

**STAT130**

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Collage: Business and Economics

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Case study

**Compensation for Sales Professionals**

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| ID Number | Student Name |
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\* Executive Summary.

A local company of sales professionals in Abu Dhabi conducted a survey of its employees to study the relationship, if any, between the years of experience and salary for individuals employed in inside and outside sales positions. On the survey, respondents were asked to specify one of three levels of years of experience: low (1-10 years), medium (11-20 years), and high (21 or more years).

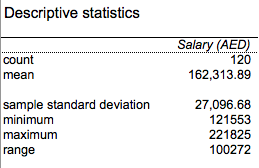
\* Introduction and Main text.

We discussed Compensation for Sales Professionals case. We tried to make a report of how these sales professionals affect the society. First of all, we will focus on solving questions to help us in our report results. Then, we should check the assumptions and test hypothesis. All of that throw the question that A leading company of sales professionals In Abu Dhabi conducted a survey of its employees to study the relationship , if any, between the years of experience and salary for individuals employed in inside and outside sales positions .On the survey, respond answered asked to specify one of three levels of years of experience:  low (1-10 years), medium (11-20 years), and high (21 or more years).



1. **Use descriptive statistics to summarize the data.**

|  |  |
| --- | --- |
| **Descriptive statistics** |  |
|  |  |
|  | *Salary (AED)* |
| count | 120 |
| mean | 162,313.89 |
| sample variance | 734,229,862.22 |
| sample standard deviation | 27,096.68 |
| minimum | 121553 |
| maximum | 221825 |
| range | 100272 |
|  |  |
| 1st quartile | 140,686.00 |
| median | 153,724.00 |
| 3rd quartile | 190,231.00 |
| interquartile range | 49,545.00 |
| mode | 133,660.00 |
|  |  |
| low extremes | 0 |
| low outliers | 0 |
| high outliers | 0 |
| high extremes | 0 |

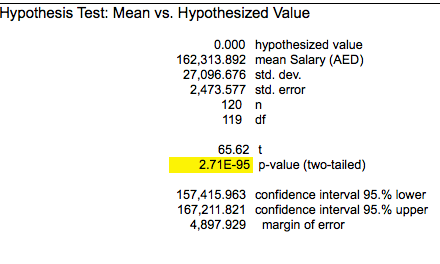


**2. Construct a 95% confidence interval of the mean annual salary for all salespersons.**

* Normality: Data is normally distributed because the sample size is large enough (120 > 30).
* T-test will be used to construct C.I as the population standard deviation is unknown.
* Lower: 157,415.963 upper: 167,211.821
* Interpretation: we are 95% confident that the true mean salary of all employees is between 157,415.963 and 167,211.821 AED.

**Assumption is justified**

**95% CI for the mean annual salary is (157415.96 , 167211.82)**

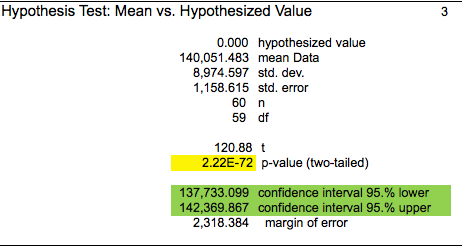


**3.Construct a 95% confidence interval of the mean salary for inside salespersons.** Assumptions:

* Normality: data is normally distributed (sample size = 60).
* T-test will be used (population standard deviation is unknown).
* Lower: 137733.099 upper: 142369.867
* Interpretation: we are 95% confident that the true mean salary of inside employees is between 137733.099 and 142369.867 AED.

**Assumption is justified**

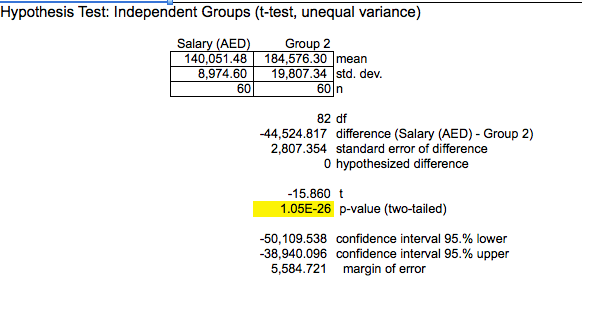
**95% CI for the mean annual salary is** **(137733.09, 142369.86)**



1. **Is there any significant difference due to position? Use a 0.05 level of significance.**

**Hypothesis:**

**Hₒ:µ1=µ2**

**H1:µ1≠µ2**

* **Assumptions:**
* H0: µ1=µ2.  
  H1: µ1≠µ2.
* Assumptions:
  + Data is randomly selected.
  + Data is normally distributed (sample size > 30).
  + Equality of variances test:
    - P-value = 7.55E-09 ≈ 0 < 0.05 (unequal variances).
* T-value = -15.86
* P-value= 1.04E-26 ≈ 0
* Conclusion: P-value= 1.04E-26 ≈ 0 < 0.05, so reject H0. So we can conclude that there is a difference between the salaries of inside and outside employees.

