

The association of Carbohydrate and Monosaturated fat with the risk of iron deficiency

G11 AP Statistics

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Proposal

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Research Question

Both macronutrients (e.g carbohydrates and fat) and micronutrients (e.g vitamins and minerals) are included in our daily intakes. Iron homeostasis is important in human's health system. The abnormal of iron homeostasis such as iron-deficiency (ID) may cause diseases such as anemia. One of my primary school classmates had diagnosed as iron-defected anemia 6 years ago. She gradually recovered through regulating her diet and ate specific food such as pork liver to directly increase the iron intake. This is an insight that the adjustment of diet may help treat iron-deficiency anemia. I am wondering whether there are other nutrients indirectly contribute to the recovery of iron-deficiency. Carbohydrate and monosaturated fat occupy a large proportion of daily diet. Thus, this research aims to find out whether carbohydrate and monosaturated fat in particular affect body iron homeostasis.

Background Information

Iron is required for the survival of most organisms, including bacteria, plants, and humans [1].

The abnormal of iron homeostasis may cause pathophysiological conditions: the defection of iron may lead to anemia, and the overload of iron may lead to genetic disorders, inflammation and infection, cardiovascular diseases, cancer, and neurodegeneration diseases [2]. Given that ferritin level reflects on total iron stores in the blood, and the transferrin saturation indicates the iron transportation ability, the ferritin level and transferrin saturation usually are used to evaluate iron status in the clinical studies [3]. Therefore, this research will choose ferritin level and transferrin saturation as the two response variables to specify the iron status.

Humans derive iron from their everyday diet, predominantly from plant foods and the rest from foods of animal origin [4]. Iron absorption can vary from 1 to 40% [5] due to the different components of meal. Carbohydrates are one of the three macronutrients in the human diet, along with protein and fat. [6] They serve as the energy source and participate in sugar and insulin metabolism. However, there is few studies reflected the relationship between carbohydrate and the iron homeostasis. Besides, monounsaturated fats also present in daily diet and play an important role in human body to regulate LDL cholesterol level [7]. They are found in plant foods, such as nuts, avocados, and vegetable oils [8] Therefore, carbohydrate and monosaturated fat are selected as explanatory variables. Human generally consume micronutrients along with macronutrients, so this research considers both micronutrients and macronutrients except carbohydrate and monosaturated fat as confounding variables.

Sampling and experimental design

Type of study: This research is an observational study which utilizes the dietary data of participants and iron status examination data.

Variables: The total amount of carbohydrate and monosaturated fat are chosen as explanatory variables. The ferritin level and transferrin saturation are chosen as response variables.

Data collection: The research obtained all the data from NHANES 2017-2020 database [6] (Data in this database was collected from 2019 to March 2020 and were combined with data from the NHANES 2017-2018 cycle to form a nationally representative sample of NHANES 2017-March 2020 pre-pandemic data.)

Scope of inference: The sample size of each dataset is larger than 9000, so it is enough to be generalized to the population of people all over the world.

Exploratory Data Analysis

The full join was performed between all variables except ferritin level and transferrin saturation.

The right join was performed between all explanatory variables, confounding variables and ferritin level. The right join was also performed between all explanatory variables, confounding variables and ferritin level.

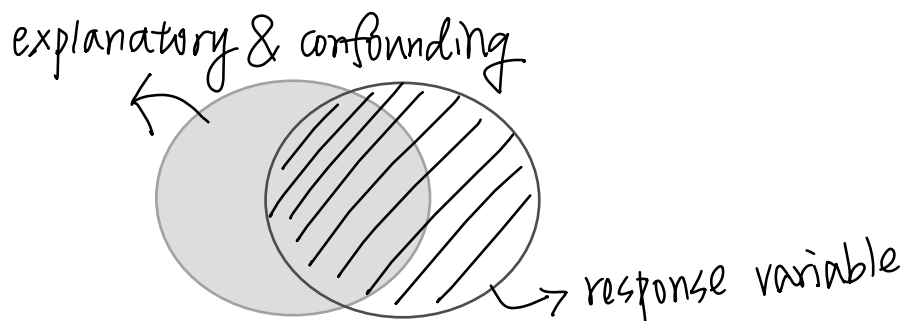


Figure 1. The Venn diagram briefly shows the right join of data after the collection.

The minimum, first quartile, median, mean, third quartile, maximum were generated by using R.

