

ACADGILD ASSIGNMENT 8.2

```
library(RcmdrPlugin.IPSUR)
```

```
data(RcmdrTestDrive)
```

Perform the below operations: -

a. Compute the measures of central tendency for salary and reduction which variable has highest center?

ANSWER:

The R-script for the given problem is as follows:

```
library(Rcmdr)
library(RcmdrPlugin.IPSUR)
data(RcmdrTestDrive)
RcmdrTestDrive
str(RcmdrTestDrive)
library(psych)
describe(RcmdrTestDrive$salary)
describe(RcmdrTestDrive$reduction)
```

The output of the R-Script (from Console window) is given as follows:

```
> library(Rcmdr)
> library(RcmdrPlugin.IPSUR)
> data(RcmdrTestDrive)
> RcmdrTestDrive
order smoking gender race before after salary reduction
parking
1 1 Nonsmoker Female Caucasian 72.6 75.2 618.65 9 2
2 2 Nonsmoker Male AfricanAmer 75.3 73.2 544.56 62 1
3 3 Nonsmoker Female Caucasian 75.5 74.5 550.24 19 4
4 4 Nonsmoker Female Caucasian 71.3 74.6 616.16 30 1
5 5 Nonsmoker Female Hispanic 74.3 73.8 543.39 105 1
6 6 Nonsmoker Male Caucasian 73.0 73.6 692.09 43 1
7 7 Smoker Male Hispanic 72.4 70.7 800.48 229 5
8 8 Nonsmoker Male Hispanic 73.6 74.0 703.79 40 1
9 9 Nonsmoker Female Caucasian 73.7 75.9 540.06 101 2
10 10 Nonsmoker Female Hispanic 74.6 74.8 522.28 440 1
11 11 Nonsmoker Female AfricanAmer 75.8 73.1 377.17 213 1
12 12 Nonsmoker Female Caucasian 75.3 72.1 525.96 474 2
```