1. **Construct a 95% confidence interval estimate of the mean salary difference for inside and outside salespersons.**
2. Assumptions: Data is normally distributed.
3. Lower: -50,109.53
4. Upper: -38,940.09
5. Interpretation: we are 95% confident that the true mean salary difference of inside and outside employees is between -50,109.53 and -38,940.09 AED.

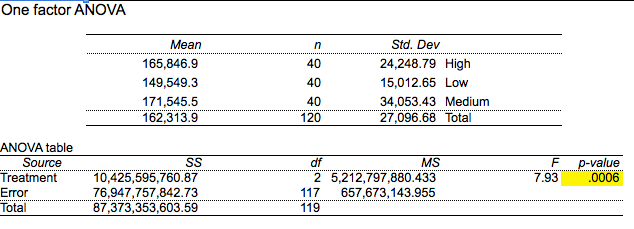
# 6- Using C.I to make the conclusion:

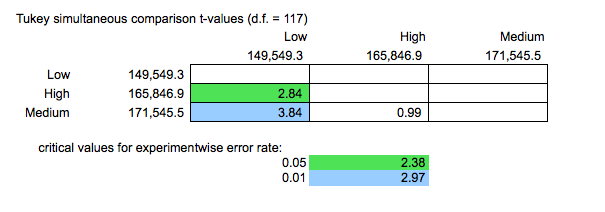
we reject H0 and we can reach the same conclusion if we used the C.I calculated in part (5). The 95% confidence interval for the mean salary difference between inside and outside employees, does not contain the hypothesized value (0) so we reject H0.

**7- Hypothesis test for the significant difference due to years of experience:**

Here, we have 3 groups to be tested (low, medium and high) experience. So ANOVA test is to be used.

* H0: µlow=µmedium= µhigh  
  H­1: at least two means differ.
* Assumptions:
  + Data is randomly selected.
  + Data is normally distributed (sample size > 30).
  + Equality of variances test:
    - Largest S.D = 34053.42
    - Smallest S.D = 15012.65
* F-value = 7.93
* P-value= 0.0006
* Conclusion: P-value= 0.0006 < 0.05, so reject H0. So we can conclude that there is at least two means differ
* We use Tukey analysis to find out which means differ. At 0.05 level of significance, only Low and High experience mean differ. With all other means equal.



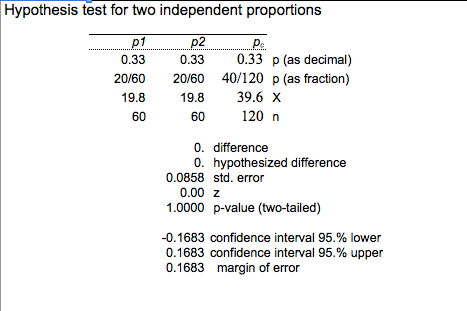
**TUKEY METHOD**

**8- Point estimates for the proportion of salespersons according to their positions**

**Proportion for inside persons = = = 0.50 = 50 %**

# 9- Is there a difference between the proportions of inside salesperson between Low and High Experience?

* H0: P1=P2.  
  H1: P1≠P2.
* Assumptions:
  + n1 . P1 = 120(20/120) > 5
  + n2 . P2 = 120(20/120) > 5
  + n1 .(1- P1)= 120(1- 20/120) > 5
  + n1 .(1- P1)= 120(1- 20/120) > 5
* z-value = 0.00
* P-value= 1.00
* Conclusion: P-value= 1.00 > 0.05, so we don’t reject H0. So we can conclude that there is no difference between the proportions of inside salesperson between low and high experience.



# 10- 95% confidence interval of the difference in proportion of inside salespersons between Low and High experience.

Lower: -0.0943

Upper: 0.0943

Interpretation: we are 95% confident that the difference in proportion of inside salespersons between low and high experience is between (-0.0943, 0.0943).

# 11- Test of significance of relation between salespersons position and years of experience.

H0: “Position” and “Years of experience” are independent.

H1: “Position” and “Years of experience” are dependent

Chi-square (independence test):

P-value ≈ 0 < 0.05, so we reject H0 and we can conclude that “Position” and “Years of experience” have significance relation (dependent).

# Conclusion

**It is clear** that there is a significant difference between the salaries of inside employees and the salaries of outside employees. Also from the experience, we can conclude that that there is a significant difference between the salespersons of high experience and low experience. However, the proportions of inside salespersons (with high and low experience) **are the same.**