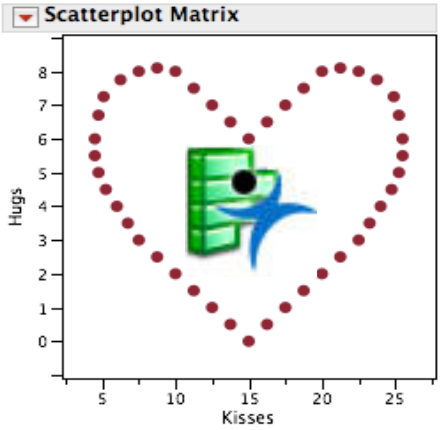
Learning About Biases and Gaps in My Self-Collected Data

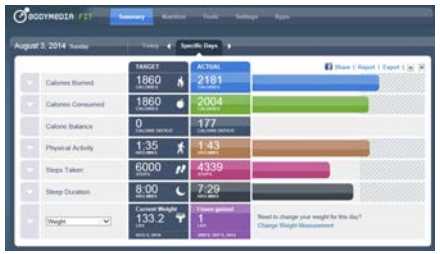
A Picture is Worth 1000 Calories

Shannon Conners, PhD
Director of Dev Ops, JMP R&D, SAS



You all inspired me to do more with my data!

workout data



food logging

cholesterol

SNPs

sleep tracking

activity monitoring

HR tracking

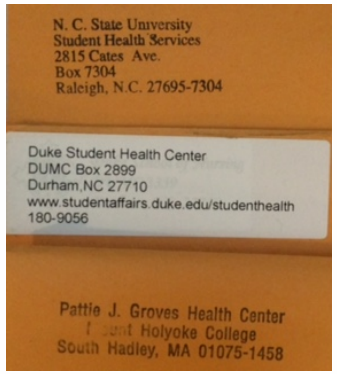
weight

blood pressure

blood glucose

resting HR

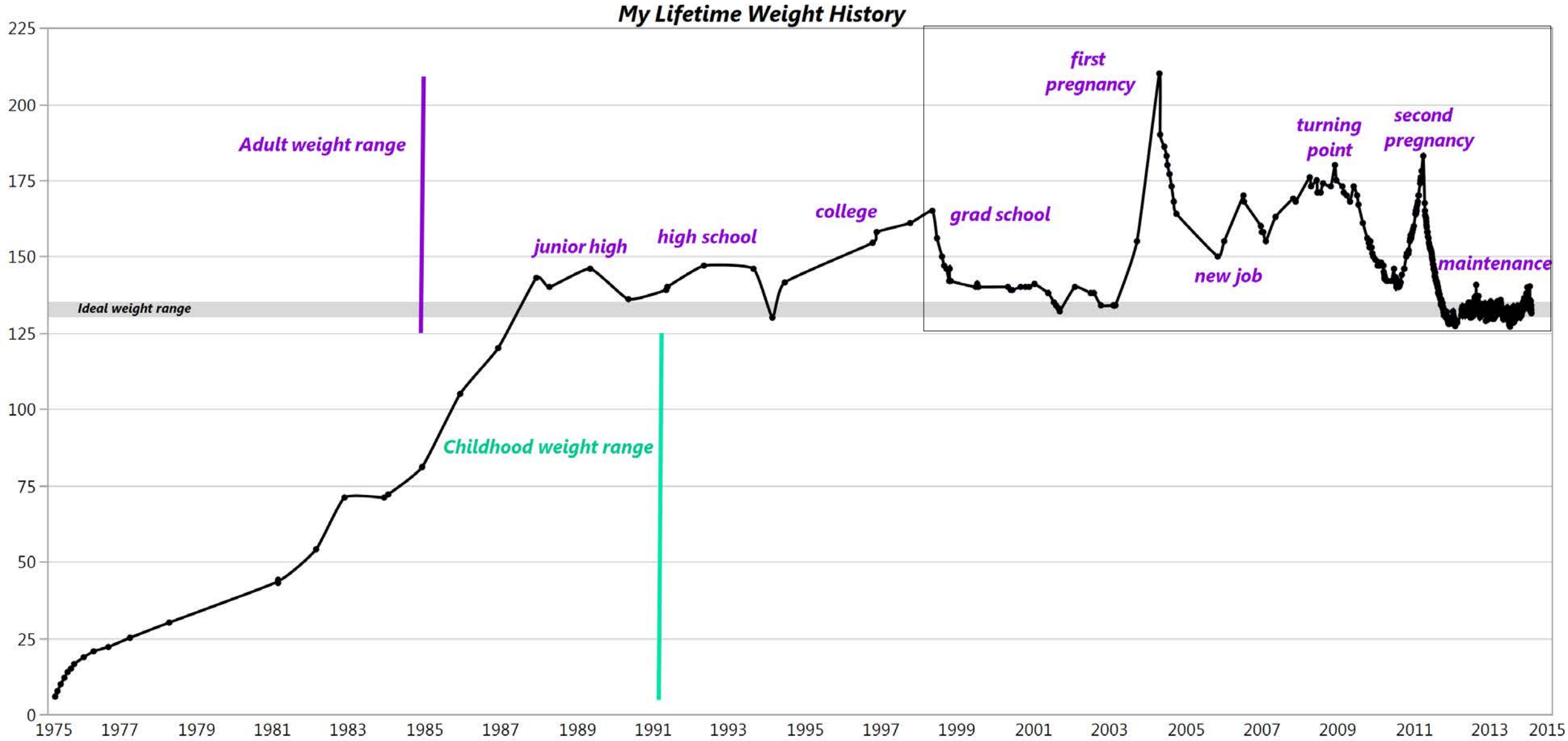
My Lifetime Weight History

