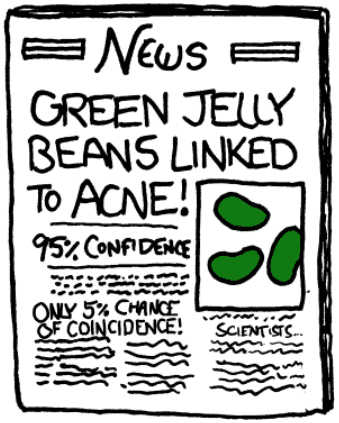
DA
NDA
KTİR.
KLİYORUZ.
AYŞEGÜL GÖZALAN
YAKUT
AKYÖN YILMAZ
KLİMUD
3.Ulusal
Klinik Mikrobiyoloji Kongresi-2015
18-22 Kasım 2015

ÇALIŞMA PLANLAMA VE MAKALE YAZMADA SIK YAPILAN HATALAR VE ÇÖZÜM ÖNERİLERİ

Doç.Dr.Ayşegül Gözalan,
Ankara Atatürk Eğitim ve Araştırma Hastanesi
Tıbbi Mikrobiyoloji

Prof. Dr. Yakut Akyön Yılmaz
Hacettepe Üniversitesi, Tıp Fakültesi
Tıbbi Mikrobiyoloji AD

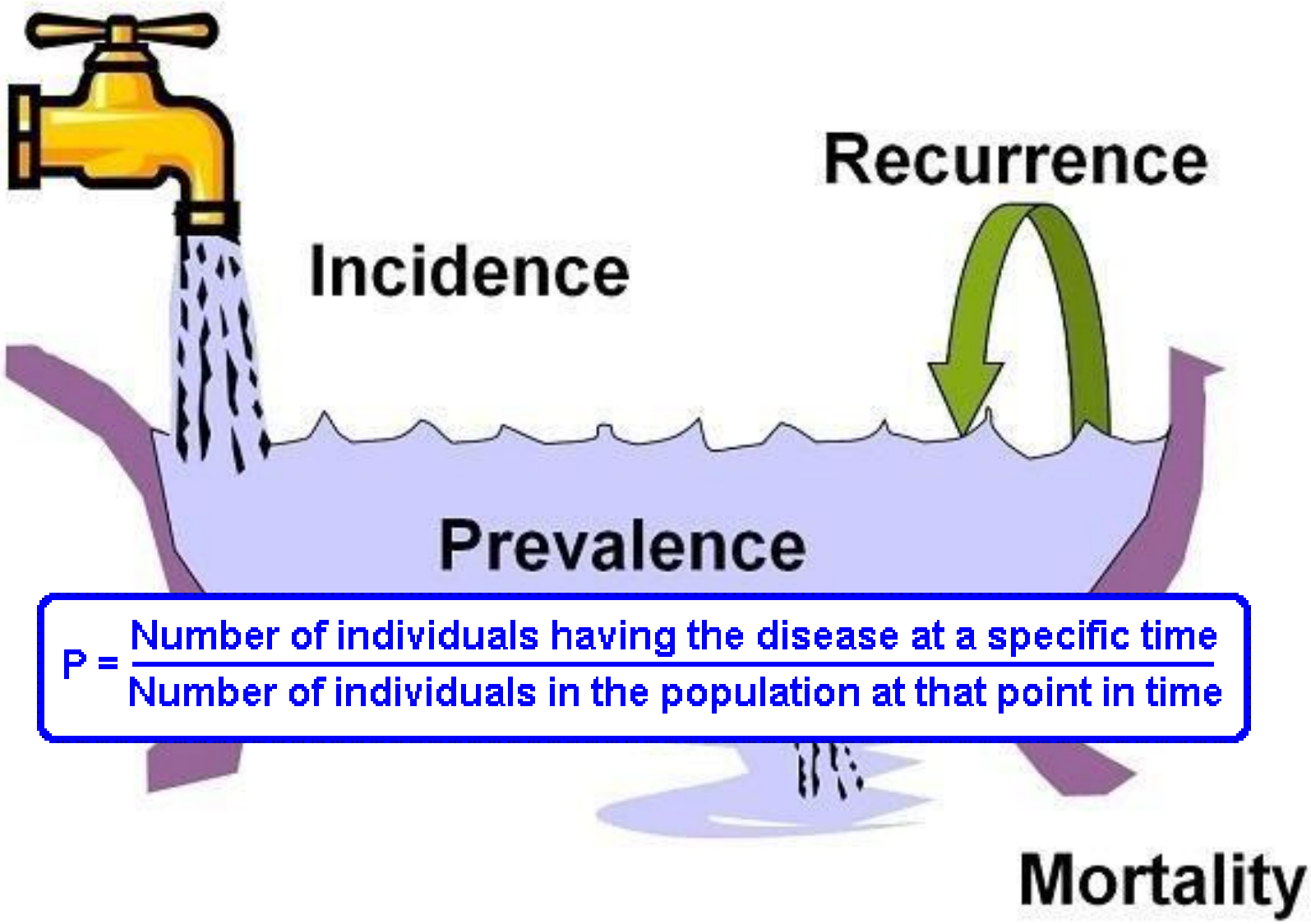
- ✓ laboratuvarıma herhangi bir neden ile gelen hastalarda, enzyme-linked immunosorbent assay (ELISA) testi kullanarak *Francisella tularensis'*e karşı gelişen antikorlara bakmak ve seroprevalansı belirlemek istiyorum?



- ✓ Ayın her çift günü gelen ilk 10 hastayı çalışmaya alacağım?

