Assignment 1: Employee Engagement and Satisfaction

Research Administrative Services is a shared services unit that supports the application and post-award management of research grants for Emory faculty. In the Fall semester of 2017, Emory Institutional Research Services surveyed employees of Research Administrative Services about aspects of their jobs and work environment. They received 92 completed responses from a population of 169 employees for a response rate of 54.4%. These responses are available in the file *RAS_Survey data*, which can be interpreted using the two codebooks on variable types and definitions.

The goal of the assignment is not only to analyze the data correctly, but also to demonstrate how data analysts should effectively communicate the results to others.

In that regard, I dedicated my time in explaining my results and presenting them in a nice format. I have discussed 1) the summary of overall approaches/procedures I took, 2) rationale/criteria I used to judge why certain set of results are meaningful, and 3) the interpretation of the results.

Please use these data to answer the following questions.

1. The questionnaire includes items related to the following constructs:

a) My Role (Q1-8)

b) RAS Management (Q1-12)

c) Work Environment (Q1-13 except 10)

d) Communication (Every question except Q7-9)

e) Training

f) Total Resources and Processes (Every question except Q4,10,11)

g) Overall Satisfaction (Every question except Q6)

Calculate the reliability of the items that make up each of the above constructs. Report and interpret your results. What changes, if any, would you make to the items that comprise the constructs?

In performing your analyses please ensure that you ***exclude*** variables that capture:

- ***textual comments*** (MyRole_Q10, MyRole_Q11, RasManagement_Q14, RasManagement_Q15, WorkEnvironment_Q14, WorkEnvironment_Q15,

Communication_Q8, Communication_Q9, ToolsResourcesAndProcesses_Q10, ToolsResourcesAndProcesses_Q11, OverallSatisfaction_Q6) or

- items that capture ***overall*** evaluations (MyRole_Q9, RasManagement_Q13, WorkEnvironment_Q10, Communication_Q7, ToolsResourcesAndProcesses_Q4).

"Under the reliability analysis, you want to import the items to the "items" field not "rating" field."

MyRole:

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
MyRole_Q1	26.96	31.163	.717	.859
MyRole_Q2	27.34	29.061	.695	.859
MyRole_Q3	26.86	30.936	.719	.858
MyRole_Q4	26.76	32.096	.647	.865
MyRole_Q5	26.77	34.046	.373	.889
MyRole_Q6	27.97	29.373	.603	.870
MyRole_Q7	27.46	27.218	.769	.850
MyRole_Q8	27.42	29.478	.682	.860

Reliability Statistics

Cronbach's Alpha	N of Items
.879	8

Even if I am using factor analysis to validate the questionnaire used in a survey, it is still a good practice to perform reliability analysis *"to check if the measures consistently reflect or tap the contract or latent variable that they are expected to measure"* (from the chapter *Analysis Strategies* from textbook page 117).

For example, the degree of reliability can be measured by the consistency of the response regardless of the number of times the question is asked. Basically, we would want each response from a question to follow a consistent pattern across items with a scale when it is measuring a single construct since the idea, trait, attitude, perception in a person who is answering a questionnaire ought to cause him or her to response in a similar way across all of the items that are designed to measure that particular construct.

When we run a reliability analysis, we can see an output named 'Cronbach's alpha', which gives an indication of "how much variation exists (and is shared) in the response given". This measure ranges from 0 to 1. If there is no internal consistency, number will be closer to 0; whereas, number will be closer to 1 when there exists internal consistency.

Based on the rule of thumb, it is recognized that there exists a reasonable amount of internal consistency when the value of Cronbach's alpha is above 0.70. In this case, this value is 0.879, and we can safely assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data. Question 5 is asking participants whether the work is challenging, and this question has a higher degree of variability in response than the other questions.

RAS Management (Q1-12)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RasManagement_Q1	39.92	61.544	.659	.877
RasManagement_Q2	39.85	61.581	.739	.873
RasManagement_Q3	39.50	63.571	.746	.875
RasManagement_Q4	39.66	62.072	.733	.874
RasManagement_Q5	39.70	60.280	.752	.872
RasManagement_Q6	41.97	83.966	-.648	.934
RasManagement_Q7	39.90	61.276	.747	.873
RasManagement_Q8	40.30	58.126	.726	.872
RasManagement_Q9	40.48	57.087	.786	.868
RasManagement_Q10	40.30	60.478	.699	.874
RasManagement_Q11	40.64	59.837	.651	.877
RasManagement_Q12	39.98	59.450	.711	.873

Reliability Statistics

Cronbach's Alpha	N of Items
.889	12

The Cronbach's alpha value for this set of questions is 0.889, and we can safely assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data.

Question 6 is asking participants whether the supervisor is micromanaging or not, and this question has a higher degree of variability in response than the other questions as the corrected item-total correlation is negative unlike the positive values from the other questions.

Work Environment (Q1-13 except 10)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
WorkEnvironment_Q1	41.12	45.337	.652	.849
WorkEnvironment_Q2	41.23	45.673	.650	.850
WorkEnvironment_Q3	41.11	45.153	.694	.847
WorkEnvironment_Q4	40.90	46.639	.667	.850
WorkEnvironment_Q5	41.35	44.625	.687	.847
WorkEnvironment_Q6	41.33	44.903	.624	.851
WorkEnvironment_Q7	41.40	43.144	.752	.841
WorkEnvironment_Q8	41.89	48.032	.396	.866
WorkEnvironment_Q9	41.89	47.087	.415	.866
WorkEnvironment_Q11	41.07	48.237	.406	.865
WorkEnvironment_Q12	40.98	50.747	.270	.871
WorkEnvironment_Q13	41.82	46.042	.448	.864

Reliability Statistics

Cronbach's Alpha	N of Items
.866	12

The Cronbach's alpha value for this set of questions is 0.866, and we can safely assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data.

Question 11 is asking about whether participants feel well treated. Question 12 is asking participants about the departmental administrator, and Question 13 is asking about the compensation for which participants receive. As you can see above, these questions have a higher degree of variability in response than the other questions that mainly asks about RAS unit management.

Question 8 and 9 also has a higher level of variability in response than the other questions related to RAS because these questions asks sentiment about people across RAS department (not within the department) and also asks about the recognition and team building components, which are far from the construct of the questions 1 through 7.

Communication (Every question except Q7-9)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Communication_Q1	18.10	18.441	.663	.889
Communication_Q2	18.37	16.082	.750	.875
Communication_Q3	18.35	16.471	.741	.876
Communication_Q4	18.74	15.074	.803	.866
Communication_Q5	18.59	17.102	.711	.881
Communication_Q6	18.46	17.284	.686	.884

Reliability Statistics

Cronbach's Alpha	N of Items
.897	6

The Cronbach's alpha value for this set of questions is 0.897, and we can safely assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data.

Question 4 is asking participants about whether changes in goals, decisions, or processes that affect employee's work are communicated effectively. As you can see above on the item-total correlation, these questions have a higher degree of variability in response than the other questions that mainly asks about clear understanding related to RAS organization.

Training

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Training_Q1	16.70	7.687	.696	.537
Training_Q2	16.79	7.880	.661	.552
Training_Q3	16.89	8.010	.697	.544
Training_Q4	16.87	8.290	.641	.566
Training_Q5	16.62	13.008	-.167	.803
Training_Q6	16.95	11.503	.093	.734

Reliability Statistics

Cronbach's Alpha	N of Items
.686	6

The Cronbach's alpha value for this set of questions is 0.686, and in this case we cannot assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data.

Question 5 and 6 are asking whether participants prefer formal training or informal training, respectively. These questions are slightly different in nature compared to the other questions that ask about quantity of the training. As you can see above on the item-total correlation, these questions have a higher degree of variability in response as a result.

Total Resources and Processes (Every question except Q4,10,11)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ToolsResourcesAndProcesses_Q1	23.39	31.296	.648	.843
ToolsResourcesAndProcesses_Q2	23.74	30.481	.606	.847
ToolsResourcesAndProcesses_Q3	23.88	31.733	.499	.858
ToolsResourcesAndProcesses_Q5	23.71	28.759	.725	.832
ToolsResourcesAndProcesses_Q6	23.88	27.403	.758	.827
ToolsResourcesAndProcesses_Q7	24.11	28.208	.736	.831
ToolsResourcesAndProcesses_Q8	23.60	29.738	.533	.858
ToolsResourcesAndProcesses_Q9	23.15	35.163	.408	.865

Reliability Statistics

Cronbach's Alpha	N of Items
.863	8

The Cronbach's alpha value for this set of questions is 0.863, and we can safely assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data.

Question 3 is asking whether RAS Central Operations is receptive and responsive to suggestions and requests from the RAS staff. Question 9 is asking whether employee's colleagues are competent. These questions are slightly different in nature compared to the other

questions that ask about tools and resources of the organization. As you can see above on the item-total correlation, these questions have a higher degree of variability in response as a result.

Overall Satisfaction (Every question except Q6)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
OverallSatisfaction_Q1	15.22	12.502	.775	.903
OverallSatisfaction_Q2	15.18	14.064	.718	.914
OverallSatisfaction_Q3	14.89	13.175	.822	.895
OverallSatisfaction_Q4	15.02	12.395	.835	.890
OverallSatisfaction_Q5	15.47	11.834	.820	.895

Reliability Statistics

Cronbach's Alpha	N of Items
.918	5

The Cronbach's alpha value for this set of questions is 0.918, and we can definitely assume that there is almost perfect internal consistency across the response that participants answered throughout this survey data.

All of these questions in this topic asks participants about whether they are satisfied about the RAS units.

2. Use the data on the above items, ***excluding those related to overall satisfaction***, i.e. items related to constructs 1a-1f above to extract independent factors (use principle components with varimax rotation with a factor loading cutoff of 0.56). Provide a table of factor loadings. Label each factor and interpret it. What are the items loading on to each factor capturing?

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	20.253	38.948	38.948	20.253	38.948	38.948	6.500	12.500	12.500
2	3.442	6.619	45.567	3.442	6.619	45.567	5.111	9.829	22.329
3	2.823	5.429	50.997	2.823	5.429	50.997	4.929	9.478	31.807
4	2.462	4.735	55.731	2.462	4.735	55.731	4.557	8.763	40.570
5	2.061	3.963	59.694	2.061	3.963	59.694	3.990	7.674	48.243
6	1.841	3.540	63.234	1.841	3.540	63.234	3.558	6.843	55.087
7	1.586	3.050	66.285	1.586	3.050	66.285	3.425	6.587	61.674
8	1.575	3.029	69.314	1.575	3.029	69.314	1.982	3.811	65.485
9	1.297	2.494	71.808	1.297	2.494	71.808	1.974	3.796	69.281
10	1.193	2.294	74.102	1.193	2.294	74.102	1.892	3.639	72.920
11	1.113	2.140	76.241	1.113	2.140	76.241	1.727	3.321	76.241
12	.972	1.870	78.111						
13	.881	1.695	79.806						
14	.814	1.565	81.371						
15	.730	1.404	82.775						
16	.697	1.340	84.115						
17	.659	1.268	85.383						
18	.631	1.213	86.596						
19	.572	1.101	87.696						
20	.532	1.023	88.720						
21	.503	.966	89.686						
22	.454	.873	90.559						
23	.397	.763	91.322						
24	.377	.726	92.048						
25	.340	.654	92.702						
26	.322	.620	93.322						
27	.302	.581	93.902						
28	.283	.544	94.447						
29	.262	.504	94.951						
30	.262	.504	95.454						
31	.234	.449	95.904						
32	.209	.402	96.306						
33	.200	.385	96.691						
34	.190	.365	97.056						
35	.186	.357	97.414						
36	.155	.299	97.712						
37	.147	.283	97.996						
38	.140	.269	98.264						
39	.118	.228	98.492						
40	.117	.225	98.717						
41	.104	.200	98.917						
42	.093	.180	99.096						
43	.086	.165	99.262						
44	.064	.124	99.385						
45	.060	.115	99.500						
46	.052	.100	99.601						
47	.045	.087	99.687						
48	.044	.085	99.773						
49	.039	.075	99.848						
50	.033	.063	99.911						
51	.027	.052	99.964						
52	.019	.036	100.000						

Extraction Method: Principal Component Analysis.

