



RUNNING COLD

Colder weather = more calories burned?

Nick Alexander

MY FIRST RUN



March 17, 2013

Campton Hills, IL

Sunday 4:00 PM

Partly Cloudy

 **35** °F | °C

Precipitation: 0%

Humidity: 59%

Wind: 14 mph

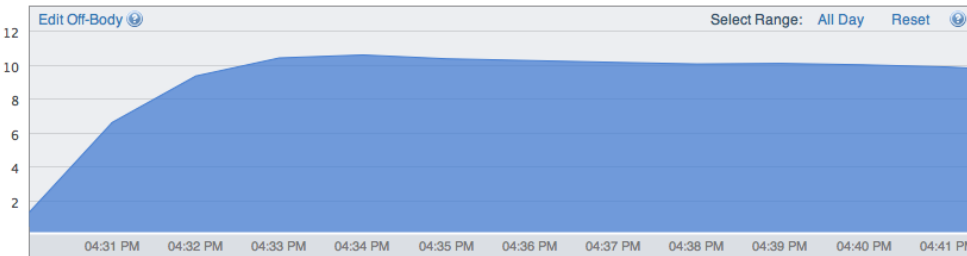
DATA

- **Date:** 2013-03-17
- **Time:** 4:30 – 4:41 PM (11 minutes)
- **Average METs:** 8.9
- **Calories Burned:** 107
- **Distance:** 0.99 miles
- **Average Speed:** 5.4 mph
- **Temperature:** 35° F
- **Humidity:** 59%
- **Wind:** 14 mph
- **Heart Rate 3 min after finish:** 130 bpm
- **Notes:** Felt terrible for 30 min after run



Google earth

feet 500
meters 100



WHY DO THIS?

- To test a claim

WHY DO THIS?

- **To test a claim**
- **Very low barriers**
 - Can do it at home
 - Time commitment only ~15 min per trial
 - Makes me exercise
 - Already had the calorie tracker
 - Learn to do experiments

PROBLEMS WITH TIME

- **Need better Time resolution**

PROBLEMS WITH TIME

- **Need better Time resolution**
- **Don't use the first or last minute data point**
 - Helps compensate for lack of precise synchronization between devices
 - Compensate for start and end effects
- **Start and end trials with 2 minutes of no steps**
 - Helps identify boundaries of the test

CONSTANTS

- **Route**
 - Distance (1 mile)
 - Elevation
- **Clothing**
- **Run Speed (~)**
- **Run Duration (~)**
- **Time of Day (~)**

