# BIOS 6643 Final Project

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### **Introduction**

Individuals who classified as overweight or obese were enrolled into the study to understand factors that contribute to weight loss. Participants were asked to step on a bluetooth scale once a day over the course of the study. Within the study, there are 3 cohorts. These cohorts indicate participants who started the study around the same time.

**Cohort 1 (N = 29)**

* 29 people beginning 04/10/2018 – 07/01/2018 (All but 1 began on in April and May)
* Ending between 11/14/2018 – 02/20/2020

**Cohort 2 (N = 26)**

* 26 people beginning 02/13/2019 – 09/30/2019 (All but 2 began between 02/13/2020 – 02/16/2020)
* Ending between 12/22/2019 – 04/20/2020 (All but 2 ended between 04/05/2020 – 04/20/2020)

**Cohort 3 (N = 36)**

* 36 people beginning 09/30/2019 – 11/05/2020
* Ending between 12/02/2019 – 04/20/2020 (All but 2 ended in March or April)

The research questions of interest are :

* What is the trajectory of weight over the duration of time in the study?
* Is there a relationship between month of study and weight loss, when accounting for sex and age?

### **Methods**

#### **Data Cleaning**

In order to use the FPCA method, we filled in missing dates.

#### **Data Analysis**

### **Results**

|  | **Cohort 1 (N=29)** | **Cohort 2 (N=26)** | **Cohort 3 (N=36)** | **Overall (N=91)** |
| --- | --- | --- | --- | --- |
| **Age** |  |  |  |  |
| Mean (95% CI) | 42 (27.13, 55.1) | 42 (22.21, 54.7) | 44 (22.96, 54.47) | 42 (22.55, 54.89) |
| Missing | 0 (0%) | 1 (3.8%) | 0 (0%) | 1 (1.1%) |
| **Sex** |  |  |  |  |
| Female | 21 (72.4%) | 19 (73.1%) | 29 (80.6%) | 69 (75.8%) |
| Male | 8 (27.6%) | 6 (23.1%) | 7 (19.4%) | 21 (23.1%) |
| Missing | 0 (0%) | 1 (3.8%) | 0 (0%) | 1 (1.1%) |
| **Race** |  |  |  |  |
| Asian | 0 (0%) | 1 (3.8%) | 4 (11.1%) | 5 (5.5%) |
| Black | 0 (0%) | 3 (11.5%) | 4 (11.1%) | 7 (7.7%) |
| White | 26 (89.7%) | 21 (80.8%) | 28 (77.8%) | 75 (82.4%) |
| Other | 3 (10.3%) | 0 (0%) | 0 (0%) | 3 (3.3%) |
| Missing | 0 (0%) | 1 (3.8%) | 0 (0%) | 1 (1.1%) |
| **Ethnicity** |  |  |  |  |
| Hispanic or Latino | 4 (13.8%) | 3 (11.5%) | 10 (27.8%) | 17 (18.7%) |
| Non Hispanic or Latino | 25 (86.2%) | 22 (84.6%) | 26 (72.2%) | 73 (80.2%) |
| Missing | 0 (0%) | 1 (3.8%) | 0 (0%) | 1 (1.1%) |
| **Marital Status** |  |  |  |  |
| Single | 3 (10.3%) | 6 (23.1%) | 7 (19.4%) | 16 (17.6%) |
| Committed Relationship | 4 (13.8%) | 1 (3.8%) | 4 (11.1%) | 9 (9.9%) |
| Married | 21 (72.4%) | 14 (53.8%) | 25 (69.4%) | 60 (65.9%) |
| Divorced | 1 (3.4%) | 4 (15.4%) | 0 (0%) | 5 (5.5%) |
| Missing | 0 (0%) | 1 (3.8%) | 0 (0%) | 1 (1.1%) |
| **Baseline Weight** |  |  |  |  |
| Mean (95% CI) | 210  (167.07, 277.78) | 210  (156.47, 293.77) | 220  (163.28, 292.97) | 210  (158.57, 291.95) |
| **Total Measures** |  |  |  |  |
| Mean (95% CI) | 310  (127.6, 525.4) | 310  (97, 459.25) | 130  (35.88, 212.5) | 240  (42.25, 487.25) |
| **Time Span** |  |  |  |  |
| Mean (95% CI) | 550  (324.8, 600) | 410  (233.38, 433) | 180  (144.25, 202) | 360  (159.25, 600) |

***Table 1. Cohort Characteristics***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Effect** | **Estimate** | **Standard Error** | **DF** | **t Value** | **Pr > |t|** |
| **Intercept** | 257.75 | 17.7749 | 82 | 14.50 | <.0001 |
| **Cohort** |  |  |  |  |  |
| Cohort 1 | -13.0229 | 8.4097 | 82 | -1.55 | 0.1253 |
| Cohort 2 | -20.1874 | 8.1817 | 82 | -2.47 | 0.0157 |
| **Sex = Female** | -29.5361 | 7.8177 | 82 | -3.78 | 0.0003 |
| **Age** | -0.4813 | 0.3599 | 82 | -1.34 | 0.1848 |
| **Race** |  |  |  |  |  |
| Asian | -32.7713 | 14.9763 | 82 | -2.19 | 0.0315 |
| Black/African American | 22.0760 | 12.7268 | 82 | 1.73 | 0.0866 |
| Other | -5.2281 | 18.8988 | 82 | -0.28 | 0.7828 |
| **Days in Study** | 0.0076 | 0.004578 | 15E3 | 1.65 | 0.0985 |
| **Month** |  |  |  |  |  |
| Jan | 0.3882 | 0.1847 | 752 | 2.10 | 0.0359 |
| Feb | 0.0142 | 0.2531 | 752 | 0.06 | 0.9552 |
| Mar | 0.2309 | 0.2969 | 752 | 0.78 | 0.4369 |
| Apr | 0.1749 | 0.3277 | 752 | 0.53 | 0.5936 |
| May | -0.4406 | 0.3624 | 752 | -1.22 | 0.2245 |
| Jun | -0.7535 | 0.3724 | 752 | -2.02 | 0.0434 |
| Jul | -0.3909 | 0.3701 | 752 | -1.06 | 0.2911 |
| Aug | -1.1872 | 0.3485 | 752 | -3.41 | 0.0007 |
| Sep | -0.4939 | 0.3138 | 752 | -1.57 | 0.1159 |
| Oct | -0.6566 | 0.2499 | 752 | -2.63 | 0.0088 |
| Nov | -0.5303 | 0.1828 | 752 | -2.90 | 0.0038 |

***Table 2. Linear Mixed Model Effect Estimates (AIC = 61726.4)***

**Note:** Reference levels - Cohort = 3, Sex = Male, Race = White, Month = December

61744.5

### **Discussion**