- ✓ Böylece hem tularemi ile fare teması arasındaki ilişkiyi ortaya çıkartacağım hem de Türkiye'deki seroprevalansı belirleyeceğim

- ✓ Çalışmamın başlığı bile hazır; Incidence and seroprevalence of tularaemia in TURKEY, 2015.



$$P = \frac{\text{Number of individuals having the disease at a specific time}}{\text{Number of individuals in the population at that point in time}}$$

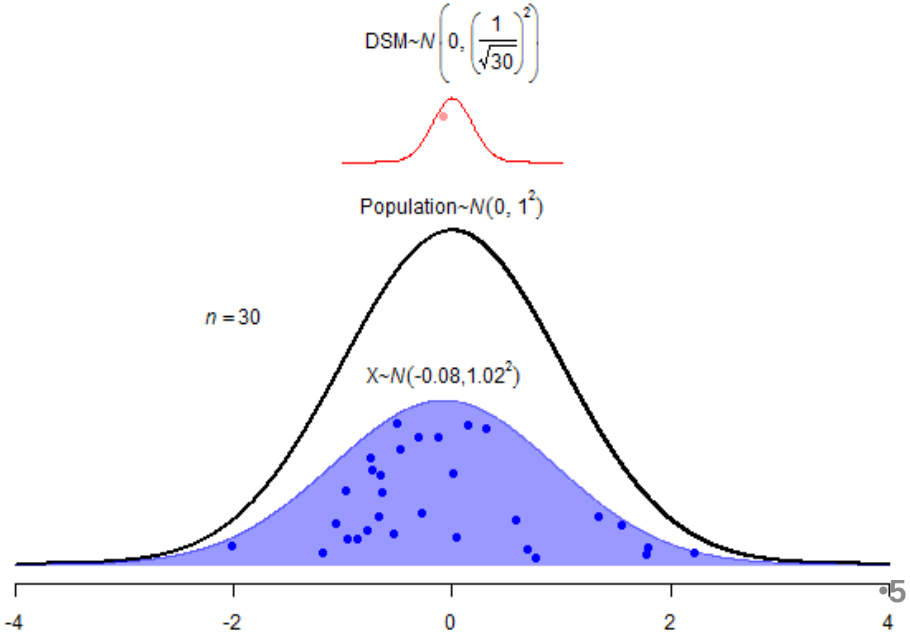
We have to get information about this large group of people

POPULATION

Random selection

Work with a small group of randomly selected people

SAMPLE



Seropositivity of tularaemia in ……..Ankara, 2015

- ✓ Toplam 6.524 serum örneğinin 476'sında (%7.296) Anti-*Francisella tularensis* IgG antikor varlığı saptadım

- ✓ Seropozitif bulduğum 476 örnekten 171'i (%35.924) kadın, 305'i (%64.075) erkek ……

