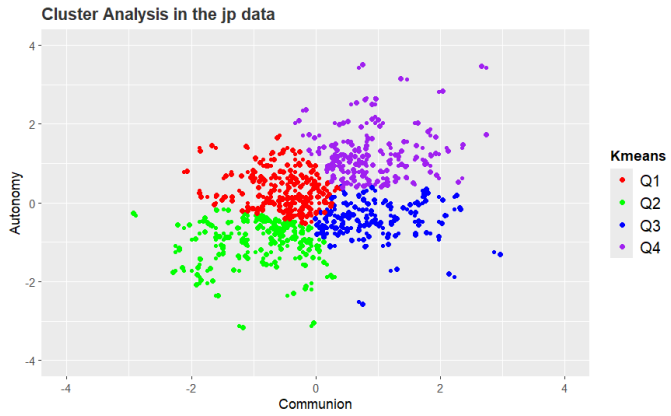
Japan results

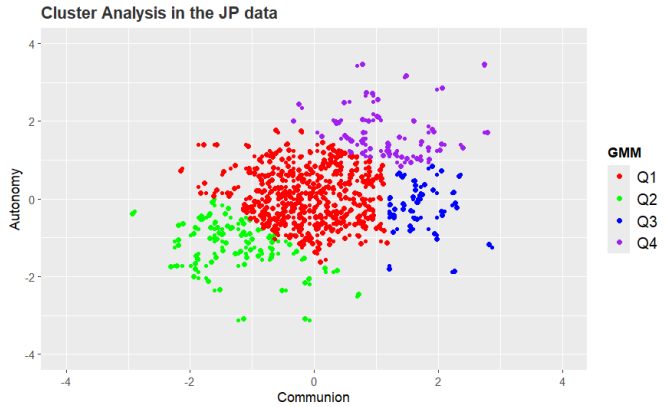
1. Cluster results

We used 3 clustering methods to group Japanese dataset-Kmeans, GMM and LPA. Each of them shows different strengths and shortcomings.

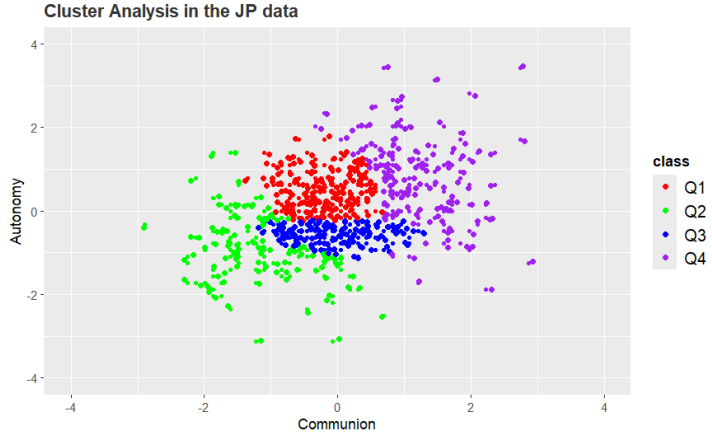
1) Kmeans



2) GMM



3) LPA

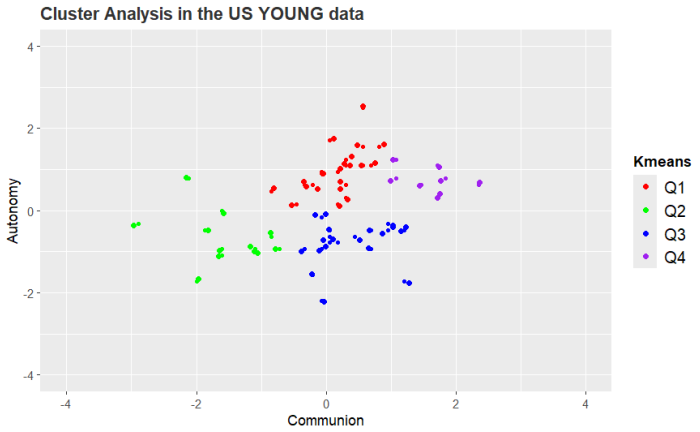


Based on the previous research, we chose Kmeans to do later analyisis.

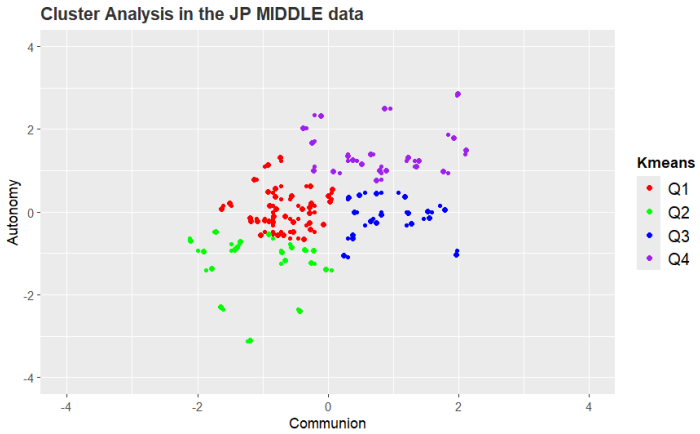
2. Cluster group results

We divided the Japanese dataset into 3 groups according to their age: YOUNGEST 20-36; MIDDLE 37-45; OLDEST 46 AND ABOVE. And the group clustering results are as follows:

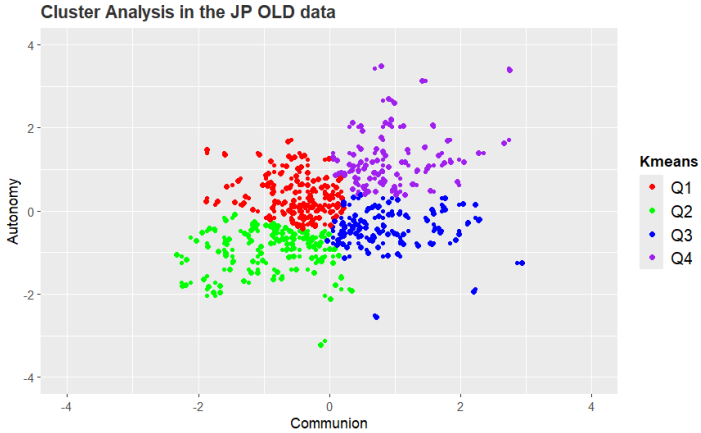
1) Young



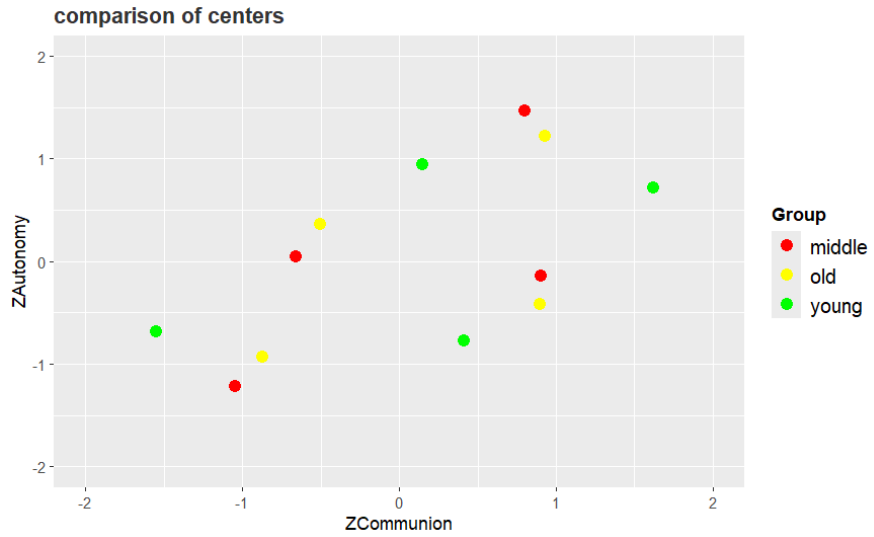
2) Middle



3) Old

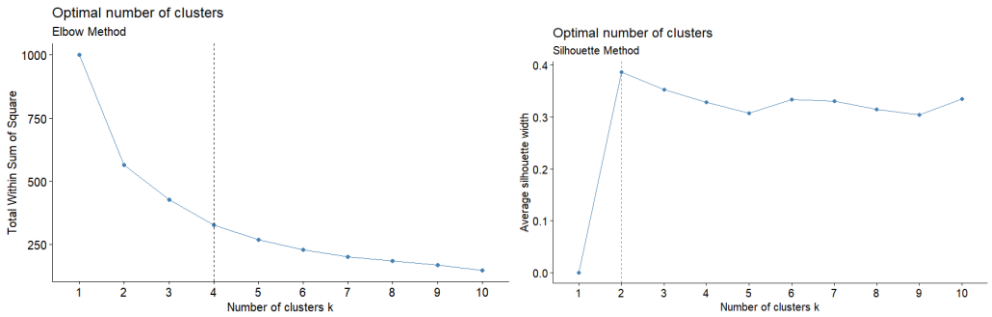


4) Comparison of centers



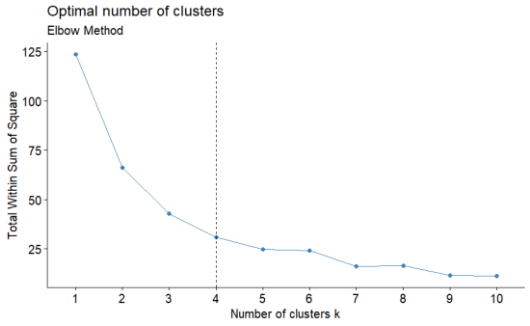
3. Elbow method and ASW

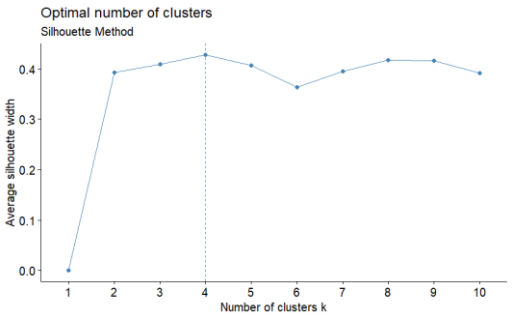
1) Overall




```
Number of clusters: 2 Average Silhouette Width: 0.3815289
Number of clusters: 3 Average Silhouette Width: 0.3495681
Number of clusters: 4 Average Silhouette Width: 0.3299155
Number of clusters: 5 Average Silhouette Width: 0.3287453
Number of clusters: 6 Average Silhouette Width: 0.3309049
Number of clusters: 7 Average Silhouette Width: 0.3327689
Number of clusters: 8 Average Silhouette Width: 0.3434125
Number of clusters: 9 Average Silhouette Width: 0.3328229
Number of clusters: 10 Average Silhouette Width: 0.3355457
```

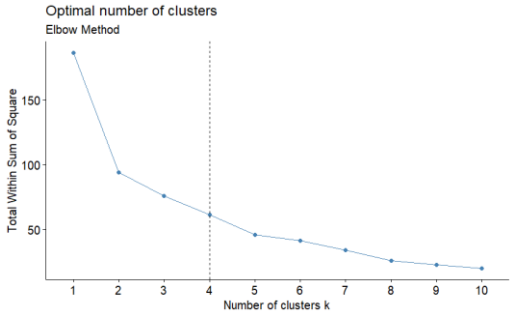
2) Young

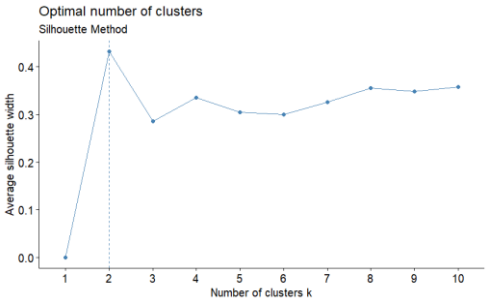





```
Number of clusters: 2 Average Silhouette Width: 0.3934016
Number of clusters: 3 Average Silhouette Width: 0.4092919
Number of clusters: 4 Average Silhouette Width: 0.4282703
Number of clusters: 5 Average Silhouette Width: 0.4070163
Number of clusters: 6 Average Silhouette Width: 0.4027752
Number of clusters: 7 Average Silhouette Width: 0.4097197
Number of clusters: 8 Average Silhouette Width: 0.4179557
Number of clusters: 9 Average Silhouette Width: 0.4162042
Number of clusters: 10 Average Silhouette Width: 0.3910863
```