13	13	Nonsmoker	Female	Caucasian	75.0	72.5	548.88	144	1
14	14	Nonsmoker	Male	Asian	72.8	72.7	537.70	179	2
15	15	Nonsmoker	Male	Asian	74.4	75.7	500.20	63	3
16	16	Nonsmoker	Female	Hispanic	72.9	73.1	597.73	570	1
17	17	Nonsmoker	Female	Hispanic	72.3	74.0	578.95	437	4
18	18	Nonsmoker	Male	Caucasian	74.0	74.6	690.06	62	2
19	19	Nonsmoker	Male	Caucasian	73.1	72.8	748.98	437	2
20	20	Nonsmoker	Male	AfricanAmer	74.0	76.1	811.71	60	1
21	21	Nonsmoker	Male	Other	73.6	74.5	660.58	255	1
22	22	Nonsmoker	Male	Hispanic	73.4	75.0	586.29	133	4
23	23	Nonsmoker	Male	AfricanAmer	73.9	74.0	387.59	88	1
24	24	Nonsmoker	Male	Caucasian	73.0	73.9	524.54	116	1
25	25	Nonsmoker	Female	Hispanic	74.2	75.7	536.87	48	3
26	26	Nonsmoker	Male	Caucasian	73.6	75.4	503.64	365	1
27	27	Smoker	Male	AfricanAmer	74.6	68.1	496.09	73	1
28	28	Nonsmoker	Male	AfricanAmer	74.5	72.6	701.91	306	5
29	29	Nonsmoker	Female	Caucasian	72.6	73.2	595.70	497	1
30	30	Nonsmoker	Male	Asian	72.6	74.1	759.30	32	1
31	31	Nonsmoker	Female	Hispanic	72.1	73.7	717.91	497	1
32	32	Nonsmoker	Male	Asian	73.2	73.5	808.63	21	2
33	33	Smoker	Male	Caucasian	73.2	70.0	682.60	291	1
34	34	Nonsmoker	Male	Asian	74.3	75.2	623.09	83	1
35	35	Smoker	Male	AfricanAmer	74.0	68.7	550.28	55	2
36	36	Nonsmoker	Male	AfricanAmer	75.5	72.9	646.25	100	8
37	37	Nonsmoker	Female	AfricanAmer	75.4	72.6	635.43	439	4
38	38	Nonsmoker	Male	Caucasian	75.5	72.5	437.19	419	1
39	39	Nonsmoker	Female	Caucasian	74.4	73.6	619.29	23	2
40	40	Nonsmoker	Male	Caucasian	73.7	75.0	593.68	71	1
41	41	Nonsmoker	Male	AfricanAmer	75.8	73.1	546.26	109	4
42	42	Nonsmoker	Female	Caucasian	74.3	72.2	704.83	98	1
43	43	Nonsmoker	Male	Caucasian	74.7	73.1	764.15	78	1
44	44	Nonsmoker	Female	Caucasian	74.9	72.0	859.67	257	3
45	45	Nonsmoker	Female	AfricanAmer	75.3	76.2	724.25	487	1
46	46	Nonsmoker	Male	AfricanAmer	75.6	75.0	631.62	213	3
47	47	Nonsmoker	Female	Hispanic	72.7	73.4	478.39	383	1
48	48	Nonsmoker	Female	Caucasian	75.6	74.9	652.79	116	1
49	49	Nonsmoker	Male	Caucasian	73.8	71.9	545.66	1632	2
50	50	Nonsmoker	Male	Caucasian	74.7	75.8	515.95	151	1
51	51	Nonsmoker	Male	AfricanAmer	75.4	74.8	612.27	152	3
52	52	Nonsmoker	Female	Hispanic	74.3	73.8	633.12	390	2
53	53	Nonsmoker	Male	AfricanAmer	75.0	73.2	671.35	64	1
54	54	Nonsmoker	Female	AfricanAmer	75.3	73.8	643.83	85	1
55	55	Nonsmoker	Male	Hispanic	74.8	73.6	794.66	71	2
56	56	Smoker	Female	Asian	73.2	70.6	888.00	37	1
57	57	Nonsmoker	Female	Caucasian	74.0	75.8	602.94	89	2
58	58	Smoker	Male	Caucasian	75.5	74.3	716.78	172	1
59	59	Nonsmoker	Male	Caucasian	75.3	72.8	606.12	3	1
60	60	Nonsmoker	Male	AfricanAmer	73.9	73.7	704.90	247	5
61	61	Nonsmoker	Male	Caucasian	71.7	72.5	620.32	127	2
62	62	Nonsmoker	Male	Caucasian	73.6	74.7	515.92	337	1
63	63	Nonsmoker	Female	AfricanAmer	72.1	73.7	655.72	123	1
64	64	Nonsmoker	Female	Hispanic	72.7	73.1	619.44	205	4
65	65	Nonsmoker	Female	Caucasian	74.5	71.9	640.48	61	1
66	66	Smoker	Male	Caucasian	73.2	72.8	844.32	119	2
67	67	Nonsmoker	Female	Caucasian	73.3	74.9	918.03	165	2
68	68	Nonsmoker	Female	Asian	74.2	75.1	933.49	480	6

