

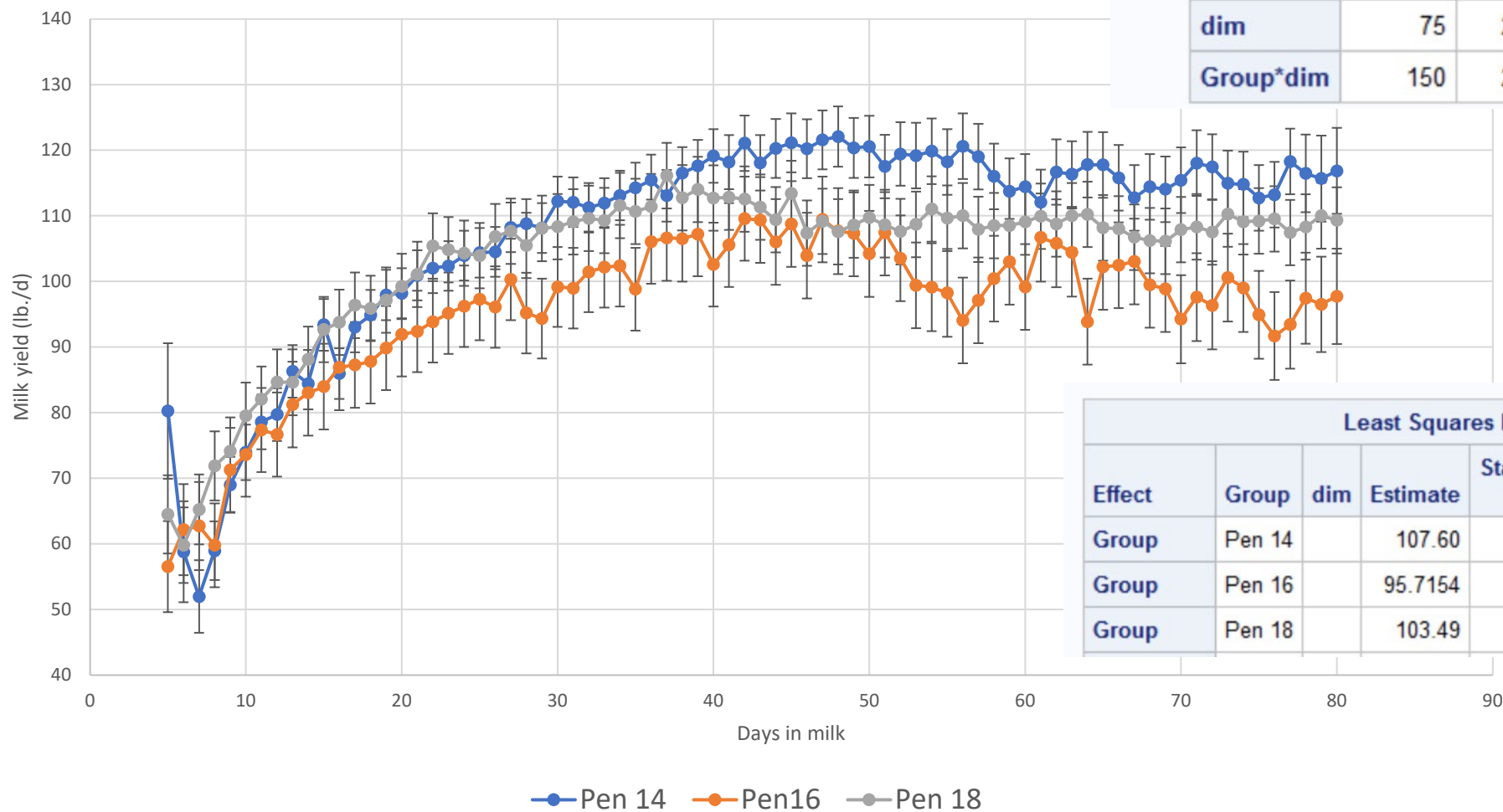
Icon dairy

Period in Analysis: 10/22/2020 to 1/6/2021

Inclusion criteria

- Cows exposed to lights from calving to 30 days after calving
- Enrollment period 10/22/2020 to 12/17/2021
- Pen 14 (XIANT), n = 33
- Pen 16, n = 13
- Pen 18, n = 19
- Only multiparous cows included

Milk yield by days in milk



Null Model Likelihood Ratio Test

| DF | Chi-Square | Pr > ChiSq |
|----|------------|------------|
| 1 | 4254.47 | <.0001 |