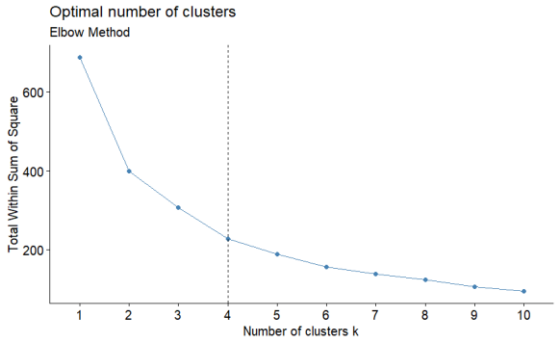
3) Middle

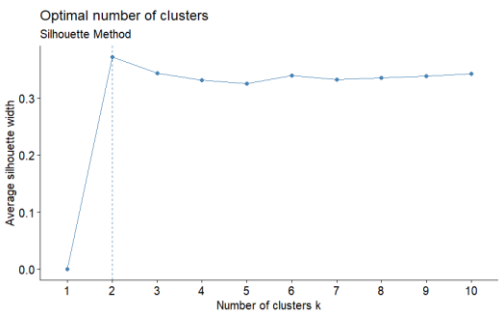





```
Number of clusters: 2 Average Silhouette Width: 0.4322387
Number of clusters: 3 Average Silhouette Width: 0.331006
Number of clusters: 4 Average Silhouette Width: 0.3363618
Number of clusters: 5 Average Silhouette Width: 0.3490055
Number of clusters: 6 Average Silhouette Width: 0.3401529
Number of clusters: 7 Average Silhouette Width: 0.3471159
Number of clusters: 8 Average Silhouette Width: 0.3580994
Number of clusters: 9 Average Silhouette Width: 0.3605575
Number of clusters: 10 Average Silhouette Width: 0.3616212
```

4) Old





```
Number of clusters: 2 Average Silhouette Width: 0.3724213
Number of clusters: 3 Average Silhouette Width: 0.345509
Number of clusters: 4 Average Silhouette Width: 0.331001
Number of clusters: 5 Average Silhouette Width: 0.3305676
Number of clusters: 6 Average Silhouette Width: 0.3399422
Number of clusters: 7 Average Silhouette Width: 0.3429694
Number of clusters: 8 Average Silhouette Width: 0.3553224
Number of clusters: 9 Average Silhouette Width: 0.3594882
Number of clusters: 10 Average Silhouette Width: 0.3448599
```

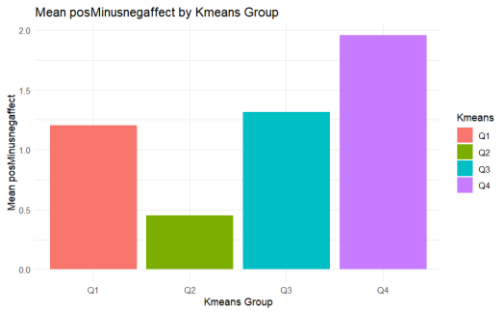
5) Conclusion

We can conclude that in young and old group, Elbow methods show the best at 4 clusters. While in middle group, ASW shows the best at 4 clusters.

4. ANOVA test

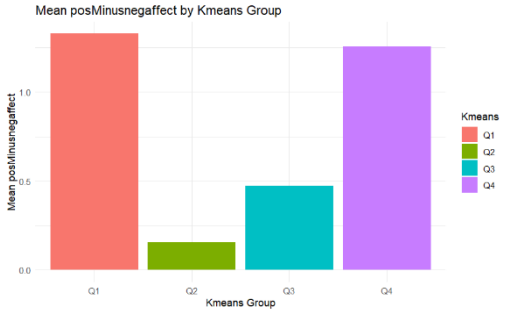
1) PosMinusnegaffect

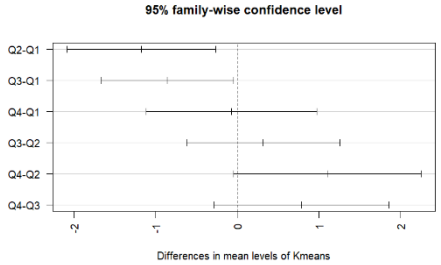
ALL




```
$Kmeans
          diff       lwr       upr     p adj
Q2-Q1 -0.7515954 -1.0415773 -0.4616135 0.0000000
Q3-Q1  0.1101829 -0.1987678  0.4191337 0.7945764
Q4-Q1  0.7528311  0.4522488  1.0534133 0.0000000
Q3-Q2  0.8617783  0.5471299  1.1764268 0.0000000
Q4-Q2  1.5044265  1.1979909  1.8108620 0.0000000
Q4-Q3  0.6426481  0.3182043  0.9670920 0.0000028
```