69	69	Nonsmoker	Female	Hispanic	74.7	74.2	699.63	39	3
70	70	Nonsmoker	Female	Caucasian	74.4	74.2	593.27	434	4
71	71	Smoker	Male	Caucasian	74.5	69.7	634.24	147	1
72	72	Smoker	Female	Caucasian	73.0	69.3	686.98	270	2
73	73	Nonsmoker	Female	Hispanic	73.5	72.5	618.68	384	1
74	74	Smoker	Female	Hispanic	72.3	70.6	631.20	87	1
75	75	Nonsmoker	Female	Caucasian	75.7	73.8	608.88	291	3
76	76	Smoker	Female	Hispanic	75.6	69.1	686.28	31	2
77	77	Smoker	Female	AfricanAmer	75.4	70.0	715.44	549	1
78	78	Nonsmoker	Male	Hispanic	73.4	74.8	754.66	172	2
79	79	Nonsmoker	Male	AfricanAmer	72.9	74.6	865.89	251	1
80	80	Nonsmoker	Female	Caucasian	72.3	74.0	890.88	335	6
81	81	Smoker	Male	AfricanAmer	74.4	70.7	777.91	319	1
82	82	Smoker	Male	Caucasian	72.8	70.5	680.56	519	1
83	83	Nonsmoker	Male	Caucasian	75.1	73.5	594.61	94	2
84	84	Nonsmoker	Male	AfricanAmer	73.2	75.1	651.73	15	1
85	85	Smoker	Male	Caucasian	74.0	71.3	601.11	397	5
86	86	Nonsmoker	Female	Asian	73.8	72.9	626.71	95	2
87	87	Nonsmoker	Female	Caucasian	73.5	74.8	643.80	551	2
88	88	Smoker	Male	Hispanic	72.2	66.6	724.52	89	1
89	89	Nonsmoker	Female	AfricanAmer	74.4	75.3	745.57	121	2
90	90	Smoker	Male	Caucasian	75.2	72.5	842.05	319	1
91	91	Nonsmoker	Male	AfricanAmer	73.6	74.2	880.47	424	3
92	92	Nonsmoker	Female	Caucasian	73.1	72.6	1016.21	79	2
93	93	Nonsmoker	Male	AfricanAmer	73.9	73.3	726.13	372	5
94	94	Nonsmoker	Male	Caucasian	74.9	74.4	780.21	195	1
95	95	Nonsmoker	Female	Caucasian	72.5	75.0	704.08	324	1
96	96	Nonsmoker	Female	Other	75.0	73.4	785.89	532	3
97	97	Nonsmoker	Male	AfricanAmer	73.8	75.2	662.98	91	2
98	98	Nonsmoker	Male	Caucasian	73.6	75.2	621.30	32	1
99	99	Smoker	Male	Asian	74.8	71.3	521.17	94	2
100	100	Nonsmoker	Female	Caucasian	73.8	74.3	714.58	95	3
101	101	Nonsmoker	Male	Caucasian	75.8	74.6	728.94	99	5
102	102	Smoker	Male	Caucasian	75.5	71.1	812.26	275	1
103	103	Smoker	Male	Caucasian	72.4	71.7	924.78	203	1
104	104	Nonsmoker	Female	AfricanAmer	73.6	74.3	1001.31	131	3
105	105	Nonsmoker	Male	Hispanic	73.3	74.3	724.99	116	2
106	106	Nonsmoker	Male	Hispanic	72.9	73.3	822.35	66	1
107	107	Nonsmoker	Male	Hispanic	75.7	73.1	653.58	574	1
108	108	Nonsmoker	Female	Asian	72.6	73.3	642.28	87	1
109	109	Nonsmoker	Male	AfricanAmer	73.8	73.6	730.12	149	1
110	110	Smoker	Female	AfricanAmer	72.8	70.6	708.30	538	1
111	111	Nonsmoker	Male	Caucasian	73.9	71.9	629.17	419	2
112	112	Nonsmoker	Male	Caucasian	73.2	75.1	790.33	33	1
113	113	Nonsmoker	Male	AfricanAmer	75.5	73.8	788.05	213	1
114	114	Nonsmoker	Female	Caucasian	72.4	74.5	849.25	44	1
115	115	Nonsmoker	Male	AfricanAmer	72.8	74.5	1036.06	814	1
116	116	Nonsmoker	Male	Hispanic	74.8	75.2	1149.92	131	2
117	117	Smoker	Male	Caucasian	75.6	72.4	854.31	100	4
118	118	Nonsmoker	Female	Caucasian	74.1	74.2	768.94	688	4
119	119	Smoker	Male	Caucasian	75.3	69.6	666.74	83	1
120	120	Nonsmoker	Female	Hispanic	75.1	73.2	639.72	185	1
121	121	Smoker	Male	AfricanAmer	74.1	70.3	744.38	60	2
122	122	Nonsmoker	Female	Caucasian	74.6	74.1	584.08	6	1
123	123	Nonsmoker	Male	Caucasian	74.1	72.5	712.00	60	2
124	124	Nonsmoker	Female	AfricanAmer	73.9	72.7	789.76	282	1