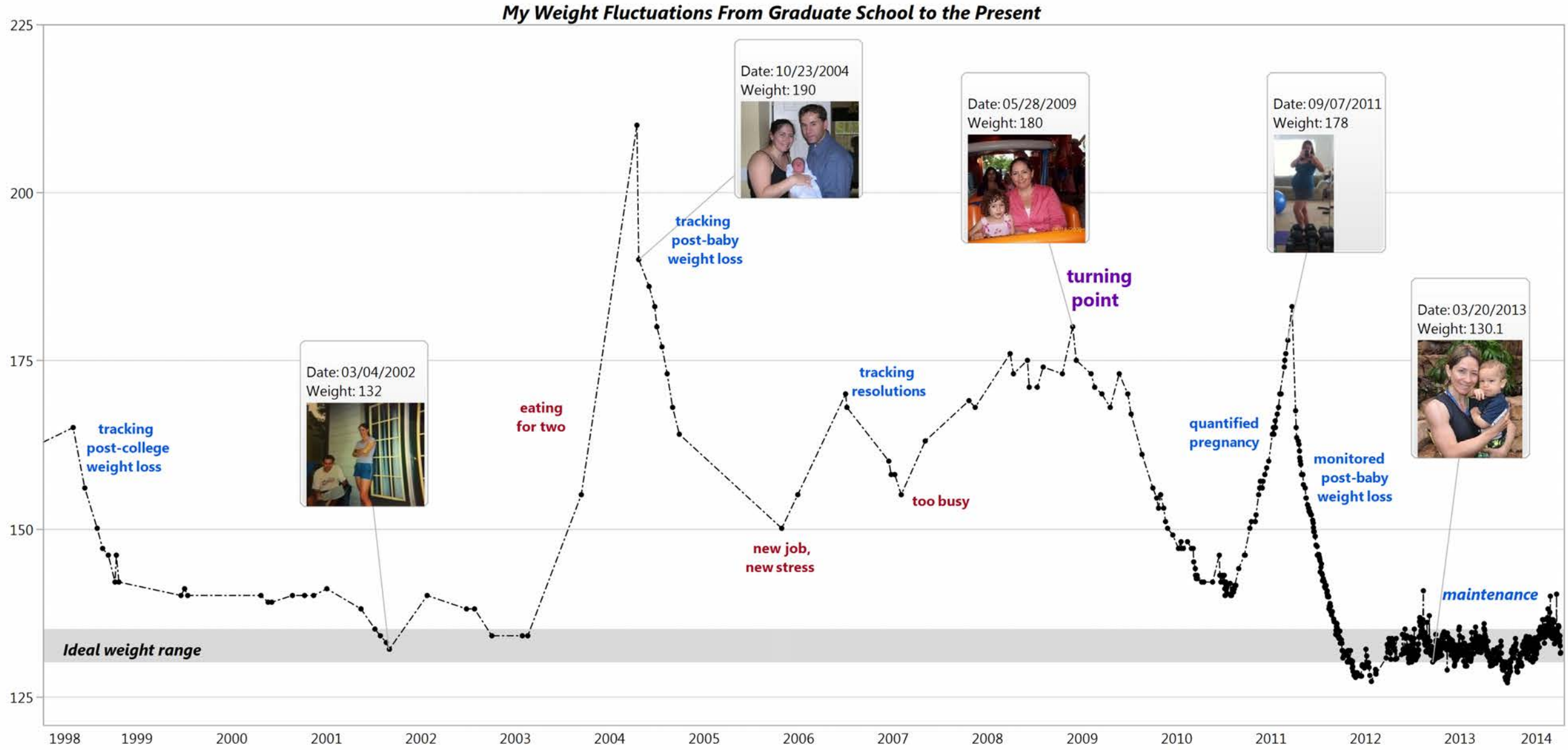


225
200
175
150
125
100
75
50
25
0

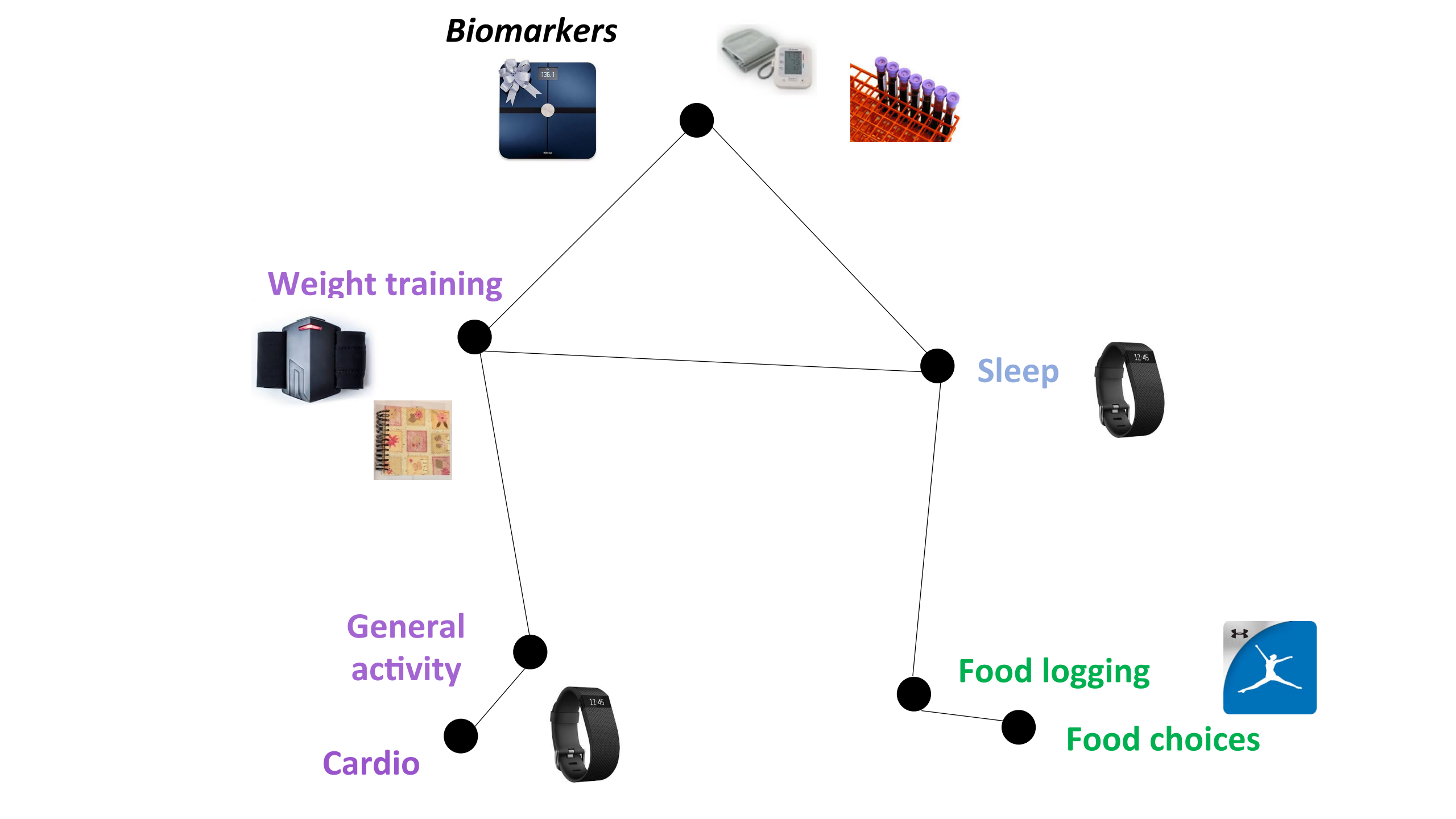
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

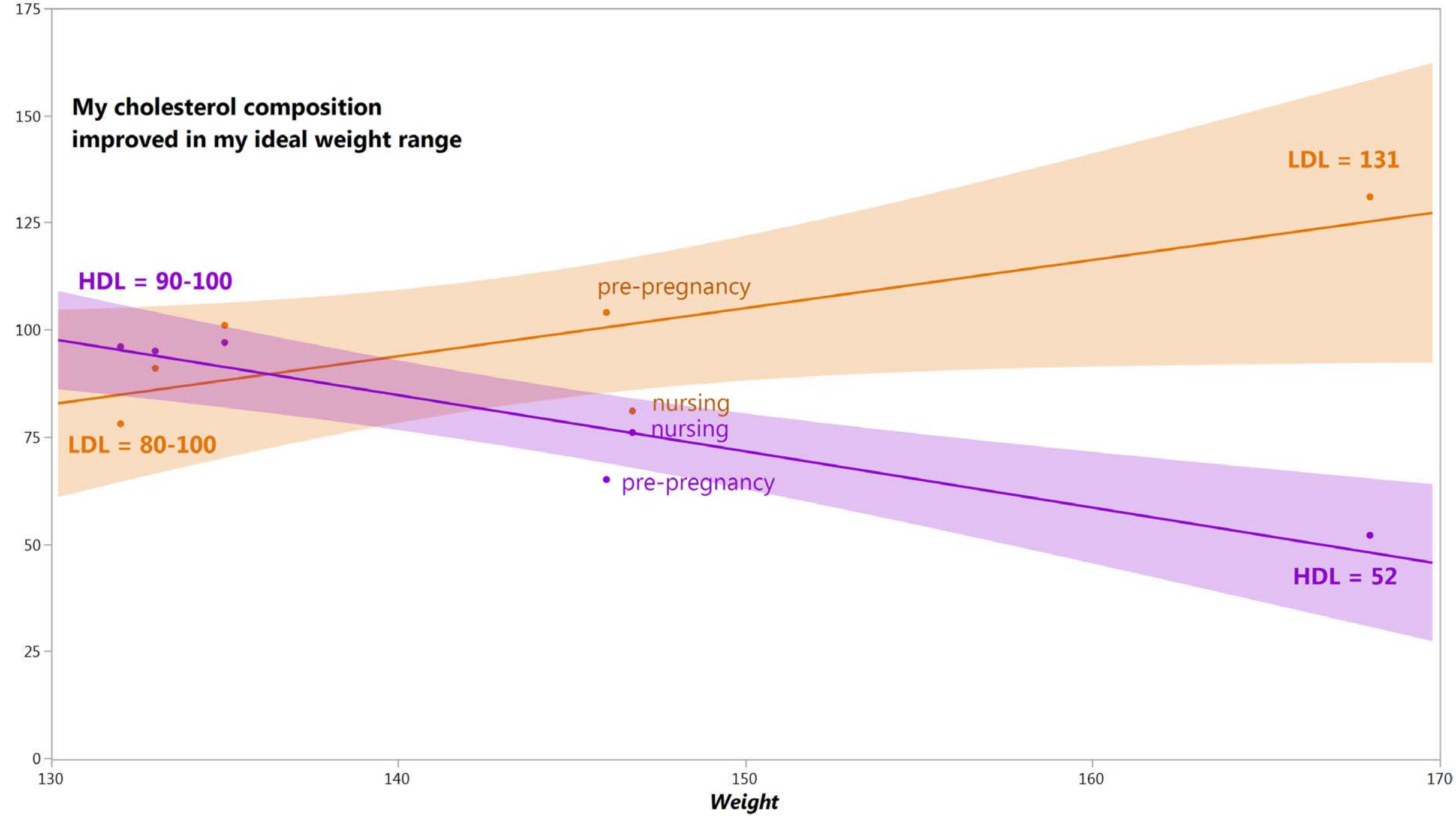
Date

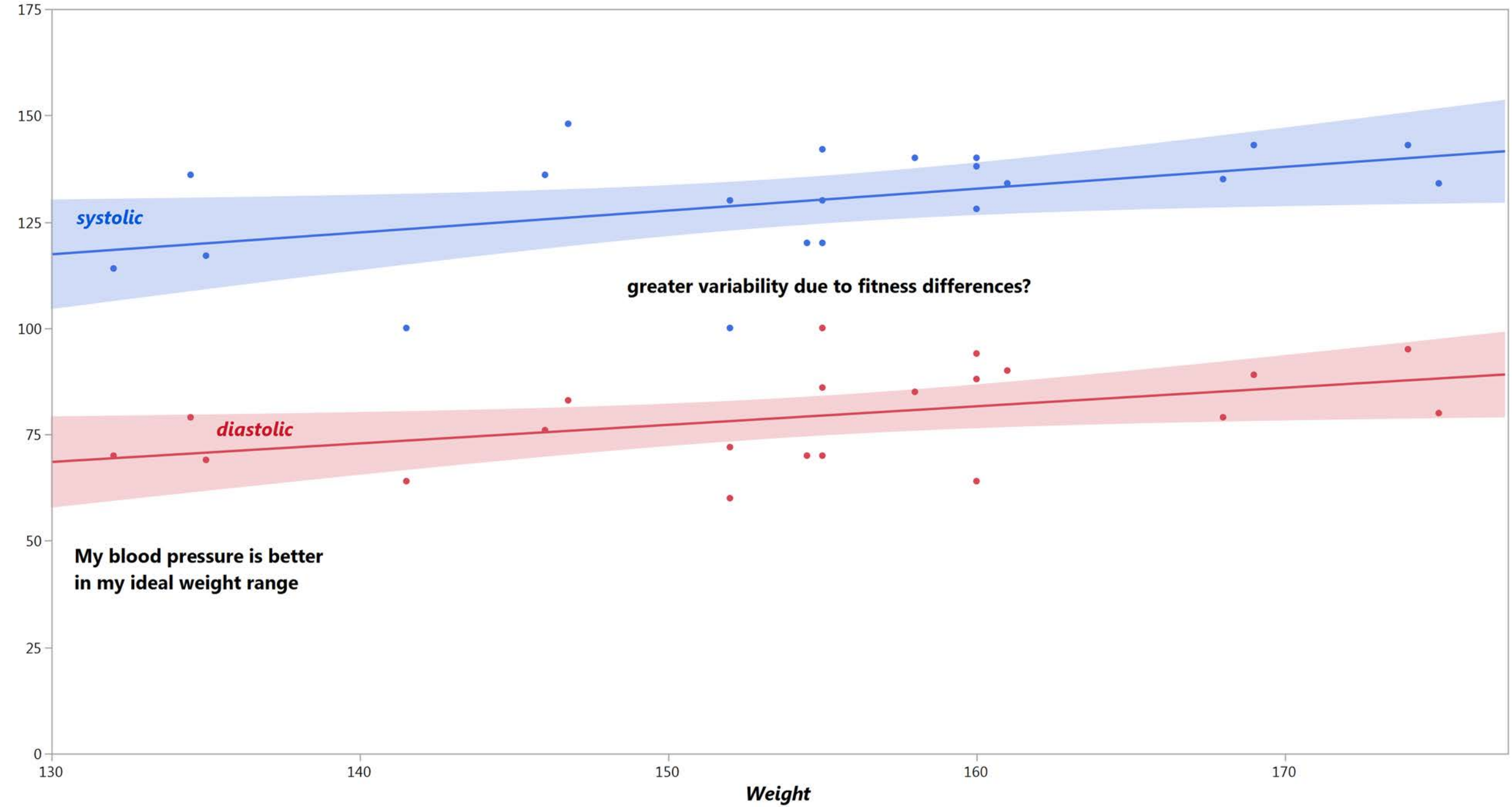

My Lifetime Weight History
225
200
175
150
125
100
75
50
25
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
Adult weight range
Ideal weight range
Childhood weight range
junior high
high school
college
grad school
first pregnancy
new job
turning point
second pregnancy
maintenance