VARIABLES



Weather

- Temperature
- Humidity
- Wind speed
- Barometric pressure



Calorie Burn

- Total & Peak Calorie Burn
- Avg. & Peak METs



Heart Rate

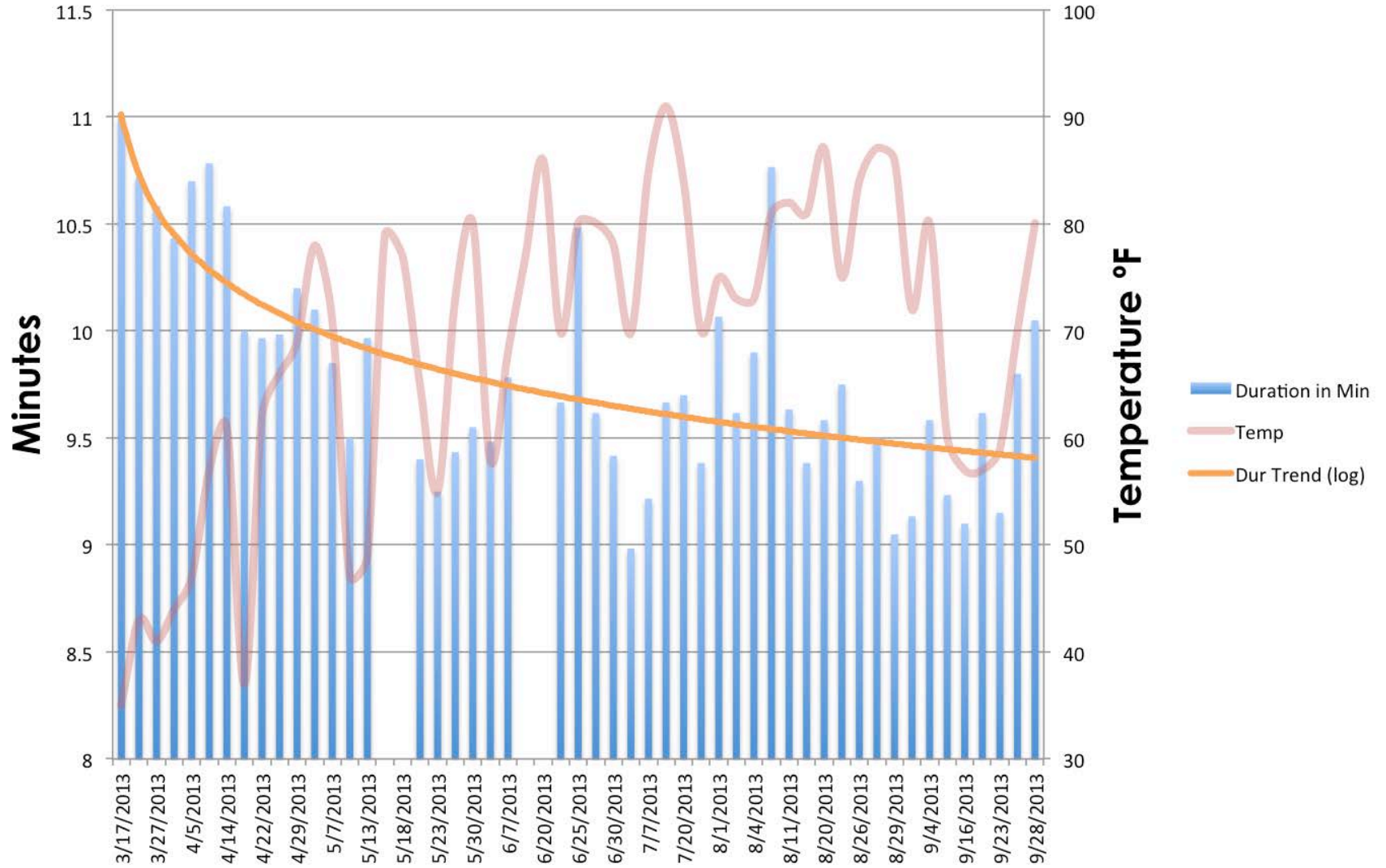
- Avg. & Max



Run Speed, Duration

- **Fitness Level**

Run Duration Over Time