YOUNG

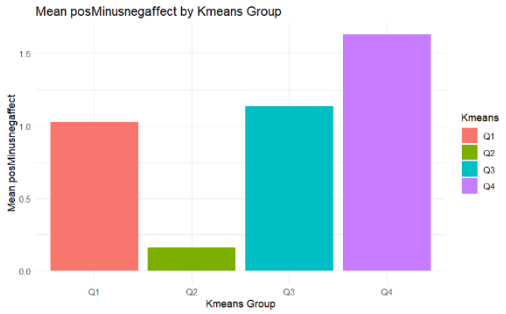


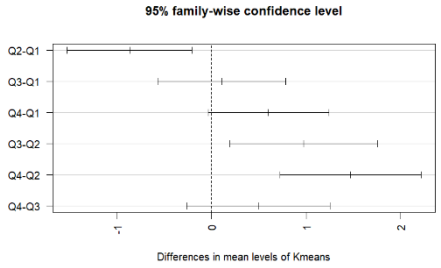


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.17440476	-2.0851159	-0.26369367	0.0064047
Q3-Q1	-0.85634921	-1.6647195	-0.04797894	0.0339069
Q4-Q1	-0.07232143	-1.1179280	0.97328509	0.9977894
Q3-Q2	0.31805556	-0.6198469	1.25595802	0.8056637
Q4-Q2	1.10208333	-0.0466079	2.25077457	0.0644972
Q4-Q3	0.78402778	-0.2853456	1.85340112	0.2226231

MIDDLE

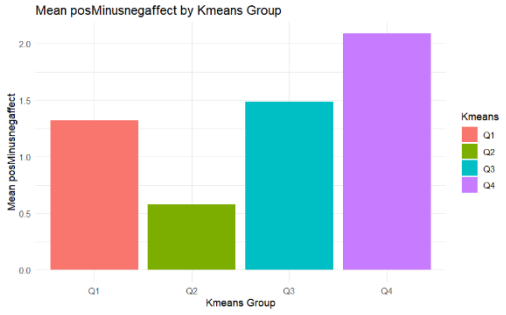


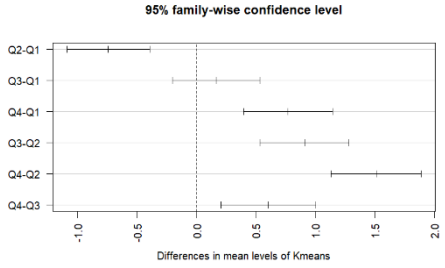


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-0.8659159	-1.52747116	-0.2043607	0.0050473
Q3-Q1	0.1082671	-0.56625075	0.7827849	0.9748645
Q4-Q1	0.6029730	-0.03594257	1.2418885	0.0715449
Q3-Q2	0.9741830	0.19561744	1.7527486	0.0080491
Q4-Q2	1.4688889	0.72095634	2.2168214	0.0000096
Q4-Q3	0.4947059	-0.26471632	1.2541281	0.3267805

OLD



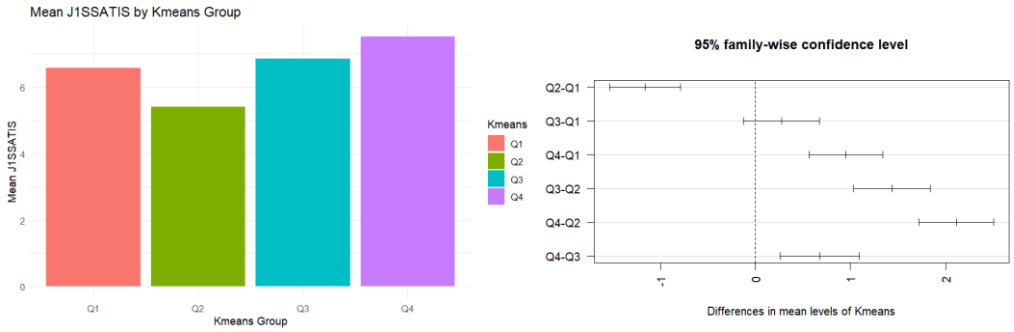


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-0.7419079	-1.0894347	-0.3943812	0.0000004
Q3-Q1	0.1665643	-0.2015915	0.5347200	0.6475729
Q4-Q1	0.7702222	0.3966081	1.1438362	0.0000011
Q3-Q2	0.9084722	0.5355234	1.2814211	0.0000000
Q4-Q2	1.5121301	1.1337921	1.8904681	0.0000000
Q4-Q3	0.6036579	0.2062872	1.0010286	0.0006096

2) J1SSATIS

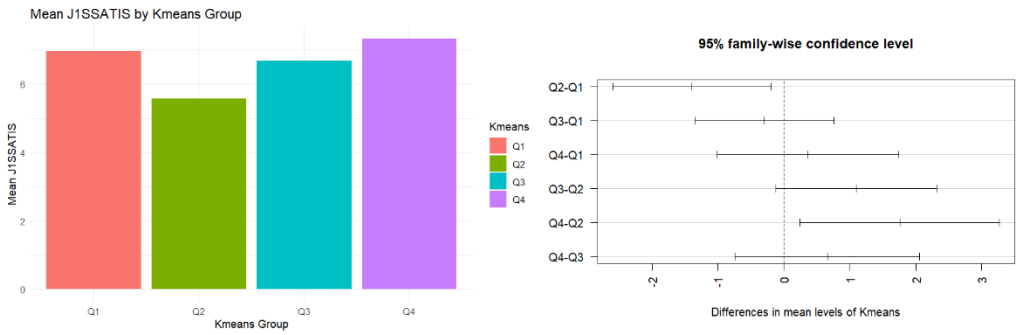
ALL



$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.1646616	-1.5382937	-0.7910296	0.0000000
Q3-Q1	0.2725216	-0.1253272	0.6703703	0.2912328
Q4-Q1	0.9495663	0.5614916	1.3376410	0.0000000
Q3-Q2	1.4371832	1.0320400	1.8423264	0.0000000
Q4-Q2	2.1142279	1.7186785	2.5097774	0.0000000
Q4-Q3	0.6770447	0.2585449	1.0955445	0.0002092

