

Data Analysis and Management by R: Final Project

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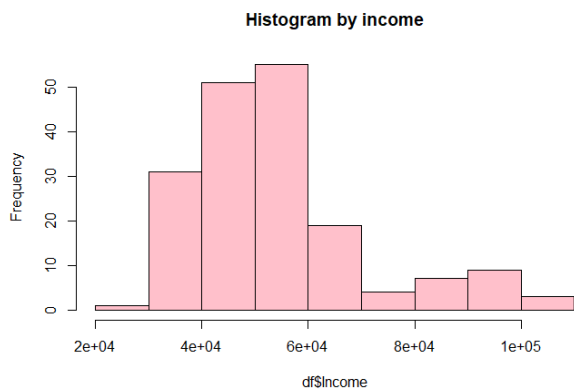
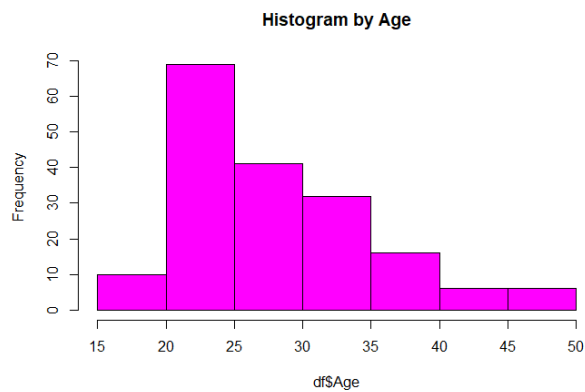
2022-12-21

I. Overall data summary of all three products

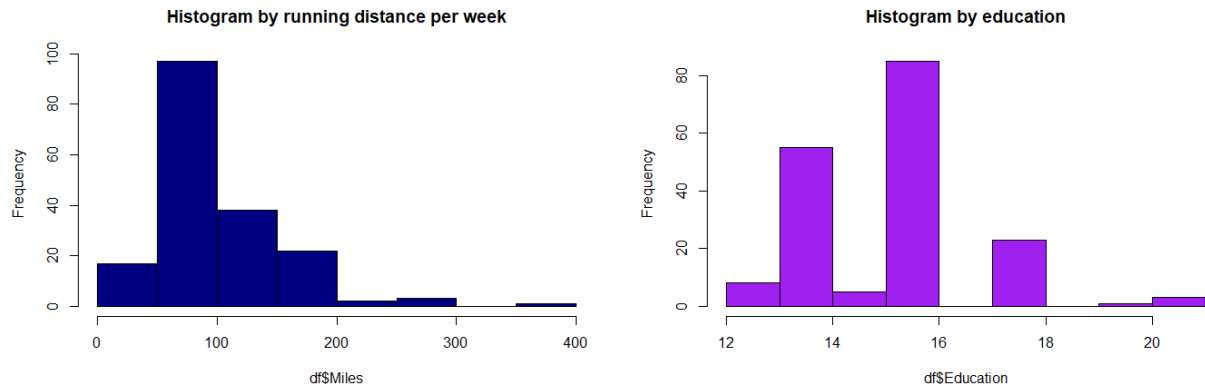
	Mean	Median	SD	Min	Max	P25	P75	N
df\$Age	28.79	26.00	6.94	18	50	24.00	33.00	180
df\$Education	15.57	16.00	1.62	12	21	14.00	16.00	180
df\$Usage	3.46	3.00	1.08	2	7	3.00	4.00	180
df\$Fitness	3.31	3.00	0.96	1	5	3.00	4.00	180
df\$Income	53719.58	50596.50	16506.68	29562	104581	44058.75	58668.00	180
df\$Miles	103.19	94.00	51.86	21	360	66.00	114.75	180

II. Overall characteristics of consumers

By age and income



By running miles per week and education



By gender and marital status

	Female	Male		Partnered	Single
TM195	40	40	TM195	48	32
TM498	29	31	TM498	36	24
TM798	7	33	TM798	23	17

1. The datasummary table and four histograms visualisation above gives the general information of 180 customers' profile who purchase TM195, TM498 and TM768. The customers' age range is particularly large, from 18 to 50 years of age with a mean age 28.79. The average customer of CardioGood Fitness also has obtained higher education degree, use CardioGood Fitness treadmill for 3.46 hours per week (though the most active one use up to 7 hours per week, and has average fitness level (3.31/5 scores). CardioGood Fitness's customers come from middle to high income household (mean income = 53,720\$) and run 103.19 miles per week on average (with the highest miles run per week = 360 miles). Overall, product both TM498 and TM798 attract more male customers than female ones, especially TM798. On the other hand, TM195 is equally attractive to both genders. All three devices are more popular among partnered customers.