METRICS TOOLS



BodyMedia

Google



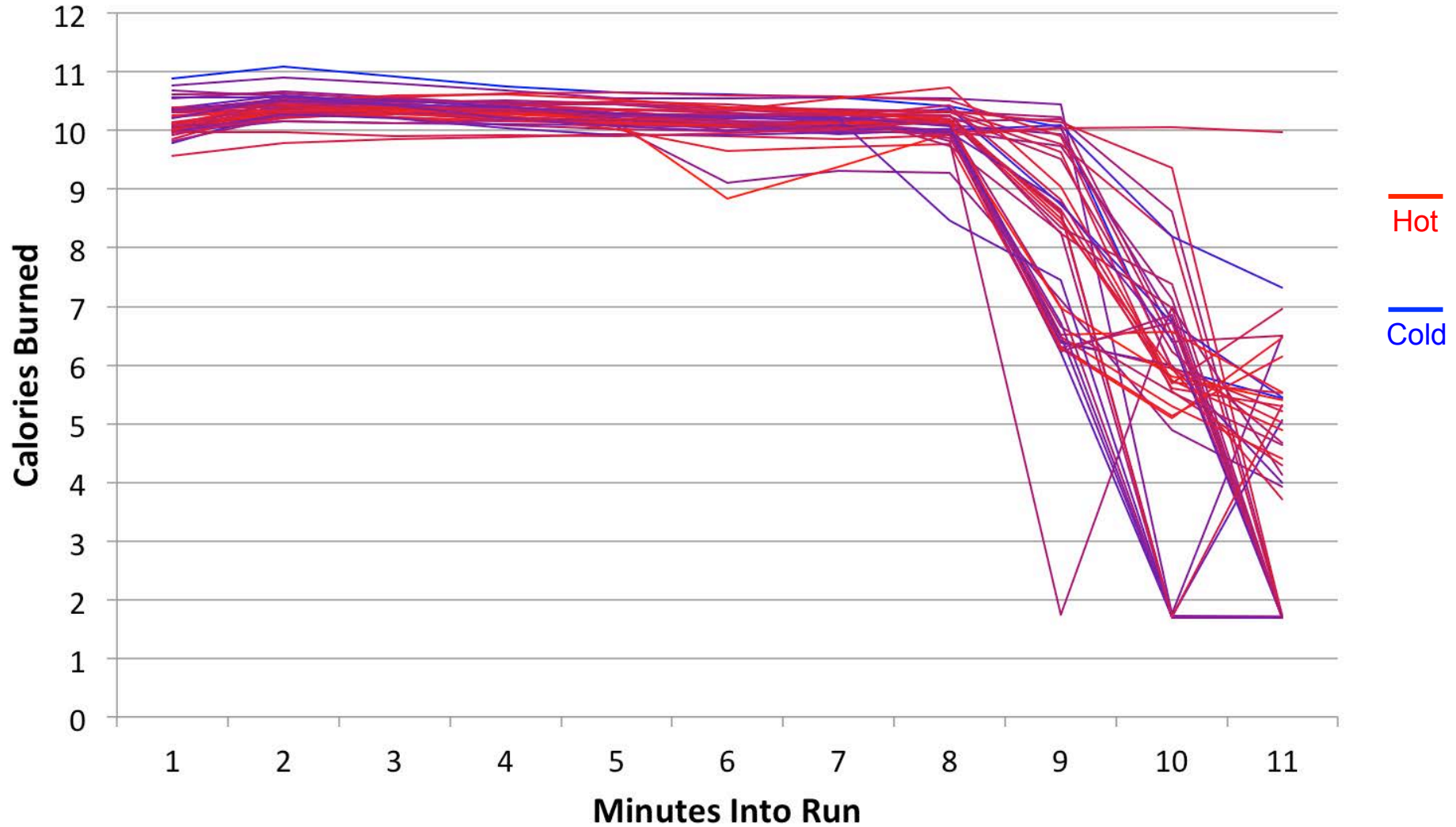
Weather



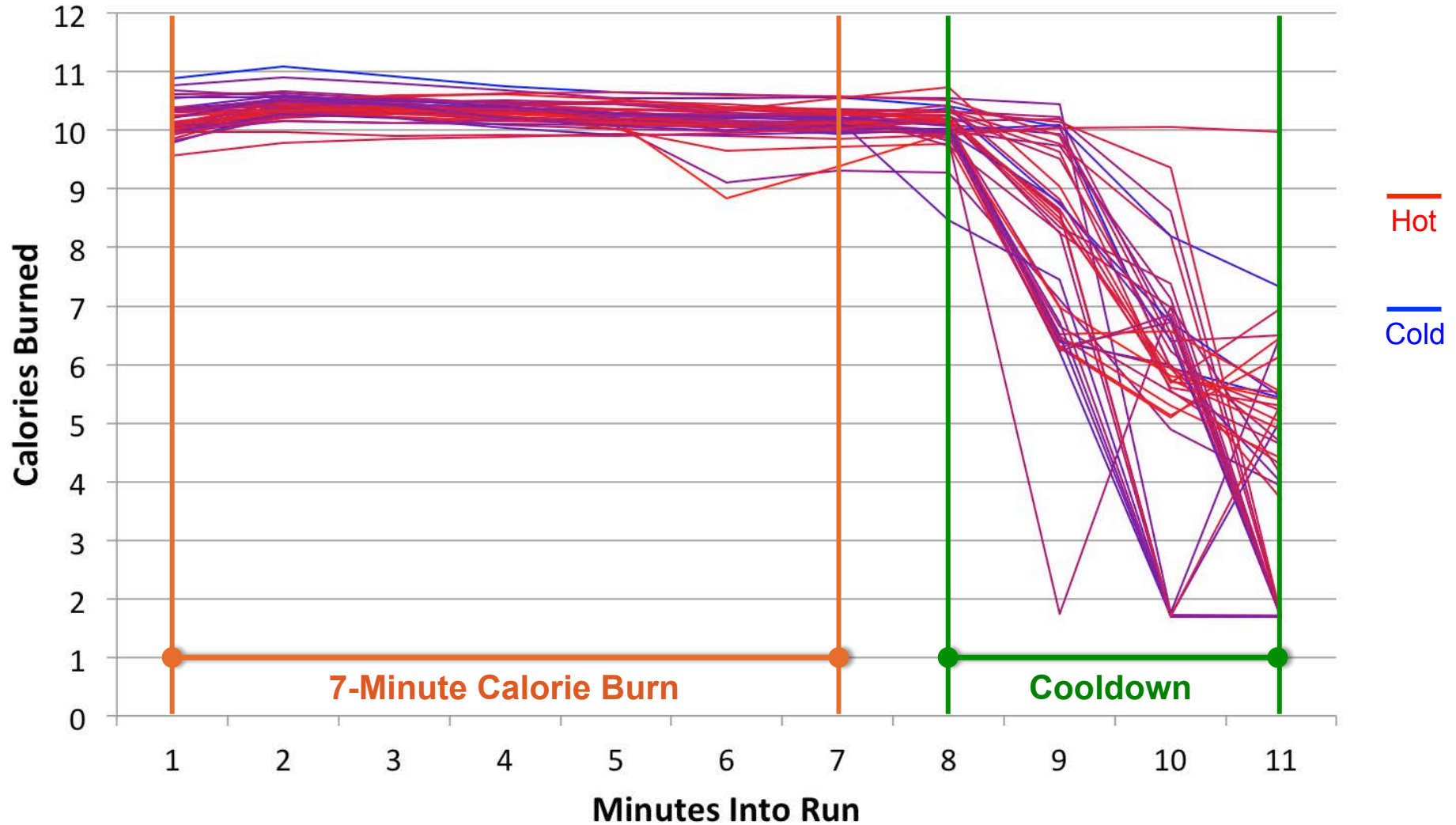
wunderground.com
Temp @ KARR Airport



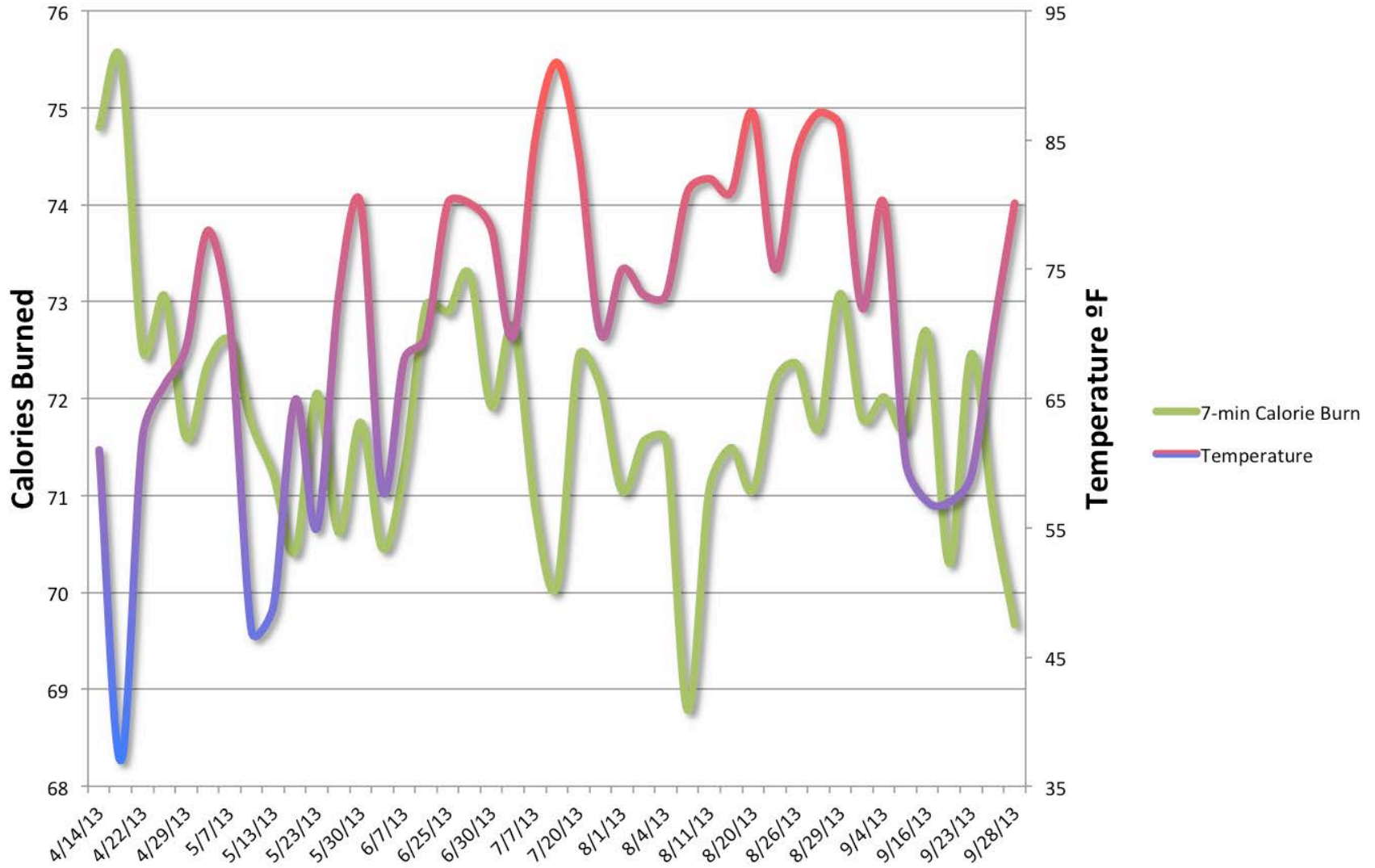
Calorie Burn by Minute for All Runs

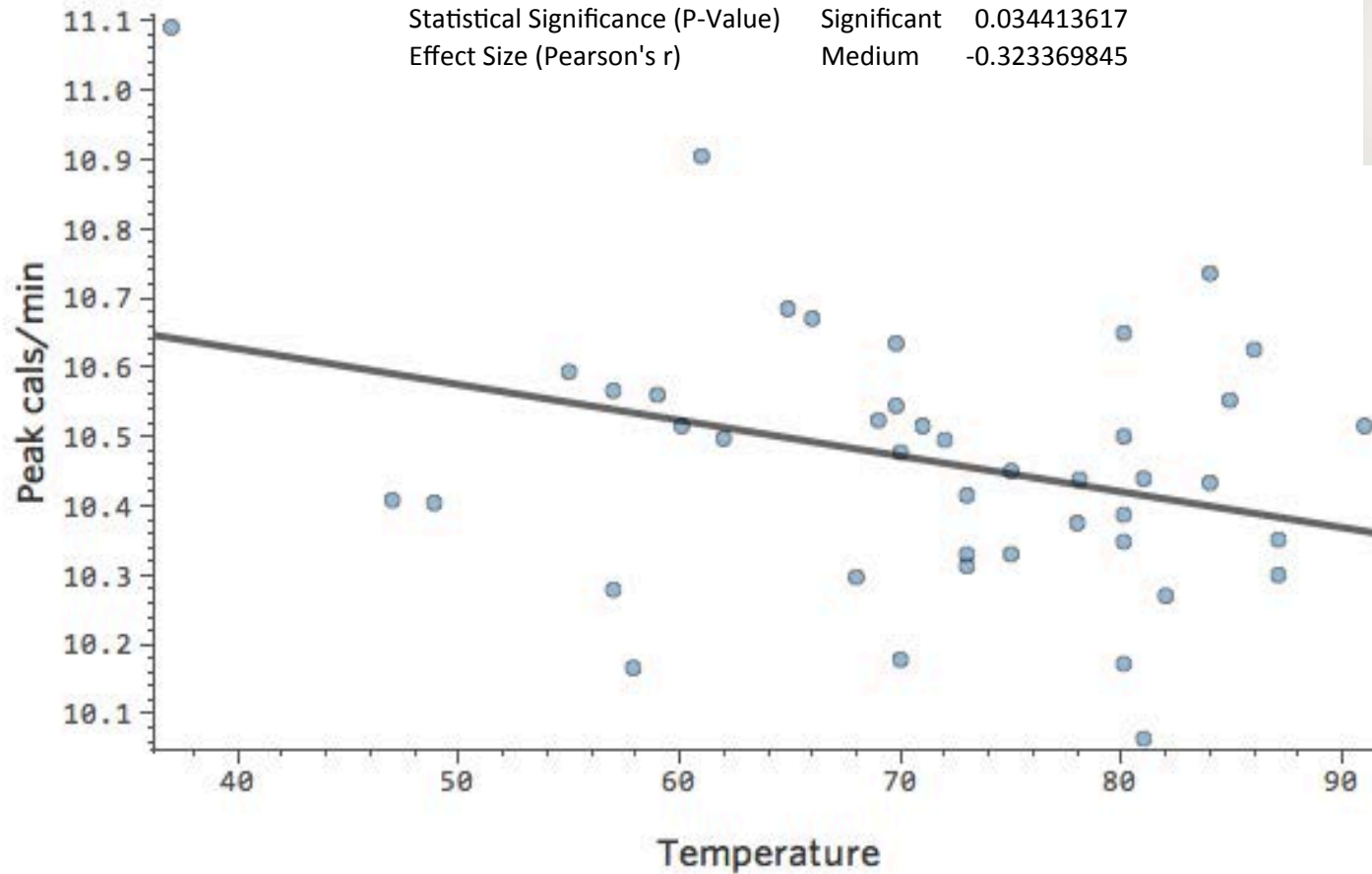