Type 3 Tests of Fixed Effects

| Effect | Num DF | Den DF | F Value | Pr > F |
|-----------|--------|--------|---------|--------|
| Group | 2 | 62 | 1.72 | 0.1871 |
| dim | 75 | 2880 | 43.97 | <.0001 |
| Group*dim | 150 | 2880 | 1.57 | <.0001 |

Least Squares Means

| Effect | Group | dim | Estimate | Standard Error | DF | t Value | Pr > t |
|--------|--------|-----|----------|----------------|----|---------|---------|
| Group | Pen 14 | | 107.60 | 3.4238 | 62 | 31.43 | <.0001 |
| Group | Pen 16 | | 95.7154 | 5.4356 | 62 | 17.61 | <.0001 |
| Group | Pen 18 | | 103.49 | 4.4793 | 62 | 23.10 | <.0001 |

Milk yield by dim up to 30 dim

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 61 | 1.16 | 0.3198 |
| dim | 25 | 1194 | 71.44 | <.0001 |

| Least Squares Means | | | | | | |
|---------------------|--------|----------|----------------|----|---------|---------|
| Effect | Group | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | 89.6822 | 3.7314 | 61 | 24.03 | <.0001 |
| Group | Pen 16 | 80.1285 | 6.2175 | 61 | 12.89 | <.0001 |
| Group | Pen 18 | 91.6358 | 4.9030 | 61 | 18.69 | <.0001 |

| Differences of Least Squares Means | | | | | | | | | |
|------------------------------------|--------|--------|----------|----------------|----|---------|---------|--------------|--------|
| Effect | Group | Group | Estimate | Standard Error | DF | t Value | Pr > t | Adjustment | Adj P |
| Group | Pen 14 | Pen 16 | 9.5537 | 7.2474 | 61 | 1.32 | 0.1924 | Tukey-Kramer | 0.3906 |
| Group | Pen 14 | Pen 18 | -1.9536 | 6.1577 | 61 | -0.32 | 0.7521 | Tukey-Kramer | 0.9461 |
| Group | Pen 16 | Pen 18 | -11.5073 | 7.9164 | 61 | -1.45 | 0.1512 | Tukey-Kramer | 0.3203 |