(summary ())

SEQN	Gender	Age	Race	Country.of.birth	Ratio.of.family.income.to.poverty	Weight
Min. :109264	1:4622	Min. :12.00	1:1208	1 :6994	Min. :0.000	Min. : 27.60
1st Qu.:113185	2:4831	1st Qu.:26.00	2: 973	2 :2454	1st Qu.:1.140	1st Qu.: 64.90
Median :117063		Median :46.00	3:3277	77: 4	Median :2.100	Median : 77.80
Mean :117076		Mean :45.05	4:2372	99: 1	Mean :2.526	Mean : 81.23
3rd Qu.:120973		3rd Qu.:62.00	5:1623		3rd Qu.:4.080	3rd Qu.: 93.80
Max. :124822		Max. :80.00			Max. :5.000	Max. :254.30
					NA's :1250	NA's :129
Height	Energy.1	Protein.1	Carbohydrate.1	Total.sugars.1	Dietary.Fiber.1	Total.fat.1
Min. :131.1	Min. : 0	Min. : 0.00	Min. : 0.0	Min. : 0.00	Min. : 0.00	Min. : 0.00
1st Qu.:159.0	1st Qu.: 1418	1st Qu.: 49.90	1st Qu.: 160.6	1st Qu.: 55.72	1st Qu.: 8.80	1st Qu.: 15.60
Median :165.9	Median : 1944	Median : 70.42	Median : 224.6	Median : 90.36	Median : 13.80	Median : 24.40
Mean :166.4	Mean : 2114	Mean : 78.19	Mean : 247.1	Mean :106.53	Mean : 15.99	Mean : 27.85
3rd Qu.:173.6	3rd Qu.: 2628	3rd Qu.: 98.20	3rd Qu.: 310.7	3rd Qu.:137.81	3rd Qu.: 20.60	3rd Qu.: 36.24
Max. :198.7	Max. :12501	Max. :545.20	Max. :1586.2	Max. :931.16	Max. :103.40	Max. :268.59
NA's :140	NA's :792	NA's :792	NA's :792	NA's :792	NA's :792	NA's :792
Total.monosaturated.fat	Total.polysaturated.fat	Cholesterol	Iron	Vitamin.C	Vitamin.D	
Min. : 0.00	Min. : 0.00	Min. : 0.0	Min. : 0.00	Min. : 0.00	Min. : 0.000	
1st Qu.: 17.34	1st Qu.: 11.02	1st Qu.: 129.0	1st Qu.: 8.08	1st Qu.: 16.90	1st Qu.: 1.100	
Median : 25.88	Median : 17.40	Median : 232.0	Median : 11.85	Median : 45.20	Median : 2.900	
Mean : 29.36	Mean : 20.42	Mean : 305.2	Mean : 13.55	Mean : 76.01	Mean : 4.339	
3rd Qu.: 37.61	3rd Qu.: 26.46	3rd Qu.: 412.0	3rd Qu.: 16.83	3rd Qu.: 104.70	3rd Qu.: 5.600	
Max. :200.10	Max. :218.70	Max. :2403.0	Max. :111.04	Max. :1977.40	Max. :105.700	
NA's :792	NA's :792	NA's :792	NA's :792	NA's :792	NA's :792	
Vitamin.K	Calcium	Phosphorus	Magnesium	Zinc	Copper	Sodium
Min. : 0.0	Min. : 2.0	Min. : 0	Min. : 5.0	Min. : 0.00	Min. : 0.018	Min. : 2
1st Qu.: 38.5	1st Qu.: 513.0	1st Qu.: 848	1st Qu.: 183.0	1st Qu.: 6.02	1st Qu.: 0.683	1st Qu.: 2141
Median : 70.0	Median : 793.0	Median :1201	Median : 254.0	Median : 8.90	Median : 0.989	Median : 3059
Mean : 115.4	Mean : 908.8	Mean :1323	Mean : 284.3	Mean : 10.36	Mean : 1.138	Mean : 3413
3rd Qu.:129.0	3rd Qu.:1161.0	3rd Qu.:1650	3rd Qu.: 352.0	3rd Qu.:12.86	3rd Qu.: 1.377	3rd Qu.: 4265
Max. :2561.1	Max. :6495.0	Max. :7373	Max. :1506.0	Max. :477.53	Max. :43.248	Max. :25949
NA's :792	NA's :792	NA's :792	NA's :792	NA's :792	NA's :792	NA's :792
Selenium	Caffeine	total.length.of.food.fast.minutes	Transferrin.Saturation			
Min. : 0.0	Min. : 0.0	Min. : 0.00	Min. : 2.00			
1st Qu.: 67.7	1st Qu.: 4.0	1st Qu.:14.00	1st Qu.:19.00			
Median : 98.1	Median : 72.0	Median :30.00	Median :25.00			
Mean : 110.3	Mean : 125.1	Mean :29.19	Mean :26.57			
3rd Qu.:139.1	3rd Qu.:174.0	3rd Qu.:44.00	3rd Qu.:33.00			
Max. :1195.6	Max. :4320.0	Max. :59.00	Max. :92.00			
NA's :792	NA's :792					