My Weight Fluctuations From Graduate School to the Present
225
200
175
150
125
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
tracking post-college weight loss
Date: 03/04/2002
Weight: 132
eating for two
Date: 10/23/2004
Weight: 190
tracking post-baby weight loss
new job, new stress
tracking resolutions
too busy
Date: 05/28/2009
Weight: 180
turning point
quantified pregnancy
Date: 09/07/2011
Weight: 178
monitored post-baby weight loss
Date: 03/20/2013
Weight: 130.1
maintenance
Ideal weight range

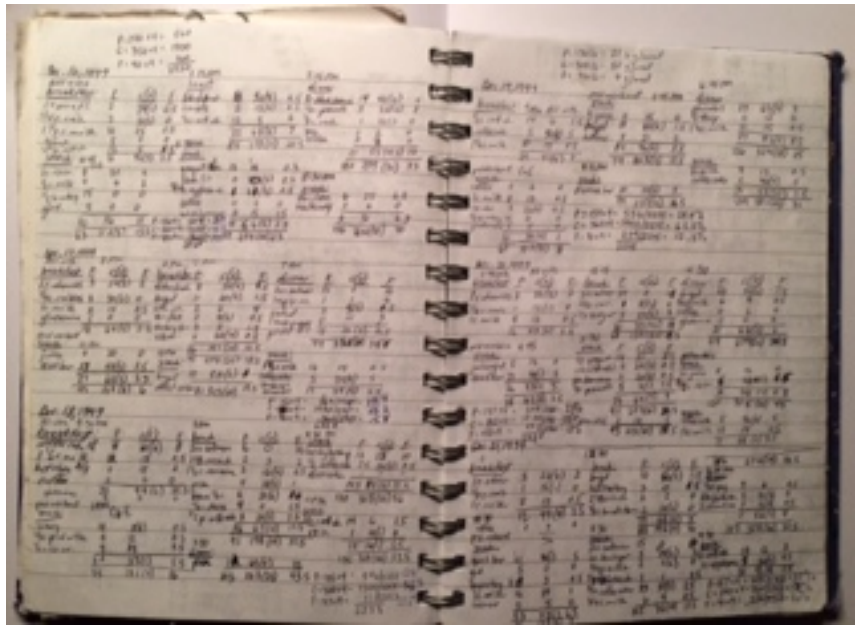
A constellation of behaviors influences my (non-genetic) biomarkers.


Biomarkers
Weight training
Sleep
General activity
Cardio
Food logging
Food choices


My cholesterol composition
improved in my ideal weight range
LDL = 131
HDL = 90-100
pre-pregnancy
nursing
nursing
LDL = 80-100
pre-pregnancy
HDL = 52
175
150
125
100
75
50
25
0
130
140
150
160
170
Weight


175
150
125
100
75
50
25
0
130
140
150
160
170
Weight
systolic
diastolic
greater variability due to fitness differences?
My blood pressure is better
in my ideal weight range

I am what (and how much) I eat.



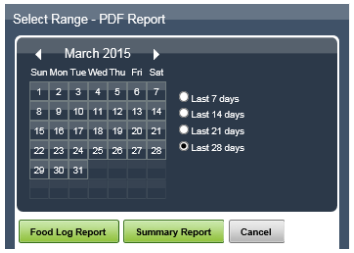
My food log before apps

Tools to estimate portion size

Date	Meal	Item Name	Cleaned Item Name	Primary Food Category	Cleaned Food Category	Calories	Fat	Carb	Protein
12/21/2010	Breakfast	Honey	Honey	Sugar	Sugar	21	0	6	0
12/21/2010	Breakfast	Greek yogurt (Fage, plain)	Greek Yogurt, Plain, Nonfat	Dairy	Yogurt	60	0	5	1
12/21/2010	Breakfast	Capuccino, Small	Cappuccino	CoffeeMilk	Coffee,Milk	49	2	5	3
12/21/2010	AM Snack	Ground beef, grass fed	Beef, ground, grass fed	Meat	Beef	162	12	0	1
12/21/2010	AM Snack	Capuccino, large, nonfat	Cappuccino	CoffeeMilk	Coffee,Milk	43	0	6	4
12/21/2010	AM Snack	GREEN GIANT Black Beans, Canned	Beans, Black, Canned	Bean	Bean	45	0	9	3
12/21/2010	AM Snack	Onions, Chopped	Onions, Chopped	Vegetable	Vegetable	32	0	7	1
12/21/2010	AM Snack	Pepper, Bell or Sweet, Red	Pepper, Bell or Sweet, Red	Vegetable	Vegetable	23	0	4	1
12/21/2010	AM Snack	Oil, Olive	Oil, Olive	Fat	Fat	30	3	0	0
12/21/2010	Lunch	Capuccino, large, nonfat	Cappuccino	CoffeeMilk	Coffee,Milk	43	0	6	4
12/21/2010	Lunch	Shrimp, Steamed	Shrimp, Mixed Species, Cooked	Seafood	Seafood	27	0	0	5
12/21/2010	Lunch	Planters Brittle Nut Medley	Candy, Brittle Nut Medley	Candy	Candy,Nut	50	3	4	1
12/21/2010	Lunch	Protein bar, peanut butter crunch	Protein Bar, Peanut Butter Crunch	Supplement	Supplement	190	9	13	1
12/21/2010	Dinner	Butternut squash soup	Buttercup Squash Soup	Fruit	Fruit	220	2	44	4
12/21/2010	Dinner	Salad, Mixed Baby Greens with Arugula, Butterh...	Salad, Mixed Baby Greens with Arugula	Vegetable	Vegetable	22	0	4	2
12/21/2010	Dinner	Pepper, Bell or Sweet, Red	Pepper, Bell or Sweet, Red	Vegetable	Vegetable	26	0	5	1
12/21/2010	Dinner	ATHENOS Feta Cheese, Crumbled	Cheese, Feta	Dairy	Cheese	22	2	0	2
12/21/2010	Dinner	Greek yogurt (Fage, plain)	Greek Yogurt, Plain, Nonfat	Dairy	Yogurt	60	0	5	1
12/21/2010	Dinner	Sugar snap peas	Snap Peas	Vegetable	Vegetable	35	0	6	2
12/21/2010	Dinner	Green Giant antioxidant blend	Vegetables, Snap Peas, Peppers, Broccoli, C...	Vegetable	Vegetable	50	3	7	1
12/21/2010	Dinner	Good seasons dressing	Dressing, Balsamic Vinaigrette	Sauce	Dressing	75	7	2	0

