRODUCTION

Obesity has reached epidemic proportions in urban youth. Poverty is known to be the single most reliable predictor of obesity in the United States. Yet, food awareness is another major covariate with obesity. Consequently, we designed a game to inform urban youth about the nutritional content of common food items. The game incorporated 100 randomly selected foods from the NDL/FNIC SR-25 Abridged Nutritional Facts database, which is composed of over 8000 food items and 53 macro- and micronutrients. It was predicted that students who played the game were more likely to score higher on a post-game assessment of nutrition than students who were merely told to memorize the content.

METHODS

Participants were recruited from the York College Research Pool, which is composed mainly of 18-year-old freshmen. Half of the participants were randomly assigned to play the game, which offered feedback, a reward/punishment system, and competition. The remaining participants were given a text-based lesson on nutrition that included the same information as the experimental condition, but without game mechanics. In the game, subjects were asked to respond to challenges by preparing meals using the ingredients from the NDL/FNIC database. Challenges placed an emphasis on certain macronutrients to draw the students' attention to the relationship between the food (e.g., "fish") and the macronutrient (e.g., "protein"). Subjects participated in a post-experiment quiz, where they estimated five macronutrient values (lipids, cholesterol, sodium, carbohydrates, and protein) for 20 randomly selected foods from the database. The game board, rules of the game, and data sheets are presented in Figures 1-3.

RESULTS

Data from score sheets were compared to the actual values for macronutrients from the SR25 database. The absolute difference between the subject data and the correct value was computed and summed across all categories and subjects. 124 subjects participated in the experimental condition and 25 subjects participated in the control condition. The mean difference for the experimental group was 3951(SD=5188) and the mean difference for the control group was 4699 (SD=2646). Nonparametric statistics revealed that the control group exhibited a larger error in the post-test than the experimental group, $C^2=64.68$, $p<0.05$.

DISCUSSION

Students who participated in the board game performed better on a post-treatment assessment of nutrition than students who only memorized nutrition fact cards. Pilot data from this game were used to inform the design of a digital game that was recently used to collect data from 100 freshmen at York College (Figures 4-5).

To reach a national audience, a mobile version of the game (Figure 6) was developed for iPad (Apple Computers, Cupertino, CA). Game assets were modified and several levels of increasing difficulty were created to encourage long-lasting engagement with the game and sustained practice with the content. We anticipate students who have experience with the game will perform better on post-game assessments of nutrition facts compared to students who are only offered a text-based version of content.