Figure 2. The data summary of cleaned Transferrin Saturation dataset

SEQN	Gender	Age	Race	Country.of.birth	Ratio.of.family.income.to.poverty	Weight	
Min. :109264	1:5201	Min. : 1.00	1:1334	1 :8036	Min. :0.000	Min. : 8.2	
1st Qu.:113201	2:5356	1st Qu.:20.00	2:1087	2 :2516	1st Qu.:1.073	1st Qu.: 60.2	
Median :117077		Median :42.00	3:3677	77: 4	Median :2.040	Median : 75.2	
Mean :117085		Mean :41.25	4:2670	99: 1	Mean :2.477	Mean : 75.3	
3rd Qu.:120983		3rd Qu.:61.00	5:1789		3rd Qu.:4.000	3rd Qu.: 91.5	
Max. :124822		Max. :80.00			Max. :5.000	Max. :254.3	
					NA's :1379	NA's :144	
Height	Energy.1	Protein.1	Carbohydrate.1	Total.sugars.1	Dietary.Fiber.1	Total.fat.1	
Min. : 78.3	Min. : 0	Min. : 0.00	Min. : 0.0	Min. : 0.00	Min. : 0.00	Min. : 0.00	
1st Qu.:157.2	1st Qu.: 1372	1st Qu.: 47.95	1st Qu.: 158.7	1st Qu.: 56.36	1st Qu.: 8.60	1st Qu.: 15.32	
Median :164.9	Median : 1883	Median : 68.11	Median : 220.3	Median : 90.15	Median : 13.40	Median : 23.69	
Mean :161.8	Mean : 2065	Mean : 76.07	Mean : 243.3	Mean :105.84	Mean : 15.58	Mean : 27.22	
3rd Qu.:172.9	3rd Qu.: 2564	3rd Qu.: 95.52	3rd Qu.: 304.8	3rd Qu.:136.06	3rd Qu.: 19.90	3rd Qu.: 35.43	
Max. :199.6	Max. :12501	Max. :545.20	Max. :1586.2	Max. :931.16	Max. :103.40	Max. :268.59	
NA's :362	NA's :990	NA's :990	NA's :990	NA's :990	NA's :990	NA's :990	
Total.monosaturated.fat	Total.polysaturated.fat	Cholesterol	Iron	Vitamin.C	Vitamin.D		
Min. : 0.00	Min. : 0.00	Min. : 0.0	Min. : 0.000	Min. : 0.00	Min. : 0.00		
1st Qu.: 16.62	1st Qu.: 10.61	1st Qu.: 123.0	1st Qu.: 7.905	1st Qu.: 17.80	1st Qu.: 1.10		
Median : 24.96	Median : 16.70	Median : 223.0	Median : 11.560	Median : 47.10	Median : 3.00		
Mean : 28.51	Mean : 19.78	Mean : 296.0	Mean : 13.266	Mean : 76.65	Mean : 4.44		
3rd Qu.: 36.59	3rd Qu.: 25.58	3rd Qu.: 397.5	3rd Qu.: 16.470	3rd Qu.: 105.40	3rd Qu.: 5.90		
Max. :200.10	Max. :218.70	Max. :2403.0	Max. :111.040	Max. :1977.40	Max. :105.70		
NA's :990	NA's :990	NA's :990	NA's :990	NA's :990	NA's :990		
Vitamin.K	Calcium	Phosphorus	Magnesium	Zinc	Copper	Sodium	Potassium
Min. : 0.0	Min. : 2	Min. : 0	Min. : 5.0	Min. : 0.000	Min. : 0.018	Min. : 2	Min. : 0
1st Qu.: 36.1	1st Qu.: 518	1st Qu.: 836	1st Qu.: 177.0	1st Qu.: 5.855	1st Qu.: 0.650	1st Qu.: 2050	1st Qu.: 1551
Median : 66.0	Median : 797	Median :1179	Median : 248.0	Median : 8.670	Median : 0.955	Median : 2950	Median : 2199
Mean : 110.1	Mean : 909	Mean :1302	Mean : 277.3	Mean : 10.098	Mean : 1.102	Mean : 3311	Mean : 2411
3rd Qu.: 122.9	3rd Qu.:1161	3rd Qu.:1624	3rd Qu.: 343.0	3rd Qu.: 12.520	3rd Qu.: 1.343	3rd Qu.: 4170	3rd Qu.: 3025
Max. :2561.1	Max. :7038	Max. :7373	Max. :1506.0	Max. :477.530	Max. :43.248	Max. :25949	Max. :14358
NA's :990	NA's :990	NA's :990	NA's :990	NA's :990	NA's :990	NA's :990	NA's :990
Selenium	Caffeine	total.length.of.food.fast.minutes	Ferritin				
Min. : 0.0	Min. : 0.0	Min. : 0.00	Min. : 1.04				
1st Qu.: 64.5	1st Qu.: 2.0	1st Qu.:14.00	1st Qu.: 37.00				
Median : 94.4	Median : 58.0	Median :30.00	Median : 80.70				
Mean : 106.9	Mean : 115.7	Mean :28.99	Mean : 132.80				
3rd Qu.: 134.8	3rd Qu.: 158.0	3rd Qu.:44.00	3rd Qu.: 166.00				
Max. :1195.6	Max. :4320.0	Max. :59.00	Max. :5190.00				
NA's :990	NA's :990						