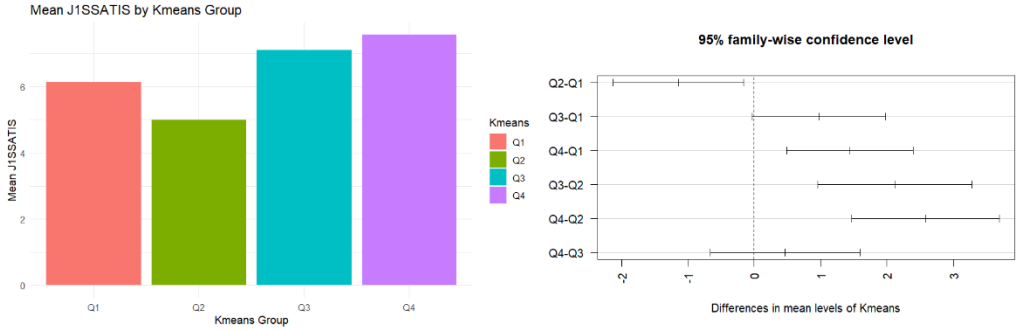
YOUNG



$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.3913690	-2.5907754	-0.1919627	0.0168191
Q3-Q1	-0.2932331	-1.3426624	0.7561963	0.8805547
Q4-Q1	0.3638393	-1.0132244	1.7409029	0.8967974
Q3-Q2	1.0981360	-0.1240100	2.3202819	0.0929213
Q4-Q2	1.7552083	0.2423821	3.2680345	0.0167985
Q4-Q3	0.6570724	-0.7398419	2.0539866	0.6009595

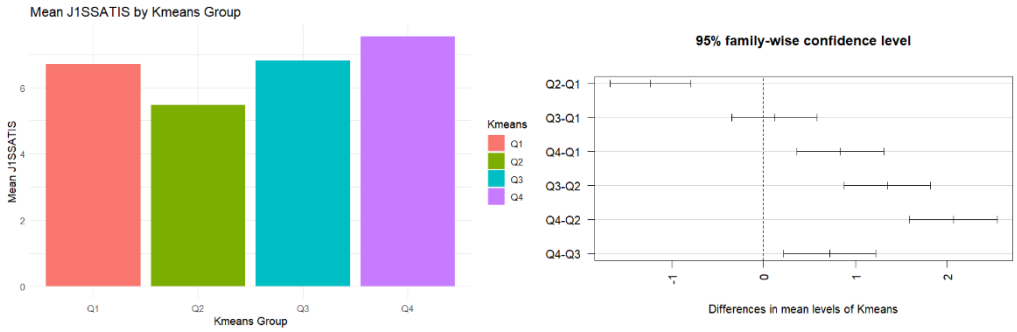
MIDDLE



$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.1424550	-2.12906111	-0.1558488	0.0165205
Q3-Q1	0.9739666	-0.03197123	1.9799045	0.0613680
Q4-Q1	1.4408784	0.48803579	2.3937210	0.0008604
Q3-Q2	2.1164216	0.95531281	3.2775303	0.0000419
Q4-Q2	2.5833333	1.46790894	3.6987577	0.0000002
Q4-Q3	0.4669118	-0.66564765	1.5994712	0.7028175

OLD

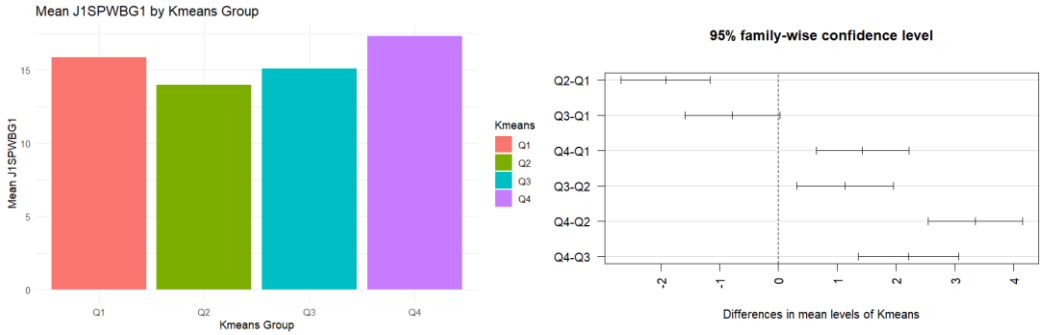


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.2304892	-1.6702324	-0.7907461	0.0000000
Q3-Q1	0.1178362	-0.3464845	0.5821570	0.9137364
Q4-Q1	0.8365827	0.3636834	1.3094820	0.0000404
Q3-Q2	1.3483255	0.8769480	1.8197030	0.0000000
Q4-Q2	2.0670719	1.5872420	2.5469018	0.0000000
Q4-Q3	0.7187464	0.2162960	1.2211969	0.0014605

3) J1SPWBG1

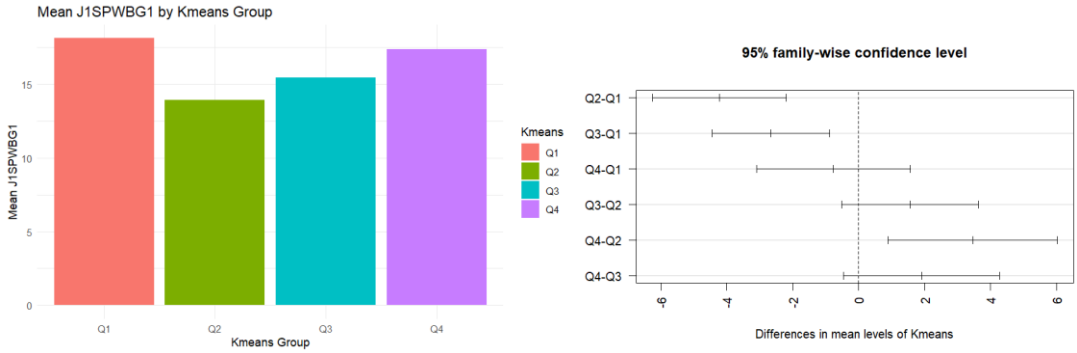
ALL



$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.9181649	-2.6784299	-1.1578999	0.0000000
Q3-Q1	-0.7825257	-1.5920667	0.0270153	0.0624237
Q4-Q1	1.4309120	0.6412592	2.2205647	0.0000228
Q3-Q2	1.1356392	0.3112555	1.9600229	0.0023653
Q4-Q2	3.3490769	2.5442145	4.1539392	0.0000000
Q4-Q3	2.2134377	1.3618761	3.0649993	0.0000000