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125 125 Smoker Male Hispanic 73.0 67.3 719.06 31 1
126 126 Nonsmoker Male AfricanAmer 75.3 73.8 903.34 82 2
127 127 Nonsmoker Male Caucasian 73.5 75.3 1044.98 65 1
128 128 Nonsmoker Male Asian 72.3 74.8 1027.36 26 2
129 129 Nonsmoker Female AfricanAmer 73.5 73.7 855.36 117 1
130 130 Nonsmoker Male Caucasian 72.9 76.2 796.51 205 1
131 131 Smoker Male Caucasian 72.6 70.3 771.74 99 3
132 132 Nonsmoker Male Caucasian 76.3 74.2 780.27 401 1
133 133 Nonsmoker Male AfricanAmer 73.0 75.2 808.65 8 2
134 134 Nonsmoker Female Caucasian 74.7 74.7 632.05 469 4
135 135 Smoker Female Hispanic 74.5 67.5 681.58 116 4
136 136 Nonsmoker Male Caucasian 71.4 74.6 823.38 298 4
137 137 Nonsmoker Male Hispanic 74.4 73.9 754.55 115 2
138 138 Nonsmoker Male Asian 72.1 73.1 938.47 721 1
139 139 Nonsmoker Male Caucasian 73.1 76.4 1072.65 135 1
140 140 Nonsmoker Male AfricanAmer 73.7 73.3 1021.69 202 1
141 141 Nonsmoker Female Caucasian 73.0 73.3 785.75 642 1
142 142 Nonsmoker Female Hispanic 73.8 74.4 882.78 95 1
143 143 Nonsmoker Female Caucasian 73.6 72.0 762.43 262 2
144 144 Nonsmoker Male Hispanic 73.1 74.2 863.78 564 1
145 145 Nonsmoker Male Caucasian 73.4 73.9 745.97 258 3
146 146 Nonsmoker Female Hispanic 74.0 72.4 809.26 41 1
147 147 Nonsmoker Female AfricanAmer 75.8 72.9 668.26 77 3
148 148 Smoker Female Asian 74.2 67.8 780.61 429 2
149 149 Nonsmoker Female AfricanAmer 75.4 73.3 749.43 557 1
150 150 Nonsmoker Male Caucasian 75.1 72.9 889.55 89 1
151 151 Nonsmoker Female Caucasian 74.6 74.9 1025.09 59 1
152 152 Smoker Male Caucasian 75.5 69.8 1156.16 370 1
153 153 Nonsmoker Male AfricanAmer 74.9 74.3 777.93 202 2
154 154 Nonsmoker Male AfricanAmer 73.6 74.3 835.96 111 2
155 155 Nonsmoker Female Caucasian 74.5 72.6 668.69 598 3
156 156 Nonsmoker Female Caucasian 75.7 74.6 870.52 55 1
157 157 Nonsmoker Male AfricanAmer 72.6 73.8 827.18 750 1
158 158 Smoker Male Caucasian 74.1 70.8 689.23 83 2
159 159 Nonsmoker Female AfricanAmer 73.6 74.2 662.17 257 1
160 160 Smoker Female Caucasian 75.0 70.3 820.52 303 1
161 161 Nonsmoker Female AfricanAmer 73.1 74.8 780.51 79 2
162 162 Nonsmoker Male Hispanic 73.6 74.3 980.09 156 4
163 163 Nonsmoker Male AfricanAmer 73.6 75.1 1084.21 166 6
164 164 Smoker Male Hispanic 73.5 72.1 1073.50 9 1
165 165 Nonsmoker Male AfricanAmer 73.7 72.5 908.11 409 3
166 166 Nonsmoker Male Hispanic 73.1 73.4 793.42 424 2
167 167 Nonsmoker Male Hispanic 74.5 74.9 804.78 205 1
168 168 Nonsmoker Male AfricanAmer 73.7 74.1 790.82 47 2
> str(RcmdrTestDrive)
'data.frame': 168 obs. of 9 variables:
 $ order : int 1 2 3 4 5 6 7 8 9 10 ...
 $ smoking : Factor w/ 2 levels "Nonsmoker","Smoker": 1 1 1 1 1 1
1 2 1 1 1 ...
 $ gender : Factor w/ 2 levels "Female","Male": 1 2 1 1 1 2 2 2
1 1 ...
 $ race : Factor w/ 5 levels "AfricanAmer",...: 3 1 3 3 4 3 4 4
3 4 ...
 $ before : num 72.6 75.3 75.5 71.3 74.3 73 72.4 73.6 73.7 74.6
...
 $ after : num 75.2 73.2 74.5 74.6 73.8 73.6 70.7 74 75.9 74.8
...
 $ salary : num 619 545 550 616 543 ...
 $ reduction: int 9 62 19 30 105 43 229 40 101 440 ...
 $ parking : int 2 1 4 1 1 1 5 1 2 1 ...

```

```

>
> library(psych)
Attaching package: 'psych'
The following object is masked from 'package:car':
  logit
The following objects are masked from 'package:ggplot2':
  %+%, alpha
> describe(RcmdrTestDrive$salary)
vars n mean sd median trimmed mad min max range skew
x1 1 168 724.52 148.86 710.15 715.53 134.6 377.17 1156.16
778.99 0.51
  kurtosis se
x1 0.2 11.49
> describe(RcmdrTestDrive$reduction)
vars n mean sd median trimmed mad min max range skew kurtosis
x1 1 168 223.63 213.06 139.5 194.43 136.4 3 1632 1629 2.29
10.02
  se
x1 16.44
Conclusion/Interpretation:
Variable salary has the highest center

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B) Which measure of center is more appropriate for before and after?

ANSWER: The **mean** is the most common measure of center.