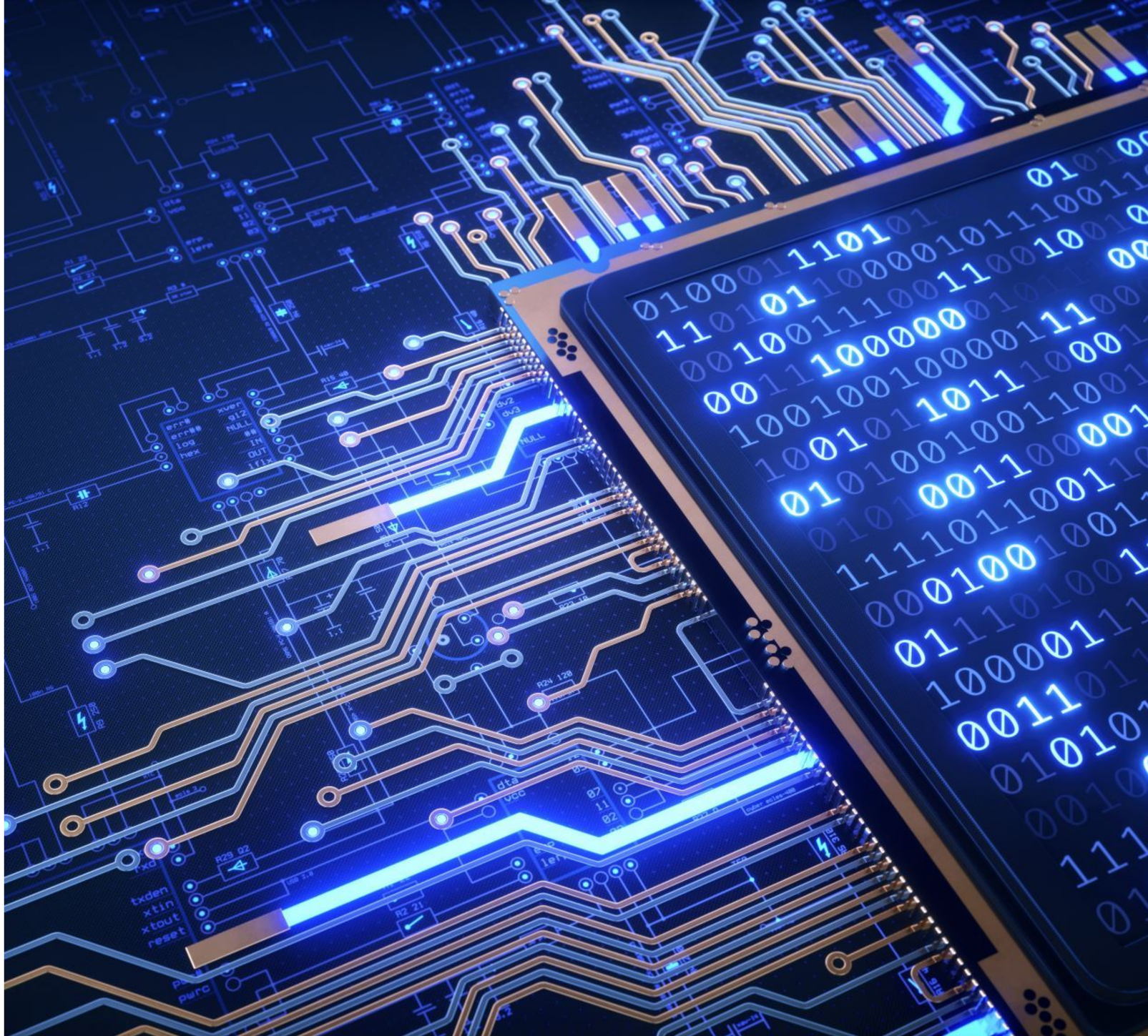
ATTRITION ANALYSIS

ANALYZING THE ATTRITION DRIVERS

CONTENT INDEX

- XYZ SEMICONDUCTOR, AN INDIAN SUBSIDIARY OF AN U.S. SEMICONDUCTOR MANUFACTURING COMPANY

- THEY HAVE PLANS FOR EXPANSION THAT WILL HELP THE COMPANY BECOME A LEADER IN SEMICONDUCTOR MANUFACTURING BY 2024.



THE PROBLEM

DURING 2020, THE PRODUCTIVITY AT XYZ SEMICONDUCTOR DROPPED DUE TO HIGH EMPLOYEE ATTRITION.

- **COMPETITIVE ADVANTAGES THE COMPANY ONCE HELD ERODED**
- **REVENUE DROPPED.**

SOLVING PROBLEM

ANJALI KARTHIKEY IS A HUMAN CAPITAL STRATEGIST.

XYZ SEMICONDUCTORS DECIDED TO HIRE ANJALI FOR

- IDENTIFY THE ATTRITION DRIVERS
- ANALYZE HOW THE COMPANY'S HR POLICIES INFLUENCED

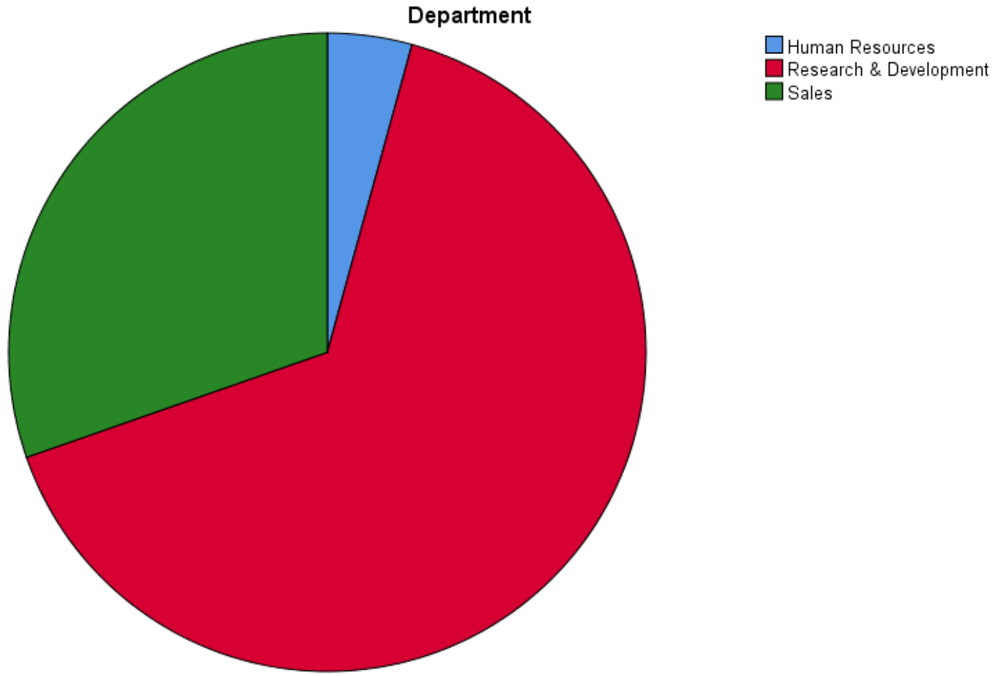
SHE COLLECTED DATA FROM HRIS SYSTEM OF THE COMPANY, AND REST SHE HAD TO COLLECT HERSELF

Q.1 SAMPLING TECHNIQUE

IT IS APPARENT THAT THERE IS UNBALANCE IN NUMBER OF CASES FROM 3 DEPARTMENTS. IT IS POSSIBLE THAT THIS IS DUE TO SAME PROPORTION EXISTING IN COMPANY ITSELF

Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Human Resources	63	4.3	4.3	4.3
	Research & Development	961	65.4	65.4	69.7
	Sales	446	30.3	30.3	100.0
	Total	1470	100.0	100.0	



SAMPLING TECHNIQUE

As she also wanted to present the attrition data according to departments, the stratification has to be done based on the department the employee works in. The sample population is divided into subgroups based on department, and then randomly selected; participants from each department are in proportion to their representation in the population. This approach ensures that the sample represents people across different departments.

VARIABLES

INDEPENDENT VARIABLES

- EMPLOYEE NUMBER
- AGE
- BUSINESS TRAVEL
- DEPARTMENT
- DISTANCE FROM HOME
- EDUCATION
- EDUCATION FIELD
- EMPLOYEE COUNT
- ENVIRONMENT SATISFACTION
- GENDER
- JOB INVOLVEMENT
- JOB LEVEL
- JOB ROLE
- JOB SATISFACTION
- MARITAL STATUS
- MONTHLY INCOME
- NUM. OF COMPAINES WORKED
- OVER18
- PERCENTAGE SALARY HIKE
- PERFORMANCE RATING
- RELATIONSHIP SATISFACTION
- STANDARD HOURS
- STOCK OPTION LEVEL
- TOTAL WORKING YEARS
- TRAINING LAST TIME YEAR
- WORK LIFE BALANCE
- YEARS AT COMPANY
- YEARS SINCE LAST PROMOTION
- YEARS WITH CURR. MANAGER