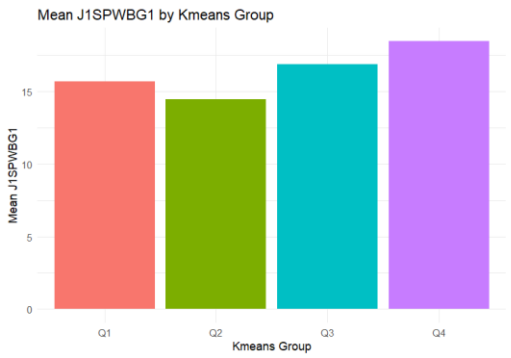
YOUNG

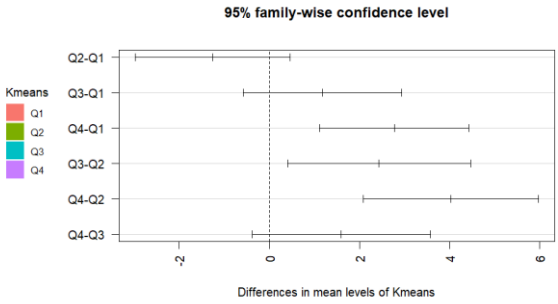


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-4.2261905	-6.2592428	-2.193138	0.0000056
Q3-Q1	-2.6691729	-4.4480069	-0.890339	0.0011450
Q4-Q1	-0.7678571	-3.1020472	1.566333	0.8197383
Q3-Q2	1.5570175	-0.5145795	3.628615	0.2039452
Q4-Q2	3.4583333	0.8940191	6.022648	0.0040079
Q4-Q3	1.9013158	-0.4665220	4.269154	0.1574108

MIDDLE

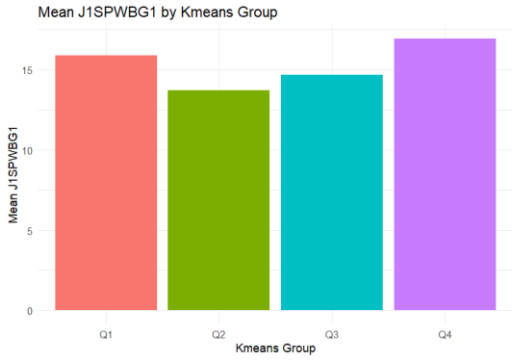


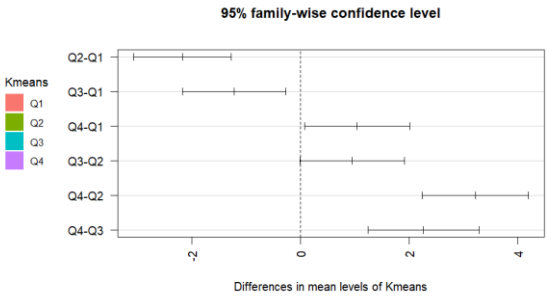


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.258258	-2.9820129	0.4654964	0.2306759
Q3-Q1	1.179650	-0.5778799	2.9371804	0.3006498
Q4-Q1	2.772297	1.1075328	4.4370618	0.0002026
Q3-Q2	2.437908	0.4092706	4.4665464	0.0118562
Q4-Q2	4.030556	2.0817353	5.9793758	0.0000031
Q4-Q3	1.592647	-0.3861107	3.5714048	0.1586462

OLD



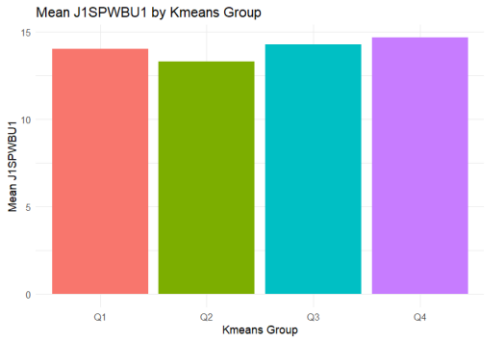


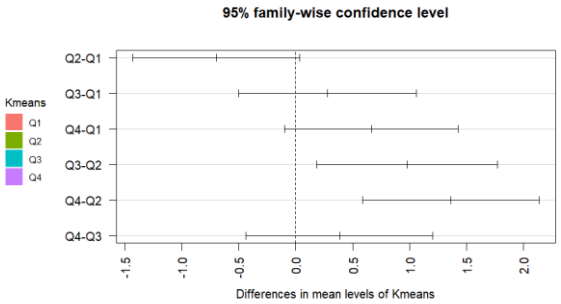
$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-2.1753383	-3.07465583	-1.2760207	0.0000000
Q3-Q1	-1.2230375	-2.17261852	-0.2734565	0.0053798
Q4-Q1	1.0436941	0.07656910	2.0108192	0.0286587
Q3-Q2	0.9523008	-0.01171204	1.9163136	0.0542450
Q4-Q2	3.2190324	2.23773357	4.2003313	0.0000000
Q4-Q3	2.2667316	1.23917165	3.2942916	0.0000002