From this chart above, we can see that first 11 components explain more than 75 percent of the variance.

"It is possible that items from different constructs may load onto each component. In this case, you need to read through the contents of the items (the questions) and come up with an umbrella name that captures the general theme of items that load onto each component."

	Component										
	1	2	3	4	5	6	7	8	9	10	11
MyRole_Q1	.305	-.027	.175	.096	.123	.721	.139	.048	.156	-.079	.345
MyRole_Q2	.379	.264	.118	.182	.020	.716	.092	.006	.036	.124	.065
MyRole_Q3	.500	.027	.116	.078	.202	.609	.117	.154	-.083	.076	.227
MyRole_Q4	.137	.031	.432	.223	.008	.234	.106	.220	.127	-.001	.656
MyRole_Q5	.129	.316	-.041	.019	.156	.112	.103	-.011	-.043	.055	.815
MyRole_Q6	.312	.005	.731	.265	-.011	.191	.154	.067	.008	.036	.153
MyRole_Q7	.504	.187	.360	.425	.074	.308	.025	.148	-.029	.169	.148
MyRole_Q8	.433	.135	.346	.270	.188	.288	.243	.321	.110	-.022	.006

MyRole_Q1	I have a clear understanding of my role and responsibilities.
MyRole_Q2	I have a clear understanding of how my performance is measured.
MyRole_Q3	I have a clear understanding of how my performance impacts the success of my RAS Unit.
MyRole_Q4	My work is meaningful.
MyRole_Q5	My work is challenging.
MyRole_Q6	The level of stress I have in my job is acceptable and manageable.
MyRole_Q7	I feel valued and appreciated.
MyRole_Q8	I am given adequate opportunities to develop my skills as a research administrator.

Here, we see that there are three different constructs of the questions based on how factor loadings have been put together. Q1-3 are of same nature (related to how much of clear understanding each participant have when performing job), 4 and 5 are of same nature (related to the perception of his/her work), and Q6 is only question that has its unique construct (related to how manageable the work is to each survey participant). Notice that question 7 and 8 are not considered at all because the none of the components reaches the factor loading threshold, which is 0.56.

RasManagement_Q1	.641	.160	-.011	.076	.052	.149	.009	-.132	.492	.211	.128
RasManagement_Q2	.766	.196	-.036	.103	.128	.144	.199	-.110	.308	.099	.116
RasManagement_Q3	.782	.239	.187	.110	.259	.203	-.048	.037	.049	-.025	-.007
RasManagement_Q4	.805	.190	.269	.088	.240	.075	.060	.031	.047	-.050	.049
RasManagement_Q5	.695	.181	.221	.235	.291	.207	.062	.129	-.047	-.051	.140
RasManagement_Q6	-.629	-.143	-.368	-.231	-.157	-.066	-.108	.071	.257	.019	-.064
RasManagement_Q7	.712	.005	.217	.312	.102	.270	.218	.075	.170	-.017	-.030
RasManagement_Q8	.333	.137	.221	.559	.268	.280	-.051	.089	.093	.171	.231
RasManagement_Q9	.377	.316	.090	.497	.225	.231	.071	.021	.296	.228	.109
RasManagement_Q10	.213	.316	.177	.442	.224	.253	.096	.024	.280	.458	.119
RasManagement_Q11	.254	.044	.418	.532	.245	.138	.143	-.213	.331	.012	.035
RasManagement_Q12	.404	.167	.275	.465	.417	.168	.072	.085	-.058	.104	.148

RasManagement_Q1	My supervisor meets with me on a regular basis to discuss my job performance.
RasManagement_Q2	The one-on-one meetings I have with my supervisor are helpful and productive.
RasManagement_Q3	My supervisor is available to discuss any questions or concerns.
RasManagement_Q4	My supervisor is responsive to my questions or concerns.
RasManagement_Q5	I feel comfortable voicing questions or concerns to my supervisor.
RasManagement_Q6	I feel "micro-managed" by my supervisor.
RasManagement_Q7	My supervisor is supportive of my professional development activities.
RasManagement_Q8	Employees in my RAS are treated fairly and consistently.
RasManagement_Q9	Promotions in the RAS are based upon an individual's performance and skills.
RasManagement_Q10	RAS management handles employee performance issues/problems in a timely and effective manner.
RasManagement_Q11	There is an effective balance of work in my RAS (i.e., workloads are equitable).
RasManagement_Q12	RAS management is committed to making my RAS a positive place to work.

Here, we can see that question 1 to 7 are of same nature (related to the each participant's perception and evaluation toward his/her supervisor); whereas, 8 to 12 are of diffferent nature (related to RAS team and management).

WorkEnvironment_Q1	.350	-.100	.192	.290	.692	.183	.188	.082	-.051	.093	.119
WorkEnvironment_Q2	.245	.070	.199	.135	.775	.077	.220	.061	.084	.051	.095
WorkEnvironment_Q3	.153	.081	.159	.256	.743	.159	.202	.131	.071	.208	.127
WorkEnvironment_Q4	.315	.026	.192	.143	.747	.059	.096	.242	.128	.090	-.086
WorkEnvironment_Q5	.040	.231	.186	.643	.357	.161	.111	.089	.052	.179	.057
WorkEnvironment_Q6	.447	.152	.038	.667	.105	.021	.215	.063	.185	.048	-.104
WorkEnvironment_Q7	.197	.229	.178	.677	.284	.149	.269	.065	.095	.025	.034
WorkEnvironment_Q8	.074	.181	.198	.154	.066	.098	.092	.202	.737	-.077	-.028
WorkEnvironment_Q9	.090	.632	.279	.422	-.184	-.022	.165	.102	.107	-.203	.102
WorkEnvironment_Q11	-.006	.093	.079	.232	.083	.020	-.010	.825	.084	.019	.083
WorkEnvironment_Q12	.050	.072	.006	-.118	.221	.082	-.026	.866	.035	.080	.012
WorkEnvironment_Q13	.143	.222	.343	.521	.079	.056	-.007	.017	-.084	-.167	.064

WorkEnvironment_Q1	We have a positive, collaborative environment in my RAS.
WorkEnvironment_Q2	People in my RAS communicate well with each other.
WorkEnvironment_Q3	People in my RAS treat each other with respect.
WorkEnvironment_Q4	People in my RAS help each other out when needed.
WorkEnvironment_Q5	Team and Staff Meetings are productive and well spent.
WorkEnvironment_Q6	We celebrate significant milestones and important accomplishments in my RAS.
WorkEnvironment_Q7	Our recognition and team-building events within the RAS are meaningful to me.
WorkEnvironment_Q8	People across the RAS organization collaborate well with each other (i.e., across all RAS units).

WorkEnvironment_Q9	ORA/RAS Central recognition and team-building events are meaningful to me.
WorkEnvironment_Q11	Faculty treat me with respect.
WorkEnvironment_Q12	Departmental administrators treat me with respect.
WorkEnvironment_Q13	I am paid fairly for the work I do.

There are total of 5 different constructs: Question 2-4 are related to people in the RAS department. Question 5-7 are related to recognition and accomplishment for those who are working in the RAS department.

Question 8 is one of a kind in a way that the nature of this question is related to one's perception about how collaborative one thinks it is the people across the RAS organization. Question 9 is also a one-of-a-kind question because this question is uniquely asking about one's value toward ORA/RAS Central recognition and team building. Lastly, question 11-12 are of similar nature as these are related to how well faculty/administrator treat survey participants with a sense of dignity.

Communication_Q1	.460	.366	-.051	.208	.356	.425	.087	.093	.034	.081	-.059
Communication_Q2	.192	.607	.042	.207	.120	.510	.127	.043	-.011	-.023	.014
Communication_Q3	.099	.496	.027	.337	.165	.569	.124	.026	.123	-.061	-.118
Communication_Q4	.337	.480	.157	.366	.080	.396	.304	.051	.045	.041	-.015
Communication_Q5	.128	.761	.141	.273	.121	.021	.180	.105	.046	-.064	.214
Communication_Q6	.225	.822	.044	.135	.030	-.022	.198	.048	.116	-.003	.068

Communication_Q1	I have a clear understanding of the goals and objectives of my RAS.
Communication_Q2	I have a clear understanding of the strategic goals and objectives of the RAS organization as a whole.
Communication_Q3	I have a clear understanding of policies and procedures that impact or govern my role.
Communication_Q4	Changes in goals, decisions, or processes that affect my work are communicated effectively.
Communication_Q5	Communications from RAS Central are clear, concise and timely.
Communication_Q6	Communication strategies by RAS Central are effective in communicating with the RAS Unit staff (e.g., Blackboard, email).

Question 2,5, and 6 are of similar nature as it asks something related to the efficiency of communication from the RAS organization, and question 3 is unique from other questions because it is asking if survey participants have a clear understanding pertaining to his/her role unrelated to what the RAS is doing.

Training_Q1	.040	.110	.267	.073	.171	.223	.781	.035	.029	.067	.045
Training_Q2	.036	.346	.119	.095	.218	.270	.667	.060	.126	-.092	.136
Training_Q3	.115	.263	.093	.091	.068	-.022	.806	.040	.040	.049	-.045
Training_Q4	.147	.180	-.045	.157	.127	-.009	.769	-.143	-.014	.150	.119
Training_Q5	-.028	.195	.035	-.052	-.049	.060	-.146	-.061	.190	-.770	.096
Training_Q6	.002	.184	.094	.040	.175	.067	.014	.035	.133	.742	.119

Training_Q1	I get enough training.
Training_Q2	The quality of training is good.
Training_Q3	There are adequate opportunities for formal training.
Training_Q4	There are adequate opportunities for informal training.
Training_Q5	I prefer formal training.
Training_Q6	I prefer informal training.

Question 1-4 are of same nature as these questions ask something related to employee trainings within the organization, and question 5-6 are of similar nature because these questions specifically ask for the preference regarding the types of training.

ToolsResourcesAndProcesses_Q1	.171	.458	.320	-.009	.125	.320	.386	.002	.331	.065	.060
ToolsResourcesAndProcesses_Q2	.136	.580	.232	.055	.181	.301	.272	-.027	.233	.158	.033
ToolsResourcesAndProcesses_Q3	.199	.728	.217	.039	-.056	.132	.189	.047	.027	.180	.108
ToolsResourcesAndProcesses_Q5	.141	.106	.856	.163	.190	.023	.100	.015	.032	.009	-.077
ToolsResourcesAndProcesses_Q6	.149	.098	.862	.219	.188	.070	.143	.013	.029	-.020	.121
ToolsResourcesAndProcesses_Q7	.176	.215	.774	-.010	.120	.018	.109	.002	.232	.173	.045
ToolsResourcesAndProcesses_Q8	.044	.279	.534	.104	.262	.079	-.059	.104	.138	-.021	-.019
ToolsResourcesAndProcesses_Q9	.220	.142	.227	.161	.404	-.091	.037	.018	.438	-.006	.042

ToolsResourcesAndProcesses_Q1	I have the tools and resources I need to do my job effectively.
ToolsResourcesAndProcesses_Q2	The RAS SOPs are clear and concise and easy to understand and follow.
ToolsResourcesAndProcesses_Q3	RAS Central Operations is receptive and responsive to suggestions and requests from the RAS staff.
ToolsResourcesAndProcesses_Q5	My workload is manageable.
ToolsResourcesAndProcesses_Q6	The level of job-related stress I experience is acceptable and manageable.
ToolsResourcesAndProcesses_Q7	The RAS staffing (number of staff) is adequate.
ToolsResourcesAndProcesses_Q8	My office space is adequate to do my job.
ToolsResourcesAndProcesses_Q9	My colleagues are competent.