Figure 3. The data summary of cleaned Ferritin dataset

The dot plot and loess regression curve were performed to roughly predict the relationship between explanatory variables and response variables.

Based on the exploratory data analysis, the LOESS curve shows an almost horizontal curve in each graph. However, there are multiple outliers. Further work will manage to treat these outliers. Also, the confounding variables are not considered, so the research will conduct linear regression by R more precisely and optimize a function which considers the explanatory variables, the confounding variables and the response variables.

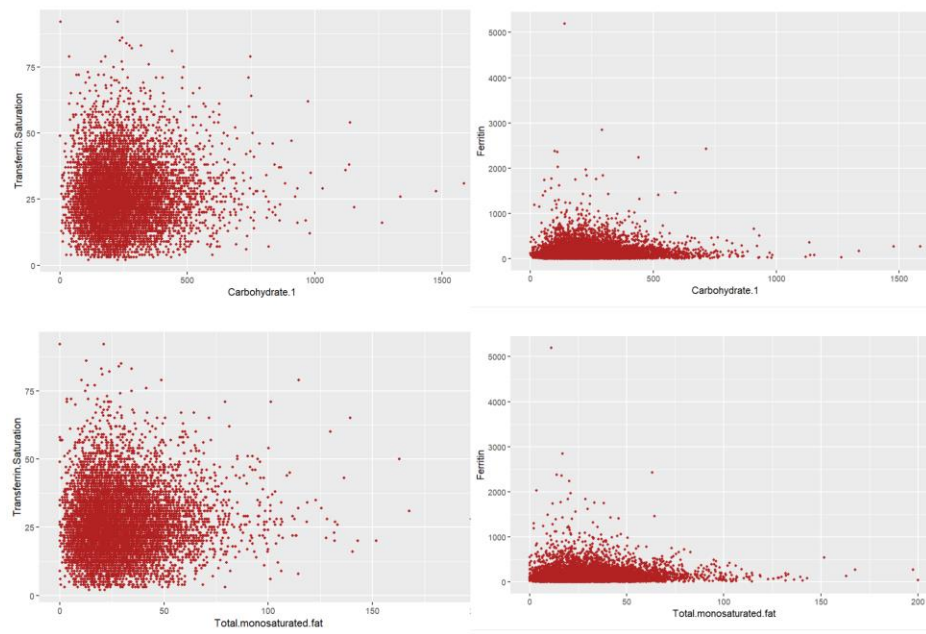


Figure 4. The dot plot of four groups

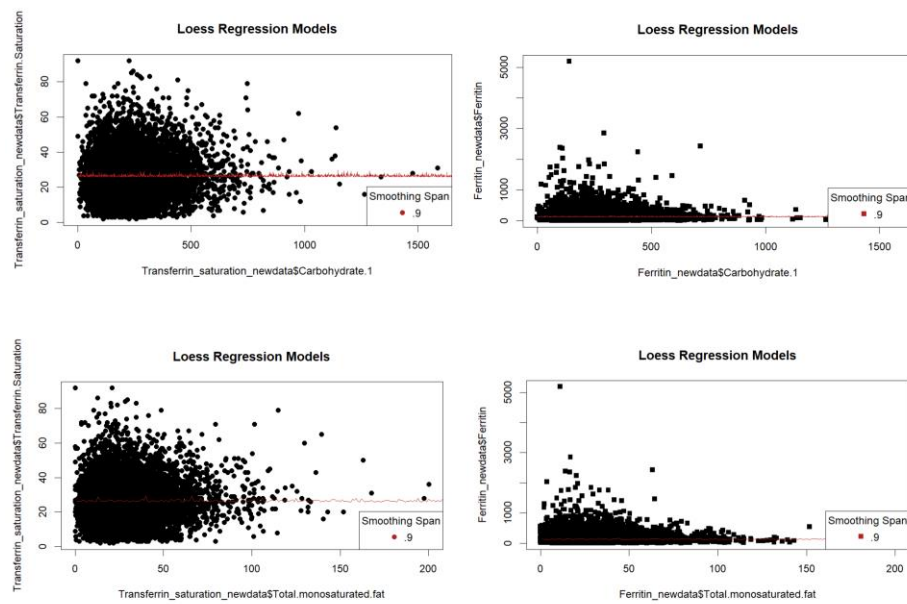


Figure 5. The LOESS Regression Model of four groups

Group Task Assignments and Timeline

In this project, I (Ura) am responsible for all the work included literature review, exploratory data analysis, establishing regression models and final write up. The exploratory data analysis will be done on May 15th. The regression model will be generated and optimized on May 17th. The main research context write-up will be done by May 20th. The presentation will be in class.