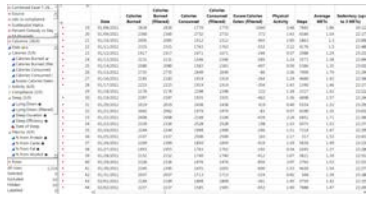
My imported food log

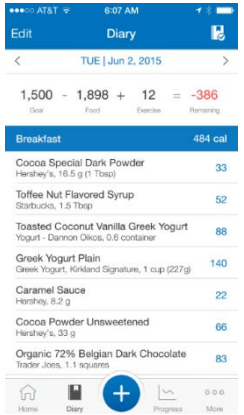
BodyMedia Activity Manager



~50 item level files

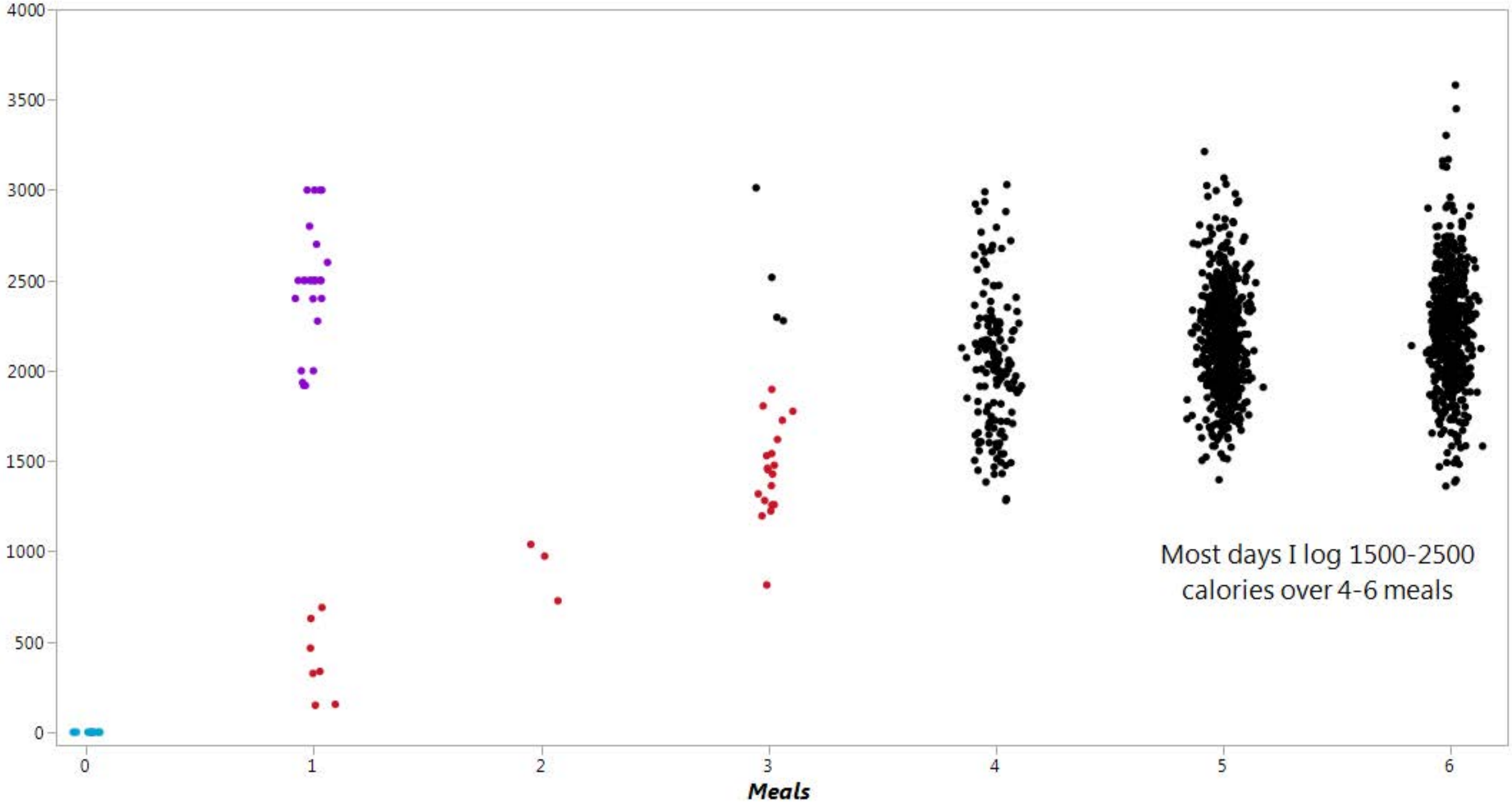
~50 summary files

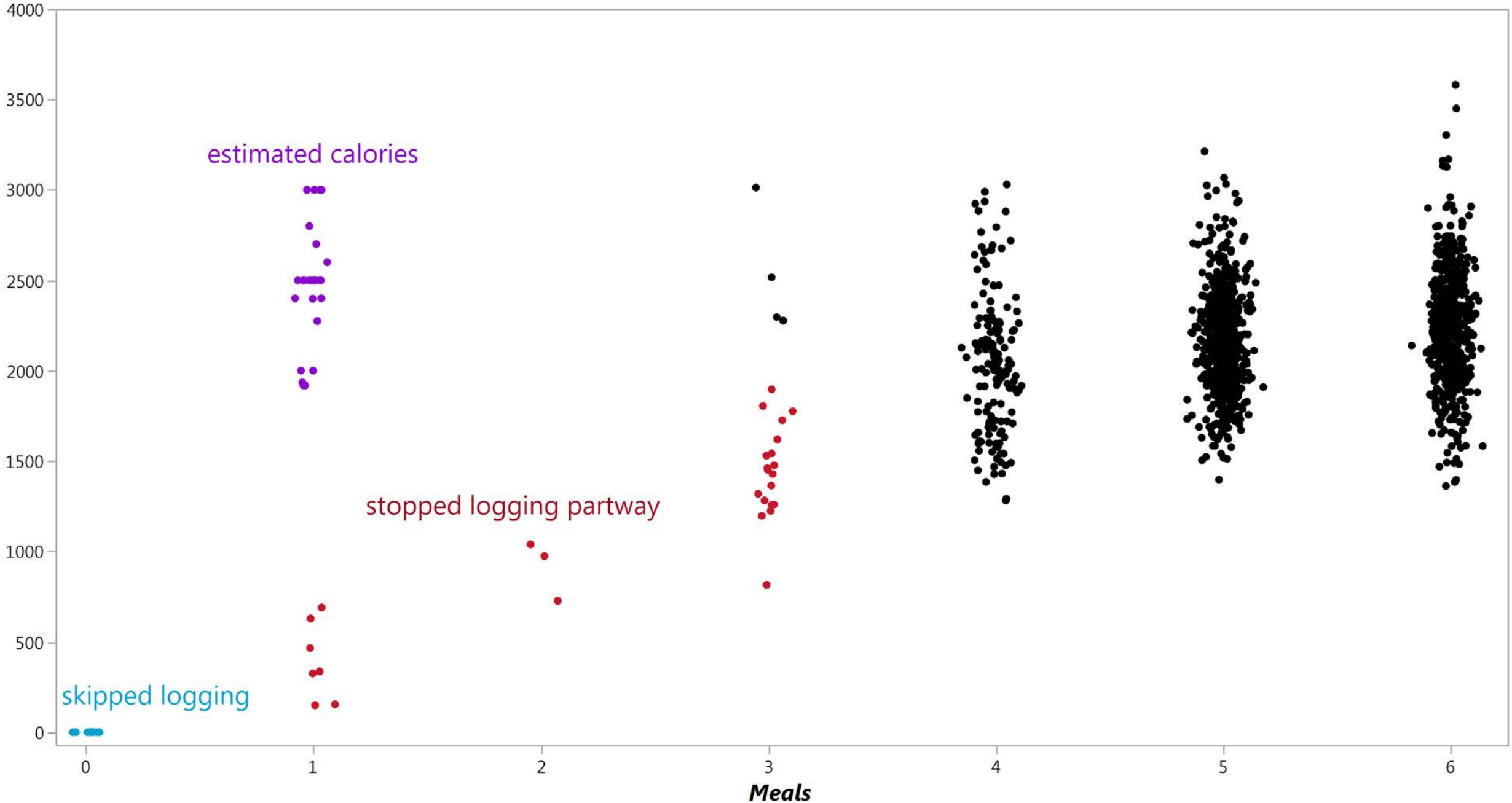


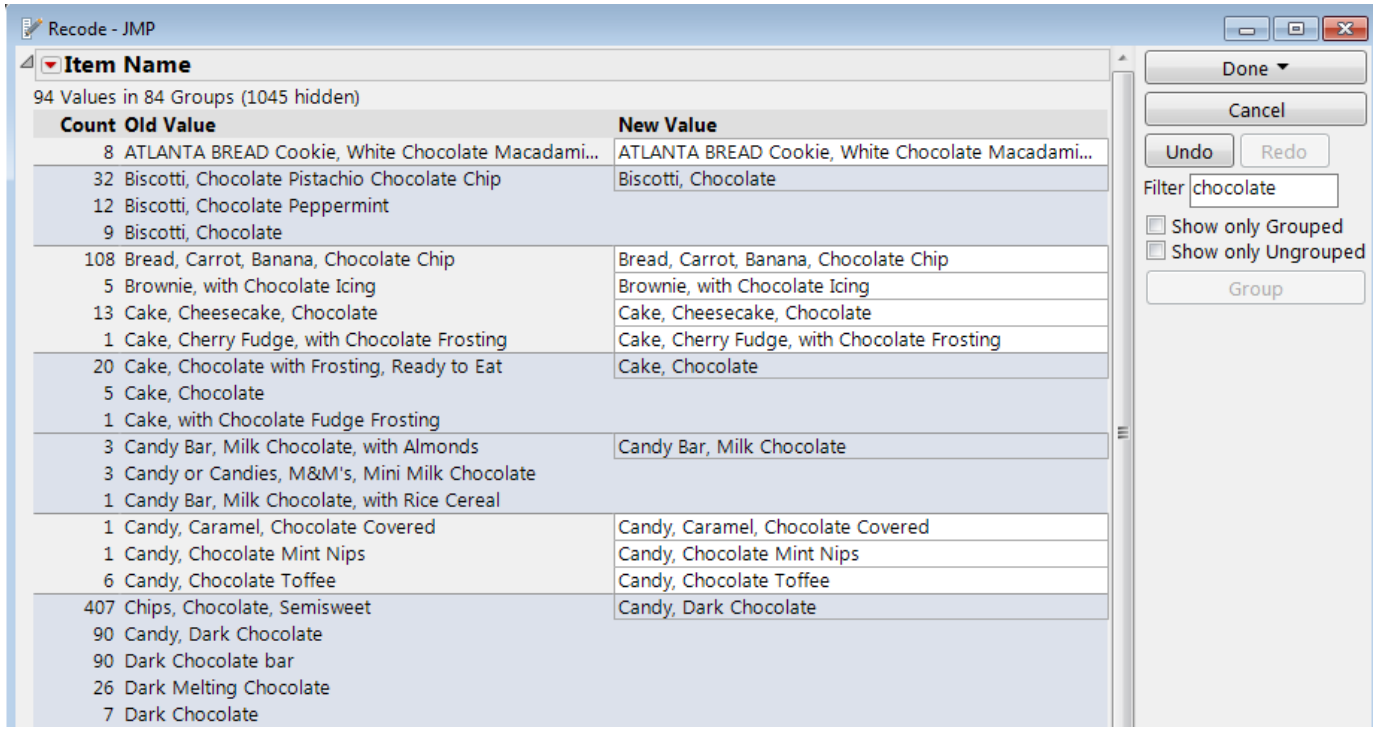


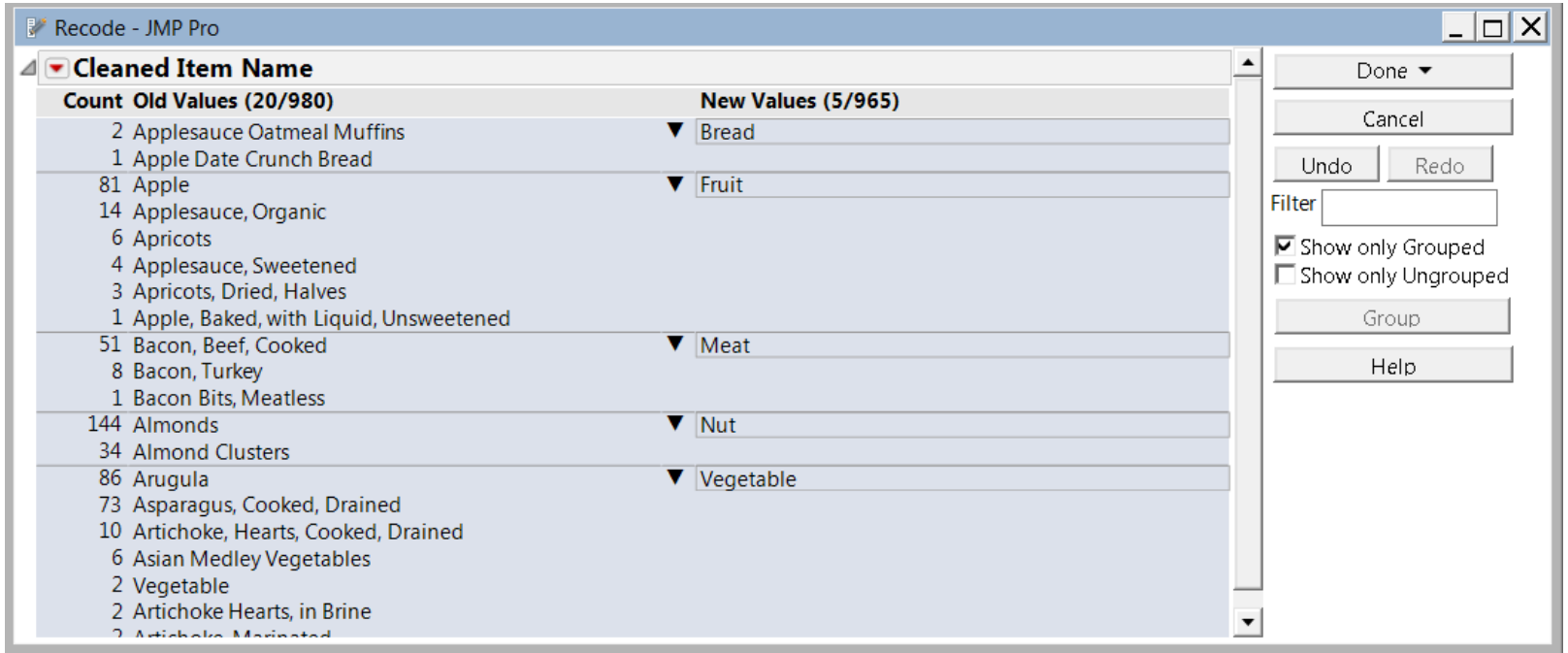
MyFitnessPal

MyFitnessPal Data Downloader Chrome Extension

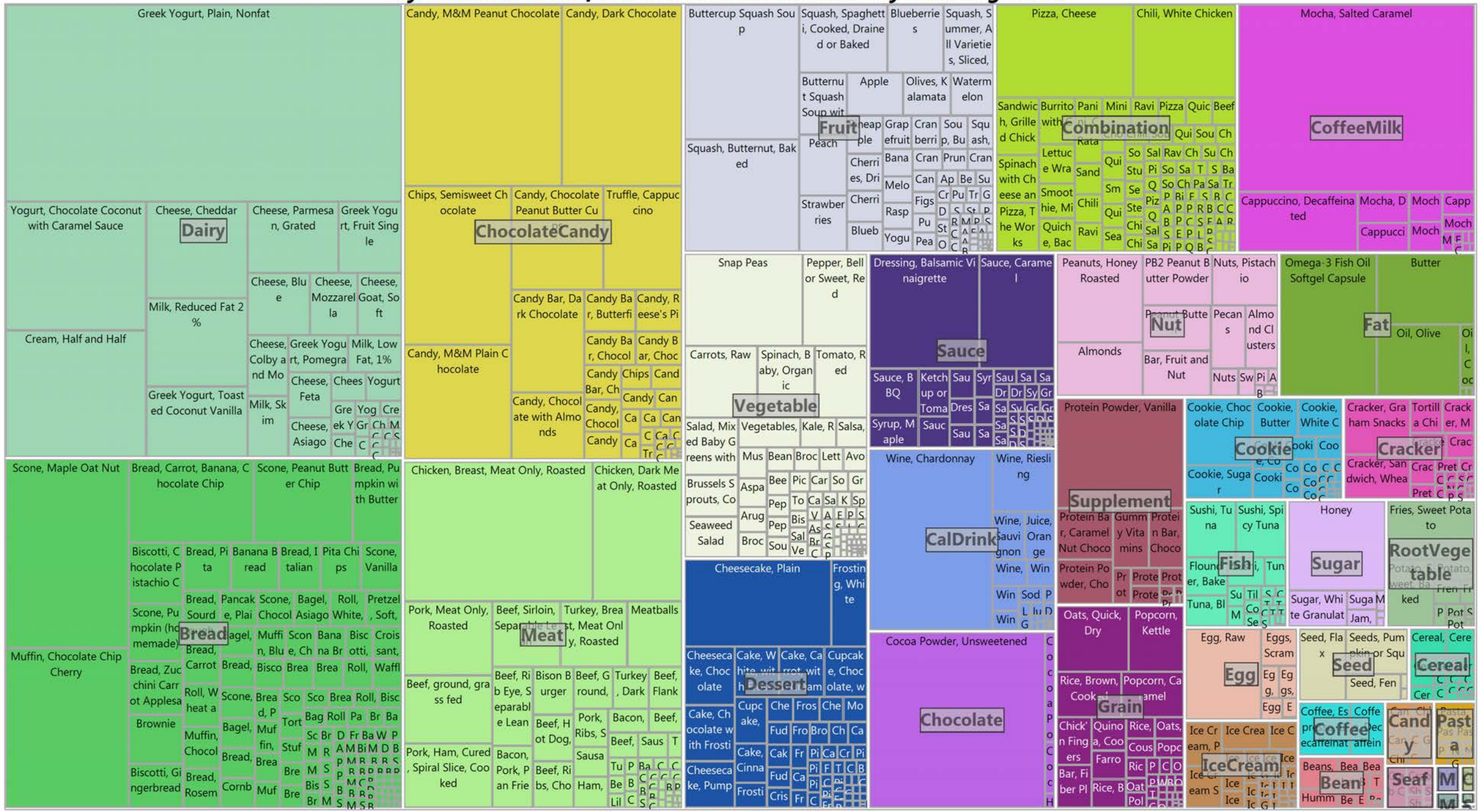

4000
3500
3000
2500
2000
1500
1000
500
0
0
1
2
3
4
5
6
Meals
Most days I log 1500-2500
calories over 4-6 meals


4000
3500
3000
2500
2000
1500
1000
500
0
estimated calories
stopped logging partway
skipped logging
0
1
2
3
4
5
6
Meals


Recode - JMP
Item Name
94 Values in 84 Groups (1045 hidden)
Count Old Value New Value
8 ATLANTA BREAD Cookie, White Chocolate Macadami... ATLANTA BREAD Cookie, White Chocolate Macadami...
32 Biscotti, Chocolate Pistachio Chocolate Chip Biscotti, Chocolate
12 Biscotti, Chocolate Peppermint
9 Biscotti, Chocolate
108 Bread, Carrot, Banana, Chocolate Chip Bread, Carrot, Banana, Chocolate Chip
5 Brownie, with Chocolate Icing Brownie, with Chocolate Icing
13 Cake, Cheesecake, Chocolate Cake, Cheesecake, Chocolate
1 Cake, Cherry Fudge, with Chocolate Frosting Cake, Cherry Fudge, with Chocolate Frosting
20 Cake, Chocolate with Frosting, Ready to Eat Cake, Chocolate
5 Cake, Chocolate
1 Cake, with Chocolate Fudge Frosting