Correlation between expected times of using the product and other factors

cor(miles, usage) = 0.7591305 -> there is a high, positive correlation (0.7591305) between the number of miles run each week and the expected number of times using the product from the customers, so production should take this correlation into account. cor(fitness, usage) = 0.6686056 -> similarly, there is also a high, positive correlation between the self-assessed level of fitness and how often product expect to use the product that I think CardioGood Fitness should be aware of their customers' expectation. cor(income, usage) = 0.5195372 -> there is another high, positive correlation between expected regular use of device and customers' income -> production should make certain assumptions on expensive devices targeting high-income customers that they expect to use their treadmill often. cor(age, usage) = 0.01506447 -> there is positive but small correlation between age and expected frequency use of device, and I think CardioGood Fitness should not be too concerned about. cor(education, usage) = 0.3951552 -> there is a high and positive correlation between years of schooling and expected use of the device bought, though lower than miles, fitness level and income factor correlation, CardioGood Fitness should still consider this.

III. Characteristics of consumers of each product

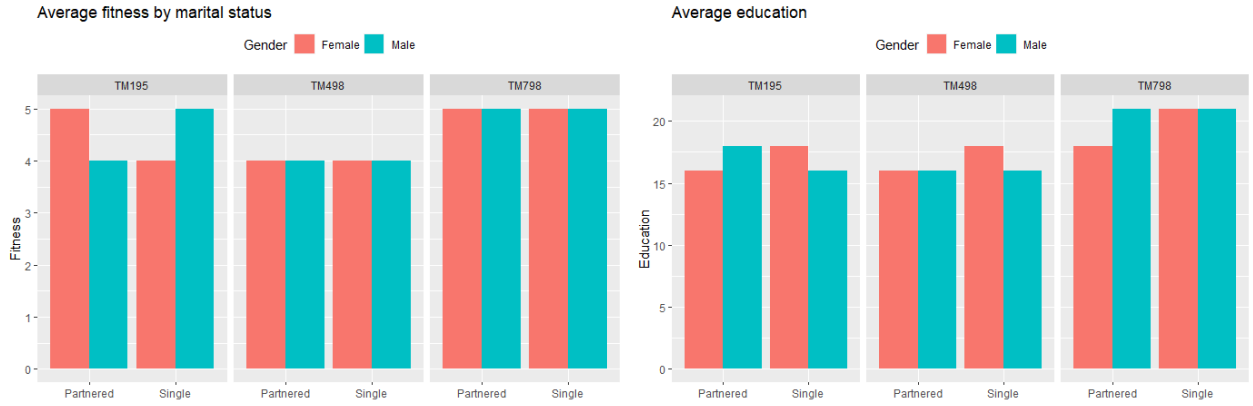
By each product separately

	Mean	Median	SD	Min	Max	P25	P75	N
TM195\$Age	28.55	26.00	7.22	18	50	23.00	33.00	80
TM195\$Education	15.04	16.00	1.22	12	18	14.00	16.00	80
TM195\$Usage	3.09	3.00	0.78	2	5	3.00	4.00	80
TM195\$Fitness	2.96	3.00	0.66	1	5	3.00	3.00	80
TM195\$Income	46418.03	46617.00	9075.78	29562	68220	38658.00	53439.00	80
TM195\$Miles	82.79	85.00	28.87	38	188	66.00	94.00	80
	Mean	Median	SD	Min	Max	P25	P75	N
TM498\$Age	28.90	26.00	6.65	19	48	24.00	33.25	60
TM498\$Education	15.12	16.00	1.22	12	18	14.00	16.00	60
TM498\$Usage	3.07	3.00	0.80	2	5	3.00	3.25	60
TM498\$Fitness	2.90	3.00	0.63	1	4	3.00	3.00	60
TM498\$Income	48973.65	49459.50	8653.99	31836	67083	44911.50	53439.00	60
TM498\$Miles	87.93	85.00	33.26	21	212	64.00	106.00	60
	Mean	Median	SD	Min	Max	P25	P75	N
TM798\$Age	29.10	27.00	6.97	22	48	24.75	30.25	40
TM798\$Education	17.32	18.00	1.64	14	21	16.00	18.00	40
TM798\$Usage	4.78	5.00	0.95	3	7	4.00	5.00	40
TM798\$Fitness	4.62	5.00	0.67	3	5	4.00	5.00	40
TM798\$Income	75441.57	76568.50	18505.84	48556	104581	58204.75	90886.00	40
TM798\$Miles	166.90	160.00	60.07	80	360	120.00	200.00	40

1. According to the datasummary, TM195 has the most responses from users out of the three (having 80 observations compared to 60 and 40 for TM498 and TM798 respectively), hence we can assume it is the most popular product of CardioGood Fitness. The average age of TM195, TM498 and TM798 device is 28.55, 28.90 and 29.10 respectively hence TM195 has the youngest customer base on average, which also reasonably has the least years of schooling (15.04) compared to TM798 (which has the highest years of schooling of 17.32). On the contrary, on average, TM498's customers also earn the highest of \$75441.57 annually, run/walk the most (166 miles per week on average) expect to use the device the most (nearly 5 times per week) and self-assess themselves the most fit (nearly excellent level) out of the three. TM498's customers tend to use their device the least (3.04 times per week) and think of themselves moderately fit on average.