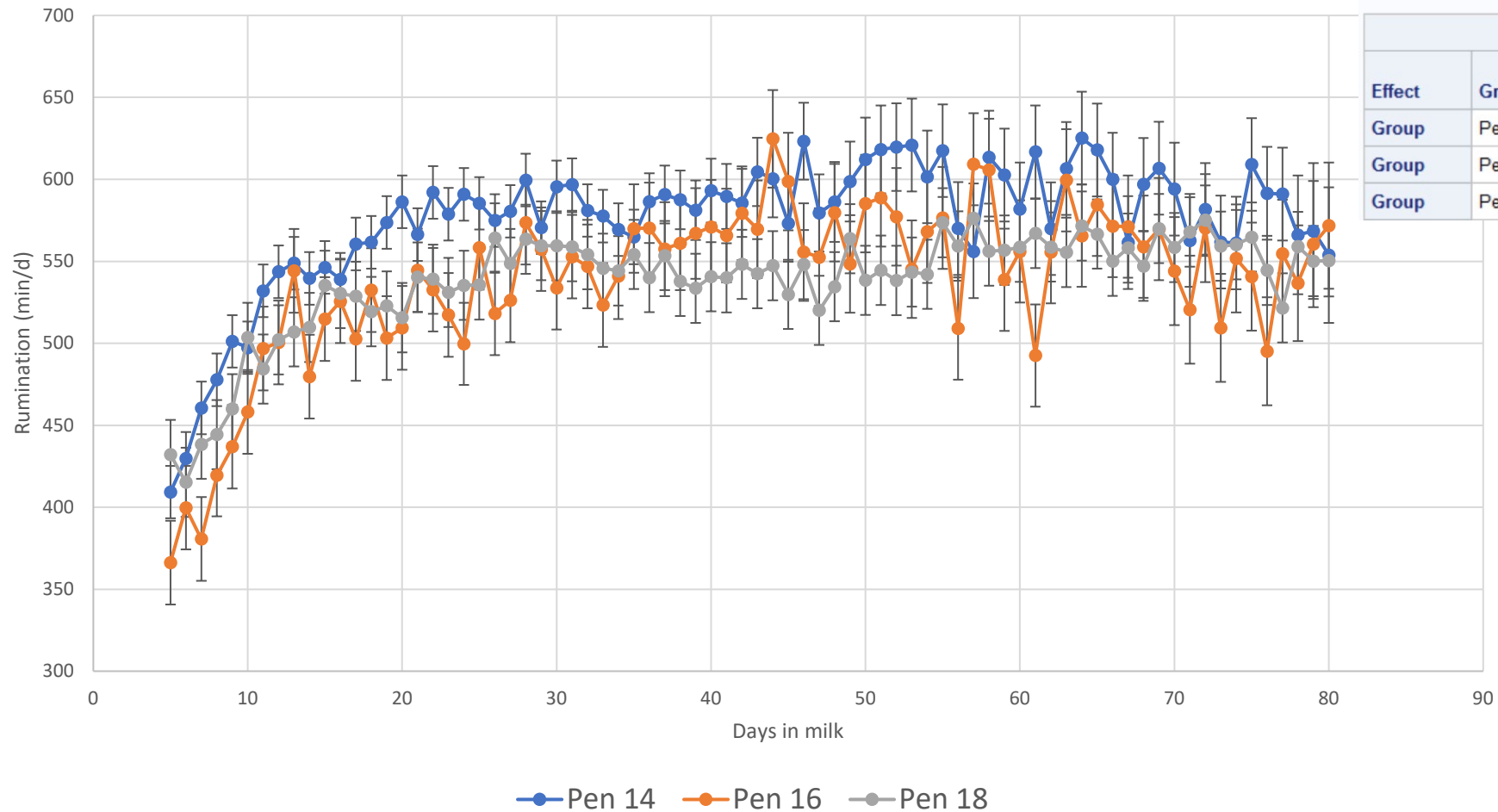
Milk yield by dim between 30 and 60 dim

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 1.75 | 0.1825 |
| dim | 30 | 1229 | 1.88 | 0.0028 |

| Least Squares Means | | | | | | |
|---------------------|--------|----------|----------------|----|---------|---------|
| Effect | Group | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | 114.73 | 3.6562 | 62 | 31.38 | <.0001 |
| Group | Pen 16 | 101.92 | 5.8260 | 62 | 17.49 | <.0001 |
| Group | Pen 18 | 110.23 | 4.7880 | 62 | 23.02 | <.0001 |

| Differences of Least Squares Means | | | | | | | | | |
|------------------------------------|--------|--------|----------|----------------|----|---------|---------|--------------|--------|
| Effect | Group | Group | Estimate | Standard Error | DF | t Value | Pr > t | Adjustment | Adj P |
| Group | Pen 14 | Pen 16 | 12.8098 | 6.8739 | 62 | 1.86 | 0.0671 | Tukey-Kramer | 0.1579 |
| Group | Pen 14 | Pen 18 | 4.5001 | 6.0243 | 62 | 0.75 | 0.4579 | Tukey-Kramer | 0.7366 |
| Group | Pen 16 | Pen 18 | -8.3097 | 7.5410 | 62 | -1.10 | 0.2747 | Tukey-Kramer | 0.5165 |

Rumination by days in milk



| Null Model Likelihood Ratio Test | | |
|----------------------------------|------------|------------|
| DF | Chi-Square | Pr > ChiSq |
| 1 | 1660.38 | <.0001 |

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 2.69 | 0.0758 |
| dim | 75 | 3324 | 14.32 | <.0001 |
| Group*dim | 150 | 3324 | 0.99 | 0.5168 |

| Least Squares Means | | | | | | | |
|---------------------|--------|-----|----------|----------------|----|---------|---------|
| Effect | Group | dim | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | | 574.57 | 11.0539 | 62 | 51.98 | <.0001 |
| Group | Pen 16 | | 538.83 | 17.2744 | 62 | 31.19 | <.0001 |
| Group | Pen 18 | | 538.24 | 14.1658 | 62 | 38.00 | <.0001 |

Rumination by dim up to 30 dim

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 2.23 | 0.1159 |
| dim | 25 | 1600 | 26.67 | <.0001 |

| Least Squares Means | | | | | | |
|---------------------|--------|----------|----------------|----|---------|---------|
| Effect | Group | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | 543.91 | 12.8821 | 62 | 42.22 | <.0001 |
| Group | Pen 16 | 497.70 | 20.5221 | 62 | 24.25 | <.0001 |
| Group | Pen 18 | 512.53 | 16.9772 | 62 | 30.19 | <.0001 |

| Differences of Least Squares Means | | | | | | | | | |
|------------------------------------|--------|--------|----------|----------------|----|---------|---------|--------------|--------|
| Effect | Group | Group | Estimate | Standard Error | DF | t Value | Pr > t | Adjustment | Adj P |
| Group | Pen 14 | Pen 16 | 46.2195 | 24.2302 | 62 | 1.91 | 0.0611 | Tukey-Kramer | 0.1451 |
| Group | Pen 14 | Pen 18 | 31.3825 | 21.3113 | 62 | 1.47 | 0.1459 | Tukey-Kramer | 0.3110 |
| Group | Pen 16 | Pen 18 | -14.8369 | 26.6342 | 62 | -0.56 | 0.5795 | Tukey-Kramer | 0.8432 |