DEPENDENT VARIABLES

- ATTRITION

IDENTIFYING OUTLIERS

MULTIVARIATE OUTLIERS

TO IDENTIFY OUTLIERS BY USING MAHALANOBIS DISTANCE

WE HAVE 33 VARIABLES, SO OUR

DEGREE OF FREEDOM IS 33,
AND
WE SET PVALUE =0.005

IDENTIFYING OUTLIERS

MULTIVARIATE OUTLIERS

Determine a χ^2 critical value for a given alpha level

p value (α	*df*		
0.005	33	*CV* =	57.648

Alpha level can be modified for custom tests

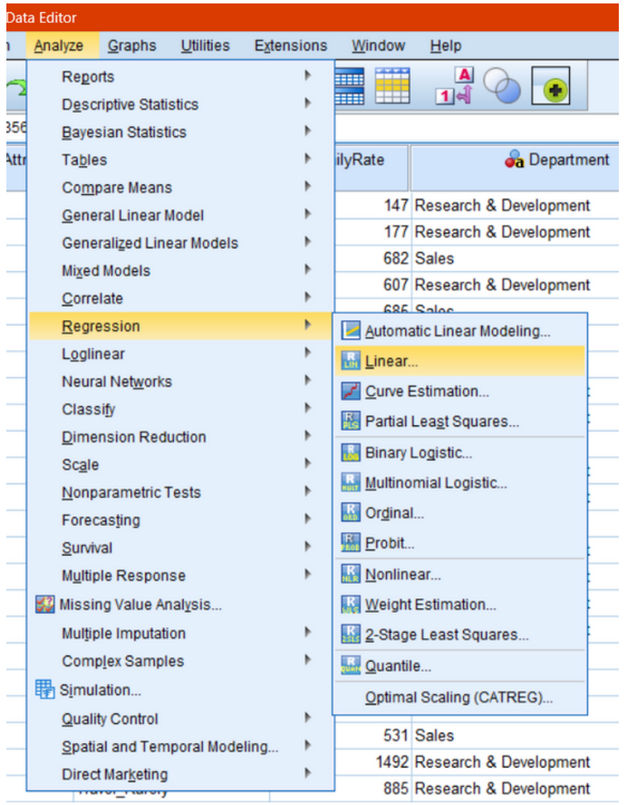
Click to Calculate

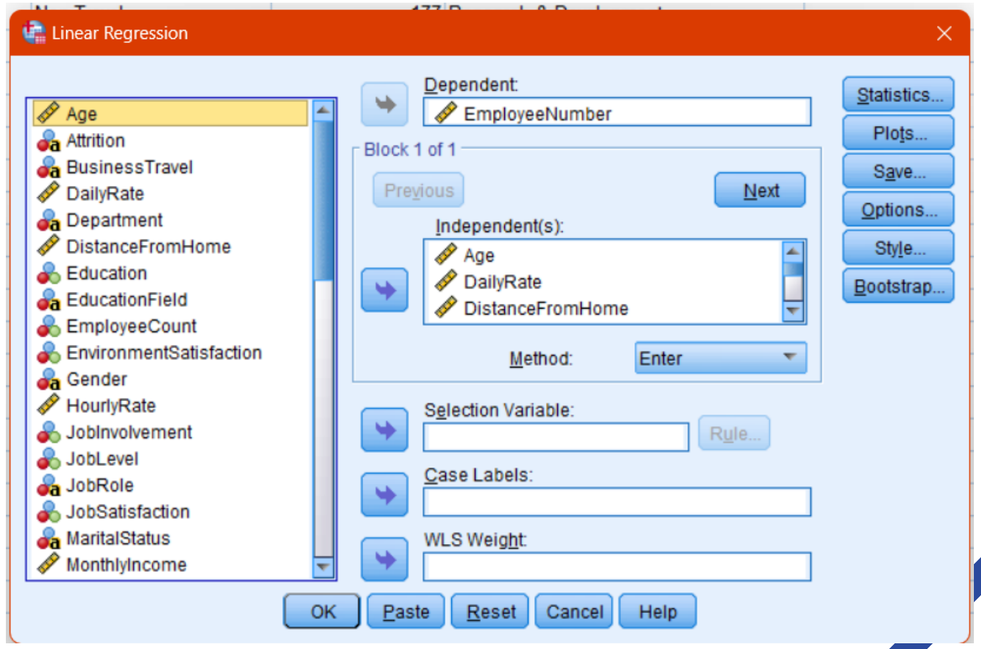
SO OUR CRITICAL MAHALANOBIS VALUE IS 57.65

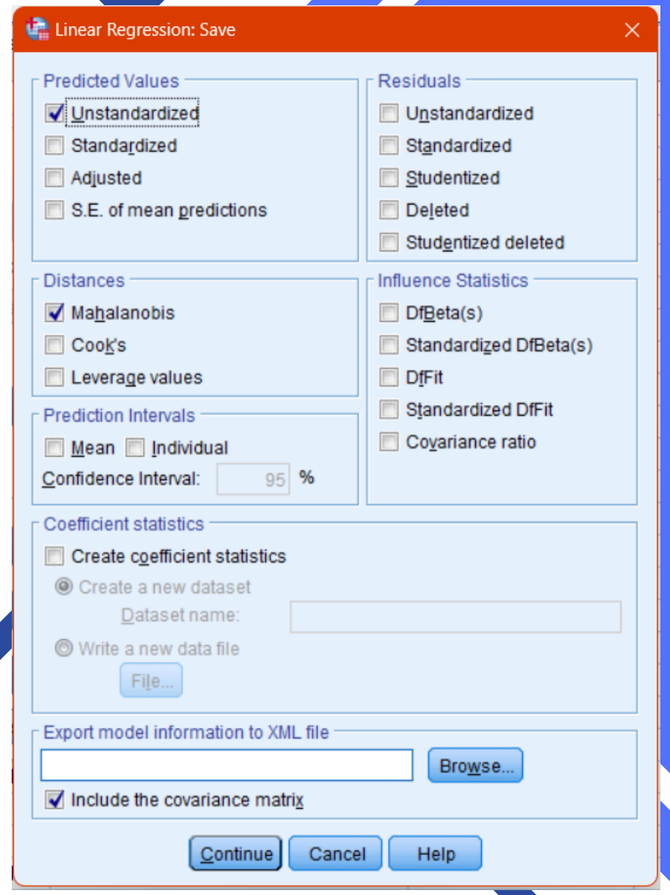
IDENTIFYING OUTLIERS

MULTIVARIATE OUTLIERS

- ### GETTING MAHALANOBIS DISTANCE







IDENTIFYING OUTLIERS

MULTIVARIATE OUTLIERS

SO WE HAVE IDENTIFIED OUTLIERS AND REMOVED THEM

MAH_1
113.37099
101.65610
84.64599
82.73770
77.07799
76.82928
73.94992
70.31564
67.38566
65.86059
64.97577
60.56243
60.52894
60.37995
59.82354
59.70968
59.11872
58.97976
57.87960133780568

IDENTIFYING OUTLIERS

UNIVARIATE OUTLIERS

We use the z-score method to identify outliers and find z-scores for each variable. If

z-score > 3.29

OR

z-score<-3.29

the data is considered an outlier.

Z-SCORES OF DIFFERENT VARIABLES

ZTotalWorkingYears
3.67532
3.67532
3.54008
3.40846
3.40846
3.29057
3.29057001467281
3.27683
3.27683
3.16232
3.16232
3.16232
3.14520
3.03407
3.01357

ZYearsWithCurrManager
3.61680
3.61680
3.61680
3.61680
3.61680
3.49390
3.49390
3.33677
3.21941
3.05674
3.05674
3.05674
3.05674
3.05674
2.77671
2.77671
2.77671

ZYearsInCurrentRole
3.79725
3.79725
3.52298
3.52298
3.52298
3.41886801552163
3.24871
3.24871
3.24871
3.24871
3.14565
3.14565
3.14565
2.97444
2.97444
2.97444
2.97444

Z-SCORES OF DIFFERENT VARIABLES

ZYearsAtCompany
5.50043
4.83644
4.76597
4.60558
4.33844
4.33844
4.33844
4.28480
4.17244
4.12441
4.00644
4.00644
4.00644
3.96403
3.84044
3.73893
3.67444
3.59379
3.48286
3.34244
3.34244299673262
3.17644
3.17644
3.01044
3.01044
3.00170
3.00170

ZYearsSinceLastPromotion
3.77107
3.77107
3.77107
3.77107
3.70642
3.70642
3.70642
3.70642
3.70642
3.70642
3.70642
3.70642
3.47286
3.47286
3.39398
3.39398
3.39398
3.39398
3.39398
3.39398
3.39397719323733
3.27460
3.17465
3.17465
3.17465
3.08153
3.08153
3.08153

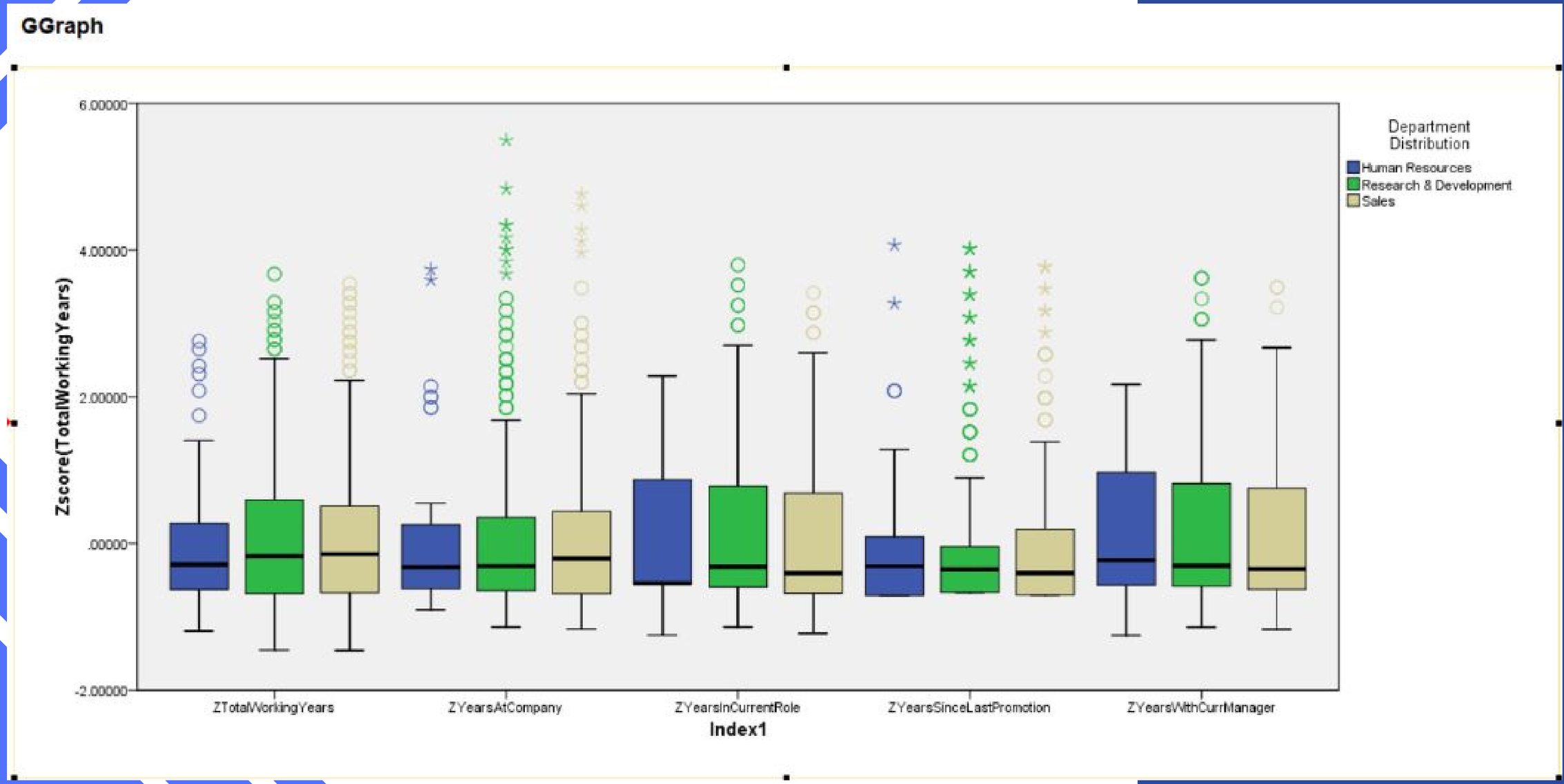
RESULTS

So these outliers were found in these 5 IV(Z-score method)

- ***Total working years***
- ***Years at current company***
- ***years in current role***
- ***years since last promotion***
- ***years with current manager***

The identified outliers have been deleted from the sample as the number of outliers not significant compared to the number of samples.