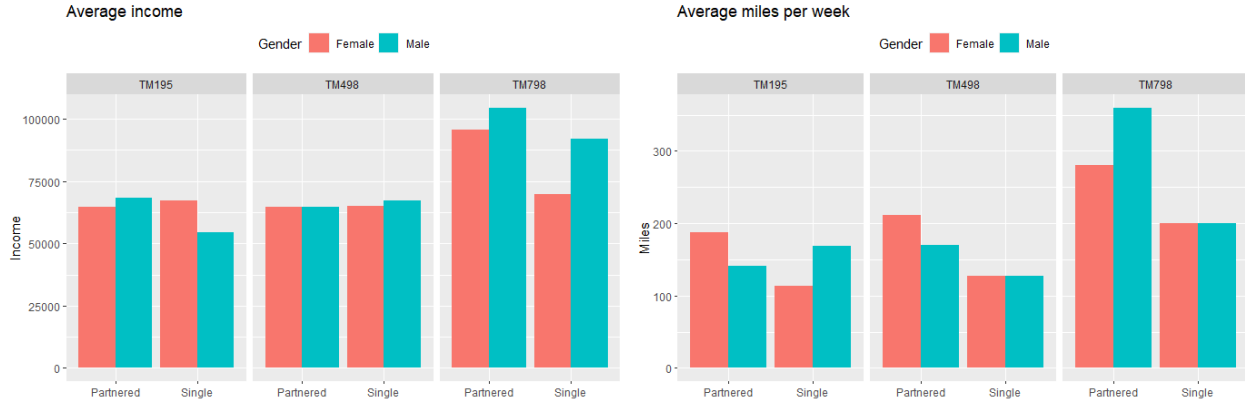
IV. Comparison of customers' characteristics by product

Comparison by gender, marital status, and average fitness/ education



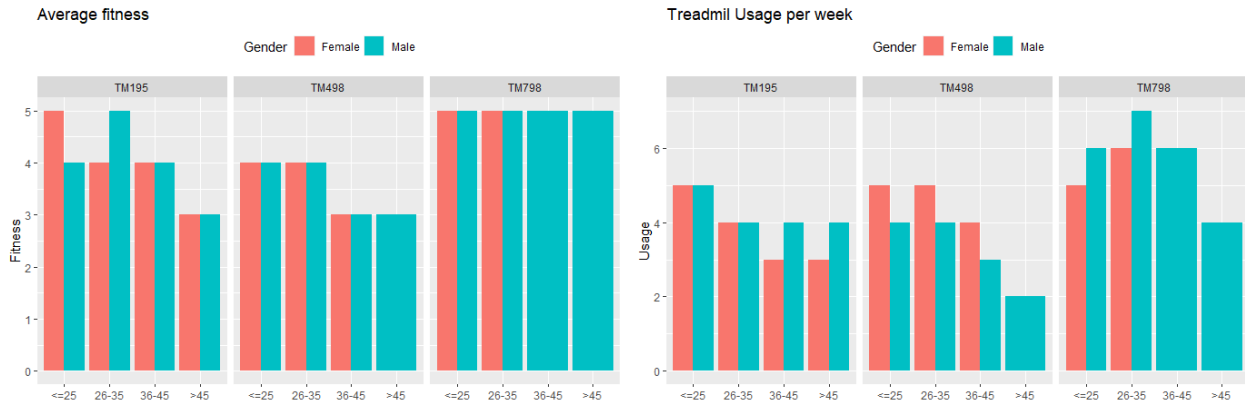
1. On average, single female and partnered male users of TM195 are in good shape (same situation applies for TM498 users, regardless of marital status and gender), while average users of TM798, regardless of marital status and genders, are in excellent shape.
2. On average, TM195 device's single male users and partnered female users have approx 16 years of schooling, while single female customers and partnered male customers have slightly higher education attainment (around 17.5 years). Except for single female customers, similarly, TM498's customers on average attend schooling for 16 years while TM798 users (irregardless of gender and marital status) spend the longest time in schools.

Comparison by gender, marital status, and income/ miles running per week



1. On average, TM195 and TM498 users earn roughly similar income annually (slightly over \$60000) whereas TM798 customers earn the highest (male > female, with partnered male customers earn the highest of more than \$100,000, followed by female counterpart).
2. On average, across all three devices, married men and women always walk/run more than single ones, with TM798 married men and women spend the most time walking/running per week (male (360 miles/week) > female (280 miles/week)). Users of TM195 appear to walk or run the least of three devices (single women (110 miles/week) v partnered men (nearly 150 miles/week)).

Comparison by gender, age group, and fitness/ treadmill usage per week



1. On average, TM798 customers, regardless of age group and gender use their treadmill the most, with customers aging from 25-45 use 6 or more than 6 times per week (male within 26-35 years old use 7 times per week in particular) compared to customers of TM195 and TM498 who use their device around 4 times per week on average.
2. Customers of TM798 are also in the best shape on average (excellent rate) regardless of age groups. customers of the other two devices are ported to be in similar fitness level (3-4 level) except for TM195 female users under 25 and male ones within 26-35 years old. Remarkably, women over 35 years old are not reported to use TM798 product. Also, while male customers use TM195 more times per week than their female counterparts on average, TM498's female customers are reported to use their product more than male.