3 Candy Bar, Milk Chocolate, with Almonds Candy Bar, Milk Chocolate
3 Candy or Candies, M&M's, Mini Milk Chocolate
1 Candy Bar, Milk Chocolate, with Rice Cereal
1 Candy, Caramel, Chocolate Covered Candy, Caramel, Chocolate Covered
1 Candy, Chocolate Mint Nips Candy, Chocolate Mint Nips
6 Candy, Chocolate Toffee Candy, Chocolate Toffee
407 Chips, Chocolate, Semisweet Candy, Dark Chocolate
90 Candy, Dark Chocolate
90 Dark Chocolate bar
26 Dark Melting Chocolate
7 Dark Chocolate
Done
Cancel
Undo
Redo
Filter chocolate
Show only Grouped
Show only Ungrouped
Group


Recode - JMP Pro
Cleaned Item Name
Count Old Values (20/980) New Values (5/965)
2 Applesauce Oatmeal Muffins Bread
1 Apple Date Crunch Bread
81 Apple Fruit
14 Applesauce, Organic
6 Apricots
4 Applesauce, Sweetened
3 Apricots, Dried, Halves
1 Apple, Baked, with Liquid, Unsweetened
51 Bacon, Beef, Cooked Meat
8 Bacon, Turkey
1 Bacon Bits, Meatless
144 Almonds Nut
34 Almond Clusters
86 Arugula Vegetable
73 Asparagus, Cooked, Drained
10 Artichoke, Hearts, Cooked, Drained
6 Asian Medley Vegetables
2 Vegetable
2 Artichoke Hearts, in Brine
Done
Cancel
Undo
Redo
Filter
Show only Grouped
Show only Ungrouped
Group
Help

My Common Breakfasts and Snacks Dominate My Food Log Data!



My patterns change over time.

Eating Patterns in My Early Pregnancy

Sum of Total Calories

Primary Food Category / Cleaned Item Name

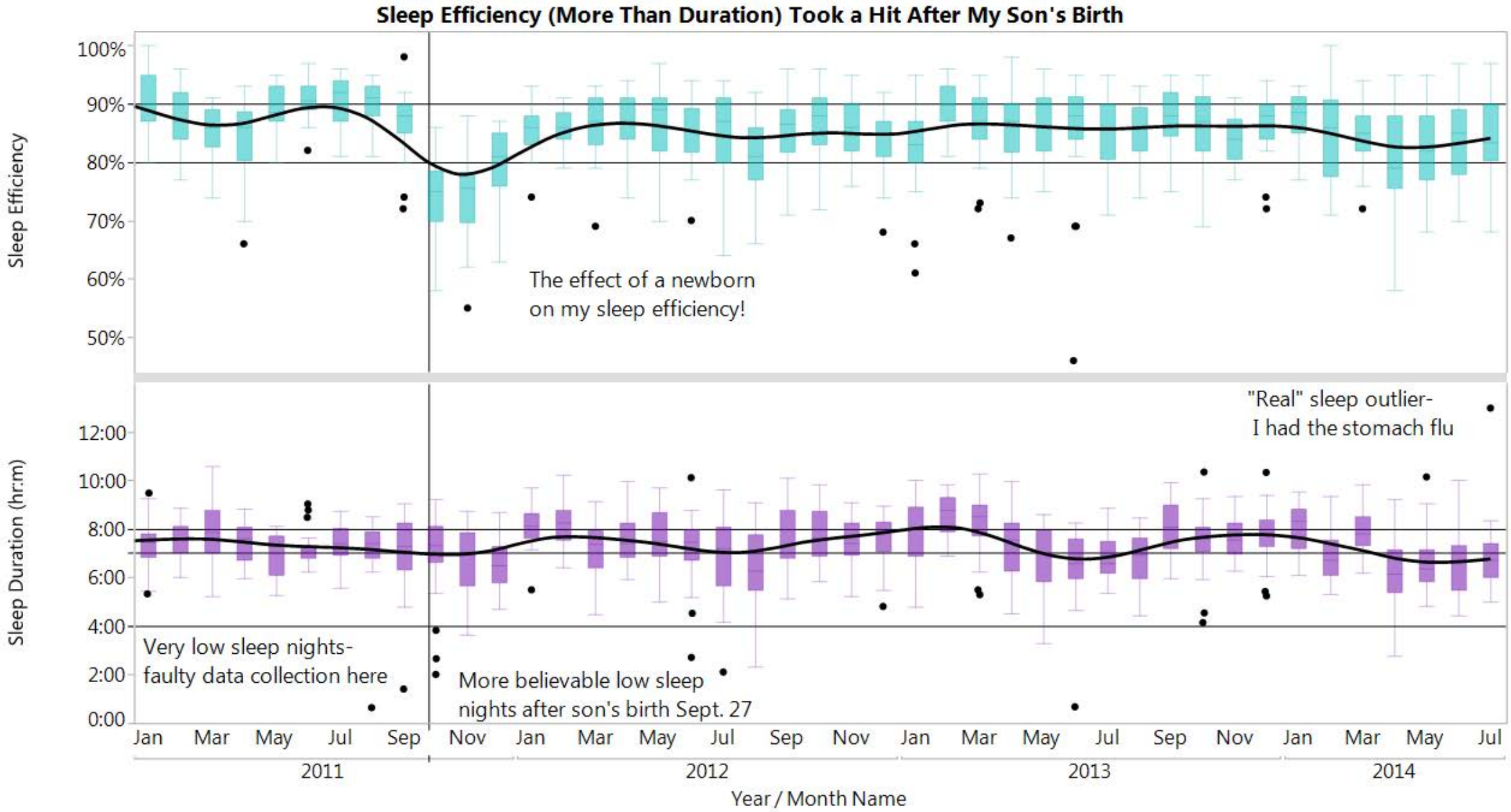
Where(Date >= 01Feb2011 & Date <= 01May2011)