BOX-PLOT


GGraph
6.00000
4.00000
2.00000
.00000
-2.00000
Zscore(TotalWorkingYears)
ZTotalWorkingYears
ZYearsAtCompany
ZYearsInCurrentRole
ZYearsSinceLastPromotion
ZYearsWithCurrManager
Index1
Department Distribution
Human Resources
Research & Development
Sales

MISSING DATA

QUANTITATIVE VARIABLES:

- Job Satisfaction
- Work Life Balance

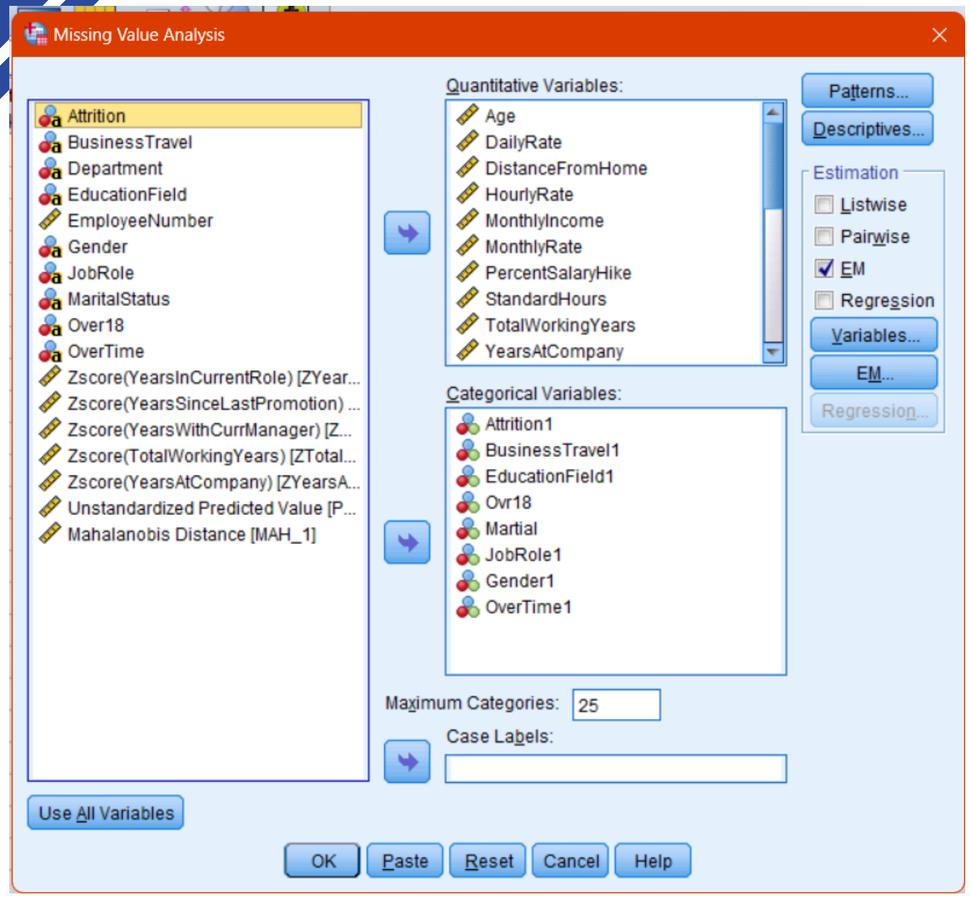
CATEGORICAL VARIABLES:

- Gender
- Business Travel
- Marital Status

So, for continuous variable we perform Median imputation and for categorical variables we perform List-wise deletion Technique

MISSING DATA

WE USED MISSING VALUE ANALYSIS TO CHECK MISSING VALUES AND USE LITTLE'S MCAR TEST TO CHECK IF VALUES ARE MISSING COMPLETELY AT RANDOM OR NOT



a. Little's MCAR test: Chi-Square = 44.553, DF = 48, Sig. = .615

AS SIGNIFICANCE IF MORE THAN 0.005, HENCE VALUES ARE MISSING RANDOMLY

MISSING DATA

QUANTITATIVE VARIABLES:

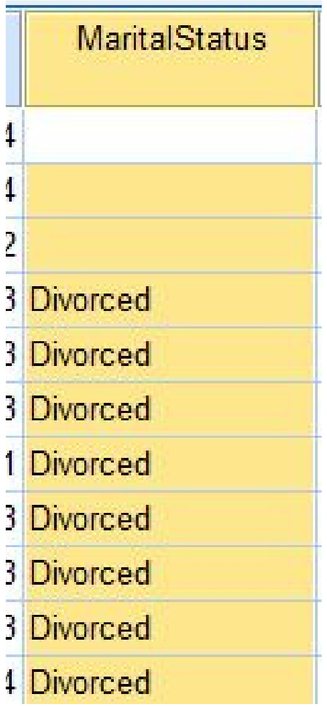
- Job Satisfaction
- Work Life Balance

CATEGORICAL VARIABLES:

- Gender
- Business Travel
- Marital Status

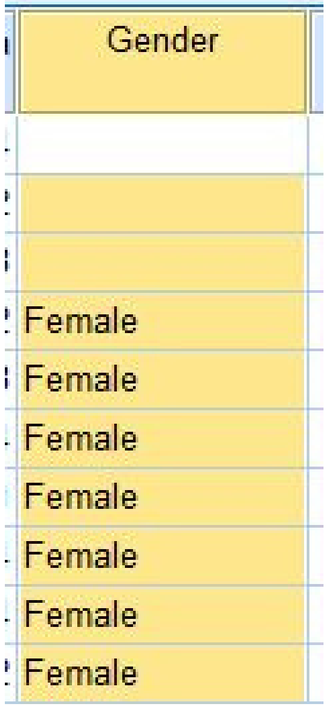
So, for continuous variable we perform Median imputation and for categorical variables we perform List-wise deletion Technique

MISSING DATA ANALYSIS



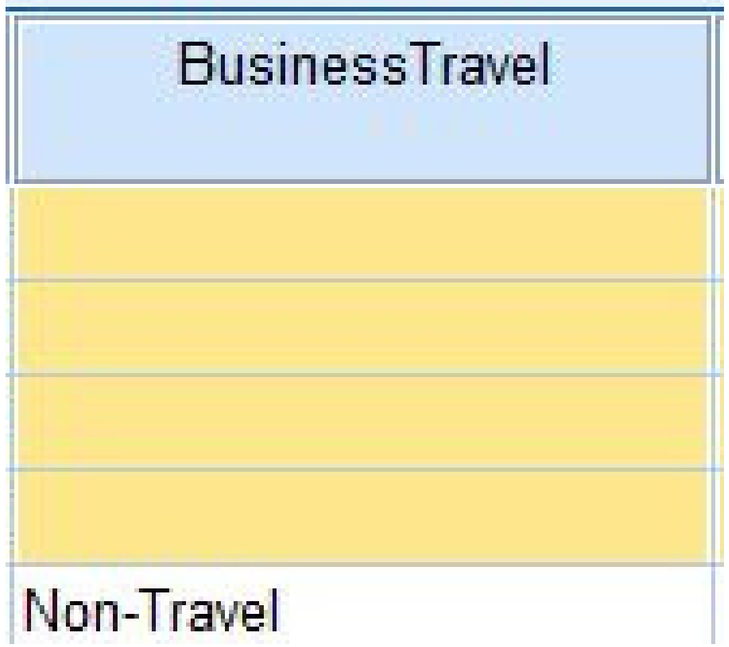
	MaritalStatus
4	
4	
2	
3	Divorced
3	Divorced
3	Divorced
1	Divorced
3	Divorced
3	Divorced
3	Divorced
4	Divorced

MARITALSTATUS



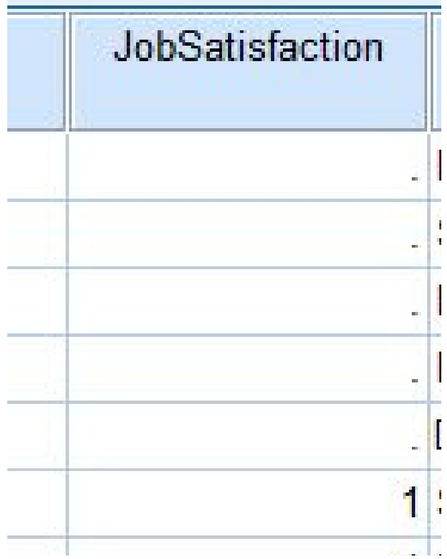
	Gender
	Female
	Female
	Female
	Female
	Female
	Female
	Female

GENDER



BusinessTravel
Non-Travel

BUSINESSTRAVEL



	JobSatisfaction
	.
	.
	.
	.
	.
	1

JOB SATISFACTION

MISSING DATA ANALYSIS

JobSatisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	289	19.7	19.7	19.7
	2	280	19.0	19.1	38.8
	3	439	29.9	30.0	68.8
	4	457	31.1	31.2	100.0
	Total	1465	99.7	100.0	
Missing	System	5	.3		
Total		1470	100.0		

Gender

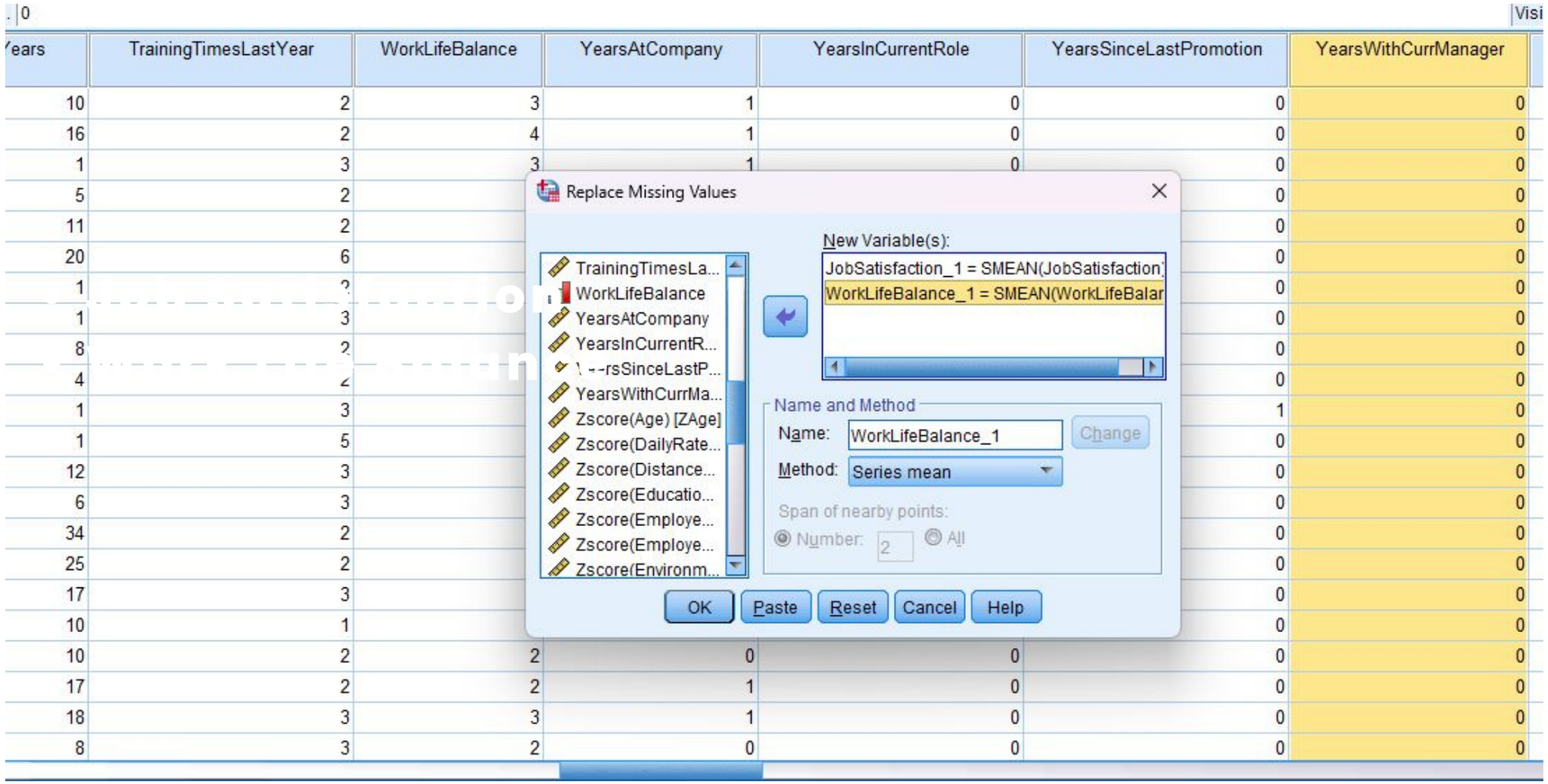
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		4	.3	.3	.3
	Female	587	39.9	39.9	40.2
	Male	879	59.8	59.8	100.0
	Total	1470	100.0	100.0	