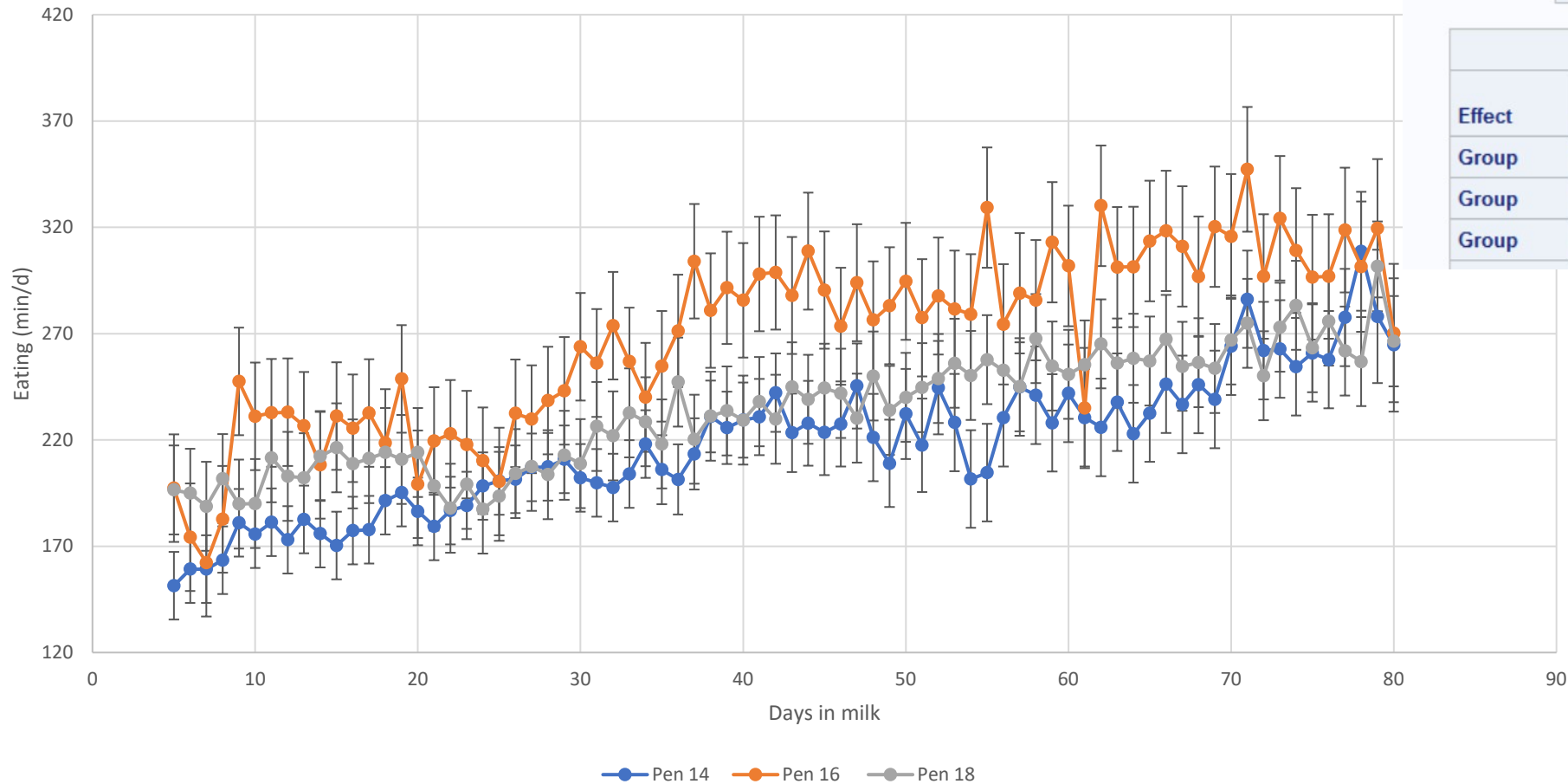
Rumination by dim between 30 and 60 dim

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 1.85 | 0.1657 |
| dim | 30 | 1264 | 1.43 | 0.0625 |