Eating Patterns in My Later Pregnancy

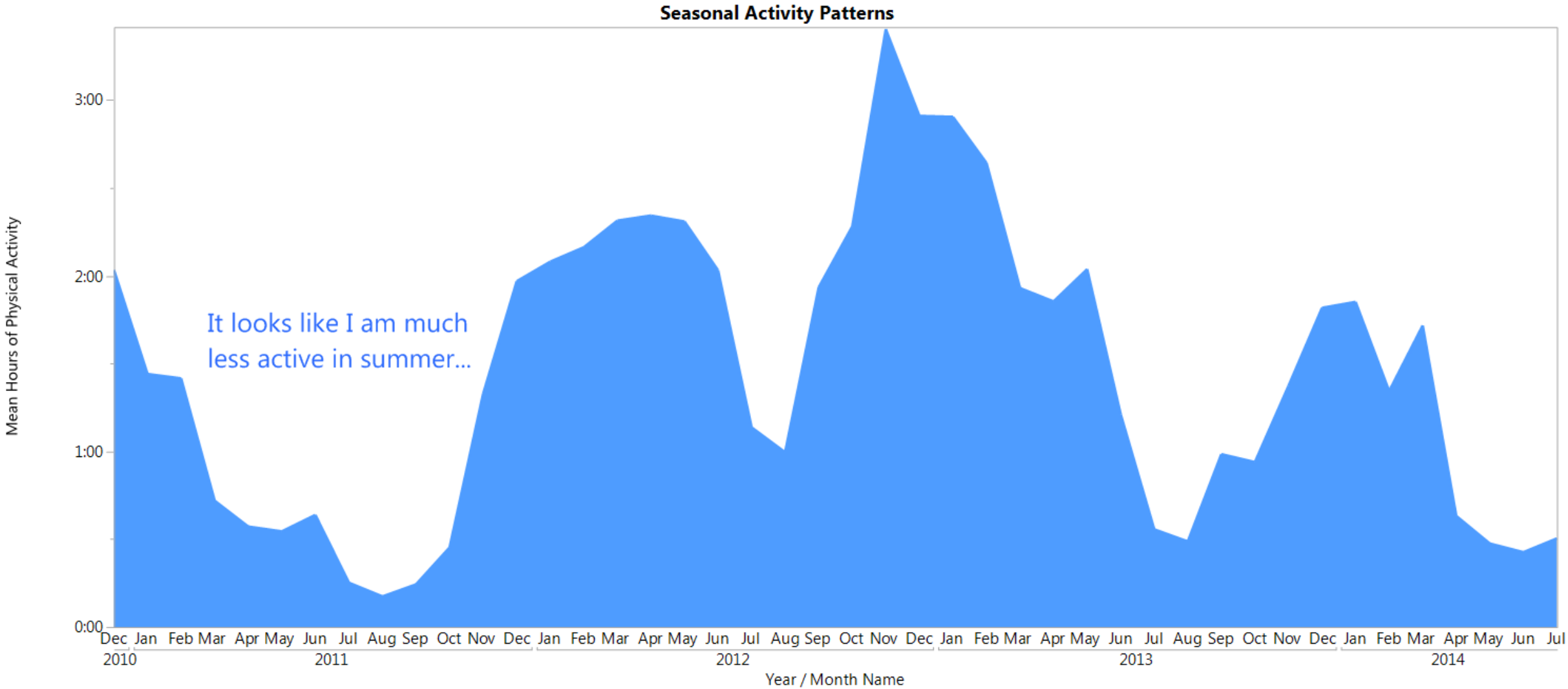
Sum of Total Calories

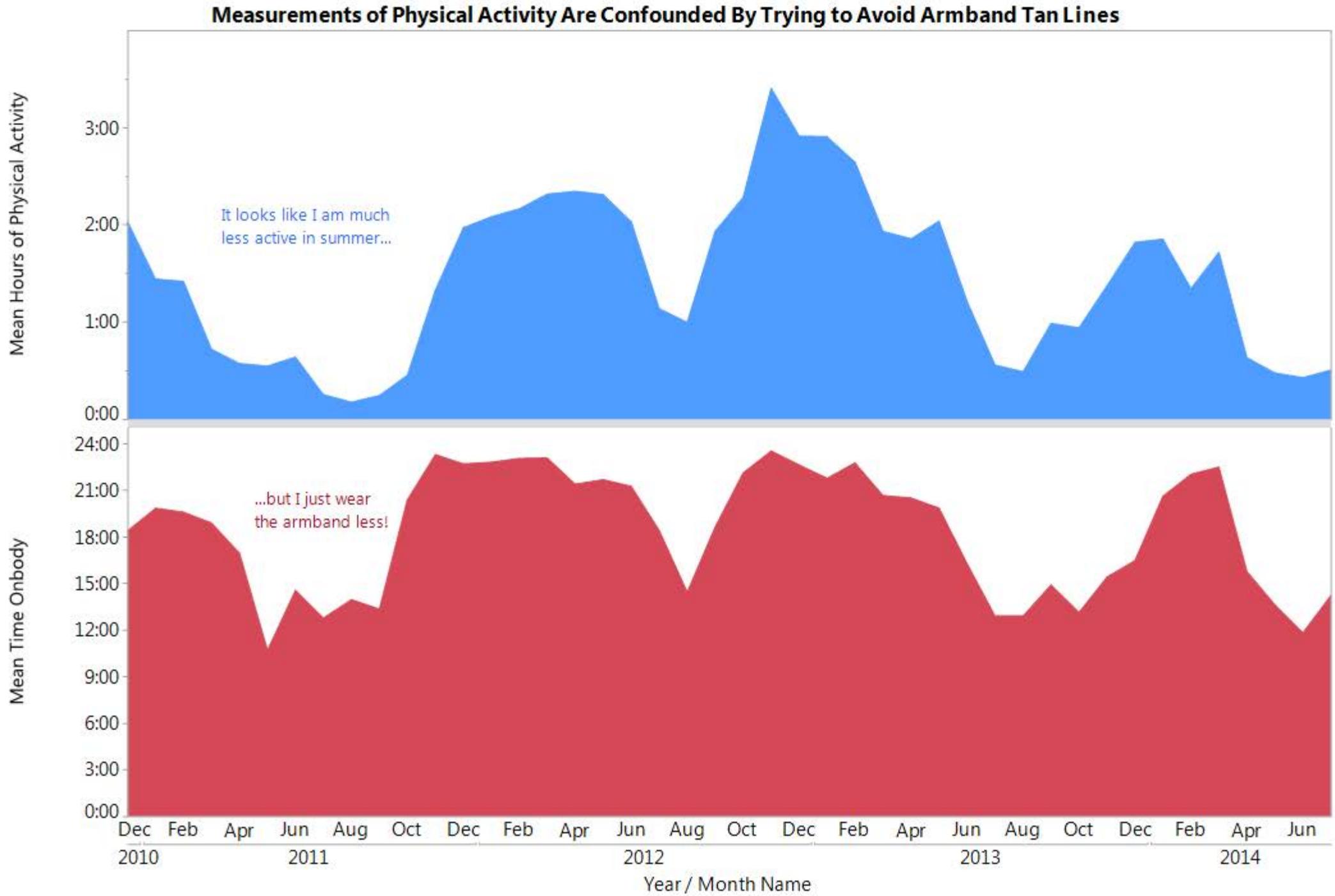
Primary Food Category / Cleaned Item Name