WorkLifeBalance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	80	5.4	5.5	5.5
	2	343	23.3	23.4	28.8
	3	891	60.6	60.7	89.6
	4	153	10.4	10.4	100.0
	Total	1467	99.8	100.0	
Missing	System	3			
Total		1470			

Double-click to activate

MISSING DATA ANALYSIS



Years	TrainingTimesLastYear	WorkLifeBalance	YearsAtCompany	YearsInCurrentRole	YearsSinceLastPromotion	YearsWithCurrManager
10	2	3	1	0	0	0
16	2	4	1	0	0	0
1	3	3	1	0	0	0
5	2				0	0
11	2				0	0
20	6				0	0
1	2				0	0
1	3				0	0
8	2				0	0
4	2				0	0
1	3				1	0
1	5				0	0
12	3				0	0
6	3				0	0
34	2				0	0
25	2				0	0
17	3				0	0
10	1				0	0
10	2	2	0	0	0	0
17	2	2	1	0	0	0
18	3	3	1	0	0	0
8	3	2	0	0	0	0

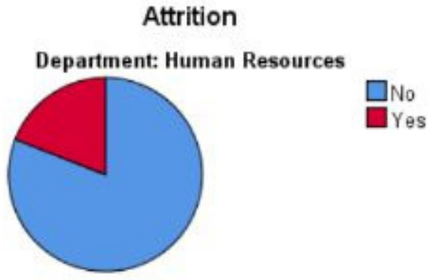
MISSING DATA ANALYSIS

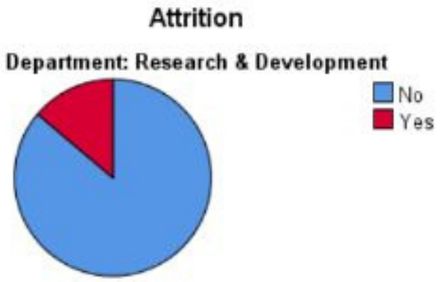
Statistics

		JobSatisfaction	BusinessTravel	Gender	WorkLifeBalance	MaritalStatus
N	Valid	1411	1416	1416	1413	1416
	Missing	5	0	0	3	0
Mean		2.73			2.76	
Median		3.00			3.00	
Mode		4			3	

THE MEDIAN OF THE MISSING DATA

DEPARTMENT WISE ATTRITION RATE





Frequencies

Statistics

Attrition

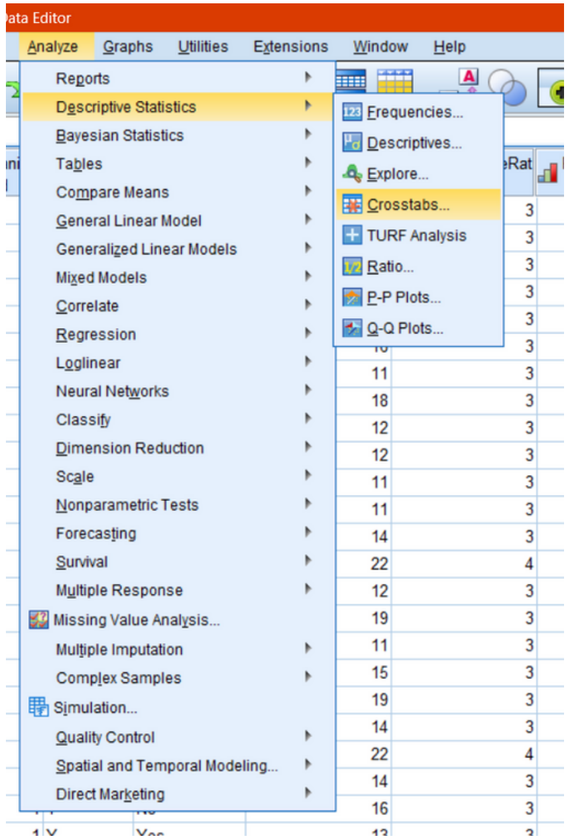
Human Resources	N	Valid	63
		Missing	0
Research & Development	N	Valid	961
		Missing	0
Sales	N	Valid	446
		Missing	0

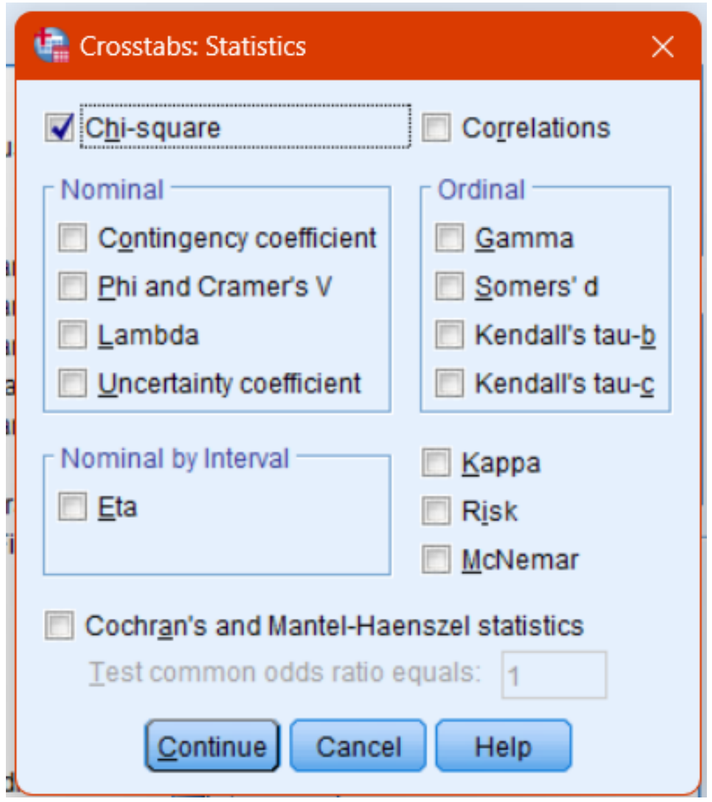
Attrition

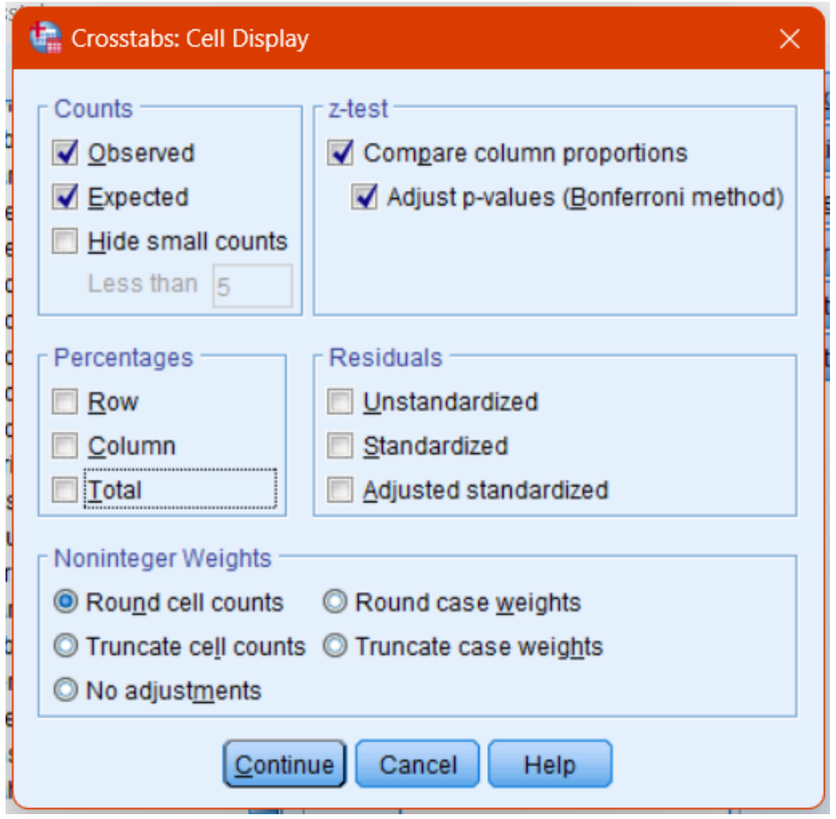
Department			Frequency	Percent	Valid Percent	Cumulative Percent
Human Resources	Valid	No	51	81.0	81.0	81.0
		Yes	12	19.0	19.0	100.0
		Total	63	100.0	100.0	
Research & Development	Valid	No	828	86.2	86.2	86.2
		Yes	133	13.8	13.8	100.0
		Total	961	100.0	100.0	
Sales	Valid	No	354	79.4	79.4	79.4
		Yes	92	20.6	20.6	100.0
		Total	446	100.0	100.0	