Kadın sayısı 35.945'den 73.632'ye yükseldi

Kadın sayısı 35.900'den 73.600'e yükseldi

Kadın sayısı 35.000'den 73.000'e yükseldi

%35.924

%35.90

%35.9

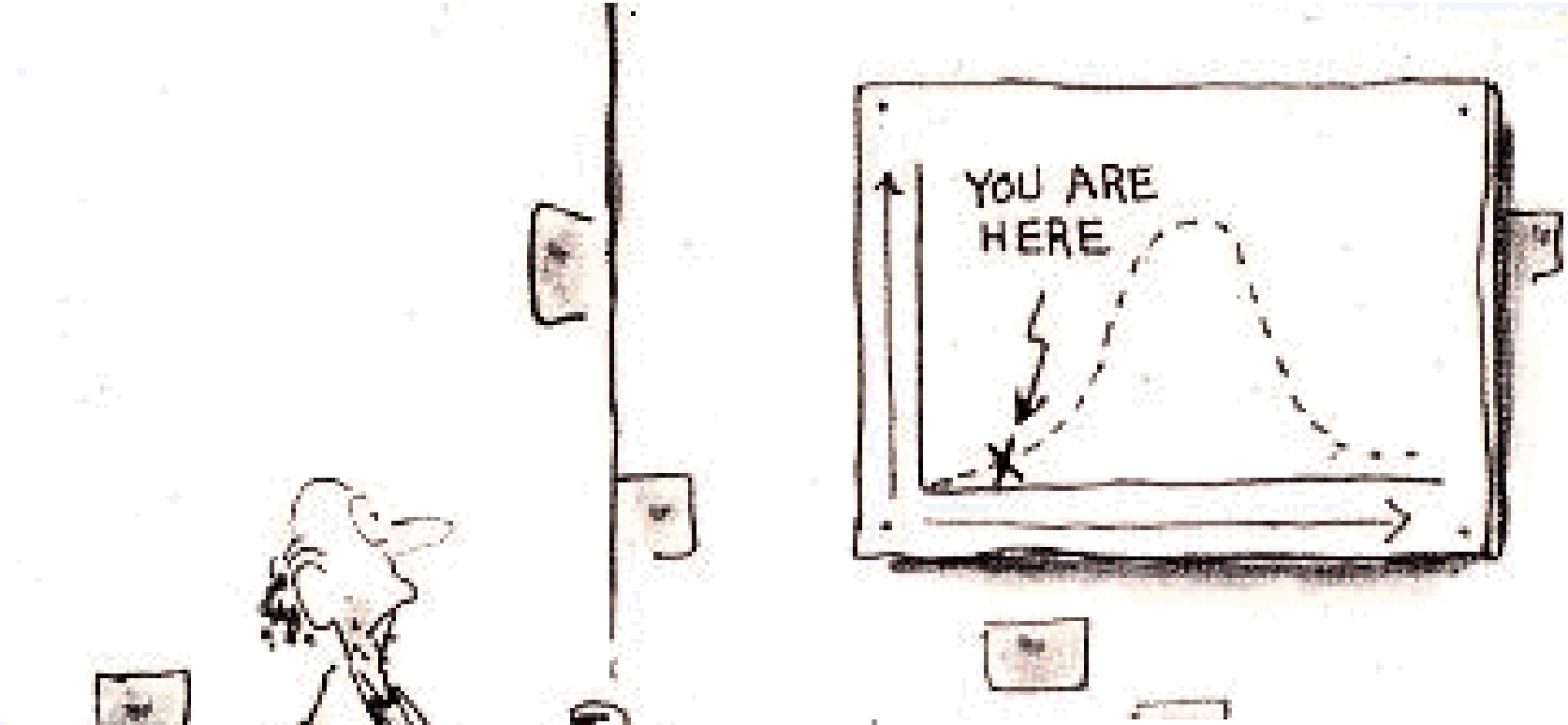
p=0.000

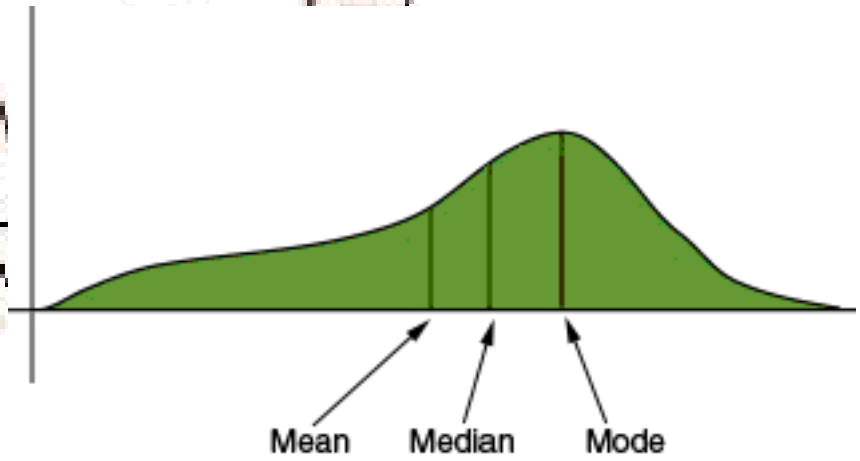
p<0.001

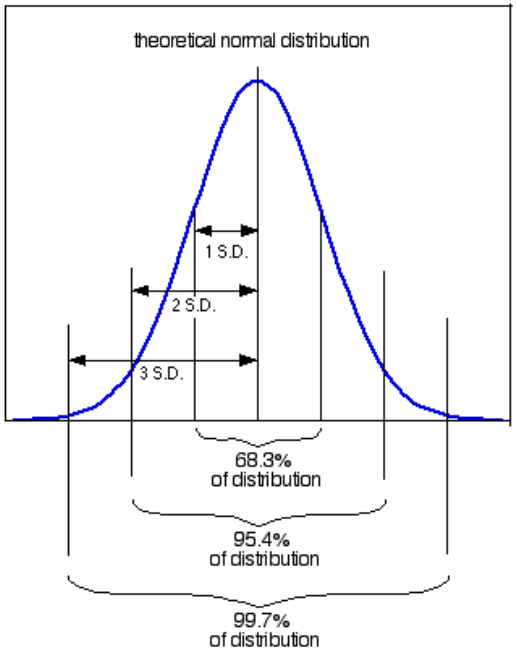
p=0.001

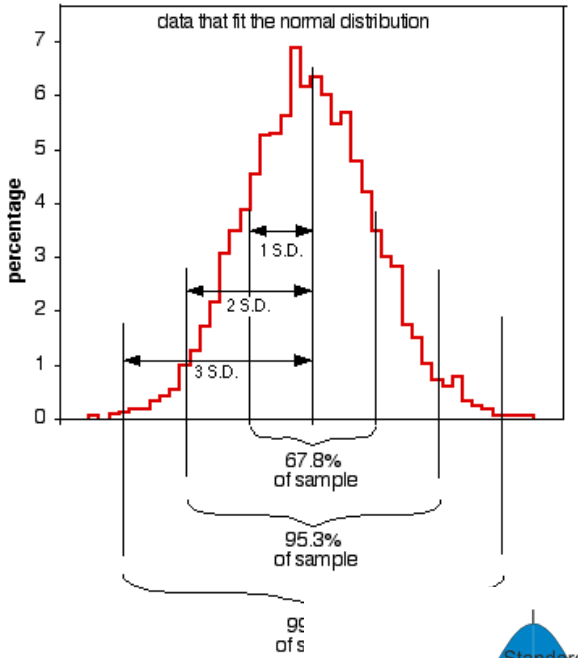
- ✓ Toplam 6.524 serum örneğinin 476' sında (%7.3) Anti-*Francisella tularensis* IgG antikor varlığı saptandım

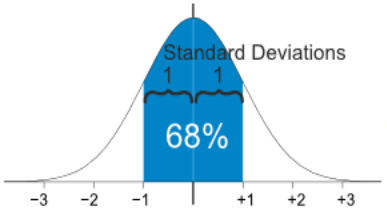
- ✓ Seropozitif bulduğum hastaların yaş ortalaması 45±2 (43-47) olarak bulundu