Data

ID	Gender	Age	Race	Country	Ratio of Fat to Weight	Height	Energy	Protein	Carbohydrate	Total Saturated Fat	Total Polyunsaturated Fat	Total Cholesterol	Vitamin C	Vitamin D	Vitamin K	Calcium	Phosphorus	Magnesium	Zinc	Copper	Sodium	Potassium	Selenium	Caffeine	total ferritin	Transferrin Saturation							
1	102904	2	13	1	0.83	42.2	154.7	1096	55.55	121.68	27.86	8.2	7.061	13.896	12.426	153	8.46	15.2	0.1	95.6	329	975	1703	1229	67.3	1	24						
2	102906	2	29	5	2	5	97.1	160.2	1698	52.58	217.69	94.2	20.7	22.175	25.513	19.171	120	12.07	63.5	1.6	75.5	991	1182	300	6.64	1.4	2001	2014	55.2	12	51	12	
3	102971	1	49	3	1	0.96	133.8	1251	24.96	159.99	84.83	51	15.275	20.533	12.317	61	6.9	156.6	0.1	93.8	732	604	85	0.306	0.323	2162	1210	49.8	0	18	417		
4	102973	1	36	3	1	0.83	74.3	184.2	1403	56.73	265.59	162.78	6.2	2.086	4.337	4.573	114	8.85	5.7	0	21.8	758	806	120	3.8	0.395	1990	1674	80.9	33	29	71	
5	102974	1	68	5	1	1.2	103.7	185.3	2385	77.75	305.41	60.84	27.7	21.8	33.443	26.218	300	18.39	95.7	4.6	281.6	1309	1918	330	8.27	1.154	6717	1695	96.8	0	9	30	
6	102977	2	12	1	1	1.35	48.7	162	1202	29.67	157.41	73.25	8.4	14.645	16.756	16.161	552	8.36	118.8	9	45.4	237	554	115	3.54	0.601	1378	1204	56.8	3	14	16	
7	102979	2	17	3	1	1.19	55.3	162.2	1686	69.1	224.65	73.54	9.1	20.447	18.069	12.851	21	11.12	7	4.6	16.1	1115	1092	194	8.68	0.794	3158	1459	120.3	32	26	29	
8	102982	1	76	3	1	0.61	83.3	177.1	2026	58.33	310.87	129.16	22.8	29.435	38.887	9.146	211	21.84	41.9	0.9	41.5	770	1144	352	10.52	1.278	2456	4233	64.4	290	53	19	
9	102984	2	44	1	2	NA	91.1	152.7	1973	79.42	244.14	105.24	14.8	30.081	23.655	12.741	264	12.44	36.8	4.3	44.3	1401	1477	245	12.61	0.805	3251	1986	99.1	60	57	12	
10	102986	2	33	5	2	1.36	72.6	158.4	3146	190.98	275.46	82.53	16	49.936	51.961	26.279	901	18.58	27.3	21.9	52.3	1053	2600	418	17.71	1.777	7251	3998	299.1	46	8	3	
11	102990	2	68	4	1	5	73	161.2	822	30.45	143.44	53.8	5.7	4.802	4.166	1.956	46	8.93	30.8	4.1	22.1	409	450	129	4.4	0.504	1059	1144	67.3	0	31	26	
12	102991	2	42	5	1	NA	81.4	161.3	878	29.27	113.17	52.08	5.4	13.769	10.535	7.436	93	6.12	16.8	1.6	28.1	499	526	117	3.3	0.43	1265	826	45.3	73	11	33	
13	102992	1	58	2	1	1.6	86	167.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20	48