CHI SQUARE TEST OF ASSICIATION

TO CHECK ASSIOCIATION BETWEEN ATTRITION RATE AND VARIOUS CATEGORICAL VARIABLES WE USE CHI SQUARE TEST



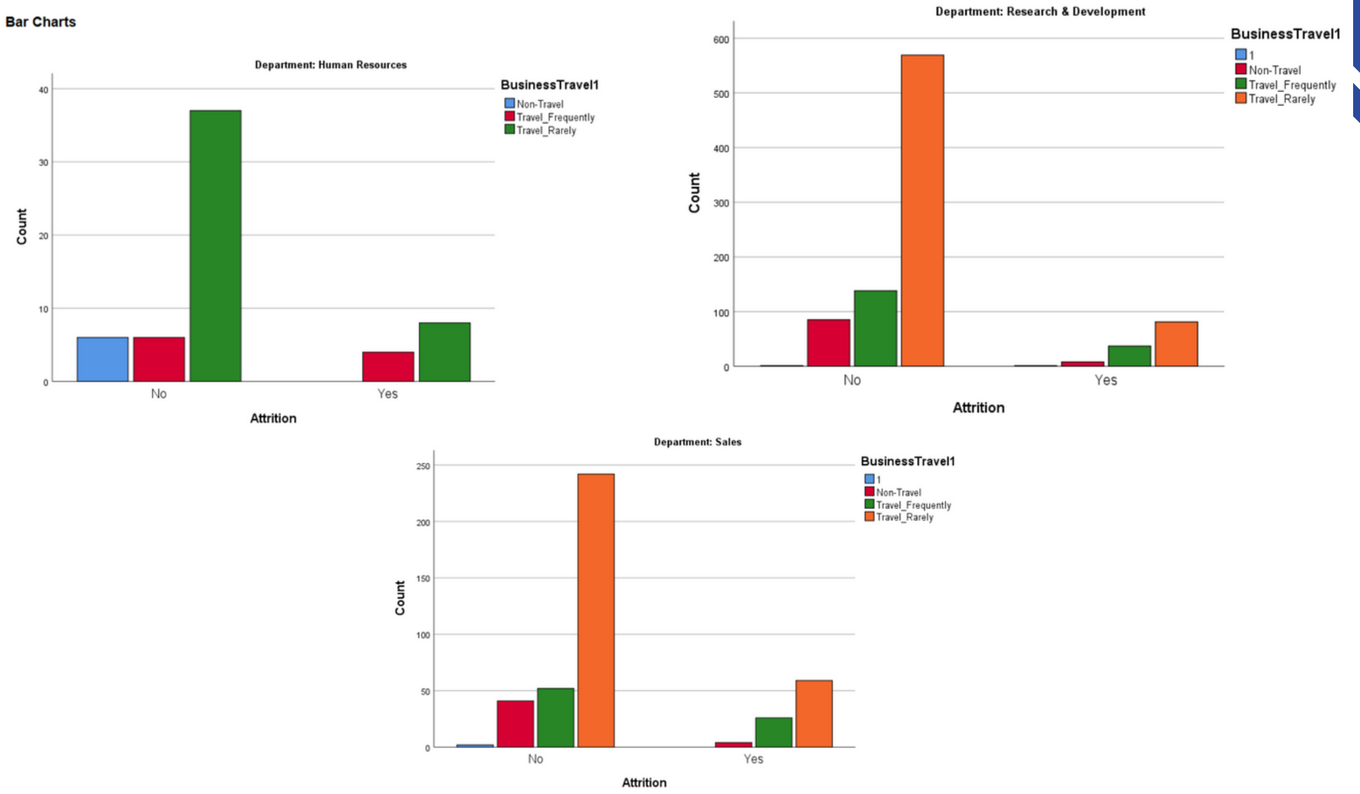




ATTRITION * BUSINESSTRAVEL

Chi-Square Tests

Department		Value	df	Asymptotic Significance (2-sided)
Human Resources	Pearson Chi-Square	4.187[a]	2	.123
	Likelihood Ratio	4.910	2	.086
	N of Valid Cases	61		
Research & Development	Pearson Chi-Square	13.223[b]	3	.004
	Likelihood Ratio	11.882	3	.008
	N of Valid Cases	920		
Sales	Pearson Chi-Square	12.060[c]	3	.007
	Likelihood Ratio	12.491	3	.006
	N of Valid Cases	426		



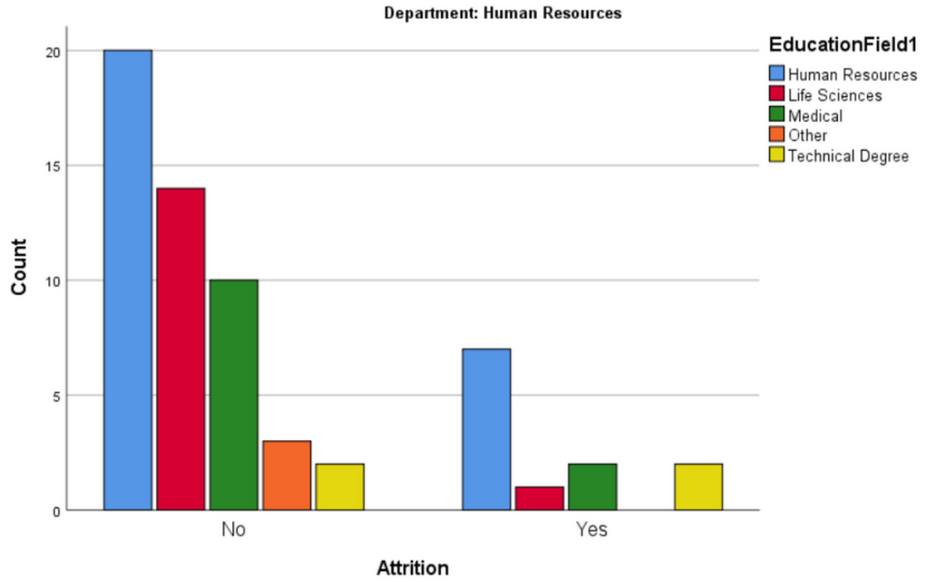
BUSINESS TRAVEL IS SIGNIFICANT FOR R&D DEPARTMENT'S ATTRITION

FOR ALL DEPTS., THOSE WHO TRAVEL FREQUENTLY HAVE HIGH ATTRITION RATE

ATTRITION * EDUCATIONFIELD

Chi-Square Tests

Department		Value	df	Asymptotic Significance (2-sided)
Human Resources	Pearson Chi-Square	5.405[a]	4	.248
	Likelihood Ratio	5.881	4	.208
	N of Valid Cases	61		
Research & Development	Pearson Chi-Square	3.233[b]	3	.357
	Likelihood Ratio	2.981	3	.395
	N of Valid Cases	920		
Sales	Pearson Chi-Square	3.712[c]	4	.446
	Likelihood Ratio	3.599	4	.463
	N of Valid Cases	426		



EDUCATION FIELD IS NOT SIGNIFICANT FOR ANY DEPARTMENT'S ATTRITION

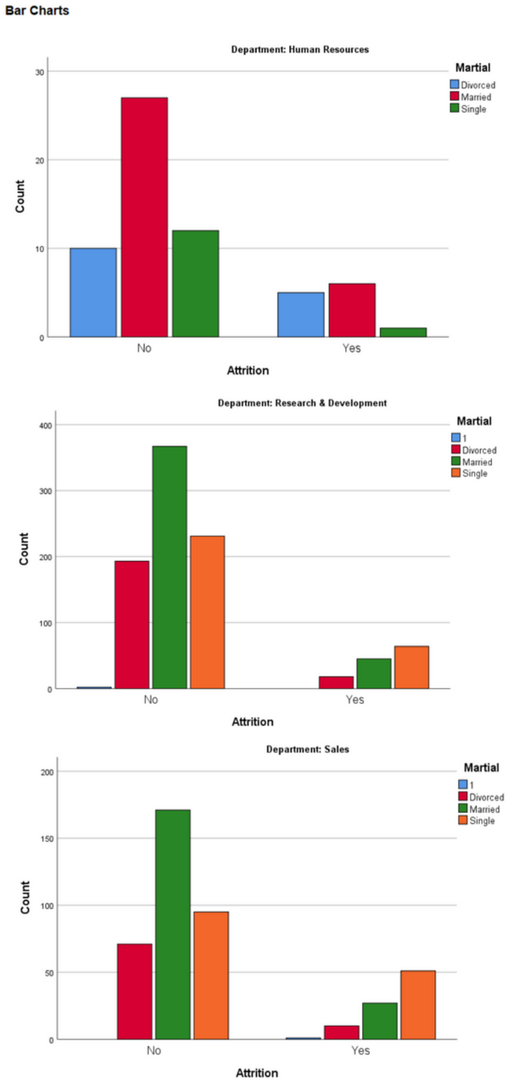
STILL IN HR DEPT. WE AN OBSERVE LIFE SCIENCE GUYS HAVE LOWER ATTRITION RATE

ATTRITION * MARTIAL STATUS

Chi-Square Tests

Department		Value	df	Asymptotic Significance (2-sided)
Human Resources	Pearson Chi-Square	2.999[a]	2	.223
	Likelihood Ratio	3.051	2	.218
	N of Valid Cases	61		
Research & Development	Pearson Chi-Square	23.564[b]	3	.000
	Likelihood Ratio	22.767	3	.000
	N of Valid Cases	920		
Sales	Pearson Chi-Square	31.085[c]	3	.000
	Likelihood Ratio	29.461	3	.000
	N of Valid Cases	426		

MATRIAL IS SIGNIFICANT FOR R&D AND SALES DEPARTMENT'S ATTRITION



FOR HR DEPT. WE CAN OBSERVE SINGLE GUYS HAVE LEAST ATTRITION RATE

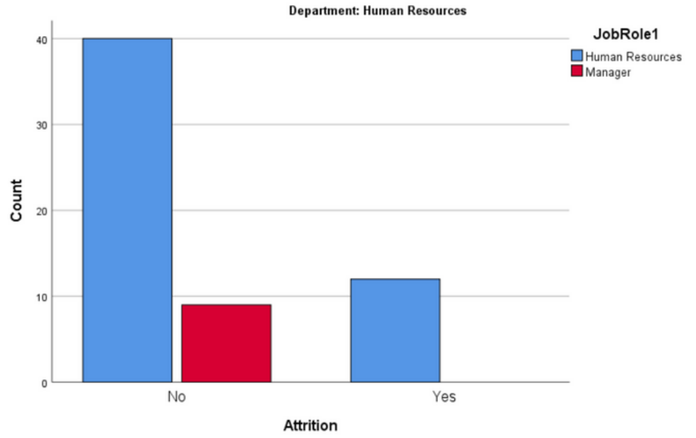
BUT IN OTHER DEPT. THEY HAVE HAVE HIGHER ATTRITION RATE

ATTRITION * JOBROLE

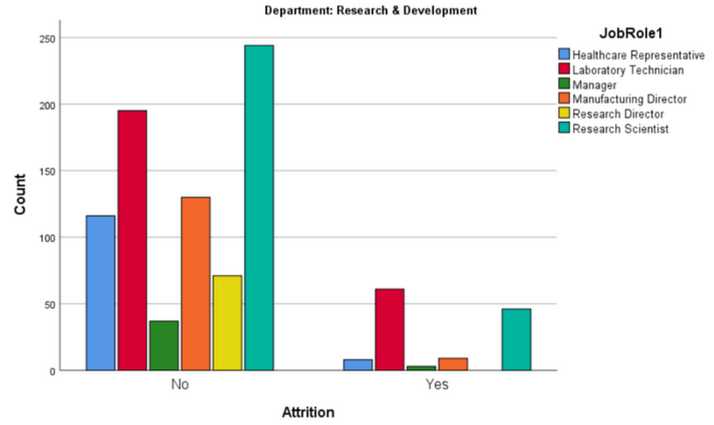
Chi-Square Tests

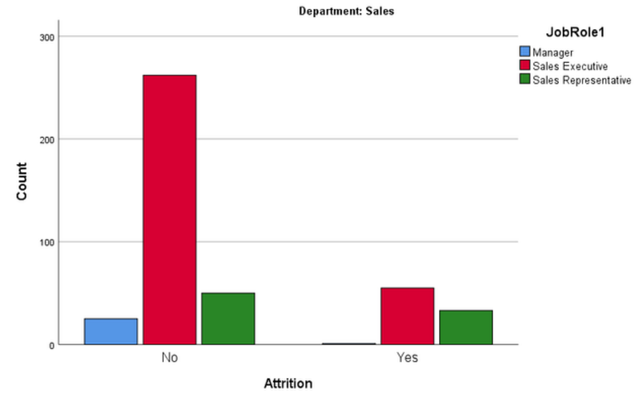
Department		Value	df	Asymptotic Significance (2-sided)
Human Resources	Pearson Chi-Square	2.586[a]	1	.108
	Continuity Correction[b]	1.331	1	.249
	Likelihood Ratio	4.309	1	.038
	Fisher's Exact Test			
	N of Valid Cases	61		
Research & Development	Pearson Chi-Square	47.266[c]	5	.000
	Likelihood Ratio	56.445	5	.000
	N of Valid Cases	920		
Sales	Pearson Chi-Square	24.854[d]	2	.000
	Likelihood Ratio	24.112	2	.000
	N of Valid Cases	426		

JOB ROLE IS SIGNIFICANT FOR R&D AND SALES DEPARTMENT'S ATTRITION



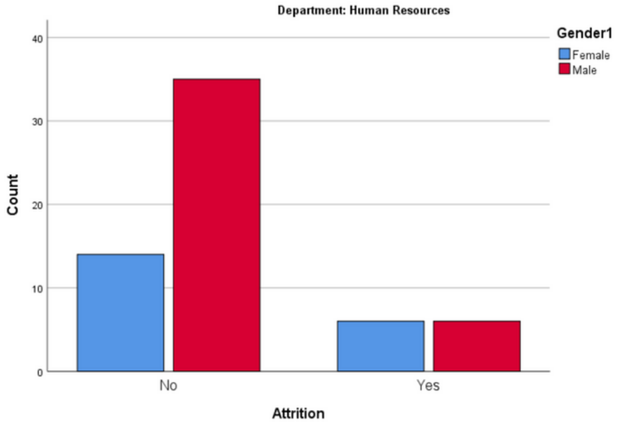
FOR HR DEPT. MANAGER HAS 0 ATTRITION RATE