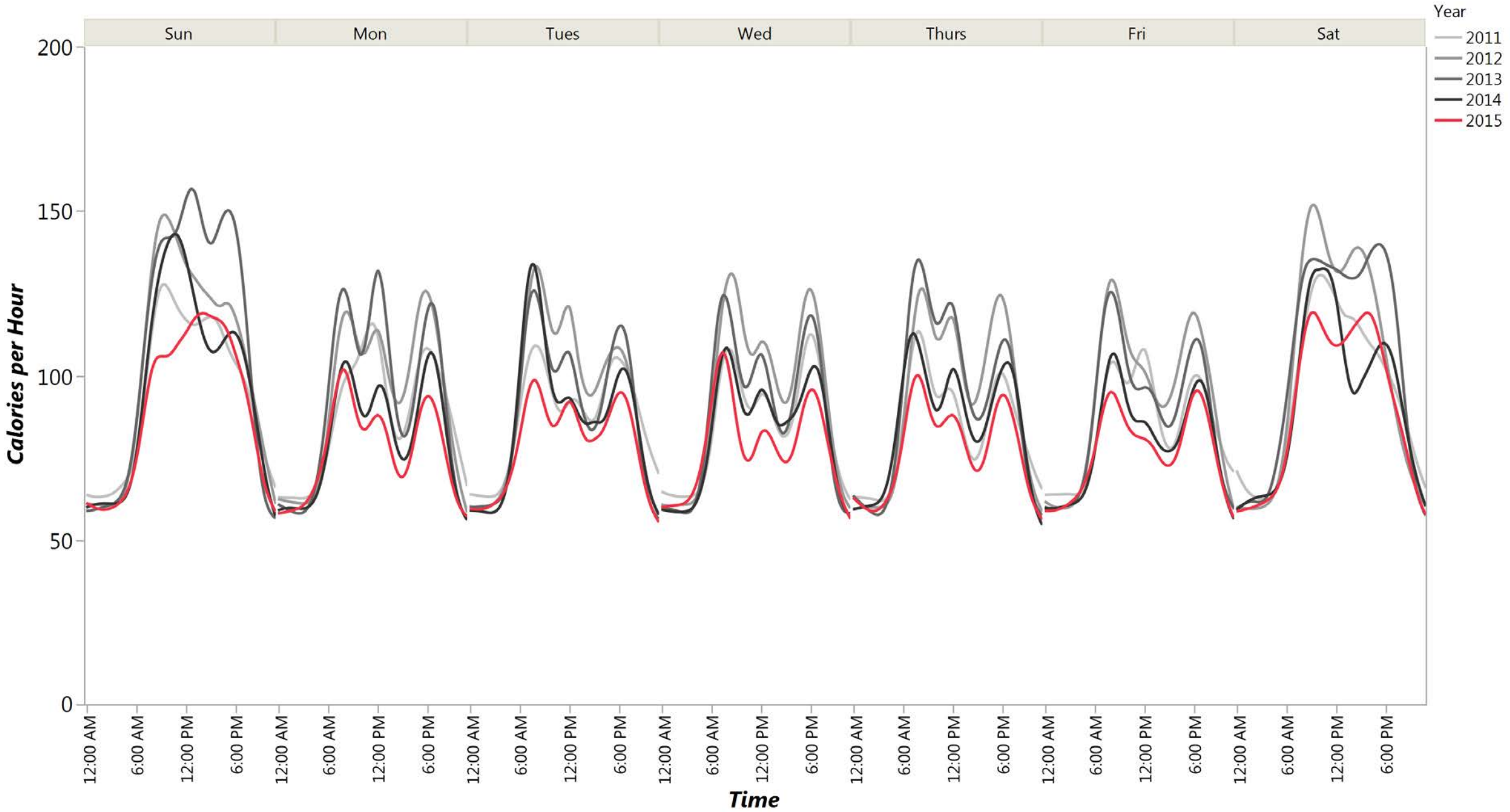
Where(Date >= 02May2011 & Date <= 24Sep2011)


Sleep Efficiency (More Than Duration) Took a Hit After My Son's Birth
Sleep Efficiency
100%
90%
80%
70%
60%
50%
The effect of a newborn
on my sleep efficiency!
Sleep Duration (hr:m)
12:00
10:00
8:00
6:00
4:00
2:00
0:00
"Real" sleep outlier-
I had the stomach flu
Very low sleep nights-
faulty data collection here
More believable low sleep
nights after son's birth Sept. 27
Jan Mar May Jul Sep Nov Jan Mar May Jul Sep Nov Jan Mar May Jul Sep Nov Jan Mar May Jul
2011
2012
2013
2014
Year / Month Name

My unique device wear patterns caused systematic bias in my data.

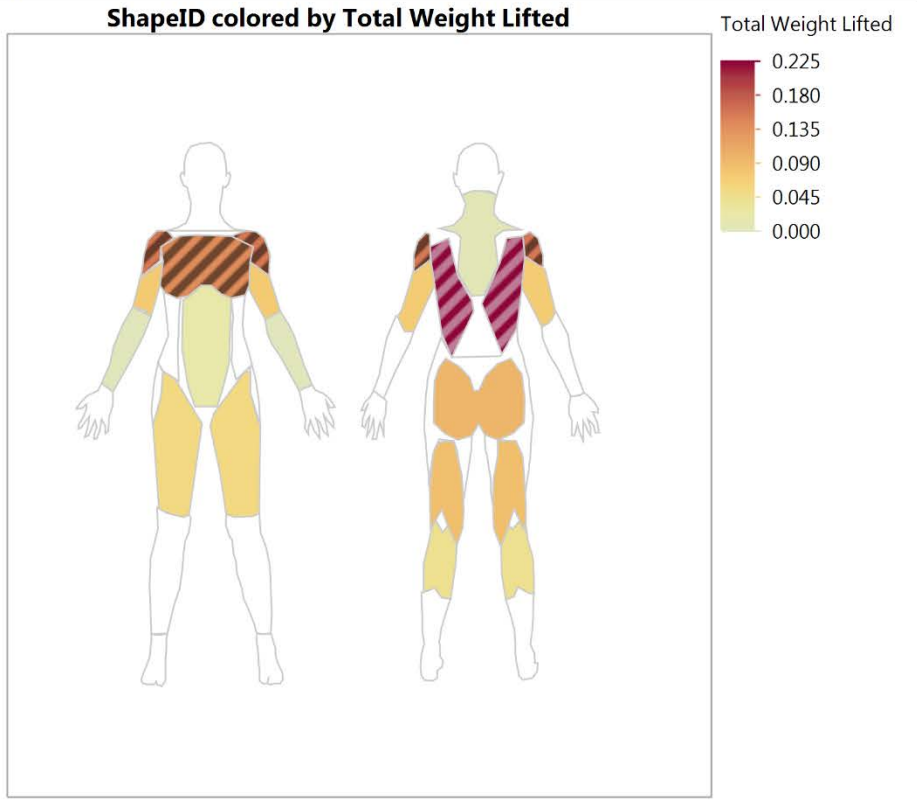

Seasonal Activity Patterns
Mean Hours of Physical Activity
3:00
2:00
1:00
0:00
It looks like I am much
less active in summer...
Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul
2010
2011
2012
2013
2014
Year / Month Name


Measurements of Physical Activity Are Confounded By Trying to Avoid Armband Tan Lines
Mean Hours of Physical Activity
3:00
2:00
1:00
0:00
It looks like I am much less active in summer...
Mean Time Onbody
24:00
21:00
18:00
15:00
12:00
9:00
6:00
3:00
0:00
...but I just wear the armband less!
Dec Feb Apr Jun Aug Oct Dec Feb Apr Jun Aug Oct Dec Feb Apr Jun Aug Oct Dec Feb Apr Jun
2010
2011
2012
2013
2014
Year / Month Name

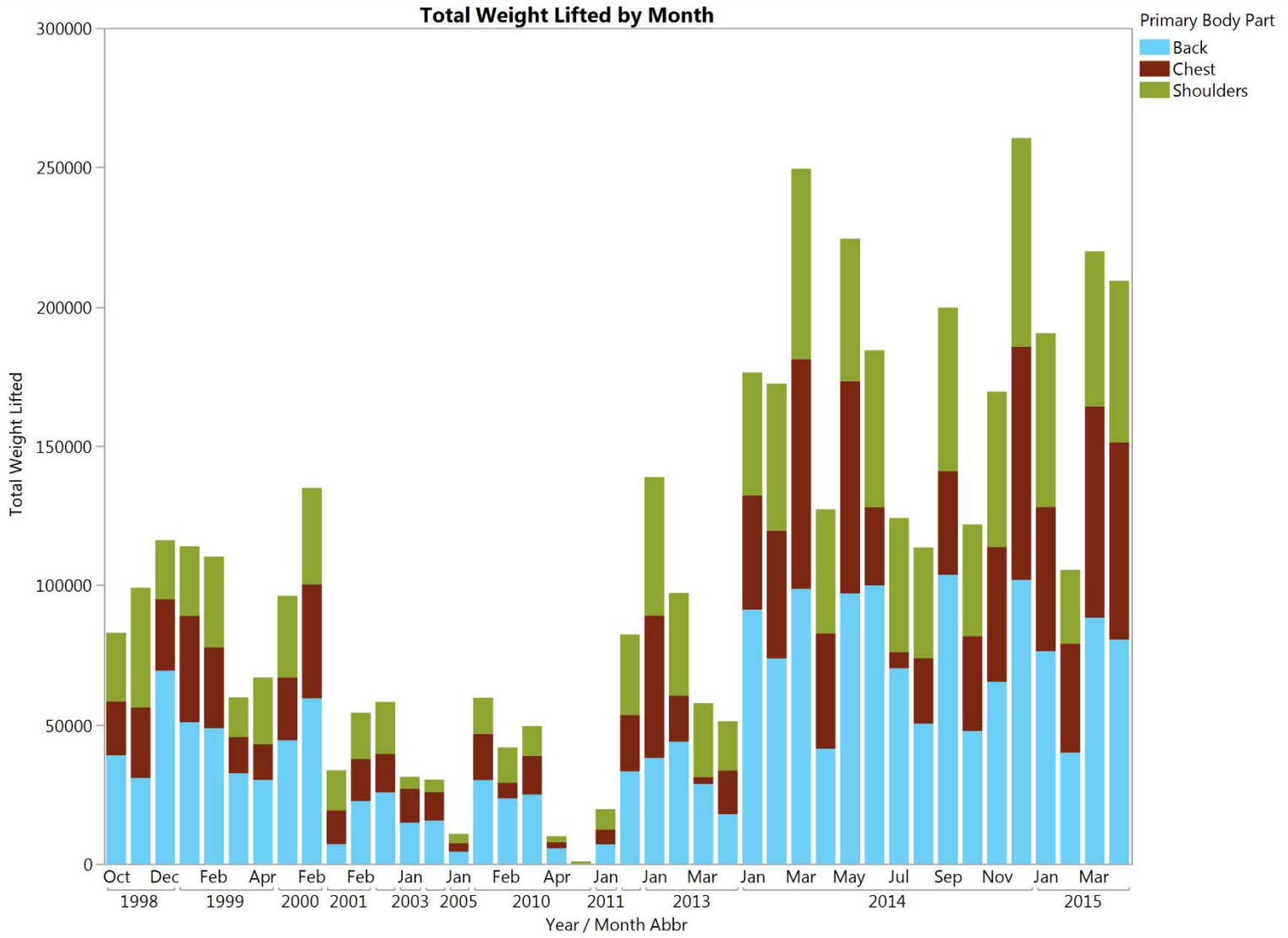

Sun
Mon
Tues
Wed
Thurs
Fri
Sat
Year
2011
2012
2013
2014
2015
200
150
100
50
0
Calories per Hour
12:00 AM
6:00 AM
12:00 PM
6:00 PM
Time