Figure 1: Game Board

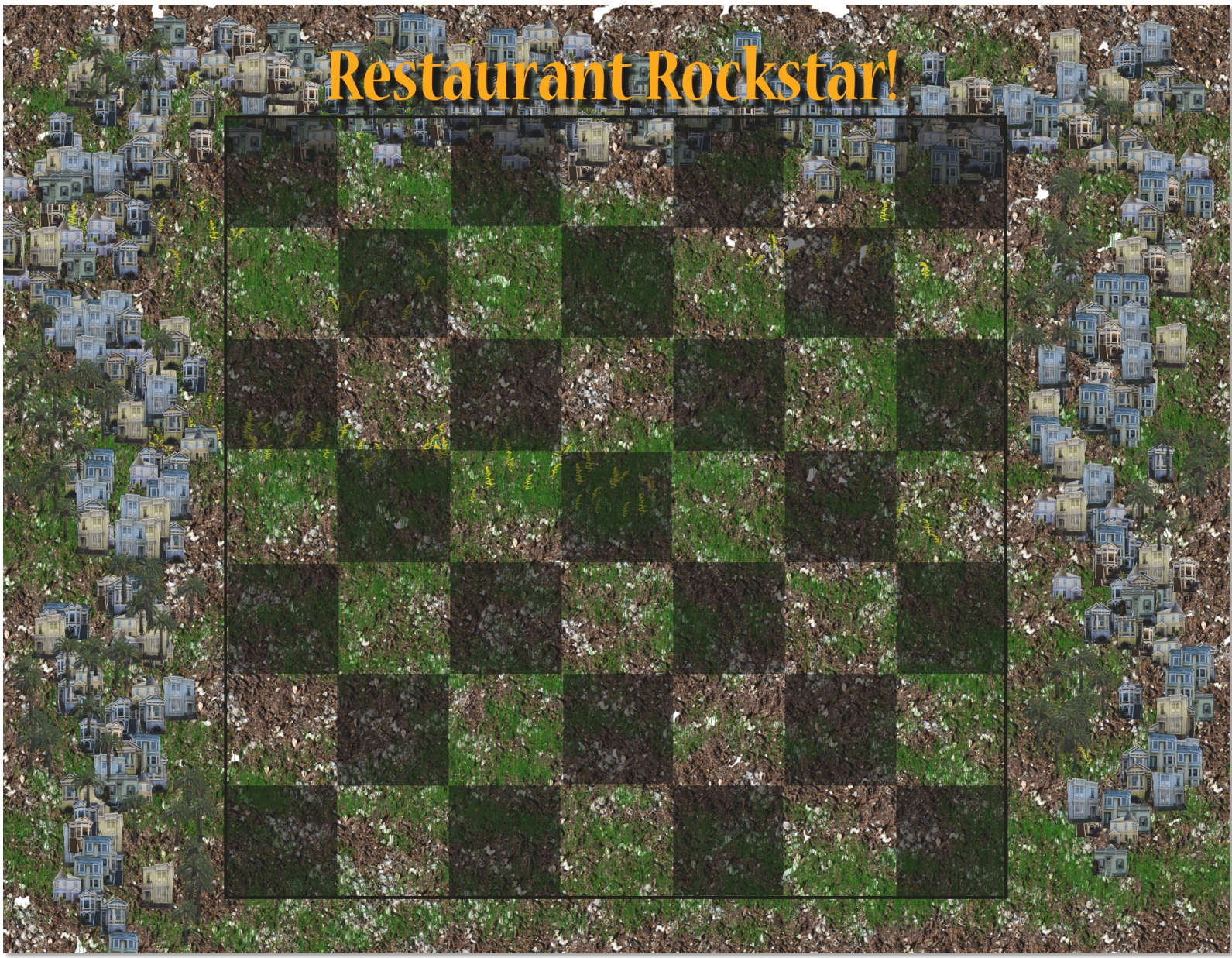


Figure 4: Digital Challenge Card



Figure 5: Digital Food Card

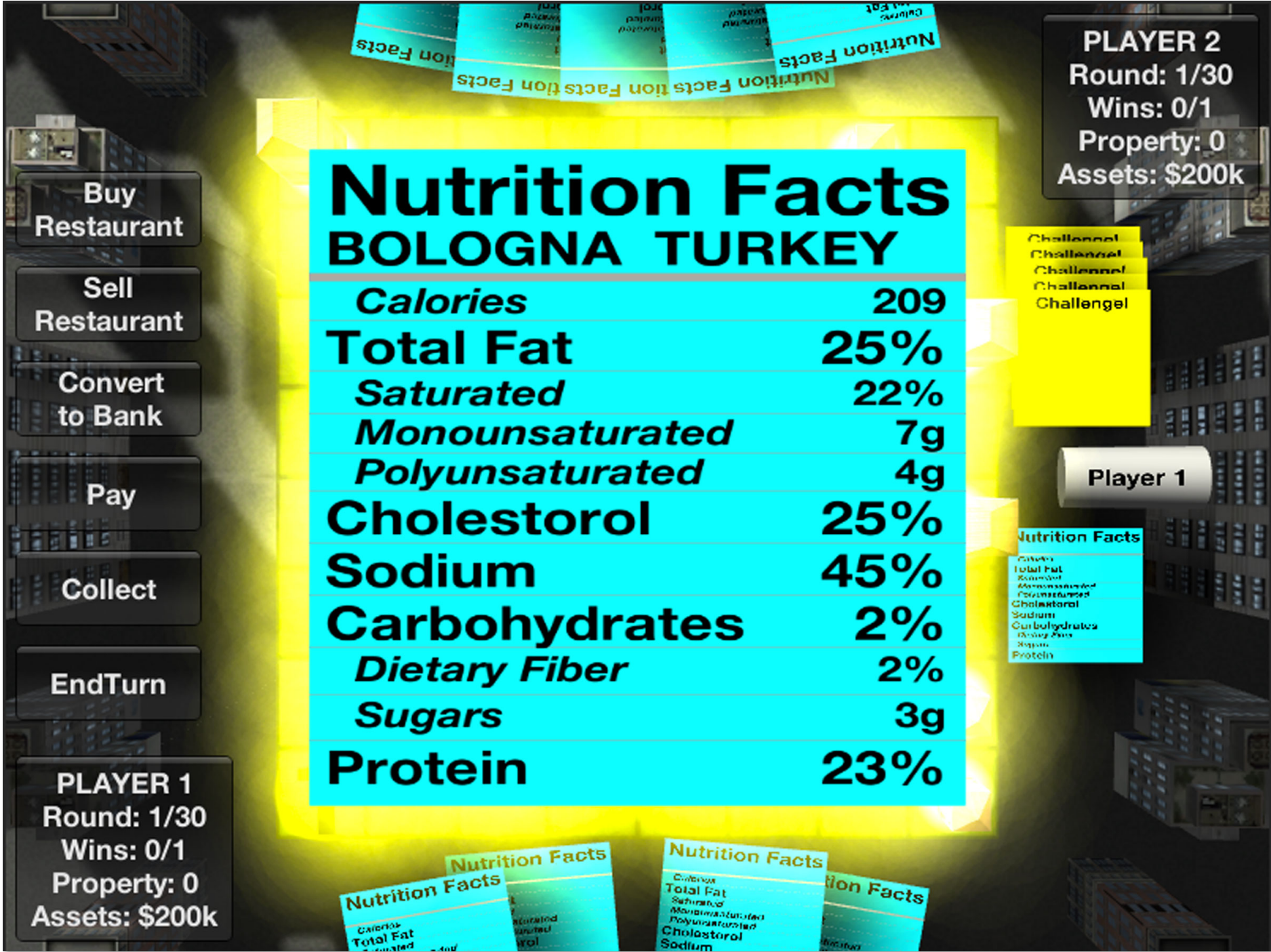


Figure 2: Game Rules

RESTAURANT ROCKSTAR!

Rules of the Game

List of Materials:

- Game Board
- Two player tokens
- Restaurant tokens
- Bank and Retail tokens
- 100 Food Cards
- 30 Challenge Cards
- Score Cards
- \$10,000 bills
- \$100,000 bills

Setting up the Game:

- Each player takes turns laying down 10 buildings (small yellow cards) on the board.
- Each player gets \$500,000.
- Shuffle the Blue Food Cards and place in a pile face down.
- Shuffle the large Yellow Question Cards and place face down.
- Each player places their own token anywhere on the board that is not occupied.

Game Objective:

Fresh out of culinary school and ready to start your own chain of restaurants! Your goal is to open as many restaurants as you can. But you have to be the best or the competition will win the market. The winner of the game is the one who can open the most restaurants within 30 rounds of play. To beat the competition, you need to prepare foods that have the highest nutrition content per calorie. Winning cooking competitions during each round of play earns you money to open your own restaurants on a map of the city.

How to Play:

- Round of Play:**
 - Except for the first round, the winner of the previous round goes first.
 - Each player moves 1 space.
 - Turn over a Yellow Question Card to reveal a cooking challenge.
 - Deal 5 Blue Food Cards to each player.
 - Exchange up to 3 of your Food Cards with new cards from the deck.
 - Respond to the challenge by selecting three cards from your hand. Don't forget to name your dish!
 - Write down the nutritional values (e.g., grams of sugar) for each Food Card.
 - Determine who won this round using your calculator. Losers pay the winner \$50,000.
 - Players decide whether to open a restaurant on the current space (\$200,000).
 - If a player needs money, they can sell any of their properties for cash to the bank (\$200,000).