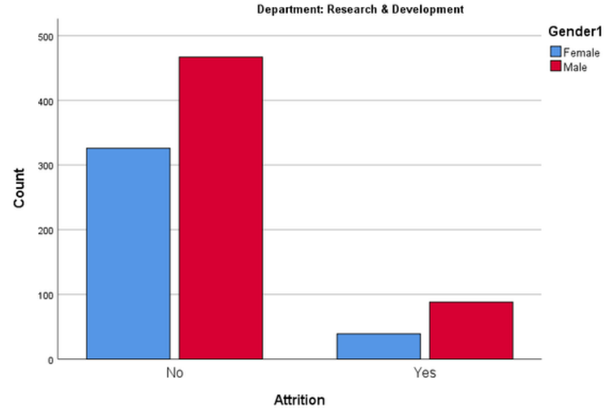


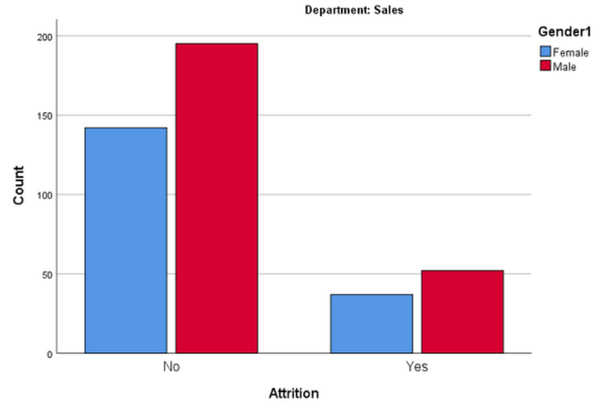


IN SALES DEPT., SALES REPRESENTATIVE HAVE HIGHER ATTRITION RATE

ATTRITION * GENDER





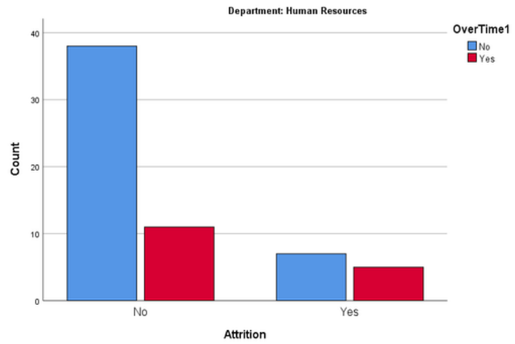


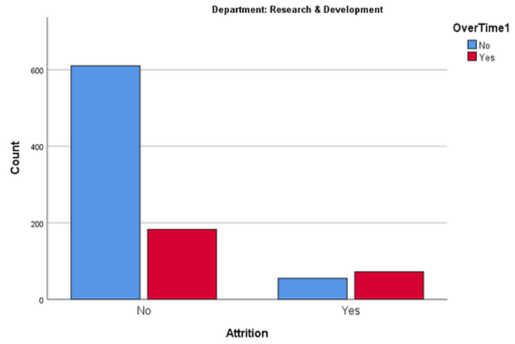
FOR HR DEPT. MALES HAVE HIGH ATTRITION RATE

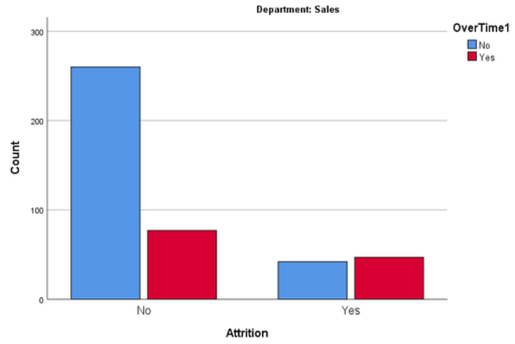
ATTRITION * OVERTIME

Chi-Square Tests

Department		Value	df	Asymptotic Significance (2-sided)
Human Resources	Pearson Chi-Square	1.840[a]	1	.175
	Continuity Correction[b]	.981	1	.322
	Likelihood Ratio	1.715	1	.190
	Fisher's Exact Test			
	N of Valid Cases	61		
Research & Development	Pearson Chi-Square	61.744[c]	1	.000
	Continuity Correction[b]	60.078	1	.000
	Likelihood Ratio	55.546	1	.000
	Fisher's Exact Test			
	N of Valid Cases	920		
Sales	Pearson Chi-Square	30.626[d]	1	.000
	Continuity Correction[b]	29.192	1	.000
	Likelihood Ratio	28.520	1	.000
	Fisher's Exact Test			
	N of Valid Cases	426		







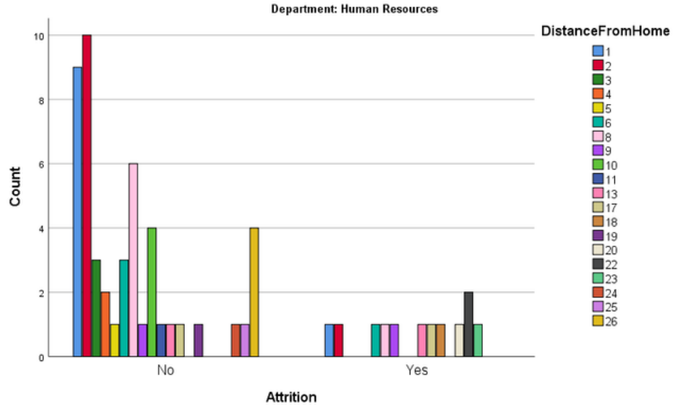
OVERTIME IS SIGNIFICANT FOR R&D AND SALES DEPARTMENT'S ATTRITION

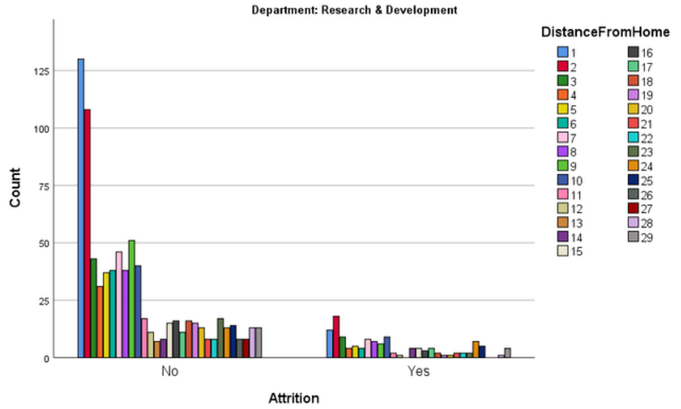
FOR ALL DEPT., THOSE WHO WORK OVERTIME HAVE LOWER ATTRITION RATES. THEY ARE DEDICATED

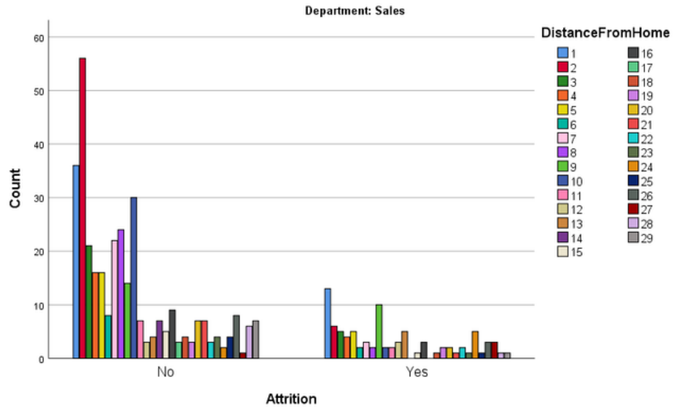
ATTRITION * DISTANCE FROM HOME

Chi-Square Tests

Department		Value	df	Asymptotic Significance (2-sided)
Human Resources	Pearson Chi-Square	29.889[a]	19	.053
	Likelihood Ratio	28.729	19	.070
	N of Valid Cases	61		
Research & Development	Pearson Chi-Square	31.587[b]	28	.292
	Likelihood Ratio	31.709	28	.287
	N of Valid Cases	920		
Sales	Pearson Chi-Square	53.905[c]	28	.002
	Likelihood Ratio	51.312	28	.005
	N of Valid Cases	426		