14	102993	1	44	3	1	0.02	99.4	181.6	4225	113	762.89	525.46	14.5	27.885	26.879	16.041	277	24.71	560.7	2.2	90.9	1316	2323	323	12.9	1.327	6760	5177	151.5	100	3	20	
15	102995	2	54	1	2	5	61.7	157.4	2180	77.53	308.13	169.59	31.9	20.645	26.969	18.094	155	11.15	200.9	7.9	131.1	1538	1490	405	8.84	1.319	2490	3563	83.2	95	29	19	
16	102997	2	30	5	1	NA	55.4	154.6	1088	43.4	133	36.25	2.9	11.78	15.334	11.888	472	6.4	4.4	2.6	18.9	153	671	100	3.9	0.481	2041	948	74.2	145	34	25	
17	102998	1	68	3	1	1.75	90.2	162.5	1352	28.45	261.42	206.85	12.2	5.482	9.429	3.562	52	4.7	3.8	0.4	6.4	160	512	65	4.03	0.611	1225	669	42.3	128	55	32	
18	102999	2	54	5	2	5	62	144.7	719	27.71	86.45	29.81	6.8	11.448	11.66	5.495	130	4.74	16.2	0.4	25	155	502	104	2.95	0.634	1349	765	51.3	92	10	23	
19	103003	1	18	5	2	1.03	45.5	159.3	1753	68	207.73	44.76	21	23.13	23.499	16.777	165	10.49	2.4	5.8	45.2	1209	1413	302	8.96	1.139	3781	1797	90.9	1	28	27	
20	103007	1	47	5	2	1.38	67.9	166.2	2494	72.34	401.39	42.21	15	25.13	21.258	11.04	119	20.59	18.5	5.3	47.7	251	924	240	6.2	1.185	6286	1615	133.1	80	34	71	
21	103012	2	48	3	1	5	66.2	166.5	2660	74.62	294.93	152.82	38.1	49.372	36.709	41.226	260	16.46	278.2	2.4	308	1441	1616	391	10.03	1.484	4062	1769	91.8	27	9	25	
22	103013	1	63	3	2	5	75.2	172.6	2837	88.86	267.36	109.46	18.4	47.523	53.838	23.973	509	23.75	2.5	8.3	19.8	1007	1587	428	10.26	1.18	3342	2566	113.9	174	35	30	
23	103015	2	30	4	1	2.16	75.9	154.5	4485	225.92	221.68	104.68	7.4	40.848	38.19	81.905	1083	15.32	5	2.2	331.6	482	2790	297	22.17	0.932	10050	3575	328.8	0	9	57.1	
24	103016	2	62	4	1	0.07	72.7	159.2	2372	73.24	227.8	111.63	13.3	43.415	41.019	32.53	245	10.1	65.1	4.8	147.2	1000	1187	300	12.98	1.165	3473	3219	80.8	0	31	13	
25	103017	1	28	4	1	NA	91.6	174.5	2882	84.51	305.86	144.56	30.6	38.819	61.272	28.274	253	10.94	121.9	1.6	147.6	972	1610	400	11.17	1.255	4300	3468	91	175	35	22	
26	103019	2	22	4	1	4.93	94.2	175.6	2114	56.42	260.33	126.55	13.8	17.85	16.667	11.058	124	15.32	109.9	4.8	51.3	1300	1234	256	8.09	0.898	2898	2213	100.1	103	39	32	
27	103021	2	19	4	1	0.06	83.5	158.7	1922	110.68	351.92	160.89	16.7	39.852	40.968	21.028	388	14.15	274.8	2.4	49.4	837	1445	284	13.94	0.954	5130	2869	170.8	0	30	21	
28	103022	2	45	1	2	7.79	62.8	146.5	1557	80.04	213.58	78.41	24.3	10.333	16.146	11.491	618	9.04	8.6	2.2	35.8	345	1396	283	8.78	0.88	1825	2115	100.2	134	32	25	