Question 2-3 are of similar nature as these questions are asking whether RAS provides clear-cut instruction and systematic approach to receive suggestion and request from the staff; whereas, question 5-7 are of different nature because these questions ask about the participants' perception regarding workload, staffing and job-related strain.

HOWEVER!
I need to evaluate the nature of the questions by comparing the factor loads not only within the same dimension but across all the dimensions. The following page just does that.

Calculation of Composite variables:

Supervisor_Comp	RAScentral_Comp	WorkStrain_Comp
RasManagement_Q1	WorkEnvironment_Q9	MyRole_Q6
RasManagement_Q2	Communication_Q2	ToolsResourcesAndProcesses_Q5
RasManagement_Q3	Communication_Q5	ToolsResourcesAndProcesses_Q6
RasManagement_Q4	Communication_Q6	ToolsResourcesAndProcesses_Q7
RasManagement_Q5	ToolsResourcesAndProcesses_Q2	
RasManagement_Q6	ToolsResourcesAndProcesses_Q3	
RasManagement_Q7		

TeamGoal_Comp	RASCommunication_Comp	RoleUnderstanding_Comp
WorkEnvironment_Q5	WorkEnvironment_Q2	MyRole_Q1
WorkEnvironment_Q6	WorkEnvironment_Q3	MyRole_Q2
WorkEnvironment_Q7	WorkEnvironment_Q4	MyRole_Q3
		Communication_Q3

Training_Comp	Respect_Comp	RAScollaborate_Comp
Training_Q1	WorkEnvironment_Q11	WorkEnvironment_Q8
Training_Q2	WorkEnvironment_Q12	
Training_Q3		
Training_Q4		

TrainingTypes_Comp	Work_Comp
Training_Q5	MyRole_Q4
Training_Q6	MyRole_Q5

As you can see from this table above, I made a sheet compiling the questions from different construct that are belonged in the same components (or same construct).

The following are the description of each variable. This way, I can evaluate the theme of the question easily to name the composite variable.

PC1 -> Supervisor_Comp	PC2 -> RAScentral_Comp	PC3 - > WorkStrain_Comp
My supervisor meets with me on a regular basis to discuss my job performance.	ORA/RAS Central recognition and team-building events are meaningful to me	The level of stress I have in my job is acceptable and manageable.
The one-on-one meetings I have with my supervisor are helpful and productive.	I have a clear understanding of the strategic goals and objectives of the RAS organization as a whole.	My workload is manageable.
My supervisor is available to discuss any questions or concerns.	Communications from RAS Central are clear, concise and timely.	The level of job-related stress I experience is acceptable and manageable.
My supervisor is responsive to my questions or concerns.	Communication strategies by RAS Central are effective in communicating with the RAS Unit staff (e.g., Blackboard, email).	The RAS staffing (number of staff) is adequate.
I feel comfortable voicing questions or concerns to my supervisor.	The RAS SOPs are clear and concise and easy to understand and follow.	
I feel "micro-managed" by my supervisor.	RAS Central Operations is receptive and responsive to suggestions and requests from the RAS staff.	
My supervisor is supportive of my professional development activities.		

PC4 -> TeamGoal_Comp	PC5 -> RAScommunication_Comp	PC6 -> RoleUnderstanding_Comp
Team and Staff Meetings are productive and well spent.	People in my RAS communicate well with each other.	I have a clear understanding of my role and responsibilities.
We celebrate significant milestones and important accomplishments in my RAS.	People in my RAS treat each other with respect.	I have a clear understanding of how my performance is measured.
Our recognition and team-building events within the RAS are meaningful to me.	People in my RAS help each other out when needed.	I have a clear understanding of how my performance impacts the success of my RAS Unit.
		I have a clear understanding of policies and procedures that impact or govern my role.

PC7 -> Training_Comp	PC8 -> Respect_Comp	PC9 - > RAScollaborate_Comp
I get enough training.	Faculty treat me with respect.	People across the RAS organization collaborate well with each other (i.e., across all RAS units).
The quality of training is good.	Departmental administrators treat me with respect.	
There are adequate opportunities for formal training.		
There are adequate opportunities for informal training.		

PC10 -> TrainingTypes_Comp	PC11 -> Work_Comp
I prefer formal training.	My work is meaningful.
I prefer informal training.	My work is challenging.

3. Compute mean index scores for each individual using the raw responses they gave to the items that comprise each factor you identified. You should be able to produce as many indices as the factors you identified. Assign a variable name and definition that captures the meaning of the items that comprise each index. Take care to ***reverse code items*** that have negative loadings on to a factor before calculating the mean index score.

"The point of factor analysis is to see if the items that were intended to capture a certain construct may actually be capturing different (latent) constructs. Running factor analysis only on the items that belong to a certain construct will not allow items from different constructs to load onto the same component.

Rather than doing separate factor analysis for each, include all the items that span across different constructs in the factor analysis at once and interpret the components that emerge from them. The idea is to utilize all the data to see the bigger picture/structure that is latent in the data."

Here is where I compute the variables based on the Question 2.

Supervisor_Comp
RasManagement_Q1
RasManagement_Q2
RasManagement_Q3
RasManagement_Q4
RasManagement_Q5
RasManagement_Q6
RasManagement_Q7

Supervisor_Comp =
*(RasManagement_Q1 + RasManagement_Q2 + RasManagement_Q3 + RasManagement_Q4 + RasManagement_Q5 + (-1*RasManagement_Q6+6) + RasManagement_Q7)/7*

RAScentral_Comp
WorkEnvironment_Q9
Communication_Q2
Communication_Q5
Communication_Q6
ToolsResourcesAndProcesses_Q2
ToolsResourcesAndProcesses_Q3

RAScentral_Comp =
(WorkEnvironment_Q9 + Communication_Q2 + Communication_Q5 + Communication_Q6 + ToolsResourcesAndProcesses_Q2 + ToolsResourcesAndProcesses_Q3)/6

WorkStrain_Comp
MyRole_Q6
ToolsResourcesAndProcesses_Q5
ToolsResourcesAndProcesses_Q6
ToolsResourcesAndProcesses_Q7

WorkStrain_Comp =
(MyRole_Q6 + ToolsResourcesAndProcesses_Q5 + ToolsResourcesAndProcesses_Q6 + ToolsResourcesAndProcesses_Q7)/4

TeamGoal_Comp
WorkEnvironment_Q5
WorkEnvironment_Q6
WorkEnvironment_Q7

TeamGoal_Comp =
(WorkEnvironment_Q5 + WorkEnvironment_Q6 + WorkEnvironment_Q7)/3

RASCommunication_Comp
WorkEnvironment_Q2
WorkEnvironment_Q3
WorkEnvironment_Q4

RASCommunication_Comp =
(WorkEnvironment_Q2+ WorkEnvironment_Q3+ WorkEnvironment_Q4)/3

RoleUnderstanding_Comp
MyRole_Q1
MyRole_Q2
MyRole_Q3
Communication_Q3

RoleUnderstanding_Comp =
(MyRole_Q1 + MyRole_Q2 + MyRole_Q3 + Communication_Q3)/4

Training_Comp
Training_Q1
Training_Q2
Training_Q3
Training_Q4

Training_Comp =
(Training_Q1+ Training_Q2 + Training_Q3 + Training_Q4)/4

Respect_Comp
WorkEnvironment_Q11
WorkEnvironment_Q12

Respect_Comp =
(WorkEnvironment_Q11 + WorkEnvironment_Q12)/2

RAScollaborate_Comp
WorkEnvironment_Q8

RAScollaborate_Comp = *WorkEnvironment_Q8*

- Notice how there is only one variable for the *RAScollaborate_Comp*. When creating a composite variable, SPSS initially encoded this as a nominal measure, but for the purpose of conducting further analysis in Q4 and Q5, I change it to a 'scale' measure type, so the format of this composite variable is same as the others.

TrainingTypes_Comp
Training_Q5
Training_Q6

TrainingTypes_Comp =
*((-1*Training_Q5+6)* + *Training_Q6)/2*

Work_Comp
MyRole_Q4
MyRole_Q5

Work_Comp =
(MyRole_Q4 + *MyRole_Q5)/2*

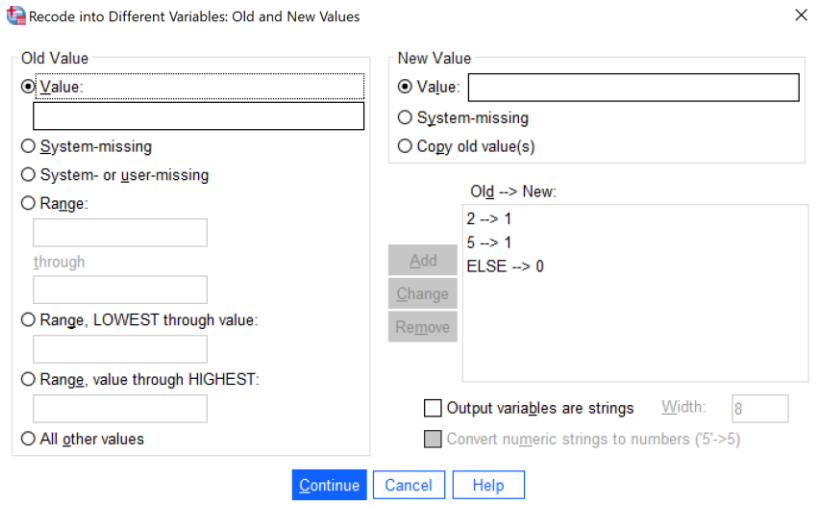
4. Are there any significant differences in the mean index scores calculated above across? Show these comparisons both visually (in figures) and in the form of statistical tests (in tables).