YOU ARE
HERE

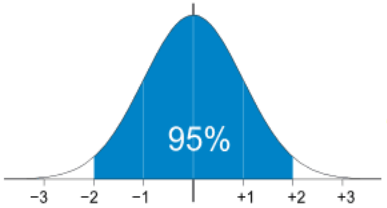

Mean
Median
Mode



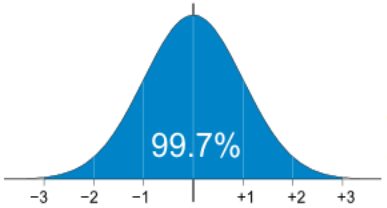




68% of values are within
1 standard deviation of the mean

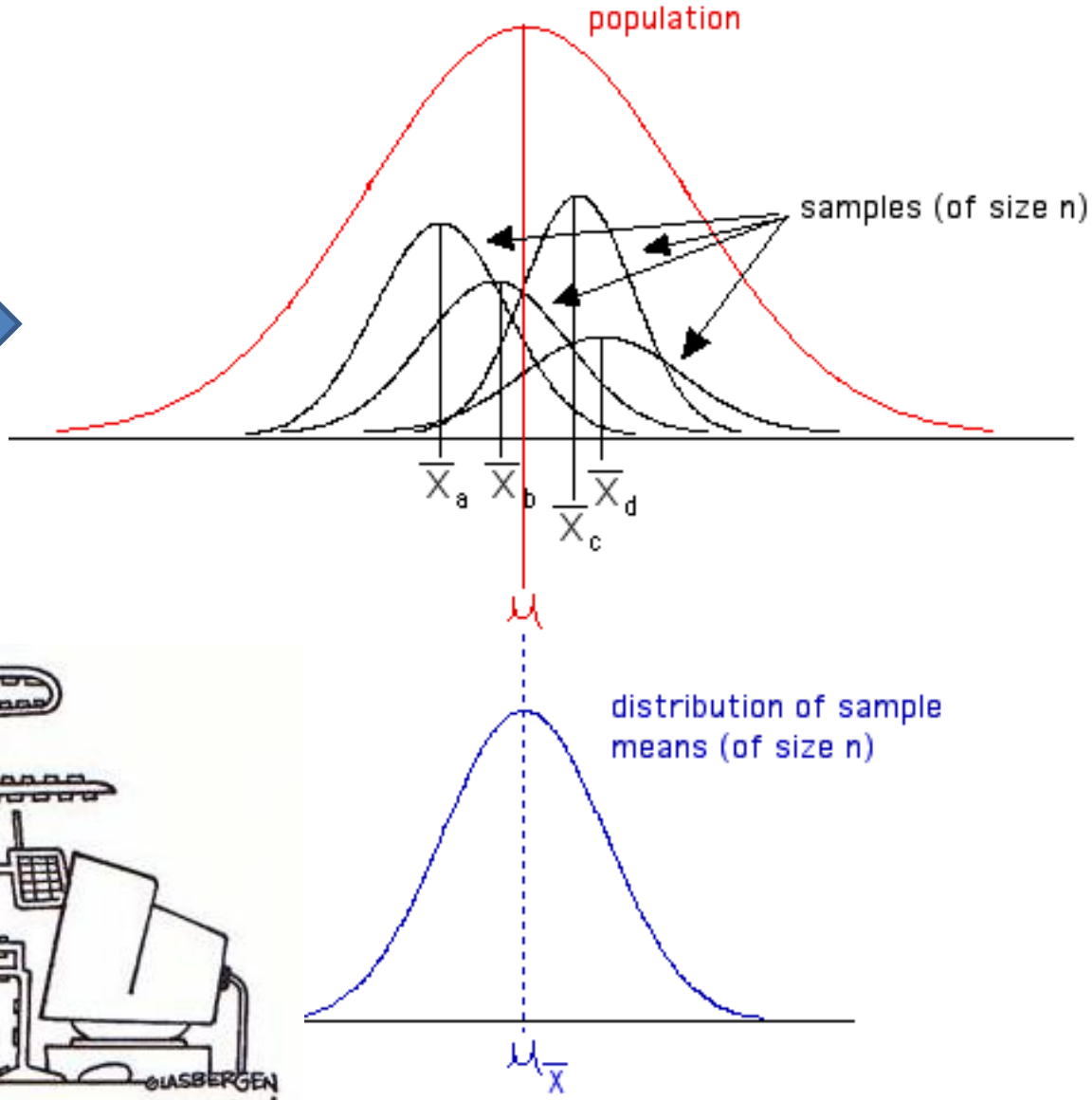


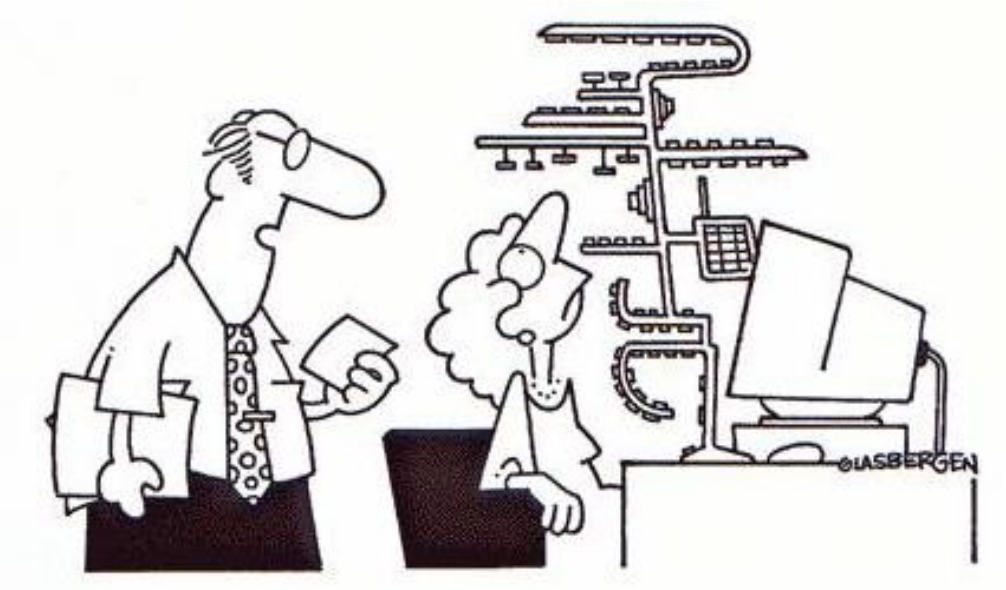
95% of values are within
2 standard deviations of the mean



99,7% of values are within
3 standard deviations of the mean

Standart hata daima standart sapmadan küçüktür





"It's the new keyboard for the statistics lab. Once you learn how to use it, it will make computation of the standard deviation easier."

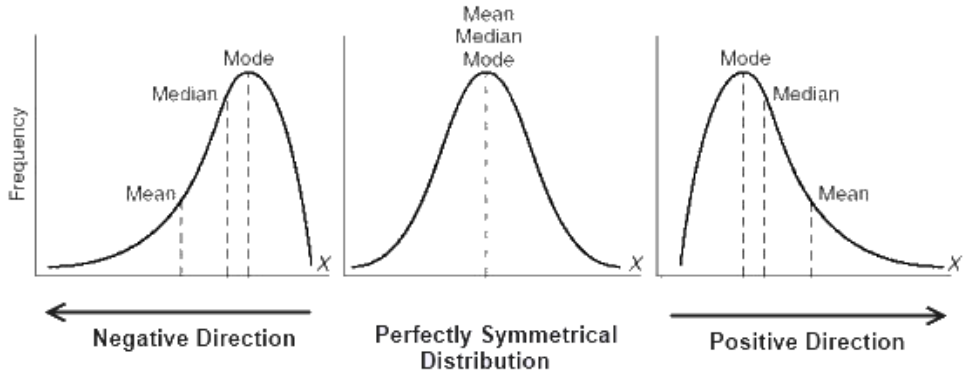
Çalışmamızda 100 erkek hastanın ağırlık ortalaması 72 kg (SD=8 kg) olarak bulundu.

$$SE_{\bar{x}} = \frac{s}{\sqrt{n}}$$

Çalışmamızda 100 erkek hastanın ağırlık ortalaması 72 kg (SE=0,8 kg) olarak bulundu.