Report

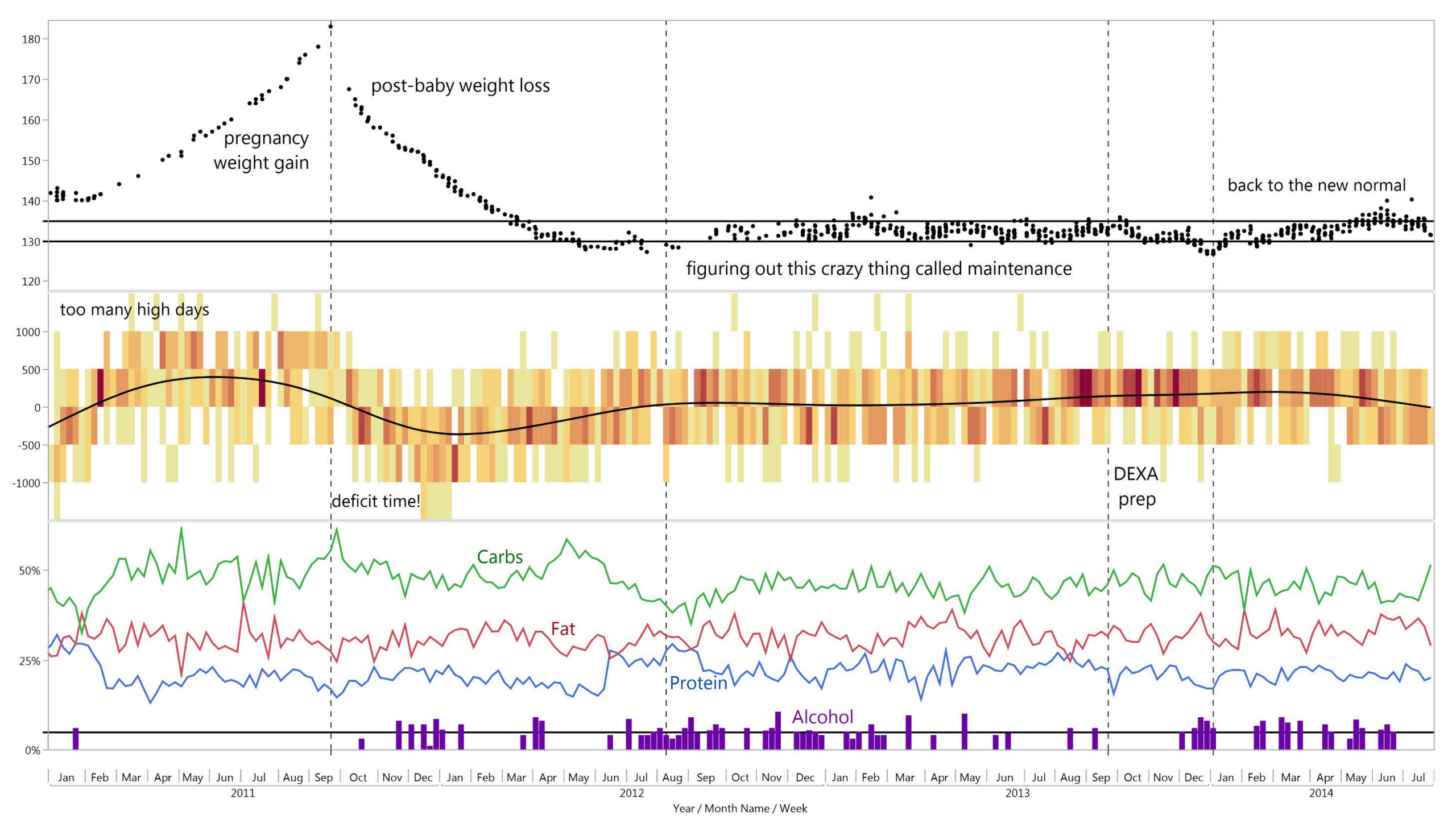
Graph Builder



Graph Builder



I have only scratched the surface in combining my data.


180
170
160
150
140
130
120
pregnancy
weight gain
post-baby weight loss
figuring out this crazy thing called maintenance
back to the new normal
too many high days
1000
500
0
-500
-1000
deficit time!
DEXA
prep
50%
25%
0%
Carbs
Fat
Protein
Alcohol
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2011
2012
2013
2014
Year / Month Name / Week

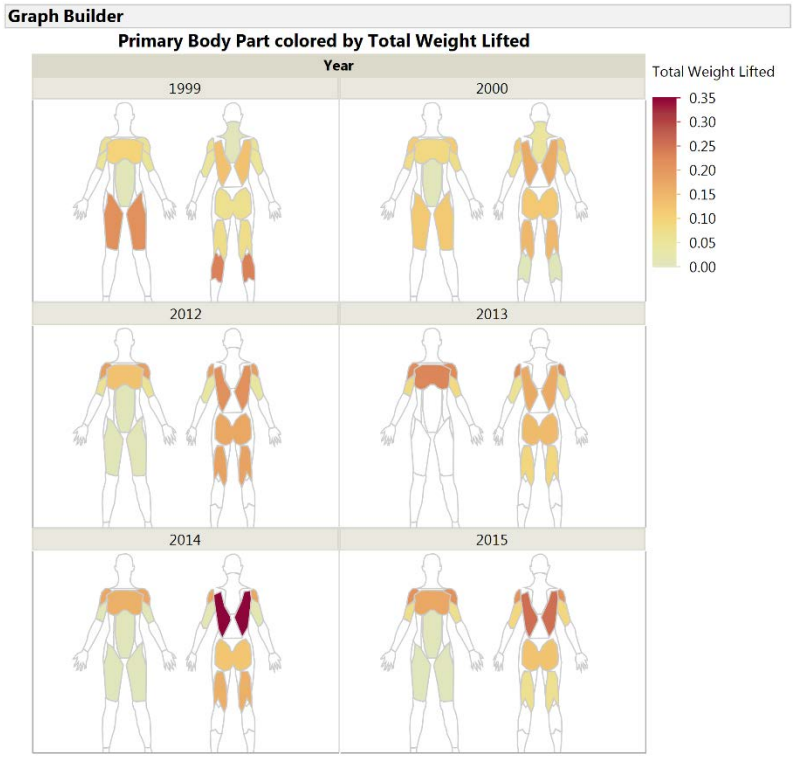
Quantified self practices also work for the uninitiated.

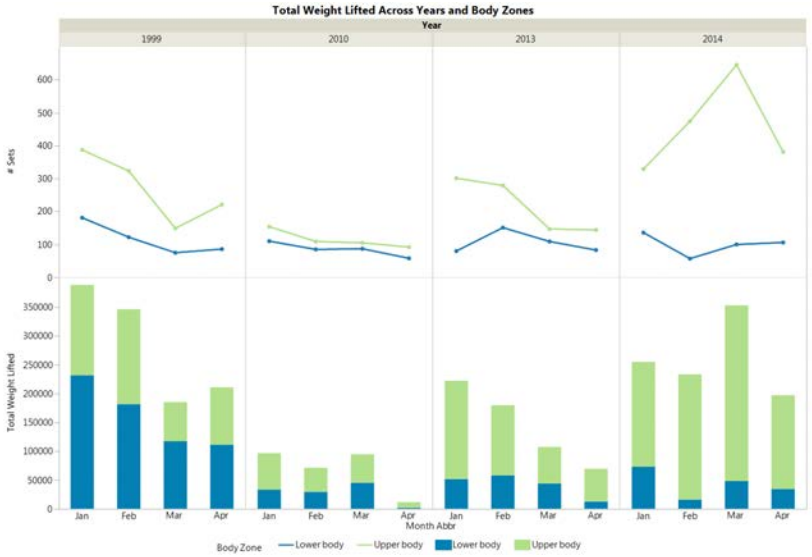
Fall 2009

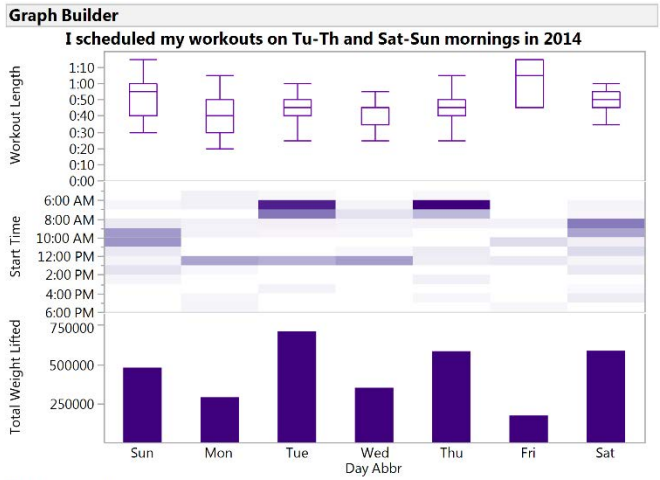
Fall 2015

- Special thanks to Xan Gregg

- Where to find me
  - **Office Hours @ QS15**
  - jmp.com/blog, Fitness and Food series
  - weighthistory.wordpress.com
  - Twitter: @ShannonConners

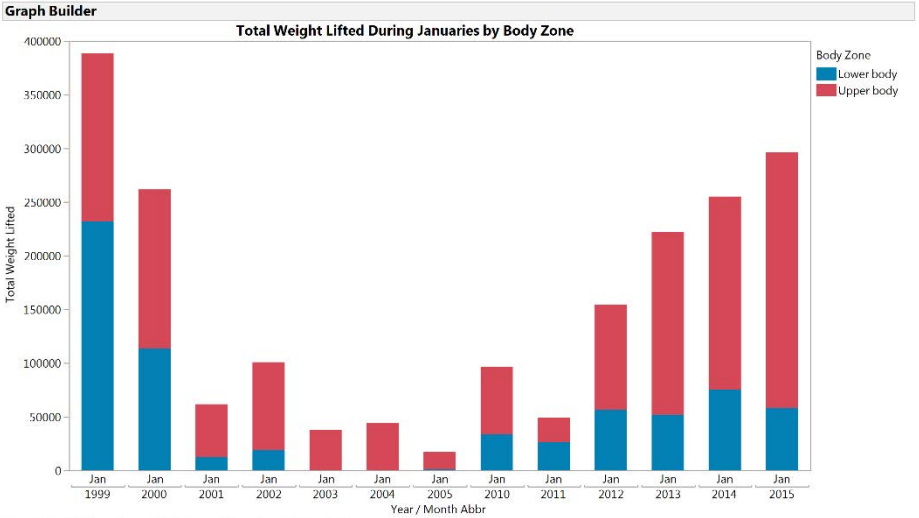






Where(Year = 2014)

Where(Year = 1999, 2000, 2012, 2013, 2014, 2015 and Month Abbr = Jan)



Where(Month Abbr = Jan and Body Zone = Lower body, Upper body)