1) Sex

2) Ethnicity

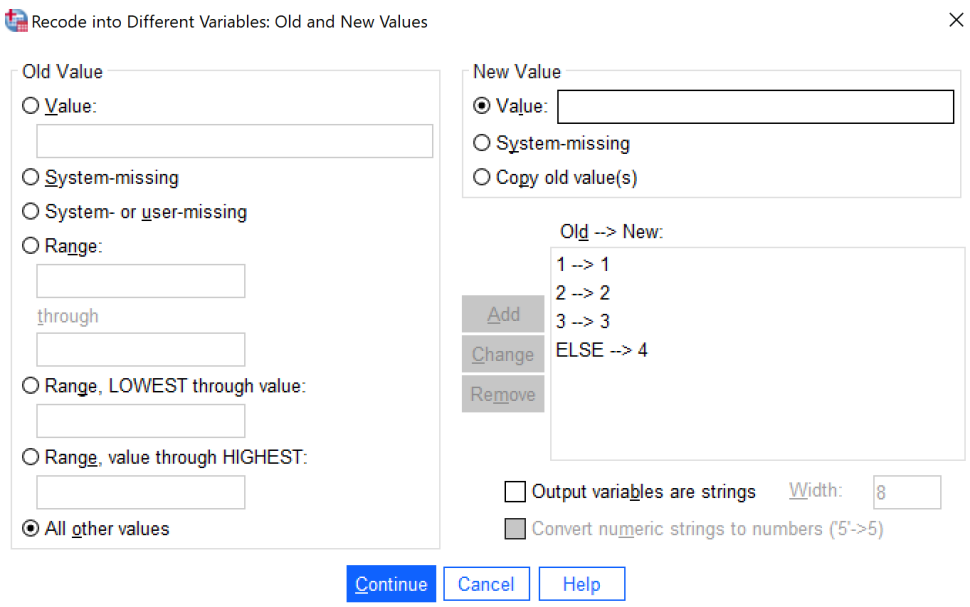
3) Treatment (DOM & BSCI) vs Control (All other) RAS units

RAS			
		1: ABOSS	1
		2: BSCI	2
		3: C&I	3
		4: CAPS	4
		5: DOM	5
		6: HSS	6
		7: PEDS	7
		8: PHN	8
		9: YRK	9



Recoding variables via video tutorials: https://youtu.be/CTWgb4FO5_Y

4) Rank (I, II, III and IV and above)



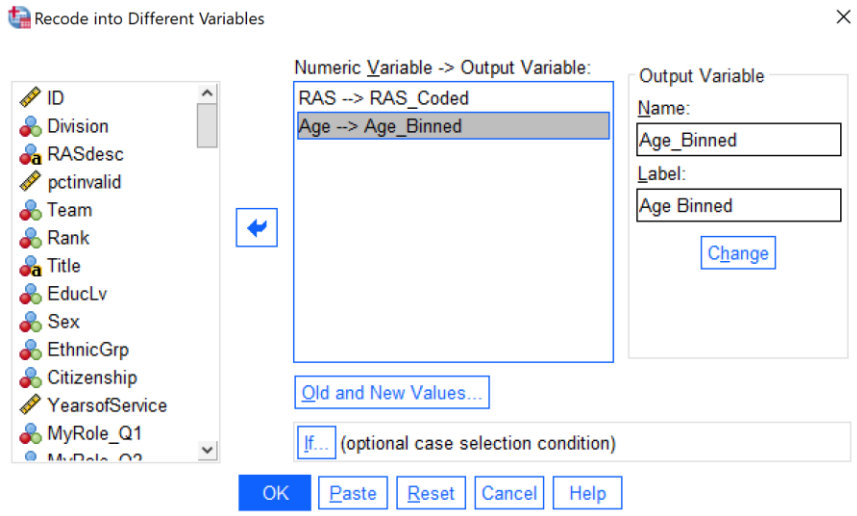
5) Education Level

6) Age **(Divide into Ranges)**

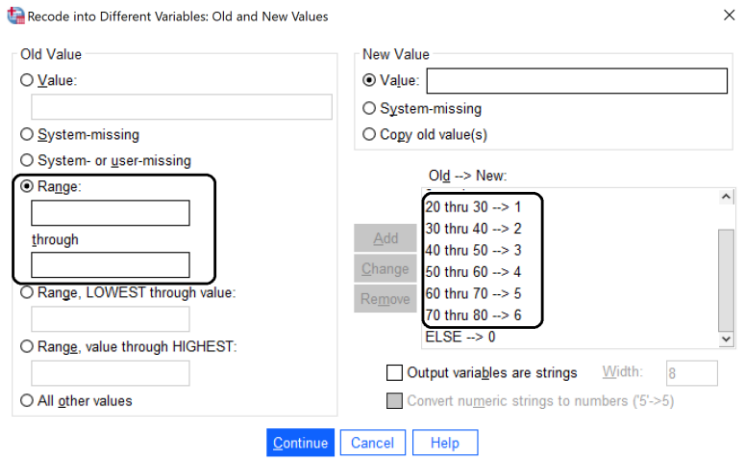
Statistics

Age

N	Valid	92
	Missing	0
Mean		47.1174
Median		45.7500
Std. Deviation		11.53436
Range		48.10
Minimum		23.20
Maximum		71.30



I created a new variable named *'Age_Binned'* that contains total of 6 different bins based on 5-year interval distributed across the data as shown below:



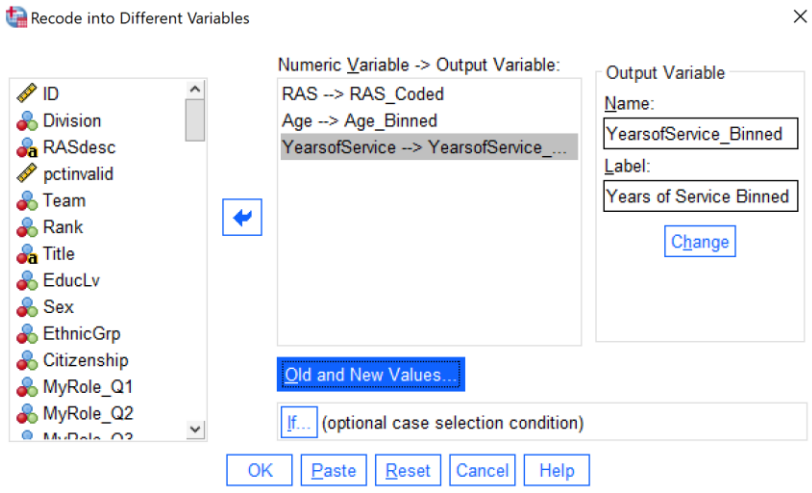
7) Years of Service **(Divide into Ranges)**

Statistics

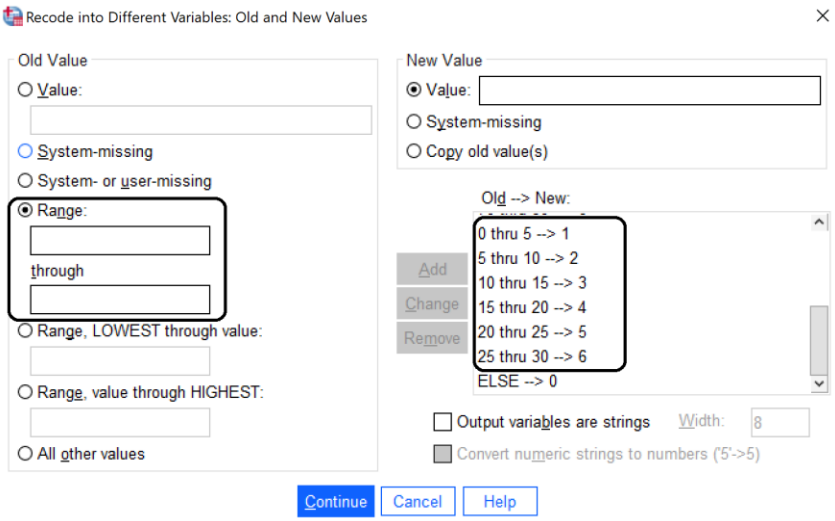
YearsofService

N	Valid	92
	Missing	0
Mean		8.7967
Median		5.7000
Std. Deviation		8.12586
Range		29.60
Minimum		.10
Maximum		29.70

Notice that minimum value is 0.10 and maximum value is 29.70.



I created a new variable named *'Years of Service Binned'* that contains total of 6 different bins based on 5-year interval distributed across the data as shown below:



Independent sample t-test (binary variable)

ANOVA (more than two levels)

Sex (binary variable: Independent sample t-test)

Group Statistics

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Supervisor_Comp	0: Male	13	4.3626	.62980	.17468
	1: Female	79	4.0434	.80888	.09101
RAScentral_Comp	0: Male	13	3.6154	.71810	.19917
	1: Female	79	3.4156	.85729	.09645
WorkStrain_Comp	0: Male	13	3.7692	.69568	.19295
	1: Female	79	3.0506	1.09806	.12354
TeamGoal_Comp	0: Male	13	3.7949	.66023	.18311
	1: Female	79	3.7300	.91065	.10246
RASCommunication_Comp	0: Male	13	4.3077	.39585	.10979
	1: Female	79	3.9705	.82723	.09307
RoleUnderstanding_Comp	0: Male	13	4.1154	.79461	.22039
	1: Female	79	3.9367	.83921	.09442
Training_Comp	0: Male	13	3.7308	.62468	.17325
	1: Female	79	3.2880	.85493	.09619
Respect_Comp	0: Male	13	4.1538	.80064	.22206
	1: Female	79	4.0633	.79003	.08889
TrainingTypes_Comp	0: Male	13	2.9615	.74893	.20772
	1: Female	79	2.8165	.71242	.08015
Work_Comp	0: Male	13	4.4231	.75955	.21066
	1: Female	79	4.2911	.79505	.08945
RAScollaborate_Comp	0: Male	13	3.2308	1.23517	.34257
	1: Female	79	3.2025	.95246	.10716

Independent sample t-test is used when two samples have different samples (for example, a group of men versus a group of women) – and we are interested in testing for difference between these two groups on a particular continuous dependent variable (different composite variables as shown above). Here, we notice that mean values across gender does not differ much.

In comparing the male versus female, the proportion of work strain in the staff is significantly higher in male than female. The average proportion of work strain in male associates is 3.76 while that of female associates is 3.05. Deeper analysis shows that the likelihood of this difference occurring by chance along is less than 1 in 100, suggesting there is an issue that needs to be addressed within the organization.

In comparing the male versus female, the proportion of training quality in the staff is significantly higher in male than female. The average proportion of work strain in male associates is 3.78 while that of female associates is 3.29. Deeper analysis shows that the likelihood of this difference occurring by chance along is less than 5 in 100, suggesting there is an issue that needs to be addressed within the organization.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Supervisor_Comp	Equal variances assumed	3.418	.068	1.355	90	.179	.31924	.23566	-.14894	.78742
	Equal variances not assumed			1.621	19.181	.121	.31924	.19696	-.09274	.73122
RAScentral_Comp	Equal variances assumed	.603	.440	.795	90	.429	.19977	.25143	-.29974	.69929
	Equal variances not assumed			.903	18.135	.378	.19977	.22129	-.26490	.66444
WorkStrain_Comp	Equal variances assumed	7.482	.008	2.279	90	.025	.71860	.31526	.09227	1.34492
	Equal variances not assumed			3.136	23.255	.005	.71860	.22911	.24494	1.19226
TeamGoal_Comp	Equal variances assumed	2.080	.153	.246	90	.806	.06491	.26380	-.45917	.58899
	Equal variances not assumed			.309	20.382	.760	.06491	.20983	-.37225	.50208
RASCommunication_Comp	Equal variances assumed	3.584	.062	1.438	90	.154	.33723	.23452	-.12868	.80314
	Equal variances not assumed			2.343	32.836	.025	.33723	.14393	.04435	.63011
RoleUnderstanding_Comp	Equal variances assumed	.545	.462	.716	90	.476	.17868	.24944	-.31688	.67423
	Equal variances not assumed			.745	16.723	.466	.17868	.23976	-.32781	.68517
Training_Comp	Equal variances assumed	5.100	.026	1.787	90	.077	.44279	.24780	-.04951	.93510
	Equal variances not assumed			2.234	20.242	.037	.44279	.19816	.02975	.85584
Respect_Comp	Equal variances assumed	.526	.470	.382	90	.703	.09056	.23688	-.38005	.56116
	Equal variances not assumed			.379	16.090	.710	.09056	.23919	-.41627	.59738
TrainingTypes_Comp	Equal variances assumed	.142	.707	.676	90	.501	.14508	.21472	-.28149	.57166
	Equal variances not assumed			.652	15.786	.524	.14508	.22264	-.32742	.61759
Work_Comp	Equal variances assumed	.052	.819	.558	90	.578	.13194	.23657	-.33805	.60192
	Equal variances not assumed			.576	16.634	.572	.13194	.22887	-.35174	.61561
RAScollaborate_Comp	Equal variances assumed	1.959	.165	.095	90	.925	.02824	.29775	-.56329	.61976
	Equal variances not assumed			.079	14.442	.938	.02824	.35894	-.73941	.79589