 - Place all Food Cards into a discard pile. Reshuffle the deck if you need more cards.
- Additional Rules:**
 - If a player lands on another player's restaurant, they can purchase the property immediately from the player for double the original value (\$400,000). Or, the player forfeits the opportunity to build a restaurant on that round.
 - If a player lands on an otherwise occupied territory (e.g., bank), the property can be converted into a restaurant for a fee (\$400,000). Or, the player forfeits the opportunity to build a restaurant on that round.
 - If a player runs out of cash, they can choose a property to sell to the bank for cash. The restaurant property gets converted into a bank.
 - If a player has no money, they can still play.
 - If a player beats a penniless player in a challenge, they are awarded money from the bank.
 - In the event of a tie, players replay the round until there is a winner.
- Ending the Game:**
 - At the end of the final round, property is valued and the player with the greatest net worth wins. All property is valued at \$200k.
 - If there is a tie, the players go into a sudden-death cooking contest.

Figure 3: Data sheets

SUBJECT ID:		DATE:				
		Lipid_Tot_(g)	Cholestrl_(mg)	Sodium_(mg)	Carbohydrt_(g)	Protein_(g)
1	YOGURT,PULLIOTAT					
2	SOUP,CLAM CHOWDER					
3	BOLOGNA,BF					
4	BANANAS,RAW					
5	PORK,RIBS					
6	CABBAGE,RAW					
7	BREAD,CRACKED-WHEAT					
8	GARDEN VEGGIE PATTIE					
9	BRANGLIA,BAM					
10	CHEESE,CHEDDAR					
11	MELONS,HONEYDEW,RAW					
12	KALE,RAW					
13	LAMB,LEG,SHIRLOIN					
14	ENGLISH MUFFIN					
15	POPCORN,AIR-POPPED					
16	APRICOTS,RAW					
17	APPLES,RAW					
18	SUNFLOWER SEEDS,KERNELS					
19	COD,ATLANTIC,RAW					
20	PASTA,SPINACH					

RESTAURANT ROCKSTAR SCORECARD				
Player ID:	Date & Time:			
ROUND	1st FOOD	2nd FOOD	3rd FOOD	NAME YOUR DISH
Nutritional Value of the Ingredients				
				BALANCE
1				\$500,000
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
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26				

Figure 6: Mobile Game Board