Çalışmamızda 100 erkek hastanın ağırlık ortalaması 72 kg (95% CI=70,4-73,6).

- ✓ Seropozitif bulduğum 476 serum örneğinin Anti-*Francisella tularensis* IgG antikor titreleri ortalaması 50.6 (SD=34.2) olarak bulundu.



Simetrik dağılımlarda

Ortalama (mean)

Standart sapma (standard deviation)

Standart hata (standard error)

Asimetrik dağılımlarda

Medyan (median)

Çeyreklerarası aralık (interquartile range)

Değer aralığı (range)

klimud.sav [DataSet1] - PASW Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

- Reports
- Descriptive Statistics
  - Frequencies...
  - Descriptives...
  - Explore...
  - Crosstabs...
  - Ratio...
  - P-P Plots...
  - Q-Q Plots...
- Tables
- Compare Means
- General Linear Model
- Generalized Linear Models
- Mixed Models
- Correlate
- Regression
- Loglinear
- Neural Networks
- Classify
- Dimension Reduction
- Scale
- Nonparametric Tests
- Forecasting
- Survival
- Multiple Response
- Missing Value Analysis...
- Multiple Imputation
- Complex Samples
- Quality Control
- ROC Curve...

	no	isim	yas					ornektarih1	antibodytiters	antibodyist	log	var
1	234	HK	72					24.09.2012	9,99	100 alti	1,00	
2	49	YÇ	30					07.02.2012	10,04	100 alti	1,00	
3	280	BY	18					19.10.2012	10,04	100 alti	1,00	
4	430	AS	45					13.02.2013	10,35	100 alti	1,01	
5	468	MÇ	38					07.03.2012	10,35	100 alti	1,01	
6	153	YZ	68			emekli san...	evet	24.05.2012	10,38	100 alti	1,02	
7	107	ÖD	73				evet	11.05.2012	10,62	100 alti	1,03	
8	106	CA	76				hayir	04.05.2012	10,70	100 alti	1,03	
9	406	SM	81				hayir	04.02.2013	11,22	100 alti	1,05	
10	228	BK	26			SSK	hayir	10.09.2012	11,38	100 alti	1,06	
11	121	FM	46			ssk	evet	09.05.2012	11,64	100 alti	1,07	
12	83	ŞK	55				evet	18.04.2012	11,77	100 alti	1,07	
13	221	Sİ	33			veşil kart	hayir	07.09.2012	12,08	100 alti	1,08	
14	42	PK	54			ssk	.	02.02.2012	12,18	100 alti	1,09	
15	272	YA	48			SGK	hayir	31.10.2012	12,40	100 alti	1,09	
16	441	SA	80			bağkur	hayir	19.02.2013	12,48	100 alti	1,10	
17	79	MP	50				evet	18.04.2012	12,52	100 alti	1,10	
18	429	HÖ	50				evet	12.02.2013	12,60	100 alti	1,10	
19	262	AD	31			emekli san...	evet	03.10.2012	12,75	100 alti	1,11	
20	287	ES	26			SGK	evet	23.10.2012	13,14	100 alti	1,12	
21	225	FC	58	kadın	.	SGK	hayir	07.09.2012	13,24	100 alti	1,12	
22	179	LA	58	erkek	ilköğrenim ve dengi	SSKB	evet	30.05.2012	13,26	100 alti	1,12	

Data View | Variable View

Explore...

klimud.sav [DataSet1] - PASW Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

	no	isim	yas	cinsiyet	ogrenim	guvence	sigara	ornektarih1	antibodytiters	antibodyist	log
1	234	HK	72	kadin	okuma yazma bil...	emekli san...	hayir	24.09.2012	9,99	100 alti	1,00
2	49	YÇ	30	erkek	.		hayir	07.02.2012	10,04	100 alti	1,00
3											1,00
4											1,01
5											1,01
6											1,02
7											1,03
8											1,03
9											1,05
10											1,06
11											1,07
12											1,07
13											1,08
14											1,09
15											1,09
16											1,10
17											1,10
18											1,10
19						emekli san...	evet	03.10.2012	12,75	100 alti	1,11
20	287	ES	26	kadin	lise ve dengi	SGK	evet	23.10.2012	13,14	100 alti	1,12
21	225	FC	58	kadin	.	SGK	hayir	07.09.2012	13,24	100 alti	1,12
22	179	LA	58	erkek	ilköğrenim ve dengi	SSKB	evet	30.05.2012	13,26	100 alti	1,12

Data View | Variable View

Explore: Plots

Boxplots
- Factor levels together
- Dependents together
- None

Descriptive
- Stem-and-leaf
- Histogram

Normality plots with tests

Spread vs Level with Levene Test
- None
- Power estimation
- Transformed Power: Natural log
- Untransformed

Continue | Cancel | Help

Explore

Variables: no, isim, yas, cinsiyet, ogrenim, guvence, sigara, ornektarih1, antibodyist