29	103023	1	22	1	1	2.38	NA	2325	84.93	202.59	59.94	9.6	40.244	45.808	33.272	247	12.47	21.7	1.2	142.3	959	1150	267	12.4	0.898	3780	2033	115.2	95	36	20		
30	103024	2	49	3	1	2.74	64.2	163.6	995	62.51	16.99	9.95	3.1	15.346	11.829	13.35	725	4.52	4.7	3.5	154.2	241	705	95	4.49	0.495	2889	1060	80.9	98	7	122	
31	103026	2	44	3	1	5	56.8	162.3	1147	41.32	167.47	63.99	11.5	6.486	14.213	9.957	5	23.72	17.8	9.9	180.5	1080	1014	313	6.34	0.915	2188	1463	37.9	12	25	30	
32	103027	2	58	1	2	4.86	63.4	163.6	1299	47.56	185.25	69.86	28.7	8.636	19.199	14.443	50	9.28	119.5	0.1	79	323	747	288	7.86	1.676	1653	2487	92.9	174	35	30	
33	103030	1	76	5	2	2.37	61.5	162.5	1161	44.29	133.39	2.76	4.6	6.187	12.654	8.879	51	5.54	2	10.5	8.9	327	691	210	3.33	0.711	1773	1142	56.8	7	72	0	
34	103031	2	19	1	1	0.65	NA	3452	151.61	283.25	61.88	40	40.122	75.351	32.088	573	21.85	42.9	4.1	125.3	979	2688	544	28.6	1.983	1180	4382	173.5	3	25	23		
35	103032	1	33	2	1	NA	113	184.4	1954	78.94	156.39	13.06	10	38.328	37.111	26.843	195	14.22	5.7	2.8	98.6	901	1112	148	10.7	0.696	5538	1469	129.2	0	47	32	
36	103033	2	41	2	1	5	62.5	154	1684	67.16	207.78	79.93	16.8	17.873	18.347	23.838	165	11.77	89.1	0.9	179	495	1284	265	9.29	1.271	3543	2661	81.6	184	3	200	
37	103034	2	54	3	1	0.98	158.1	1315	33.62	185.34	103.43	5.9	14.297	23.663	9.315	55	23.34	20.6	9.7	21.5	912	921	211	4.6	0.442	1134	2509	22.6	723	22	128		
38	103035	2	55	4	1	0.11	107.2	164.6	2401	53.35	343.69	205.28	13.3	32.285	36.085	21.467	168	10.7	9.1	24.5	403	706	274	7.27	1.318	4225	2908	89.4	49	47	353		
39	103036	1	35	1	1	3.65	105.2	177.1	2479	68.05	416.46	200.01	19.9	19.417	15.566	18.092	93	14.96	48	0.9	35.7	1030	1227	325	9.55	1.764	3520	1933	126.6	355	12	7	
40	103037	2	49	3	1	NA	113	184.4	1954	78.94	156.39	13.06	10	38.328	37.111	26.843	195	14.22	5.7	2.8	98.6	901	1112	148	10.7	0.696	5538	1469	129.2	0	47	32	
41	103040	1	44	5	2	1	1.13	138.2	172.9	6237	214.68	931.33	356.73	77.4	60.022	68.248	53.79	440	61.3	251.4	10.8	407.6	2196	3766	1159	48	4.495	11219	8112	549.7	10	11	16
42	103042	2	47	3	1	1.08	92.1	161	1973	79.81	197.21	74.24	8	25.285	28.861	28.324	200	7.71	65.9	4	79.6	771	1154	234	5.76	1.005	2546	2858	92.5	518	18	28	
43	103																																

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