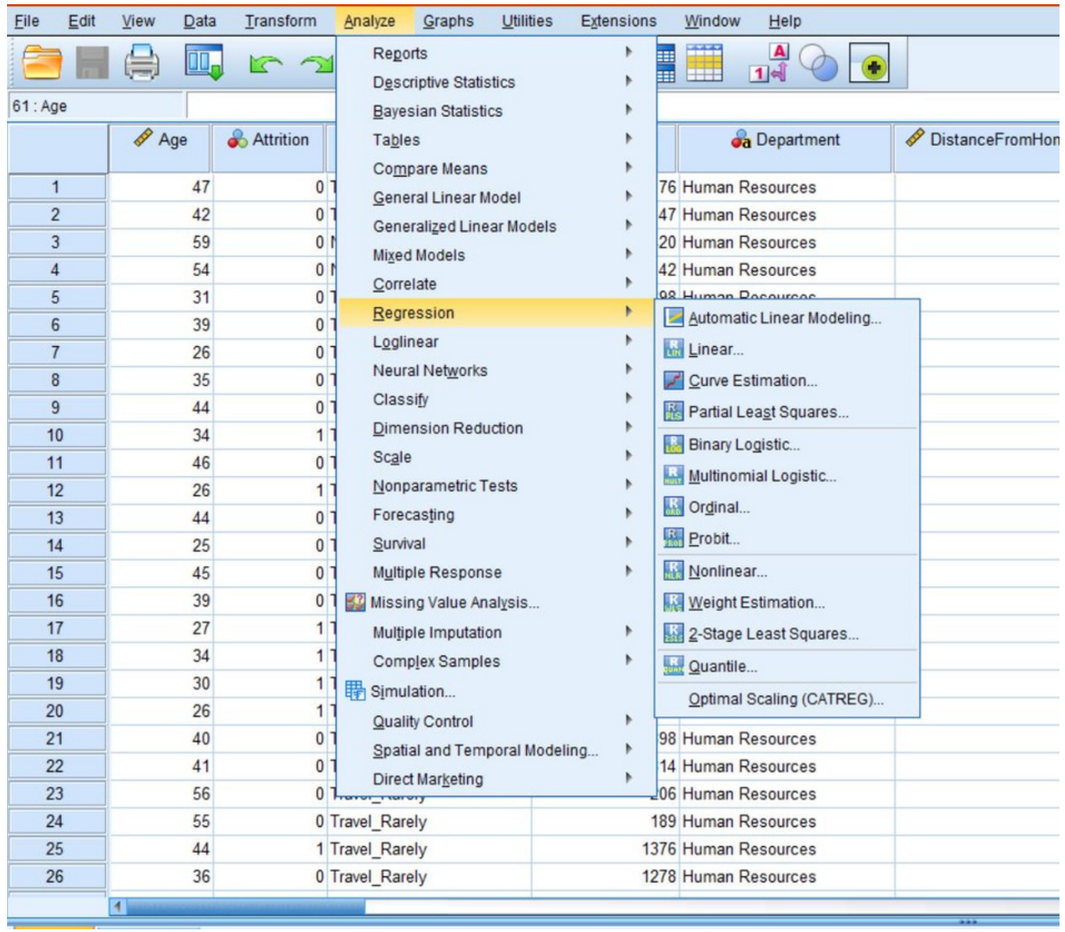
DIST FROM HOME IS SIGNIFICANT FOR SALES DEPARTMENT'S ATTRITION

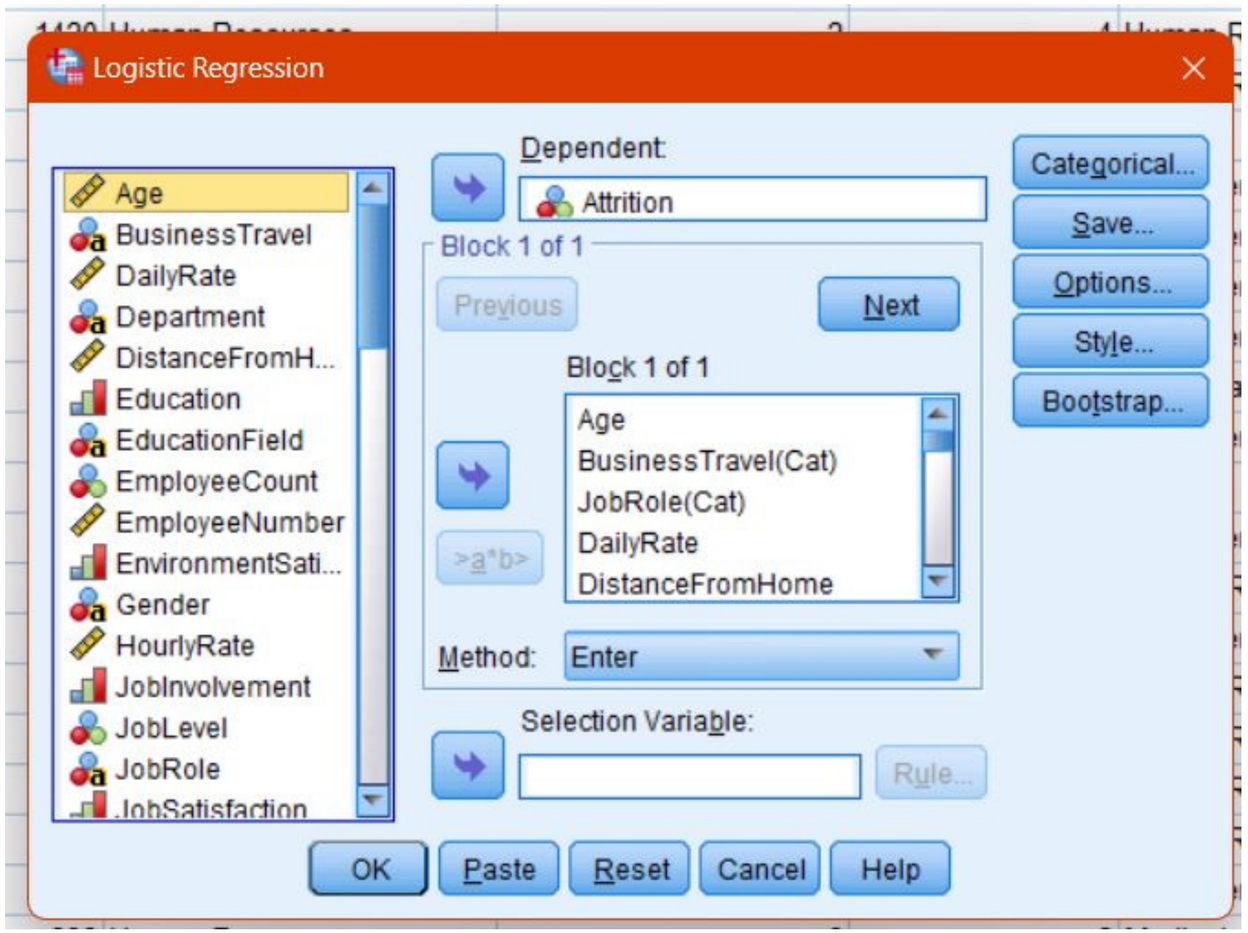
FOR SALES, THOSE LIE FAR HAVE SOMEWHAT HIGHER ATTRITION

LOGISTIC REGRESSION ANALYSIS

- After completing sign data analysis and outlier analysis, we now have to find the **variables significantly impacted.**
- The DV attrition rate is binary, and the IVs are categorical and continuous, so **we must use logistic regression.**
- The **significance level** we have used for the **logistic regression analysis is 0.05.**

LOGISTIC REGRESSION ANALYSIS





Omnibus Tests of Model Coefficients

Department Distribution			Chi-square	df	Sig.
Human Resources	Step 1	Step	60.048	35	.005
		Block	60.048	35	.005
		Model	60.048	35	.005
Research & Development	Step 1	Step	283.022	37	.000
		Block	283.022	37	.000
		Model	283.022	37	.000
Sales	Step 1	Step	165.800	36	.000
		Block	165.800	36	.000
		Model	165.800	36	.000

Model Summary

Department Distribution	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
Human Resources	1	.000[a]	.632	1.000
Research & Development	1	454.952[b]	.265	.480
Sales	1	271.804[c]	.321	.502

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found for split file Department Distribution = Human Resources.

b. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001 for split file Department Distribution = Research & Development.

c. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001 for split file Department Distribution = Sales.

LOGISTIC REGRESSION ANALYSIS

Classification Table[a]

Department Distribution		Observed		Predicted: Attrition: No	Predicted: Attrition: Yes	Predicted: Percentage Correct
Human Resources	Step 1	Attrition	No	48	0	100.0
			Yes	0	12	100.0
		Overall Percentage				100.0
Research & Development	Step 1	Attrition	No	775	16	98.0
			Yes	66	61	48.0
		Overall Percentage				91.1
Sales	Step 1	Attrition	No	332	7	97.9
			Yes	34	55	61.8
		Overall Percentage				90.4

a. The cut value is .500

Variables in the Equation

Department Distribution			B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Human Resources	Step 1[a]	Age	-1.224	2099.699	.000	1	1.000	.294	.000	.
		BusinessTravel			.000	2	1.000			
		BusinessTravel(1)	-6.432	66342.683	.000	1	1.000	.002	.000	.
		BusinessTravel(2)	-22.763	39081.560	.000	1	1.000	.000	.000	.
		DailyRate	-.021	54.701	.000	1	1.000	.979	.000	3.567E+46
		DistanceFromHome	3.065	2469.001	.000	1	.999	21.437	.000	.
		Education	8.333	13947.555	.000	1	1.000	4158.850	.000	.
		EducationField			.000	4	1.000			

LOGISTIC REGRESSION ANALYSIS

DailyRate	-.021	54.701	.000	1	1.000	.979	.000	3.567E+46
DistanceFromHome	3.065	2469.001	.000	1	.999	21.437	.000	.
Education	8.333	13947.555	.000	1	1.000	4158.850	.000	.
EducationField			.000	4	1.000			
EducationField(1)	1.519	47211.346	.000	1	1.000	4.566	.000	.
EducationField(2)	-5.843	35095.252	.000	1	1.000	.003	.000	.
EducationField(3)	-5.342	136969.137	.000	1	1.000	.005	.000	.
EducationField(4)	46.585	54276.820	.000	1	.999	1.705E+20	.000	.
EmployeeNumber	-.006	41.499	.000	1	1.000	.994	.000	2.096E+35
EnvironmentSatisfaction	-.835	16391.339	.000	1	1.000	.434	.000	.
Gender(1)	7.072	50001.426	.000	1	1.000	1178.420	.000	.
HourlyRate	.365	910.037	.000	1	1.000	1.441	.000	.
JobInvolvement	-15.451	15752.647	.000	1	.999	.000	.000	.
JobLevel	-36.817	109072.440	.000	1	1.000	.000	.000	.
JobRole(1)	66.969	150860.301	.000	1	1.000	1.214E+29	.000	.
JobSatisfaction	-4.857	26149.960	.000	1	1.000	.008	.000	.
MaritalStatus			.000	2	1.000			
MaritalStatus(1)	-14.360	63933.695	.000	1	1.000	.000	.000	.
MaritalStatus(2)	-34.796	85941.371	.000	1	1.000	.000	.000	.
MonthlyIncome	.002	23.984	.000	1	1.000	1.002	.000	2.607E+20
MonthlyRate	.000	3.383	.000	1	1.000	1.000	.001	757.247
NumCompaniesWorked	4.552	19705.649	.000	1	1.000	94.801	.000	.
OverTime(1)	19.361	48763.979	.000	1	1.000	256024864.1	.000	.
PercentSalaryHike	1.383	6504.958	.000	1	1.000	3.987	.000	.
PerformanceRating	-18.607	120767.402	.000	1	1.000	.000	.000	.
RelationshipSatisfaction	6.440	14128.250	.000	1	1.000	626.289	.000	.
StockOptionLevel	-5.952	45901.371	.000	1	1.000	.003	.000	

LOGISTIC REGRESSION ANALYSIS

Research & Development	Step 1[a]	Age	-.027	.018	2.086	1	.149	.974	.939	1.010
		BusinessTravel			12.192	2	.002			
		BusinessTravel(1)	1.646	.570	8.351	1	.004	5.186	1.698	15.838
		BusinessTravel(2)	.776	.527	2.170	1	.141	2.172	.774	6.099
		DailyRate	.000	.000	.190	1	.663	1.000	.999	1.000
		DistanceFromHome	.042	.015	7.462	1	.006	1.043	1.012	1.075
		Education	-.012	.121	.009	1	.924	.988	.779	1.254
		EducationField			7.773	3	.051			
		EducationField(1)	-.070	.275	.065	1	.798	.932	.544	1.597
		EducationField(2)	-.231	.558	.172	1	.679	.793	.266	2.369
		EducationField(3)	1.021	.413	6.100	1	.014	2.775	1.235	6.236
		EmployeeNumber	.000	.000	.537	1	.464	1.000	.999	1.000
		EnvironmentSatisfaction	-.526	.116	20.730	1	.000	.591	.471	.741
		Gender(1)	.769	.269	8.173	1	.004	2.158	1.274	3.658
		HourlyRate	.006	.006	.817	1	.366	1.006	.993	1.018
		JobInvolvement	-.541	.173	9.735	1	.002	.582	.414	.818
		JobLevel	.001	.461	.000	1	.998	1.001	.405	2.473
		JobRole(1)	.884	.551	2.574	1	.109	2.420	.822	7.121
		JobSatisfaction	-.437	.114	14.654	1	.000	.646	.516	.808
		MaritalStatus			7.082	2	.029			
		MaritalStatus(1)	.123	.366	.113	1	.736	1.131	.552	2.319
		MaritalStatus(2)	1.045	.479	4.765	1	.029	2.845	1.113	7.272
		MonthlyIncome	.000	.000	1.847	1	.174	1.000	1.000	1.000
		MonthlyRate	.000	.000	.023	1	.880	1.000	1.000	1.000
		NumCompaniesWorked	.202	.054	13.985	1	.000	1.224	1.101	1.360
		OverTime(1)	2.334	.282	68.754	1	.000	10.321	5.944	17.921
		PercentSalaryHike	-.065	.058	1.225	1	.268	.938	.836	1.051