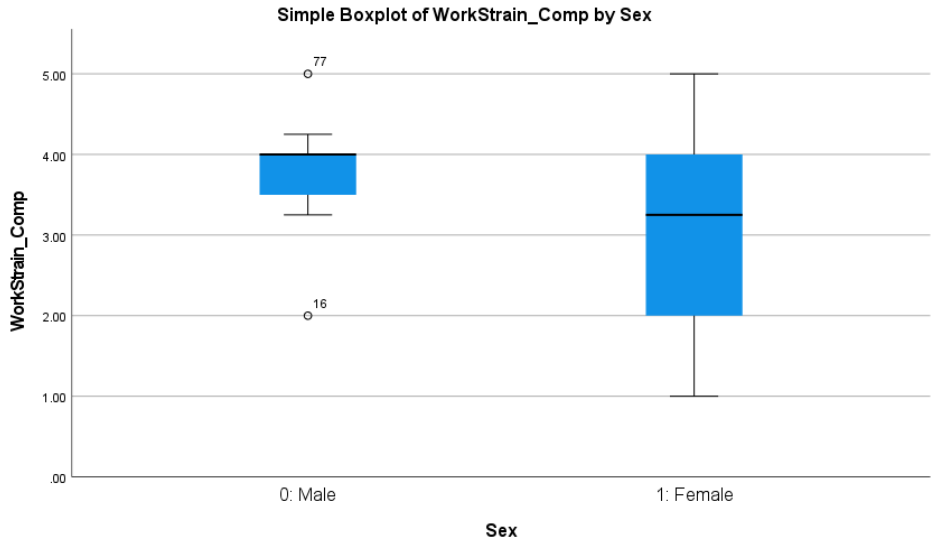
Here, we are performing Levine's test to determine whether the variances are not equal across the two groups (i.e., p-value small). If this is true, then we will need to rely on the second row of output. Levene's test clearly tell us if the two groups were similar enough that we could assume equal variances. If Levene's F-test statistic produces a significant value of greater than 0.05, then we can assume that the functional groups have similar patterns of spread or variance (or they have equal variance that they aren't significantly different in their pattern of variance).

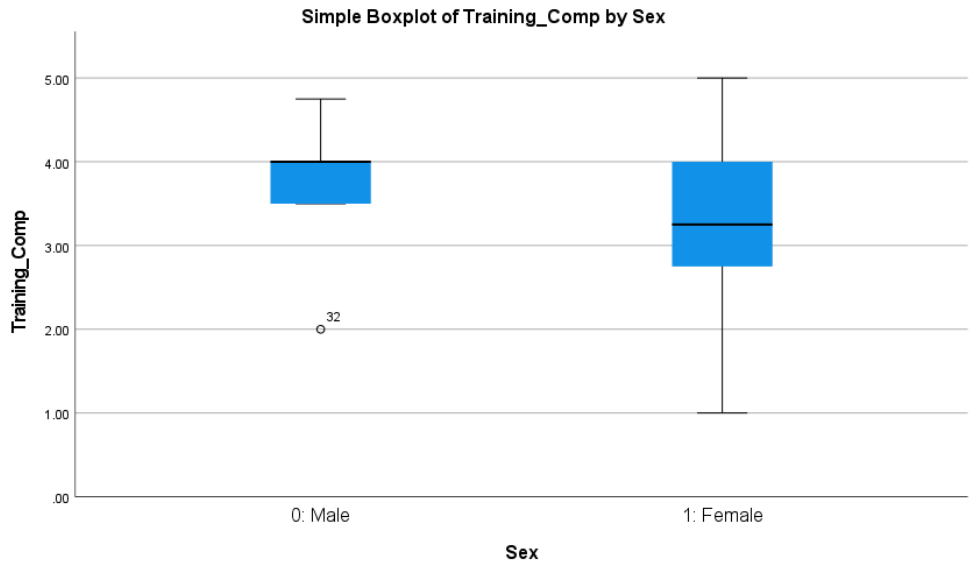
However, if Levene's F-test produces a significance value of less than 0.05, then the functional groups that we are comparing can be considered to have very different variation, meaning the functional groups don't have equal variance.

Based on the output above, we see that Levene's test shows a significant values on *WorkStrain_Comp* and *Training_Comp*, meaning that these are two composite variables where equal variance is not assumed, and we thus need to look at the second row of each output.

It is important to note that Levene's test doesn't tell us whether the means of these two composite variables are significantly different in their levels, but it only tells us that the spread or variation of these composite variables is different when we compare two groups. The t-test tells us whether the proportions (levels) of each variable different significantly when we compare male versus female.

The mean difference of these two composite variables is 0.71 and 0.13, respectively. And it is safe to assume that there is no significant difference in the mean index scores based on the p-value. Graphical representation of these two composite variables is shown as follows:





Ethnicity (Three variables: ANOVA)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Supervisor_Comp	Between Groups	.575	2	.288	.454	.636
	Within Groups	56.357	89	.633		
	Total	56.932	91			
RAScentral_Comp	Between Groups	1.341	2	.670	.953	.390
	Within Groups	62.619	89	.704		
	Total	63.960	91			
WorkStrain_Comp	Between Groups	.917	2	.458	.390	.678
	Within Groups	104.703	89	1.176		
	Total	105.620	91			
TeamGoal_Comp	Between Groups	3.290	2	1.645	2.196	.117
	Within Groups	66.672	89	.749		
	Total	69.961	91			
RASCommunication_Comp	Between Groups	1.036	2	.518	.831	.439
	Within Groups	55.489	89	.623		
	Total	56.525	91			
RoleUnderstanding_Comp	Between Groups	2.587	2	1.294	1.910	.154
	Within Groups	60.280	89	.677		
	Total	62.867	91			
Training_Comp	Between Groups	1.115	2	.557	.790	.457
	Within Groups	62.768	89	.705		
	Total	63.882	91			
Respect_Comp	Between Groups	2.798	2	1.399	2.320	.104
	Within Groups	53.669	89	.603		
	Total	56.467	91			
TrainingTypes_Comp	Between Groups	.790	2	.395	.769	.467
	Within Groups	45.764	89	.514		
	Total	46.554	91			
Work_Comp	Between Groups	1.049	2	.525	.843	.434
	Within Groups	55.372	89	.622		
	Total	56.421	91			
RAScollaborate_Comp	Between Groups	.062	2	.031	.031	.969
	Within Groups	89.014	89	1.000		
	Total	89.076	91			

Here, we see that none of the output is statistically significant. We can see that there is a significant difference in mean index score between groups as opposed to that of within groups but it is not considered statistically significant based on the p-value.

Treatment (DOM & BSCI) vs Control (All other) RAS units (Binary Variable – Independent sample t-test)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Supervisor_Comp	Between Groups	.575	2	.288	.454	.636
	Within Groups	56.357	89	.633		
	Total	56.932	91			
RAScentral_Comp	Between Groups	1.341	2	.670	.953	.390
	Within Groups	62.619	89	.704		
	Total	63.960	91			
WorkStrain_Comp	Between Groups	.917	2	.458	.390	.678
	Within Groups	104.703	89	1.176		
	Total	105.620	91			
TeamGoal_Comp	Between Groups	3.290	2	1.645	2.196	.117
	Within Groups	66.672	89	.749		
	Total	69.961	91			
RASCommunication_Comp	Between Groups	1.036	2	.518	.831	.439
	Within Groups	55.489	89	.623		
	Total	56.525	91			
RoleUnderstanding_Comp	Between Groups	2.587	2	1.294	1.910	.154
	Within Groups	60.280	89	.677		
	Total	62.867	91			
Training_Comp	Between Groups	1.115	2	.557	.790	.457
	Within Groups	62.768	89	.705		
	Total	63.882	91			
Respect_Comp	Between Groups	2.798	2	1.399	2.320	.104
	Within Groups	53.669	89	.603		
	Total	56.467	91			
TrainingTypes_Comp	Between Groups	.790	2	.395	.769	.467
	Within Groups	45.764	89	.514		
	Total	46.554	91			
Work_Comp	Between Groups	1.049	2	.525	.843	.434
	Within Groups	55.372	89	.622		
	Total	56.421	91			
RAScollaborate_Comp	Between Groups	.062	2	.031	.031	.969
	Within Groups	89.014	89	1.000		
	Total	89.076	91			

Here, just like the previous one, we can see that the sum of the squares between groups is so much smaller than that of within groups even though none of them are statistically significant.

Group Statistics

	RAS Coded	N	Mean	Std. Deviation	Std. Error Mean
Supervisor_Comp	1.00	50	4.0171	.81716	.11556
	2.00	42	4.1735	.75957	.11720
RAScentral_Comp	1.00	50	3.3667	.87805	.12418
	2.00	42	3.5357	.78910	.12176
WorkStrain_Comp	1.00	50	2.8950	1.08102	.15288
	2.00	42	3.4583	1.00140	.15452
TeamGoal_Comp	1.00	50	3.6133	.89938	.12719
	2.00	42	3.8889	.83509	.12886
RASCommunication_Comp	1.00	50	3.8267	.86305	.12205
	2.00	42	4.2460	.62495	.09643
RoleUnderstanding_Comp	1.00	50	3.8650	.88238	.12479
	2.00	42	4.0774	.76007	.11728
Training_Comp	1.00	50	3.2450	.89570	.12667
	2.00	42	3.4762	.75468	.11645
Respect_Comp	1.00	50	4.0500	.85863	.12143
	2.00	42	4.1071	.70309	.10849
TrainingTypes_Comp	1.00	50	2.8000	.69985	.09897
	2.00	42	2.8810	.73923	.11407
Work_Comp	1.00	50	4.1800	.81916	.11585
	2.00	42	4.4643	.72745	.11225
RAScollaborate_Comp	1.00	50	3.0400	.90260	.12765
	2.00	42	3.4048	1.06059	.16365

Here, we notice that mean values across Treatment (DOM & BSCI) vs Control (All other) RAS units do not differ much from one another.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Supervisor_Comp	Equal variances assumed	.003	.959	-.944	90	.348	-.15633	.16565	-.48543	.17278
	Equal variances not assumed			-.950	89.048	.345	-.15633	.16460	-.48337	.17072
RAScentral_Comp	Equal variances assumed	.692	.408	-.963	90	.338	-.16905	.17555	-.51780	.17970
	Equal variances not assumed			-.972	89.567	.334	-.16905	.17391	-.51458	.17648
WorkStrain_Comp	Equal variances assumed	1.893	.172	-2.574	90	.012	-.56333	.21883	-.99808	-.12859
	Equal variances not assumed			-2.592	89.110	.011	-.56333	.21737	-.99523	-.13144
TeamGoal_Comp	Equal variances assumed	.196	.659	-1.512	90	.134	-.27556	.18224	-.63761	.08650
	Equal variances not assumed			-1.522	89.068	.132	-.27556	.18106	-.63531	.08420
RASCommunication_Comp	Equal variances assumed	2.397	.125	-2.623	90	.010	-.41937	.15988	-.73699	-.10174
	Equal variances not assumed			-2.696	88.196	.008	-.41937	.15555	-.72848	-.11025
RoleUnderstanding_Comp	Equal variances assumed	1.826	.180	-1.224	90	.224	-.21238	.17350	-.55706	.13230
	Equal variances not assumed			-1.240	89.934	.218	-.21238	.17125	-.55260	.12784
Training_Comp	Equal variances assumed	1.519	.221	-1.324	90	.189	-.23119	.17465	-.57816	.11578
	Equal variances not assumed			-1.344	89.998	.182	-.23119	.17206	-.57303	.11064
Respect_Comp	Equal variances assumed	.000	.989	-.345	90	.731	-.05714	.16568	-.38630	.27201
	Equal variances not assumed			-.351	89.951	.726	-.05714	.16283	-.38064	.26636
TrainingTypes_Comp	Equal variances assumed	.092	.762	-.539	90	.591	-.08095	.15029	-.37954	.21763
	Equal variances not assumed			-.536	85.449	.593	-.08095	.15102	-.38120	.21929
Work_Comp	Equal variances assumed	.418	.520	-1.744	90	.085	-.28429	.16299	-.60810	.03953
	Equal variances not assumed			-1.762	89.703	.081	-.28429	.16131	-.60476	.03619
RAScollaborate_Comp	Equal variances assumed	3.525	.064	-1.782	90	.078	-.36476	.20465	-.77133	.04181
	Equal variances not assumed			-1.757	80.982	.083	-.36476	.20755	-.77772	.04819

Here, we are performing Levine's test to determine whether the variances are not equal across the two groups (i.e., p-value small). If this is true, then we will need to rely on the second row of output.