| Least Squares Means | | | | | | |
|---------------------|--------|----------|----------------|----|---------|---------|
| Effect | Group | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | 583.13 | 12.2945 | 62 | 47.43 | <.0001 |
| Group | Pen 16 | 553.12 | 19.5150 | 62 | 28.34 | <.0001 |
| Group | Pen 18 | 547.87 | 15.8058 | 62 | 34.66 | <.0001 |

| Differences of Least Squares Means | | | | | | | | | |
|------------------------------------|--------|--------|----------|----------------|----|---------|---------|--------------|--------|
| Effect | Group | Group | Estimate | Standard Error | DF | t Value | Pr > t | Adjustment | Adj P |
| Group | Pen 14 | Pen 16 | 30.0167 | 23.0046 | 62 | 1.30 | 0.1968 | Tukey-Kramer | 0.3979 |
| Group | Pen 14 | Pen 18 | 35.2652 | 20.0244 | 62 | 1.76 | 0.0832 | Tukey-Kramer | 0.1912 |
| Group | Pen 16 | Pen 18 | 5.2485 | 25.1129 | 62 | 0.21 | 0.8351 | Tukey-Kramer | 0.9762 |

Eating by days in milk



| DF | Chi-Square | Pr > ChiSq |
|----|------------|------------|
| 1 | 3729.23 | <.0001 |

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 1.96 | 0.1502 |
| dim | 75 | 3324 | 13.37 | <.0001 |
| Group*dim | 150 | 3324 | 1.23 | 0.0341 |

| Least Squares Means | | | | | | | |
|---------------------|--------|-----|----------|----------------|----|---------|---------|
| Effect | Group | dim | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | | 218.08 | 13.5930 | 62 | 16.04 | <.0001 |
| Group | Pen 16 | | 268.38 | 21.5189 | 62 | 12.47 | <.0001 |
| Group | Pen 18 | | 233.95 | 17.7497 | 62 | 13.18 | <.0001 |

Eating by dim up to 30 dim

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 1.04 | 0.3595 |
| dim | 25 | 1600 | 3.94 | <.0001 |

| Least Squares Means | | | | | | |
|---------------------|--------|----------|----------------|----|---------|---------|
| Effect | Group | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | 184.06 | 13.9156 | 62 | 13.23 | <.0001 |
| Group | Pen 16 | 220.45 | 22.1701 | 62 | 9.94 | <.0001 |
| Group | Pen 18 | 202.72 | 18.3393 | 62 | 11.05 | <.0001 |

| Differences of Least Squares Means | | | | | | | | | |
|------------------------------------|--------|--------|----------|----------------|----|---------|---------|--------------|--------|
| Effect | Group | Group | Estimate | Standard Error | DF | t Value | Pr > t | Adjustment | Adj P |
| Group | Pen 14 | Pen 16 | -36.3884 | 26.1755 | 62 | -1.39 | 0.1694 | Tukey-Kramer | 0.3522 |
| Group | Pen 14 | Pen 18 | -18.6577 | 23.0212 | 62 | -0.81 | 0.4208 | Tukey-Kramer | 0.6980 |
| Group | Pen 16 | Pen 18 | 17.7307 | 28.7723 | 62 | 0.62 | 0.5400 | Tukey-Kramer | 0.8118 |

Eating by dim between 30 and 60 dim

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| Group | 2 | 62 | 2.05 | 0.1370 |
| dim | 30 | 1264 | 3.24 | <.0001 |

| Least Squares Means | | | | | | |
|---------------------|--------|----------|----------------|----|---------|---------|
| Effect | Group | Estimate | Standard Error | DF | t Value | Pr > t |
| Group | Pen 14 | 222.43 | 12.6138 | 62 | 17.63 | <.0001 |
| Group | Pen 16 | 270.21 | 20.0632 | 62 | 13.47 | <.0001 |
| Group | Pen 18 | 239.35 | 16.3964 | 62 | 14.60 | <.0001 |

| Differences of Least Squares Means | | | | | | | | | |
|------------------------------------|--------|--------|----------|----------------|----|---------|---------|--------------|--------|
| Effect | Group | Group | Estimate | Standard Error | DF | t Value | Pr > t | Adjustment | Adj P |
| Group | Pen 14 | Pen 16 | -47.7736 | 23.6633 | 62 | -2.02 | 0.0478 | Tukey-Kramer | 0.1161 |
| Group | Pen 14 | Pen 18 | -16.9140 | 20.6869 | 62 | -0.82 | 0.4167 | Tukey-Kramer | 0.6936 |
| Group | Pen 16 | Pen 18 | 30.8596 | 25.9109 | 62 | 1.19 | 0.2382 | Tukey-Kramer | 0.4630 |