4) J1SPWBU1

ALL

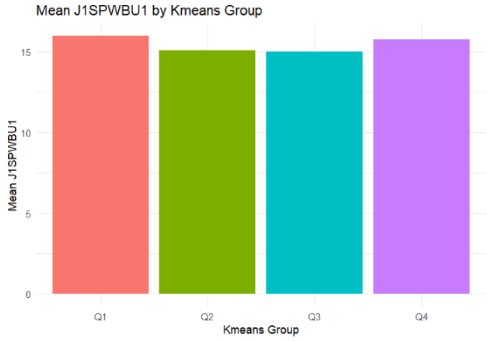


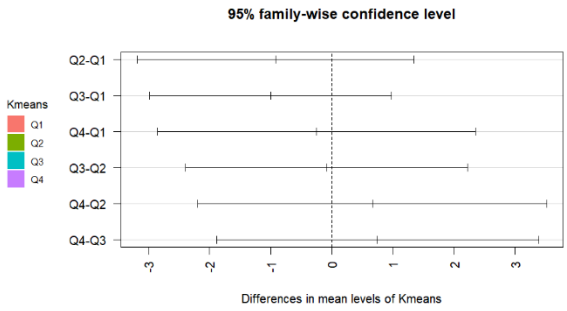


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-0.6967864	-1.42976803	0.03619531	0.0692367
Q3-Q1	0.2810480	-0.49944140	1.06153733	0.7897728
Q4-Q1	0.6647115	-0.09660332	1.42602637	0.1113006
Q3-Q2	0.9778343	0.18303491	1.77263374	0.0087219
Q4-Q2	1.3614979	0.58551930	2.13747647	0.0000450
Q4-Q3	0.3836636	-0.43733844	1.20466555	0.6242563

YOUNG

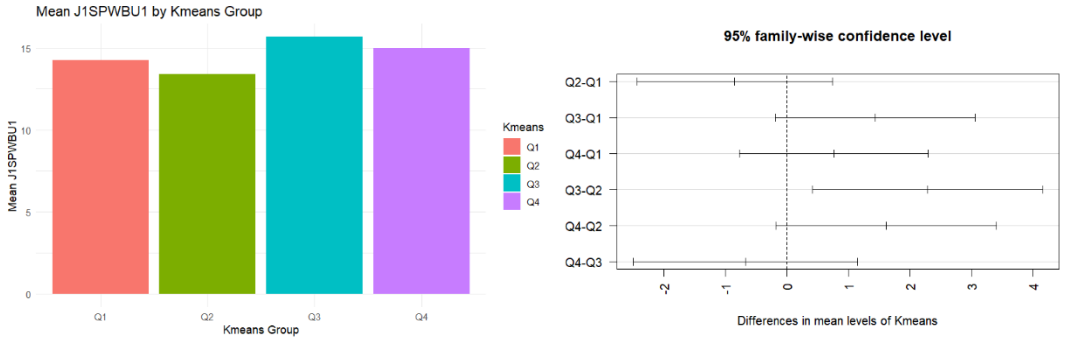




$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-0.91666667	-3.179900	1.3465664	0.7075769
Q3-Q1	-1.00000000	-2.980232	0.9802323	0.5435812
Q4-Q1	-0.25000000	-2.848465	2.3484654	0.9941343
Q3-Q2	-0.08333333	-2.389475	2.2228085	0.9996823
Q4-Q2	0.66666667	-2.187977	3.5213107	0.9257893
Q4-Q3	0.75000000	-1.885923	3.3859227	0.8748297

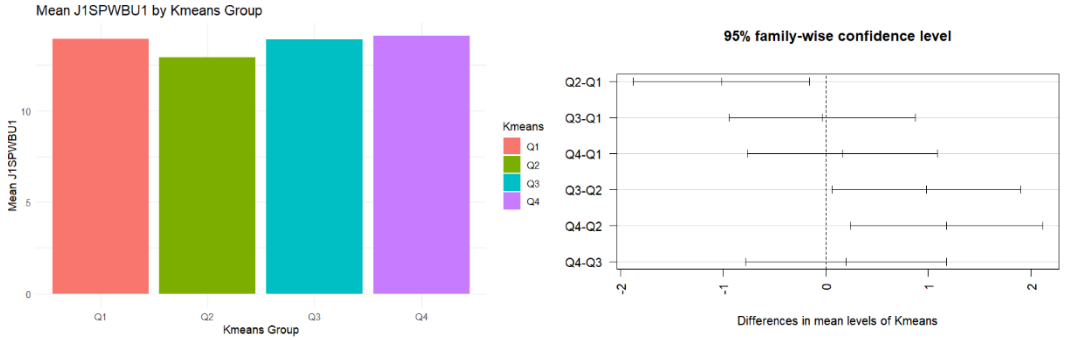
MIDDLE



$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-0.8543544	-2.4438495	0.7351408	0.4980286
Q3-Q1	1.4332273	-0.1874126	3.0538672	0.1021688
Q4-Q1	0.7567568	-0.7783428	2.2918563	0.5710844
Q3-Q2	2.2875817	0.4169500	4.1582134	0.0100641
Q4-Q2	1.6111111	-0.1859197	3.4081419	0.0951466
Q4-Q3	-0.6764706	-2.5011072	1.1481660	0.7663011

OLD

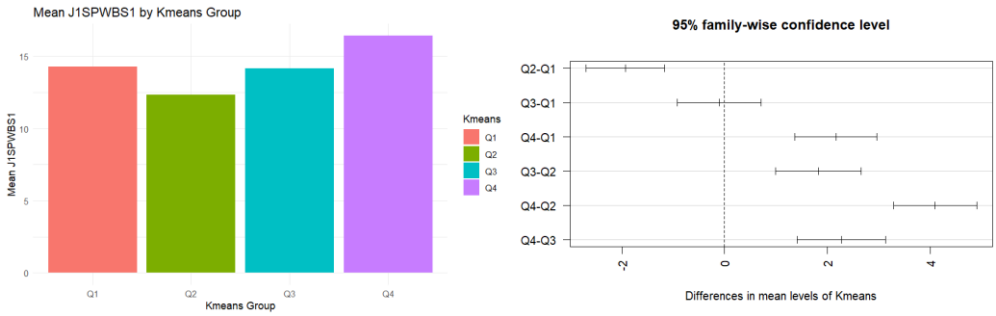


$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.01543739	-1.8741330	-0.1567418	0.0129841
Q3-Q1	-0.03563941	-0.9423281	0.8710492	0.9996256
Q4-Q1	0.16099801	-0.7624422	1.0844382	0.9695977
Q3-Q2	0.97979798	0.0593294	1.9002666	0.0318880
Q4-Q2	1.17643541	0.2394616	2.1134092	0.0071077
Q4-Q3	0.19663743	-0.7845079	1.1777828	0.9549193