Based on the output above, we see that none of the composite variables failed to have assumed equal variance, and we don't even need to look at the second row of each output.

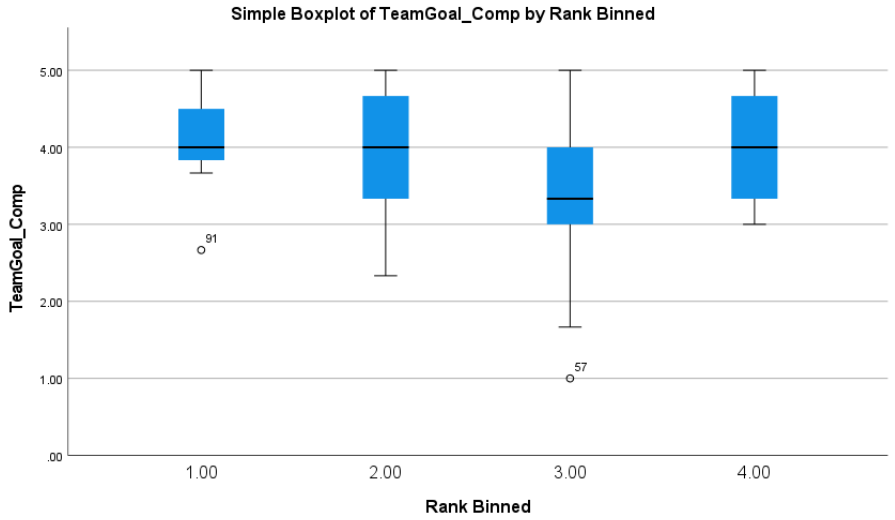
There is no significant difference on the mean index outcome, even though the result is not statistically significant. Due to this reason, no graphical representation of the mean index score is included.

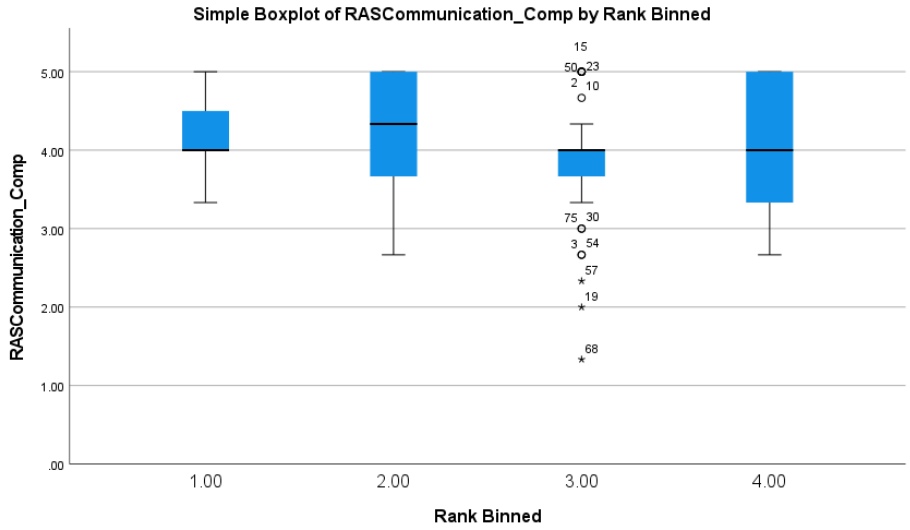
Rank (I, II, III and IV and above) -> Four variables – ANOVA

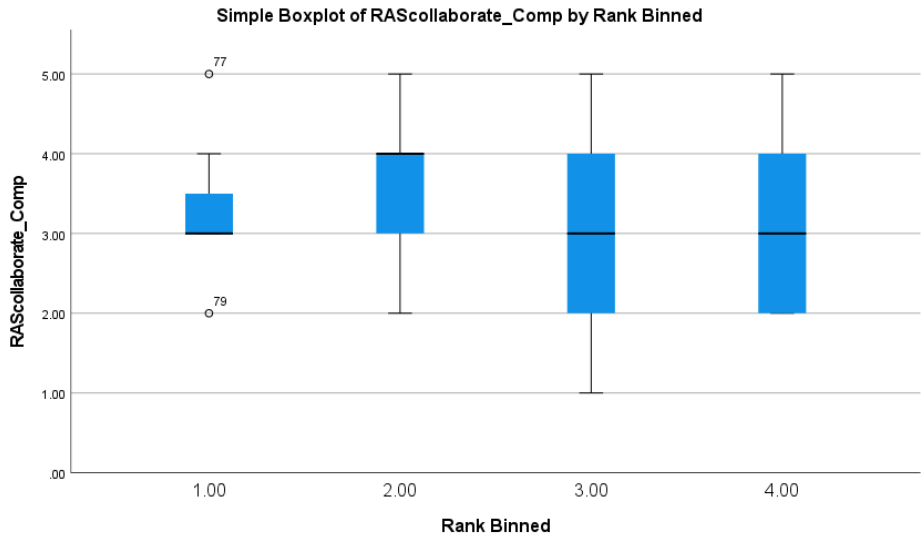
ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Supervisor_Comp	Between Groups	5.158	5	1.032	1.714	.140
	Within Groups	51.774	86	.602		
	Total	56.932	91			
RAScentral_Comp	Between Groups	5.532	5	1.106	1.629	.161
	Within Groups	58.428	86	.679		
	Total	63.960	91			
WorkStrain_Comp	Between Groups	9.295	5	1.859	1.660	.153
	Within Groups	96.325	86	1.120		
	Total	105.620	91			
TeamGoal_Comp	Between Groups	11.395	5	2.279	3.346	.008
	Within Groups	58.567	86	.681		
	Total	69.961	91			
RASCommunication_Comp	Between Groups	7.199	5	1.440	2.510	.036
	Within Groups	49.326	86	.574		
	Total	56.525	91			
RoleUnderstanding_Comp	Between Groups	5.094	5	1.019	1.516	.193
	Within Groups	57.773	86	.672		
	Total	62.867	91			
Training_Comp	Between Groups	3.434	5	.687	.977	.437
	Within Groups	60.449	86	.703		
	Total	63.882	91			
Respect_Comp	Between Groups	4.300	5	.860	1.418	.226
	Within Groups	52.167	86	.607		
	Total	56.467	91			
TrainingTypes_Comp	Between Groups	4.195	5	.839	1.703	.142
	Within Groups	42.360	86	.493		
	Total	46.554	91			
Work_Comp	Between Groups	5.064	5	1.013	1.696	.144
	Within Groups	51.357	86	.597		
	Total	56.421	91			
RAScollaborate_Comp	Between Groups	15.027	5	3.005	3.490	.006
	Within Groups	74.049	86	.861		
	Total	89.076	91			

From above, we can see that sum of the squares between groups and within groups are significantly different, but only composite variables, which satisfy the statistically significant based on the significance score, are *TeamGoal_Comp, RASCommunication_Comp,* and *RAScollaborate*. Following variables are depicted graphically in the next page to show what we just have discussed.


Simple Boxplot of TeamGoal_Comp by Rank Binned
TeamGoal_Comp
5.00
4.00
3.00
2.00
1.00
.00
91
57
1.00
2.00
3.00
4.00
Rank Binned


Simple Boxplot of RASCommunication_Comp by Rank Binned
RASCommunication_Comp
5.00
4.00
3.00
2.00
1.00
.00
15
50
23
2
10
75
30
3
54
57
19
68
1.00
2.00
3.00
4.00
Rank Binned


Simple Boxplot of RAScollaborate_Comp by Rank Binned
RAScollaborate_Comp
5.00
4.00
3.00
2.00
1.00
.00
77
79
1.00
2.00
3.00
4.00
Rank Binned

Education Level (4 levels – ANOVA)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Supervisor_Comp	Between Groups	2.529	3	.843	1.349	.264
	Within Groups	53.744	86	.625		
	Total	56.273	89			
RAScentral_Comp	Between Groups	.324	3	.108	.146	.932
	Within Groups	63.478	86	.738		
	Total	63.803	89			
WorkStrain_Comp	Between Groups	4.039	3	1.346	1.152	.333
	Within Groups	100.481	86	1.168		
	Total	104.520	89			
TeamGoal_Comp	Between Groups	4.143	3	1.381	1.816	.150
	Within Groups	65.389	86	.760		
	Total	69.532	89			
RASCommunication_Comp	Between Groups	3.686	3	1.229	2.000	.120
	Within Groups	52.839	86	.614		
	Total	56.525	89			
RoleUnderstanding_Comp	Between Groups	2.470	3	.823	1.174	.324
	Within Groups	60.311	86	.701		
	Total	62.781	89			
Training_Comp	Between Groups	3.882	3	1.294	1.882	.139
	Within Groups	59.138	86	.688		
	Total	63.020	89			
Respect_Comp	Between Groups	.448	3	.149	.233	.873
	Within Groups	55.152	86	.641		
	Total	55.600	89			
TrainingTypes_Comp	Between Groups	1.406	3	.469	.916	.437
	Within Groups	44.008	86	.512		
	Total	45.414	89			
Work_Comp	Between Groups	1.066	3	.355	.557	.645
	Within Groups	54.834	86	.638		
	Total	55.900	89			
RAScollaborate_Comp	Between Groups	.376	3	.125	.123	.946
	Within Groups	87.412	86	1.016		
	Total	87.789	89			

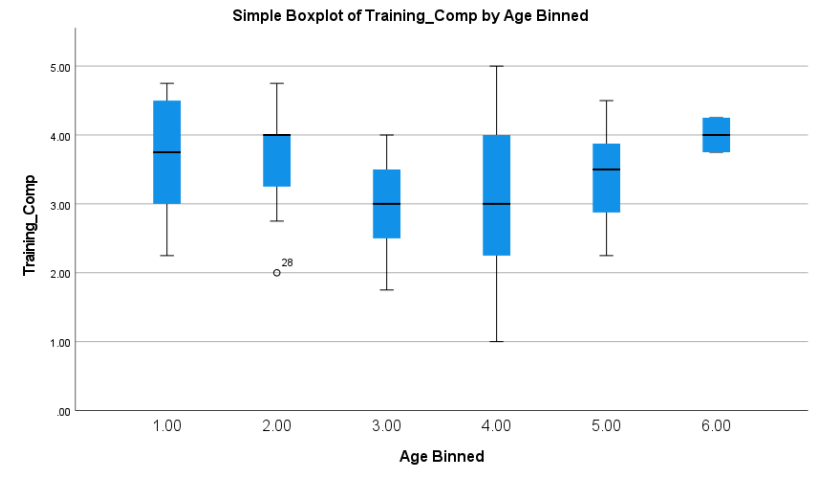
From above, we also can see that there is a big difference of the sum of the squares between groups and within groups; however, we see that none of the composite variables reach the p-value that regards any of the value to be statistically significant.