RESEARCH & DEVELOPMENT ANALYSIS

LOGISTIC REGRESSION ANALYSIS

Sales	Step 1[a]	Age	-.030	.024	1.491	1	.222	.971	.926	1.018
		BusinessTravel			16.566	2	.000			
		BusinessTravel(1)	2.762	.774	12.732	1	.000	15.829	3.472	72.161
		BusinessTravel(2)	1.390	.696	3.992	1	.046	4.016	1.027	15.707
		DailyRate	-.001	.000	1.606	1	.205	.999	.999	1.000
		DistanceFromHome	.059	.020	8.575	1	.003	1.061	1.020	1.104
		Education	.067	.172	.150	1	.698	1.069	.763	1.496
		EducationField			1.377	4	.848			
		EducationField(1)	.129	.396	.106	1	.744	1.138	.523	2.475
		EducationField(2)	-.051	.488	.011	1	.917	.950	.365	2.474
		EducationField(3)	.910	.870	1.095	1	.295	2.485	.452	13.671
		EducationField(4)	.257	.579	.197	1	.657	1.293	.415	4.026
		EmployeeNumber	.000	.000	.358	1	.550	1.000	.999	1.000
		EnvironmentSatisfaction	-.522	.159	10.800	1	.001	.593	.435	.810
		Gender(1)	.308	.331	.863	1	.353	1.360	.711	2.605
		HourlyRate	-.004	.008	.242	1	.623	.996	.980	1.012
		JobInvolvement	-.644	.224	8.264	1	.004	.525	.338	.815
		JobLevel	.733	.574	1.633	1	.201	2.081	.676	6.406
		JobRole(1)	2.449	1.369	3.203	1	.073	11.582	.792	169.333
		JobSatisfaction	-.375	.147	6.563	1	.010	.687	.516	.916
		MaritalStatus			7.903	2	.019			
		MaritalStatus(1)	.190	.511	.138	1	.710	1.209	.444	3.294
		MaritalStatus(2)	1.443	.637	5.137	1	.023	4.233	1.215	14.744
		MonthlyIncome	.000	.000	.210	1	.647	1.000	1.000	1.000
		MonthlyRate	.000	.000	.623	1	.430	1.000	1.000	1.000
		NumCompaniesWorked	.243	.074	10.645	1	.001	1.275	1.102	1.475
		OverTime(1)	2.456	.390	39.729	1	.000	11.653	5.430	25.006
		PercentSalaryHike	.009	.068	.018	1	.893	1.009	.883	1.153
		PerformanceRating	-.559	.721	.599	1	.439	.572	.139	2.352

SALES ANALYSIS

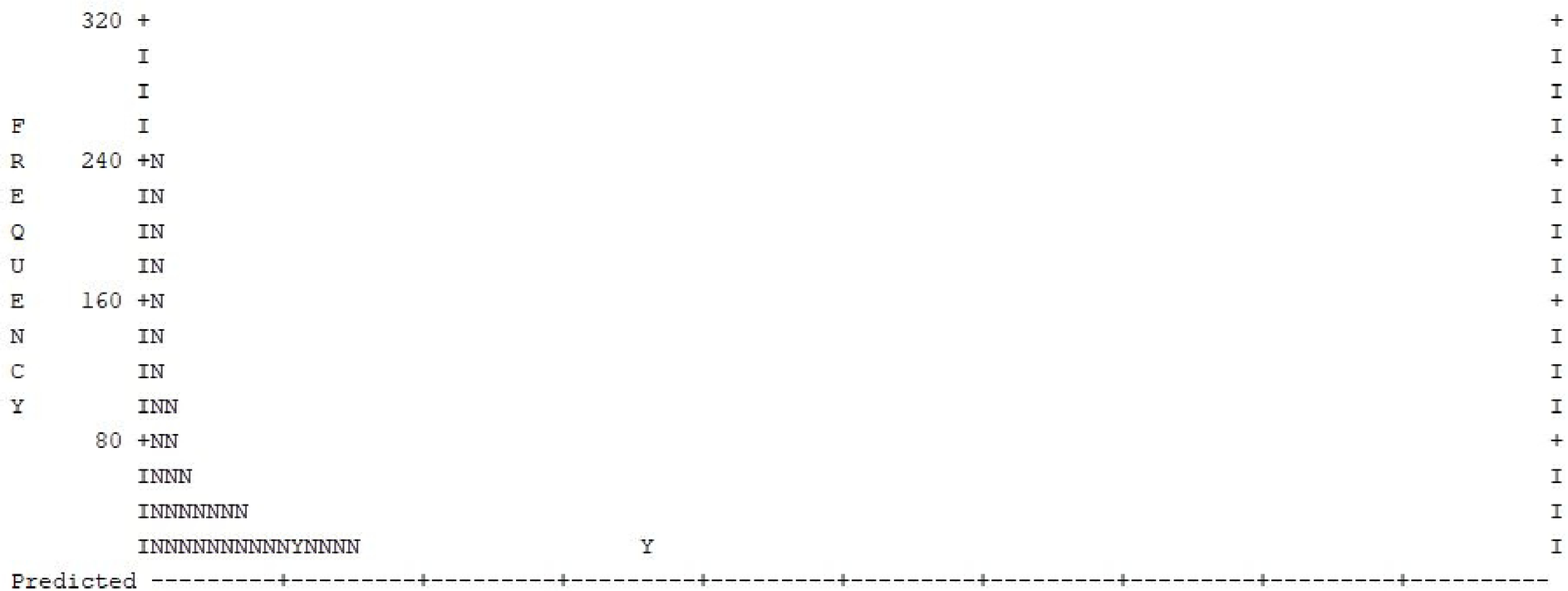
```
         Step number: 1

         Observed Groups and Predicted Probabilities

      80 +                                                                                                    +
         I                                                                                                    I
         I                                                                                                    I
F        I                                                                                                    I
R     60 +                                                                                                    +
E        I                                                                                                    I
Q        IN                                                                                                   I
U        IN                                                                                                   I
E     40 +N                                                                                                   +
N        IN                                                                                                   I
C        IN                                                                                                   I
Y        IN                                                                                                   I
      20 +N                                                                                                   +
         IN                                                                                                   I
         IN                                                                                                  YI
         IN                                                                                                  YI
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9         1
  Group:  NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY

          Predicted Probability is of Membership for Yes
          The Cut Value is .50
          Symbols: N - No
                   Y - Yes
          Each Symbol Represents 5 Cases.
```

Observed Groups and Predicted Probabilities



Predicted Probability is of Membership for Yes
The Cut Value is .50
Symbols: N - No
Y - Yes
Each Symbol Represents 20 Cases.

Observed Groups and Predicted Probabilities

```
      80 +                                                                                                    +
         I                                                                                                    I
         I                                                                                                    I
F        IY                                                                                                   I
R     60 +N                                                                                                   +
E        IN                                                                                                   I
Q        IN                                                                                                   I
U        IN                                                                                                   I
E     40 +NY                                                                                                  +
N        INN                                                                                                  I
C        INN                                                                                                  I
Y        INNN                                                                                                 I
      20 +NNNN                                                                                                +
         INNNNYNY            Y                                                                                I
         INNNNNNNNNN  NYN    N N                                                                              I
         INNNNNNNNNNNNNNNNNNNNYNNNN  NNY NN  Y   NN  Y N    Y        Y             Y Y Y   Y                  I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------+----------
  Prob:   0        .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:  NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
```

Predicted Probability is of Membership for Yes

The Cut Value is .50

Symbols: N - No

Y - Yes

Each Symbol Represents 5 Cases.

INTERPRETATION OF RESULTS

Interpretation of Omnibus Test:

The significance of Omnibus test for HR department is 0.005 which is equal to 0.005 and for R&D and Sales departments, the significance is 0.000 which is also less than 0.005. So, we can say that our model is significant.

Model Summary:

- For HR department Nagelkerke R-square value is 0.560 -> 56% of variation in attrition is accounted for the independent variables.
- For R&D department Nagelkerke R-square value is 0.480 -> 48% of variation in attrition is accounted for the independent variables.
- For Sales department Nagelkerke R-square value is 0.502 -> 50.2% of variation in attrition is accounted for the independent variables.

Interpretation of Variables:

The significant variables have been identified using the significance levels obtained from the LR analysis.

The number of samples obtained from the HR department is very less. So, the significant variables which are affecting the attrition rate can not be identified from the data set.

Significant variables

FOR RESEARCH AND DEVELOPMENT

- BusinessTravel
- EnvironmentSatisfaction
- Gender
- JobInvolvement
- JobSatisfaction
- NumCompaniesWorked
- OverTime
- RelationshipSatisfaction
- JobRole

SALES

- Distance from Home
- Environment Satisfaction
- Job Involvement
- No. Companies Worked
- Overtime
- Job role

ODDS RATIO(EXP(B))

- We have to segment the employees into groups based on the chance of them leaving the company.
- For Business travel, we have three categories: **non-travel, travel frequently, and travel rarely**. Here non-travel is the base case.
- Now by examining the Exp(B) value, we can interpret how attrition affects different categories of business travel when compared to the base case.
- In HR department, the employees who travel frequently are 0.002 times more prone to attrition and the employees who travel rarely are negligibly prone to attrition than non-travelers.

ODDS RATIO(EXP(B))

- In R&D department, the employees who travel frequently are 5.186 times more prone to attrition and the employees who travel rarely are 2.172 times prone to attrition than non-travelers.
- In Sales department, the employees who travel frequently are 15.829 times more prone to attrition and the employees who travel rarely are 4.016 times prone to attrition than non-travelers.

ODDS RATIO(EXP(B))

- For **Marital Status**, we have three categories: **divorced, Married, Single.**
- Here divorced is the base case.
- Now by examining the Exp(B) value, we can interpret how attrition affects different categories of Marital Status W.r.t. base case.
- In HR department, the employees who are married and unmarried both have equal probability of leave the company.
- In R&D department, the employees who are married have 1.131 times more probability of leave the company than those who are divorced and those who are single have 2.845 times more probability of leave the company than those who are divorced.

ODDS RATIO(EXP(B))

- For Overtime, we have two categories: Yes & No. Here 'No' is the base case.
- The second group is the base class.
- In all the departments, people who are not doing Overtime are more likely to leave the company.
- In the HR department, people who are not doing Overtime are 2.56 times probable to leave the company.
- In the R&D department, people who are not doing Overtime are 6.76 times probable to leave the company.
- In the sales department, people not doing Overtime are 1.2 times more likely to leave the company.

CONCLUSION

The significant variables which are affecting the attrition rate in different departments are different. So the company has to focus on the factors which are affecting the attrition rate departmentwise.

- In HR department, the company has to collect more data so that the analysts can find the factors affecting the attrition rate.
- In R&D department, the significant variables are Business travel, Environment satisfaction, Gender, Job involvement, etc. So, the company has to focus on these factors for employees in R&D department.
- In Sales department, the significant variables are Distance from home, Environment satisfaction, Number of companies worked, etc. So, the company has to focus on these factors for employees in Sales department.

SOLUTIONS

Changes organization can implement to prevent attrition of employees:

- **Work-life balance**: Providing employees with a healthy work-life balance
- **Recognition and Rewards**: Regular recognition and rewards can make employees feel valued and appreciated.
- **Listening and responding to employee feedback**: Regularly soliciting and acting upon employee feedback
- **Competitive Compensation**: Ensure that the organization offers competitive compensation packages that are in line with industry standards.

SOLUTIONS

THANK YOU!!

A PRESENTATION BY:

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