5) J1SPWBS1

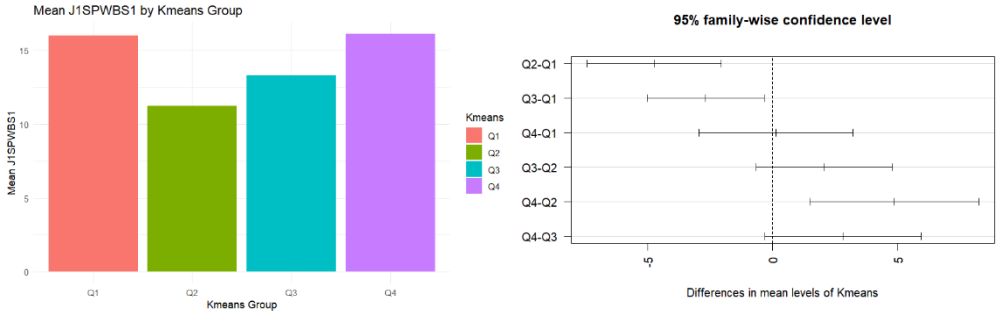
ALL



$Kmeans

	diff	lwr	upr	p adj
Q2-Q1	-1.9321021	-2.6981050	-1.1660992	0.0000000
Q3-Q1	-0.1100302	-0.9256810	0.7056206	0.9855501
Q4-Q1	2.1618070	1.3661945	2.9574195	0.0000000
Q3-Q2	1.8220719	0.9914664	2.6526775	0.0000002
Q4-Q2	4.0939091	3.2829723	4.9048459	0.0000000
Q4-Q3	2.2718372	1.4138486	3.1298257	0.0000000

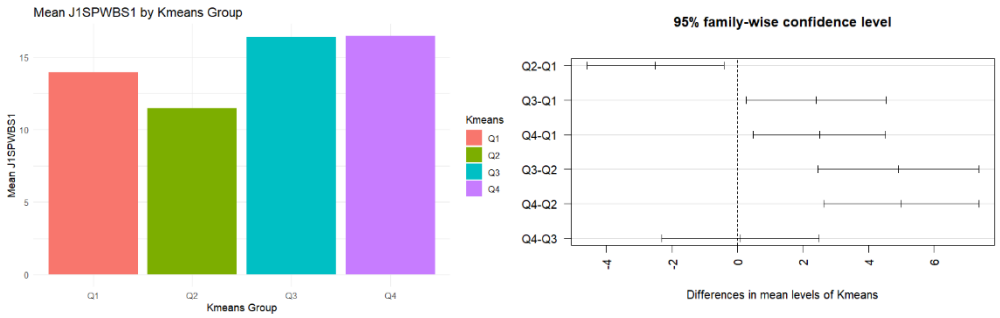
YOUNG



$Kmeans

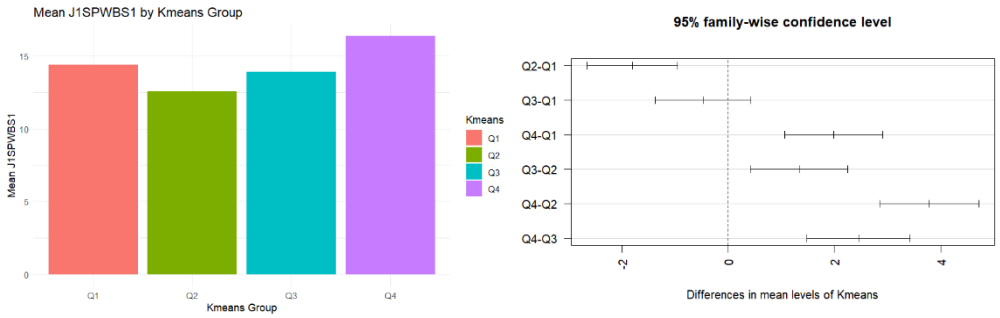
	diff	lwr	upr	p adj
Q2-Q1	-4.750000	-7.4335415	-2.0664585	0.0001049
Q3-Q1	-2.684211	-5.0321947	-0.3362264	0.0189756
Q4-Q1	0.125000	-2.9560303	3.2060303	0.9995508
Q3-Q2	2.065789	-0.6686294	4.8002083	0.2001245
Q4-Q2	4.875000	1.4902157	8.2597843	0.0018997
Q4-Q3	2.809211	-0.3162334	5.9346544	0.0927655

MIDDLE



```
$Kmeans
           diff       lwr       upr     p adj
Q2-Q1 -2.50150150 -4.5922195 -0.4107835 0.0123456
Q3-Q1  2.40699523  0.2753114  4.5386790 0.0204348
Q4-Q1  2.50405405  0.4848845  4.5232237 0.0087898
Q3-Q2  4.90849673  2.4479901  7.3690034 0.0000069
Q4-Q2  5.00555556  2.6418587  7.3692524 0.0000018
Q4-Q3  0.09705882 -2.3029489  2.4970665 0.9995716
```

OLD




```
$Kmeans
          diff       lwr       upr     p adj
Q2-Q1 -1.802268 -2.6552971 -0.9492388 0.0000006
Q3-Q1 -0.466690 -1.3673955  0.4340156 0.5397058
Q4-Q1  1.987339  1.0699920  2.9046852 0.0000003
Q3-Q2  1.335578  0.4211834  2.2499726 0.0010908
Q4-Q2  3.789607  2.8588157  4.7203975 0.0000000
Q4-Q3  2.454029  1.4793577  3.4286995 0.0000000
```

Ps: I highlighted all the none significant comparison with red.