Dependent List: antibodytiters

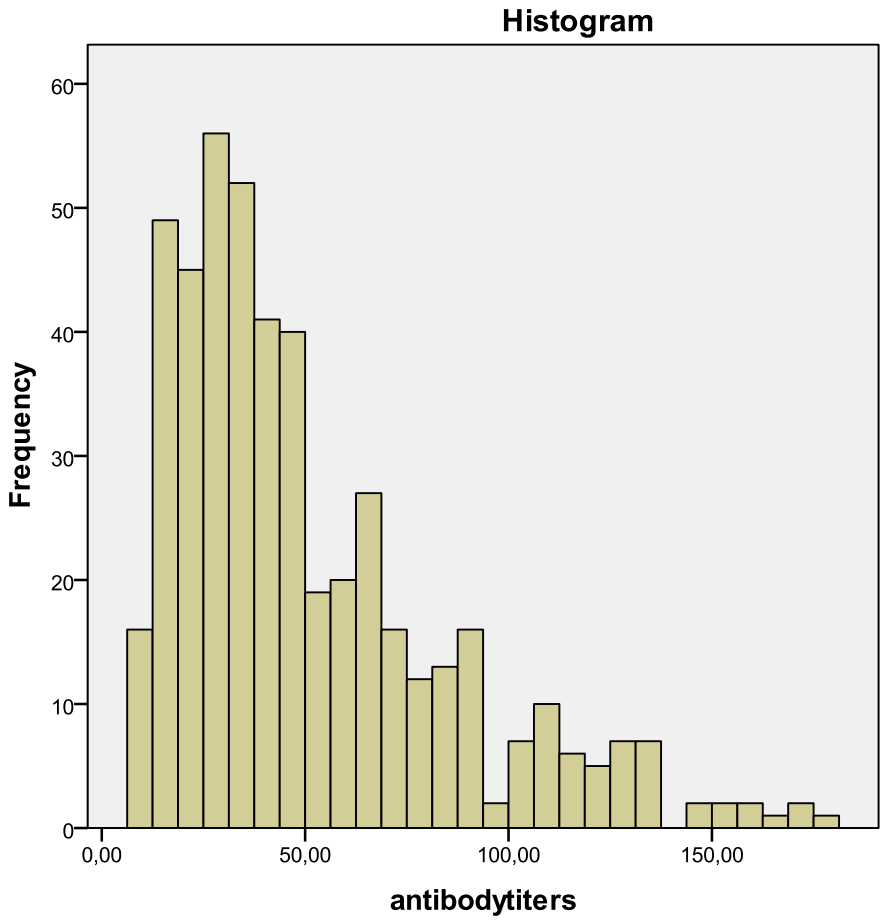
Factor List:

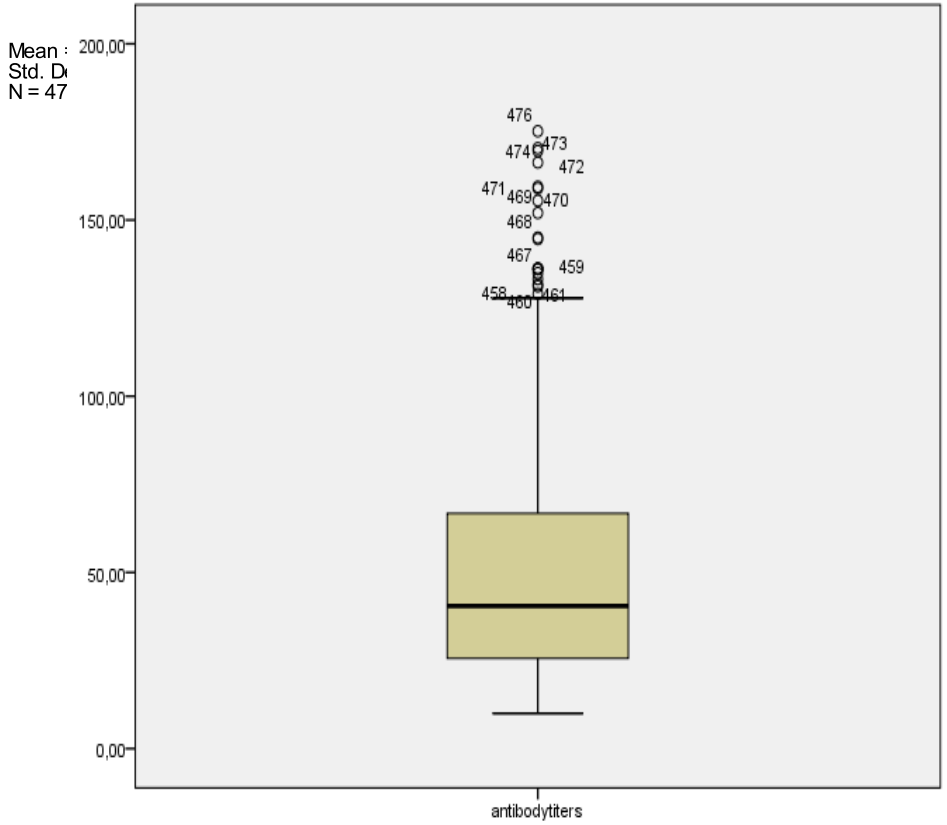
Label Cases by:

Statistics... | Plots... | Options... | Bootstrap...

Display: Both | Statistics | Plots

OK | Paste | Reset | Cancel | Help





Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
antibodytiters	,143	476	,000	,879	476	,000

a. Lilliefors Significance Correction

Descriptives

			Statistic	Std. Error
antibodytiters	Mean		50,6396	1,56961
	95% Confidence Interval for Mean	Lower Bound	47,5553	
		Upper Bound	53,7238	
	5% Trimmed Mean		47,6567	
	Median		40,4900	
	Variance		1172,713	
	Std. Deviation		34,24490	
	Minimum		9,99	
	Maximum		175,20	
	Range		165,21	
	Interquartile Range		41,15	
	Skewness		1,276	,112
	Kurtosis		1,237	,223

40.5 (Range=165.2)

40.5 (IQR=41.1)

Ben ortalama ve standart sapma kullanmak

t-testi yapmak istiyorum?

klimud.sav [DataSet1] - PASW Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