No graphical illustration is included because none of the composite variables reaches the statistical significance.

Age (Divide into Ranges)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Supervisor_Comp	Between Groups	3.006	5	.601	.959	.448
	Within Groups	53.927	86	.627		
	Total	56.932	91			
RAScentral_Comp	Between Groups	4.885	5	.977	1.422	.224
	Within Groups	59.075	86	.687		
	Total	63.960	91			
WorkStrain_Comp	Between Groups	5.300	5	1.060	.909	.479
	Within Groups	100.319	86	1.167		
	Total	105.620	91			
TeamGoal_Comp	Between Groups	4.145	5	.829	1.083	.376
	Within Groups	65.817	86	.765		
	Total	69.961	91			
RASCommunication_Comp	Between Groups	3.744	5	.749	1.220	.307
	Within Groups	52.781	86	.614		
	Total	56.525	91			
RoleUnderstanding_Comp	Between Groups	3.980	5	.796	1.163	.334
	Within Groups	58.887	86	.685		
	Total	62.867	91			
Training_Comp	Between Groups	8.845	5	1.769	2.764	.023
	Within Groups	55.037	86	.640		
	Total	63.882	91			
Respect_Comp	Between Groups	2.769	5	.554	.887	.494
	Within Groups	53.699	86	.624		
	Total	56.467	91			
TrainingTypes_Comp	Between Groups	2.593	5	.519	1.014	.414
	Within Groups	43.962	86	.511		
	Total	46.554	91			
Work_Comp	Between Groups	5.057	5	1.011	1.693	.145
	Within Groups	51.364	86	.597		
	Total	56.421	91			
RAScollaborate_Comp	Between Groups	3.841	5	.768	.775	.570
	Within Groups	85.236	86	.991		
	Total	89.076	91			

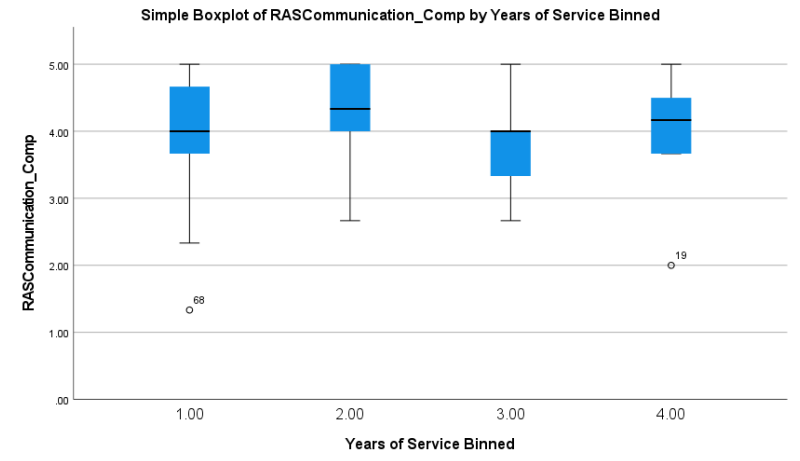


Even though there is a big difference of the sum of the square values between groups and within groups, only composite variable, *'Training_Comp'*, is statistically significant. A graphical representation for this composite variable is shown above.

Years of Service (Divide into Ranges)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Supervisor_Comp	Between Groups	.427	3	.142	.222	.881
	Within Groups	56.505	88	.642		
	Total	56.932	91			
RAScentral_Comp	Between Groups	4.388	3	1.463	2.161	.098
	Within Groups	59.572	88	.677		
	Total	63.960	91			
WorkStrain_Comp	Between Groups	.789	3	.263	.221	.882
	Within Groups	104.831	88	1.191		
	Total	105.620	91			
TeamGoal_Comp	Between Groups	1.056	3	.352	.449	.718
	Within Groups	68.906	88	.783		
	Total	69.961	91			
RASCommunication_Comp	Between Groups	1.768	3	.589	.947	.421
	Within Groups	54.757	88	.622		
	Total	56.525	91			
RoleUnderstanding_Comp	Between Groups	.101	3	.034	.047	.986
	Within Groups	62.766	88	.713		
	Total	62.867	91			
Training_Comp	Between Groups	3.718	3	1.239	1.813	.151
	Within Groups	60.164	88	.684		
	Total	63.882	91			
Respect_Comp	Between Groups	1.716	3	.572	.919	.435
	Within Groups	54.751	88	.622		
	Total	56.467	91			
TrainingTypes_Comp	Between Groups	3.107	3	1.036	2.098	.106
	Within Groups	43.447	88	.494		
	Total	46.554	91			
Work_Comp	Between Groups	.668	3	.223	.351	.788
	Within Groups	55.754	88	.634		
	Total	56.421	91			
RAScollaborate_Comp	Between Groups	2.400	3	.800	.812	.491
	Within Groups	86.676	88	.985		
	Total	89.076	91			



Even though there is a big difference of the sum of the square values between groups and within groups, only composite variable, *'RAScentral_Comp'*, is statistically significant.

5. Estimate the effects of variables 4.1-4.7 above on each of the index scores using OLS regression. In other words, if you identify *n* factors, you should be able to use the raw survey responses to calculate *n* index variables for each individual. Each of these *n* index variables will be a dependent variable in your regression analyses and variables 4.1-4.7 above will be the independent variables. Provide tables that describe your regression results and interpret the results.

* Please note that the way I write this response is closely following the format of case study 4 analysis from page 265 of the textbook.

***Supervisor_Comp* as Dependent:**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: Supervisor_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317[a]	.101	.024	.78557

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

Model summary box tells us that the R-Square is 0.101. R-square being the square of the multiple regression coefficient. R is the coefficient between the dependent variable and all the predictor variables.

The greater the R-square, the more the predictor variables are jointly predictive of the dependent variable. This measure can be regarded as a percentage of variance accounted for in our dependent variable when considering its shared linear relationship with the independent variables.

In this case, we can see that 10.1 percent of the variance in expressions of *MyRole_Comp* (collection of variables related to job sentiments) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.670	7	.810	1.312	.255[b]
	Residual	50.604	82	.617		
	Total	56.273	89			

a. Dependent Variable: Supervisor_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

Also, looking at the regression ANOVA table (which test the significance of how well the model predicts variation in dependent variable, *Supervisor_Comp* in this case, we can observe that regression ANOVA F-value is 1.312, with associated degrees of freedom of 7 and 82. There figures provide the parameters for us to determine the statistical significance.

Notice that SPSS also calculated the measure of statistical significance for us. In this case, it is a p-value of 0.255 (or $p<0.5$) so we can say that there is less than 5 in 10 chance (based on a rule of thumb, this indicates that the result is not statistically significant) that we would find this pattern of shared variance (between the *Supervisor_Comp* that is trying to measure the supervisor-related sentiments and other predictor variables mentioned above).

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.535	.691		5.115	<.001
	Sex	-.322	.274	-.138	-1.174	.244
	EthnicGrp	.040	.128	.034	.308	.759
	RAS Coded	.183	.175	.115	1.047	.298
	Age Binned	-.050	.074	-.076	-.682	.497
	Years of Service Binned	-.120	.089	-.157	-1.343	.183
	Rank Binned	.134	.103	.148	1.301	.197
	EducLv	.205	.129	.173	1.587	.116

a. Dependent Variable: Supervisor_Comp

Now that we understand the model is considered significant, we need to review the coefficient table to confirm which of our predictor variables have an impact on supervisor-related sentiments, to what extent and also in what direction.

Using our common sense and looking down the right-hand column of the table, we can see that only two (years of service and rank) of the seven predictor variables significant predict the job-related sentiment embodied within *Supervisor_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: supervisor-related sentiment (contained within *Supervisor_Comp*) =

3.535 – 0.322 (Gender) – 0.040 (Ethnic Group) + 0.183 (RAS) – 0.05 (Age) **– 0.12 (Years of Service) + 0.134 (Rank)** + 0.205 (Education level)

Based on the concepts and logic described above, we can go through the rest of the analysis.

***RASCentral_Comp* as Dependent:**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: RAScentral_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.320[a]	.102	.026	.83569

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 10.2 percent of the variance in expressions of *RASCentral_Comp* (collection of variables related to RAS Central) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.535	7	.934	1.337	.244[b]
	Residual	57.268	82	.698		
	Total	63.803	89			

a. Dependent Variable: RAScentral_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.244 (or $p<0.5$) so we can say that there is less than 5 in 10 chance (based on a rule of thumb, this indicates that the result is not statistically significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.912	.735		5.321	<.001
	Sex	-.379	.292	-.153	-1.299	.198
	EthnicGrp	.026	.137	.021	.190	.850
	RAS Coded	.197	.186	.116	1.055	.294
	Age Binned	-.041	.078	-.059	-.530	.597
	Years of Service Binned	-.251	.095	-.308	-2.638	.010
	Rank Binned	.037	.110	.039	.340	.735
	EducLv	.000	.137	.000	.001	.999

a. Dependent Variable: RAScentral_Comp

We can see that only two (Years of Service and Education Level) of the seven predictor variables significant predict the RAS central-related sentiment embodied within *RAScentral_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values:
RAS Central-related sentiment (contained within *RAScentral_Comp*) =
3.912 – 0.379 (Gender) – 0.026 (Ethnic Group) + 0.197 (RAS) – 0.041 (Age) **– 0.251 (Years of Service)** + 0.037 (Rank) **+ 0.000 (Education level)**.

WorkStrain_Comp as Dependent:

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: WorkStrain_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.389[a]	.151	.079	1.04023

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 38.9 percent of the variance in expressions of *WorkStrain_Comp* (collection of variables related to RAS Central) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.789	7	2.256	2.084	.054[b]
	Residual	88.731	82	1.082		
	Total	104.520	89			

a. Dependent Variable: WorkStrain_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.054 (or $p<0.06$) so we can say that there is less than 6 in 100 chance (based on a rule of thumb, this indicates that the result is almost statistically significant, but not quite) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.954	.915		3.229	.002
	Sex	-.752	.363	-.237	-2.072	.041
	EthnicGrp	-.081	.170	-.050	-.475	.636
	RAS Coded	.524	.232	.242	2.262	.026
	Age Binned	-.005	.097	-.005	-.049	.961
	Years of Service Binned	-.214	.118	-.205	-1.808	.074
	Rank Binned	.032	.136	.026	.236	.814
	EducLv	.209	.171	.130	1.227	.223

a. Dependent Variable: WorkStrain_Comp

We can see that only two (Gender and RAS) of the seven predictor variables significant predict the work strain-related sentiment embodied within *WorkStrain_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: work-related sentiment (contained within *WorkStrain_Comp*) =
2.954 **– 0.752 (Gender)** – 0.081 (Ethnic Group) **+ 0.524 (RAS)** – 0.005 (Age) – 0.214 (Years of Service) + 0.032 (Rank) + 0.209 (Education level).