Calorie Burn by Minute for All Runs



Calorie Burn vs. Temperature





Temperature is negatively correlated with Peak Cals/Min

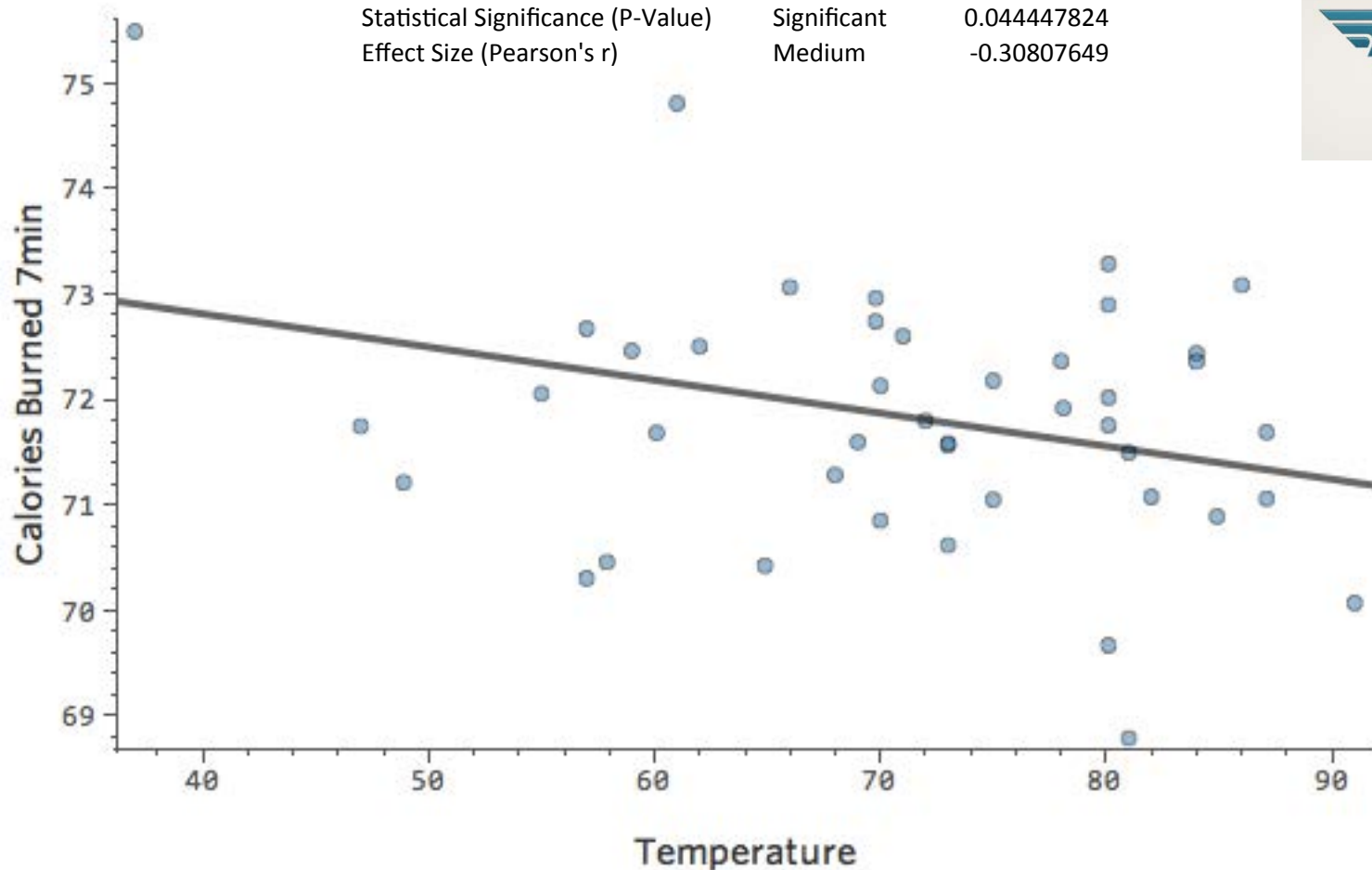
WHILE

Run Duration has NO statistically significant relationship with Peak Cals/Min

Statistical Significance (P-Value)
Effect Size (Pearson's r)

Significant
Medium

0.044447824
-0.30807649



Temperature is negatively correlated with Calories Burned 7min

WHILE

Run Duration has NO statistically significant relationship with Calories Burned 7min

WHAT DID I LEARN?

- Results
 - Tentative: hypotheses is correct
 - Effect is small: maybe 5 calories difference per mile run
- Process
 - I am motivated by data collection
 - Start early and refine experimental process for an initial period
 - Do research into other metrics that could correlate

WEAKNESSES AND IMPROVEMENTS

- The more fit you become, the fewer calories you will burn doing the same activity
- Temperature & weather data collected 20 miles away
- Short run time = noisy data?
- Need more data for higher confidence
- Hat

CONTACT

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