15 : antibodyist 1

	no	isim	yas	cinsiyet	ogrenim	guvence	sigara	ornektarih1	antibodytiters	antibodyist	log
1	234	HK	72	kadin	okuma yazma bil...	emekli san...	hayir	24.09.2012	9,99	100 alti	1,00
2	49	YÇ	30	erkek	.		hayir	07.02.2012	10,04	100 alti	1,00
3	280	BY							10,04	100 alti	1,00
4	430	AS							10,35	100 alti	1,01
5	468	MÇ							10,35	100 alti	1,01
6	153	YZ							10,38	100 alti	1,02
7	107	ÖD							10,62	100 alti	1,03
8	106	CA							10,70	100 alti	1,03
9	406	SM							11,22	100 alti	1,05
10	228	BK							11,38	100 alti	1,06
11	121	FM							11,64	100 alti	1,07
12	83	ŞK							11,77	100 alti	1,07
13	221	Sİ							12,08	100 alti	1,08
14	42	PK							12,18	100 alti	1,09
15	272	YA							12,40	100 alti	1,09
16	441	SA							12,48	100 alti	1,10
17	79	MP							12,52	100 alti	1,10
18	429	HÖ	50	kadin	ilköğrenim ve dengi		evet	12.02.2013	12,60	100 alti	1,10
19	262	AD	31	kadin	ilköğrenim ve dengi	emekli san...	evet	03.10.2012	12,75	100 alti	1,11
20	287	ES	26	kadin	lise ve dengi	SGK	evet	23.10.2012	13,14	100 alti	1,12
21	225	FC	58	kadin	.	SGK	hayir	07.09.2012	13,24	100 alti	1,12
22	179	LA	58	erkek	ilköğrenim ve dengi	SSKB	evet	30.05.2012	13,26	100 alti	1,12

Explore

no
isim
yas
cinsiyet
ogrenim
guvence
sigara
ornektarih1
antibodytiters

Dependent List: log

Factor List:

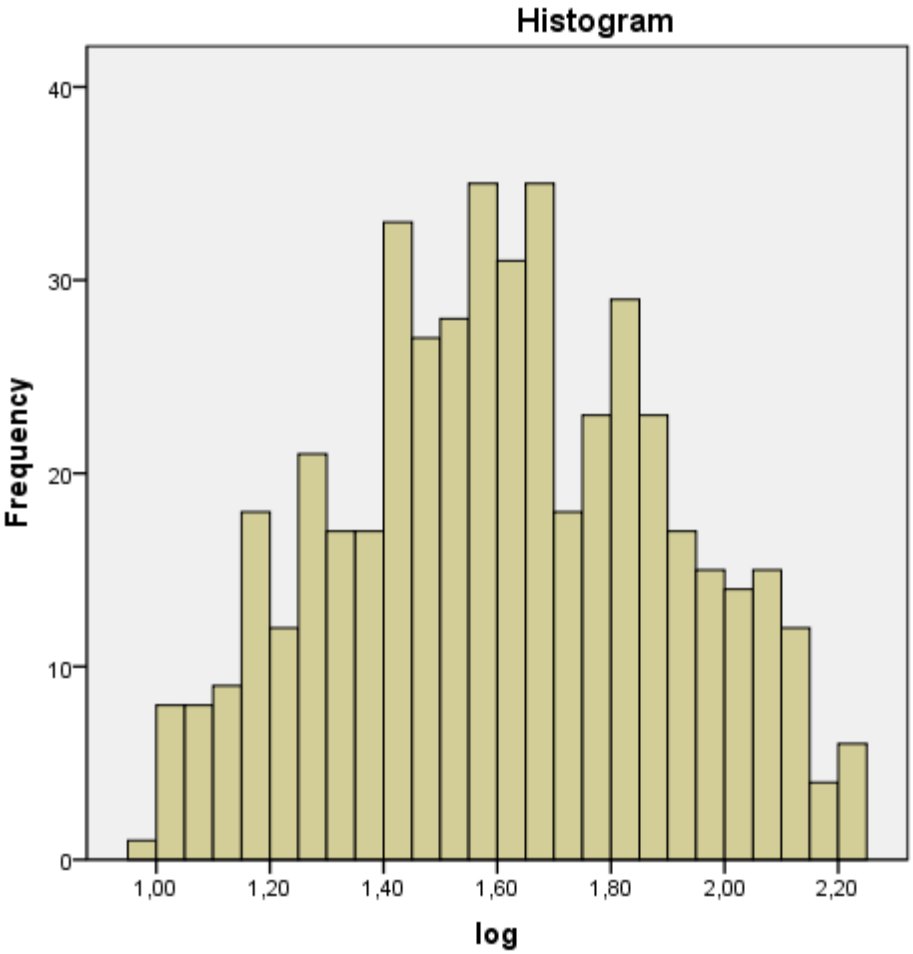
Label Cases by:

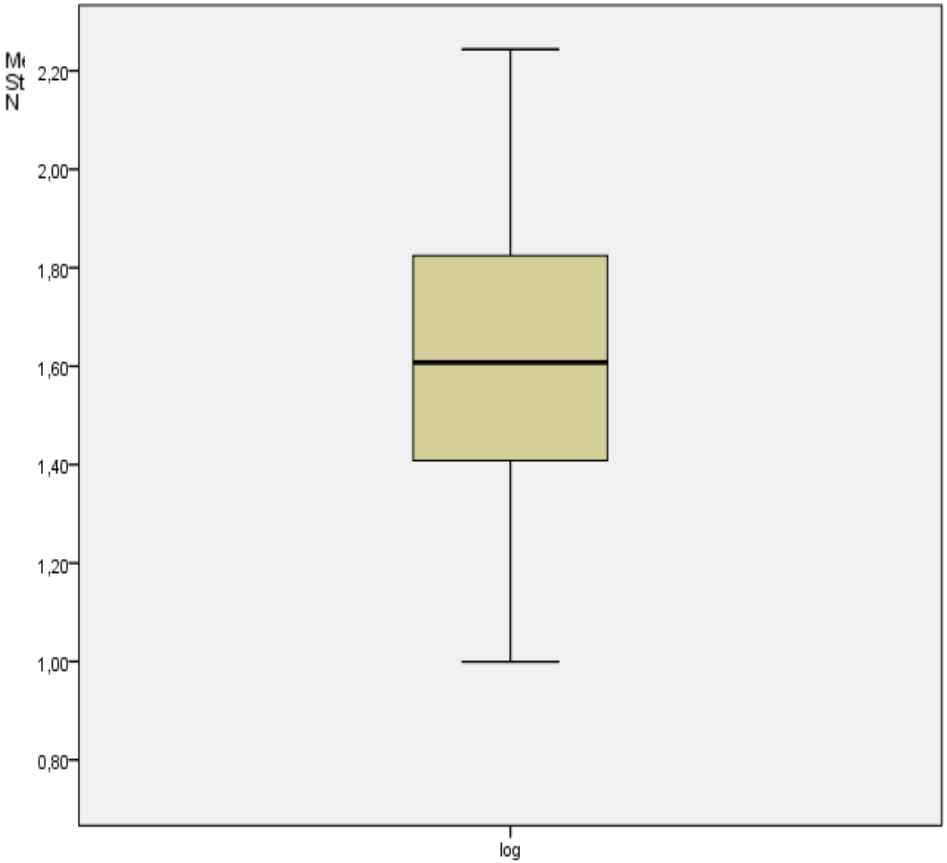
Statistics... Plots... Options... Bootstrap...