TeamGoal_Comp as Dependent:

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: TeamGoal_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.351[a]	.123	.048	.86224

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 35.1 percent of the variance in expressions of *TeamGoal_Comp* (collection of variables related to Team Goal) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.568	7	1.224	1.646	.134[b]
	Residual	60.964	82	.743		
	Total	69.532	89			

a. Dependent Variable: TeamGoal_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.134 (or $p<0.14$) so we can say that there is less than 14 in 100 chance (based on a rule of thumb, this indicates that the result is not quite significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.293	.759		4.341	<.001
	Sex	.114	.301	.044	.380	.705
	EthnicGrp	-.157	.141	-.120	-1.111	.270
	RAS Coded	.265	.192	.150	1.377	.172
	Age Binned	-.060	.081	-.082	-.749	.456
	Years of Service Binned	-.080	.098	-.094	-.816	.417
	Rank Binned	-.099	.113	-.099	-.880	.381
	EducLv	.338	.142	.257	2.387	.019

a. Dependent Variable: TeamGoal_Comp

We can see that only one (Education Level) of the seven predictor variables significant predict the team goal-related sentiment embodied within *TeamGoal_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: team goal-related sentiment (contained within *TeamGoal_Comp*) =
3.293 – 0.114 (Gender) – 0.157 (Ethnic Group) + 0.265 (RAS) – 0.060 (Age) – 0.080 (Years of Service) - 0.099 (Rank) + 0.338 (Education level).

***RASCommunication_Comp* as Dependent:**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: RASCommunication_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.420[a]	.176	.106	.75344

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 42.0 percent of the variance in expressions of *RASCommunication_Comp* (collection of variables related to RAS Communication) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.975	7	1.425	2.510	.022[b]
	Residual	46.549	82	.568		
	Total	56.525	89			

a. Dependent Variable: RASCommunication_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.022 (or $p<0.05$) so we can say that there is less than 5 in 100 chance (based on a rule of thumb, this indicates that the result is significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.610	.663		5.447	<.001
	Sex	-.246	.263	-.106	-.936	.352
	EthnicGrp	-.127	.123	-.108	-1.033	.305
	RAS Coded	.420	.168	.263	2.500	.014
	Age Binned	.035	.071	.052	.493	.623
	Years of Service Binned	-.088	.086	-.114	-1.025	.308
	Rank Binned	-.155	.099	-.172	-1.574	.119
	EducLv	.287	.124	.242	2.321	.023

a. Dependent Variable: RASCommunication_Comp

We can see that only two (RAS and Education Level) of the seven predictor variables significant predict the communication-related sentiment in RAS department embodied within *RASCommunication_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: communication-related sentiment in the RAS department (contained within *RAScommunication_Comp*) =
3.610 – 0.246 (Gender) – 0.127 (Ethnic Group) **+ 0.420 (RAS)** – 0.035 (Age) – 0.088 (Years of Service) - 0.155 (Rank) **+ 0.287 (Education level)**.

***RoleUnderstanding_Comp* as Dependent:**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: RoleUnderstanding_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.035	.82505

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 33.3 percent of the variance in expressions of *RoleUnderstanding_Comp* (collection of variables related to job understanding) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.963	7	.995	1.461	.193[b]
	Residual	55.819	82	.681		
	Total	62.781	89			

a. Dependent Variable: RoleUnderstanding_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.193 (or p<0.2) so we can say that there is less than 20 in 100 chance (based on a rule of thumb, this indicates that the result is not significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.123	.726		4.303	<.001
	Sex	-.246	.288	-.100	-.855	.395
	EthnicGrp	-.009	.135	-.008	-.070	.944
	RAS Coded	.234	.184	.139	1.274	.206
	Age Binned	-.047	.077	-.067	-.603	.548
	Years of Service Binned	-.093	.094	-.115	-.992	.324
	Rank Binned	.247	.108	.259	2.286	.025
	EducLv	.143	.135	.115	1.057	.294

a. Dependent Variable: RoleUnderstanding_Comp

We can see that only one (rank) of the seven predictor variables significant predict the centrality-related sentiment in the RAS department embodied within *RAScentral_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: centrality-related sentiment in the RAS department (contained in *RAScentral_Comp*) = 3.123 – 0.246 (Gender) – 0.009 (Ethnic Group) + 0.234 (RAS) – 0.047 (Age) – 0.093 (Years of Service) + 0.247 (Rank) + 0.143 (Education level).

Training_Comp as Dependent:

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: Training_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.428[a]	.183	.114	.79216

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 42.0 percent of the variance in expressions of *Training_Comp* (collection of variables related to job-related training) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.564	7	1.652	2.633	.017[b]
	Residual	51.456	82	.628		
	Total	63.020	89			

a. Dependent Variable: Training_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.017 (or $p<0.05$) so we can say that there is less than 5 in 100 chance (based on a rule of thumb, this indicates that the result is significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.654	.697		5.244	<.001
	Sex	-.546	.276	-.222	-1.975	.052
	EthnicGrp	.002	.130	.002	.017	.986
	RAS Coded	.236	.177	.140	1.334	.186
	Age Binned	.026	.074	.038	.355	.724
	Years of Service Binned	-.257	.090	-.317	-2.850	.006
	Rank Binned	-.139	.104	-.145	-1.339	.184
	EducLv	.232	.130	.186	1.787	.078

a. Dependent Variable: Training_Comp

We can see that only one (Years of Service) of the seven predictor variables significant predict the training-related sentiment embodied within *Training_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: training-related sentiment in the RAS department (contained in *Training_Comp*) = 3.654 – 0.546 (Gender) – 0.002 (Ethnic Group) + 0.236 (RAS) – 0.026 (Age) – 0.257 (Years of Service) - 0.139 (Rank) + 0.232 (Education level).

***Respect_Comp* as Dependent:**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: Respect_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.313[a]	.098	.021	.78212

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 31.3 percent of the variance in expressions of *Respect_Comp* (collection of variables related to respect among employees) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.439	7	.777	1.270	.275[b]
	Residual	50.161	82	.612		
	Total	55.600	89			

a. Dependent Variable: Respect_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.275 (or p<0.3) so we can say that there is less than 30 in 100 chance (based on a rule of thumb, this indicates that the result is not significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.605	.688		6.692	<.001
	Sex	.267	.273	.115	.977	.331
	EthnicGrp	-.151	.128	-.129	-1.181	.241
	RAS Coded	-.069	.174	-.044	-.398	.692
	Age Binned	-.073	.073	-.112	-1.004	.318
	Years of Service Binned	.187	.089	.246	2.105	.038
	Rank Binned	-.195	.102	-.217	-1.905	.060
	EducLv	.012	.128	.010	.091	.928

a. Dependent Variable: Respect_Comp

We can see that only one (Years of Service) of the seven predictor variables significant predict the respect-related sentiment within the organization within *Respect_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: respect-related sentiment in the department (contained in *Respect_Comp*) = 4.605 – 0.267 (Gender) – 0.151 (Ethnic Group) - 0.069 (RAS) – 0.073 (Age) **– 0.187 (Years of Service)** - 0.195 (Rank) + 0.012 (Education level).

RAScollaborate_Comp as Dependent:

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: RAScollaborate_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.374[a]	.140	.067	.95955

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 37.4 percent of the variance in expressions of *RASCollaborate_Comp* (collection of variables related to RAS collaboration) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.288	7	1.755	1.907	.079[b]
	Residual	75.501	82	.921		
	Total	87.789	89			

a. Dependent Variable: RAScollaborate_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.079 (or $p<0.1$) so we can say that there is less than 10 in 100 chance (based on a rule of thumb, this indicates that the result is not significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.807	.844		3.325	.001
	Sex	.023	.335	.008	.067	.947
	EthnicGrp	.019	.157	.013	.119	.906
	RAS Coded	.416	.214	.210	1.947	.055
	Age Binned	.142	.090	.172	1.579	.118
	Years of Service Binned	-.157	.109	-.164	-1.436	.155
	Rank Binned	-.298	.126	-.264	-2.369	.020
	EducLv	.157	.157	.106	.999	.321

a. Dependent Variable: RAScollaborate_Comp

We can see that only one (Rank) of the seven predictor variables significant predict the collaboration-related sentiment within the RAS department as a *RAScollaborate_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: collaboration-related sentiment in the RAS department (contained in *RASCollaborate_Comp*) = 2.807 – 0.023 (Gender) – 0.019 (Ethnic Group) + 0.416 (RAS) – 0.142 (Age) – 0.157 (Years of Service) **- 0.298 (Rank)** + 0.157 (Education level).

***TrainingTypes_Comp* as Dependent:**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: TrainingTypes_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.234[a]	.055	-.026	.72351

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 23.4 percent of the variance in expressions of *TrainingTypes_Comp* (collection of variables related to Training Types) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.490	7	.356	.680	.689[b]
	Residual	42.924	82	.523		
	Total	45.414	89			

a. Dependent Variable: TrainingTypes_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.689 (or p<0.7) so we can say that there is less than 70 in 100 chance (based on a rule of thumb, this indicates that the result is not significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.711	.636		5.830	<.001
	Sex	.003	.252	.002	.013	.990
	EthnicGrp	-.144	.118	-.136	-1.219	.226
	RAS Coded	.000	.161	.000	-.001	.999
	Age Binned	-.060	.068	-.102	-.891	.375
	Years of Service Binned	.055	.082	.080	.667	.507
	Rank Binned	-.095	.095	-.117	-1.002	.319
	EducLv	-.113	.119	-.106	-.951	.345

a. Dependent Variable: TrainingTypes_Comp

We can see that none of the seven predictor variables significant predict the training types-related (quantity and quality of the training) sentiment within the organization within *TrainingTypes_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: respect-related sentiment in the department (contained in *TraininTypes_Comp*) = 3.711 – 0.003 (Gender) – 0.144 (Ethnic Group) + 0.000 (RAS) – 0.060 (Age) – 0.055 (Years of Service) - 0.095 (Rank) - 0.113 (Education level).

Work_Comp as Dependent:

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex[b]	.	Enter

a. Dependent Variable: Work_Comp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.279[a]	.078	-.001	.79285

a. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

In this case, we can see that 27.9 percent of the variance in expressions of *Work_Comp* (collection of variables related to work-related sentiments) is accounted for by the particular combination of predictor variables used such as education level, years of service, ethnic group, gender, rank, etc.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.354	7	.622	.989	.445[b]
	Residual	51.546	82	.629		
	Total	55.900	89			

a. Dependent Variable: Work_Comp

b. Predictors: (Constant), EducLv, Years of Service Binned, EthnicGrp, Age Binned, RAS Coded, Rank Binned, Sex

The p-value, a measure of statistical significance for, in this case, has a value of 0.445 (or $p<0.5$) so we can say that there is less than 50 in 100 chance (based on a rule of thumb, this indicates that the result is not quite significant) that we would find this pattern of shared variance between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.072	.697		5.838	<.001
	Sex	-.274	.277	-.118	-.989	.326
	EthnicGrp	-.031	.130	-.026	-.239	.812
	RAS Coded	.285	.177	.180	1.614	.110
	Age Binned	.019	.074	.030	.263	.793
	Years of Service Binned	-.111	.090	-.146	-1.231	.222
	Rank Binned	.174	.104	.193	1.676	.098
	EducLv	-.101	.130	-.086	-.779	.438

a. Dependent Variable: Work_Comp

We can see that only one (Years of Service) of the seven predictor variables significant predict the work-related sentiment within the organization within *Work_Comp* variable.

Therefore, in this case, we can re-write our model raw regression formula with *b* values: work-related sentiment in the organization (contained in *Respect_Comp*) = 4.027 – 0.274 (Gender) – 0.031 (Ethnic Group) + 0.285 (RAS) – 0.019 (Age) **– 0.111 (Years of Service)** - 0.174 (Rank) - 0.101 (Education level).

Reference:

Predictive HR analytics : Mastering the HR Metric (Textbook)