ABSTRACT
The purpose of this study, inspired by observations of the increased use of data-driven fitness activity trackers, is to measure how different data display formats influence the perception of calories burned vs. consumed, and to assess the role of Need for Cognition. Participants evaluated different charts, tables, and graphs created from identical data: 1 line graph, 2 bar graphs, 1 pie chart, 1 table, 1 radar graph, and 3 visual displays. Questions assessed interpretation and understanding of the material as well as personal perception of the informational and motivational value of the displays. Respondents ranked motivational power of the displays in the following order (most to least): visual display, table, pie chart, line graph. Average BMI of the participants was 26.84, with a max of 49.59 and min of 17.16. Consideration of Future Consequences and Need for Cognition were also included. The results can be applied to the health and medical fields by providing insights into data display formats that are more likely to promote healthy diets, exercise, and maximize medical prescription adherence.

INTRODUCTION
• Since 1950, sedentary jobs increased 83% and less than 20% of workers are considered physically active.
• Wearables are expected to grow at a compound annual rate of 35% over the next 5 years from 2015.
• Fitness bands and other miscellaneous devices account for 36% of the wearable device market with 33 million units shipped in 2015.
• Internet-driven fitness activity trackers, such as the Fitbit, display progress more visually and offer significant advantages over traditional devices such as pedometers.

METHODS
81 Question Survey
• Qualities survey software
• 10 different data displays: 1 data set
• 273 respondents
• OSU undergraduates and Amazon’s Mechanical Turk (paid)
• Mixture of timed accuracy tests, perception of informative and motivational value, and preference
• Includes Need for Cognition scale and Consideration of Future Consequences scale

Sample Questions
• Based on the data from the previous graph, which day of the week was the amount of calories burned more than the amount of calories eaten?
• Please rate the 3 displays based on their ability to motivate you to eat healthier or exercise more, from 0 (not at all motivating) to 10 (very motivating)
• Which graph do you prefer as a progress tracker?
• I find satisfaction in deliberating hard and for long hours
• When I make a decision, I think about how it might affect me in the future

RESULTS

| Figure 4: Perceived importance of display characteristics
| Figure 5: Accuracy rate by Need for Cognition
| Figure 6: Perceived level of motivational power

CONCLUSIONS
• A table is the most informative and meaningful data display format; respondents who ranked in the bottom 25% in Need for Cognition and those who ranked in the top 25% both found the table easier to understand (they took less time to view the table yet answered more accurately) than the line graph.
• How data is displayed influences the severity of conclusions people deduce from data, even when the data itself is unchanged (the same data set is used to create every display).
• Respondents prefer clarity and informative value over portability and appearance-related characteristics.
• Respondents perceived the visual data displays as showing more consistency in calorie intake vs. expenditure, yet consider them to have more motivational power in getting them to eat healthier or exercise more.

Line graphs are perceived as the least informative and meaningful type of display, as well as the least motivating for this study.

BIBLIOGRAPHY


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