Display: Both Statistics Plots

OK Paste Reset Cancel Help

Data View Variable View





Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
log	,034	476	,200*	,988	476	,001

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

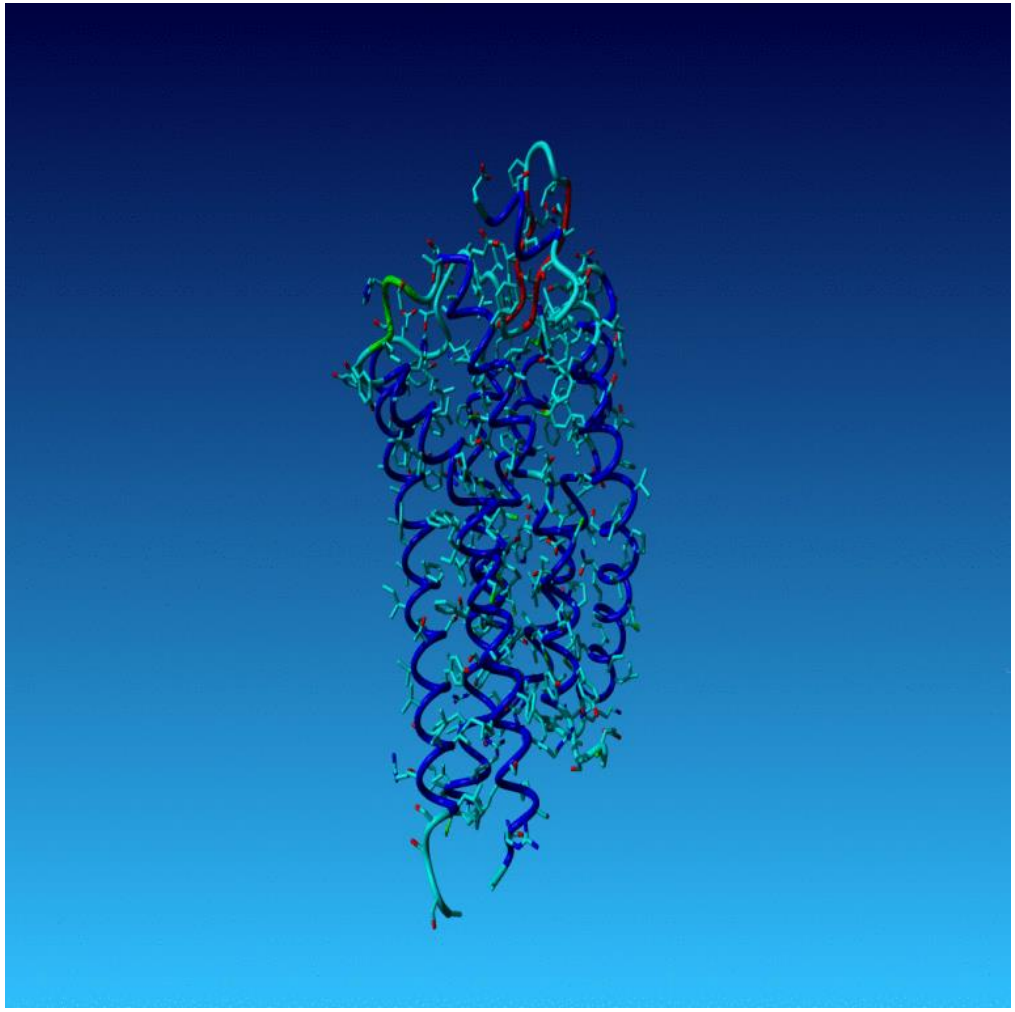
Descriptives

			Statistic	Std. Error
log	Mean		1,6113	,01319
	95% Confidence Interval for Mean	Lower Bound	1,5854	
		Upper Bound	1,6373	
	5% Trimmed Mean		1,6114	
	Median		1,6073	
	Variance		,083	
	Std. Deviation		,28788	
	Minimum		1,00	
	Maximum		2,24	
	Range		1,24	
	Interquartile Range		,42	
	Skewness		,015	,112
	Kurtosis		-,698	,223

1.6 (SD=0.3)

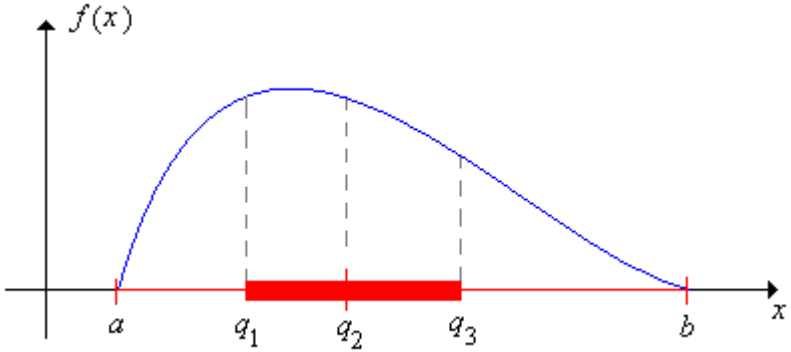
1.6 (SEM=0.0)

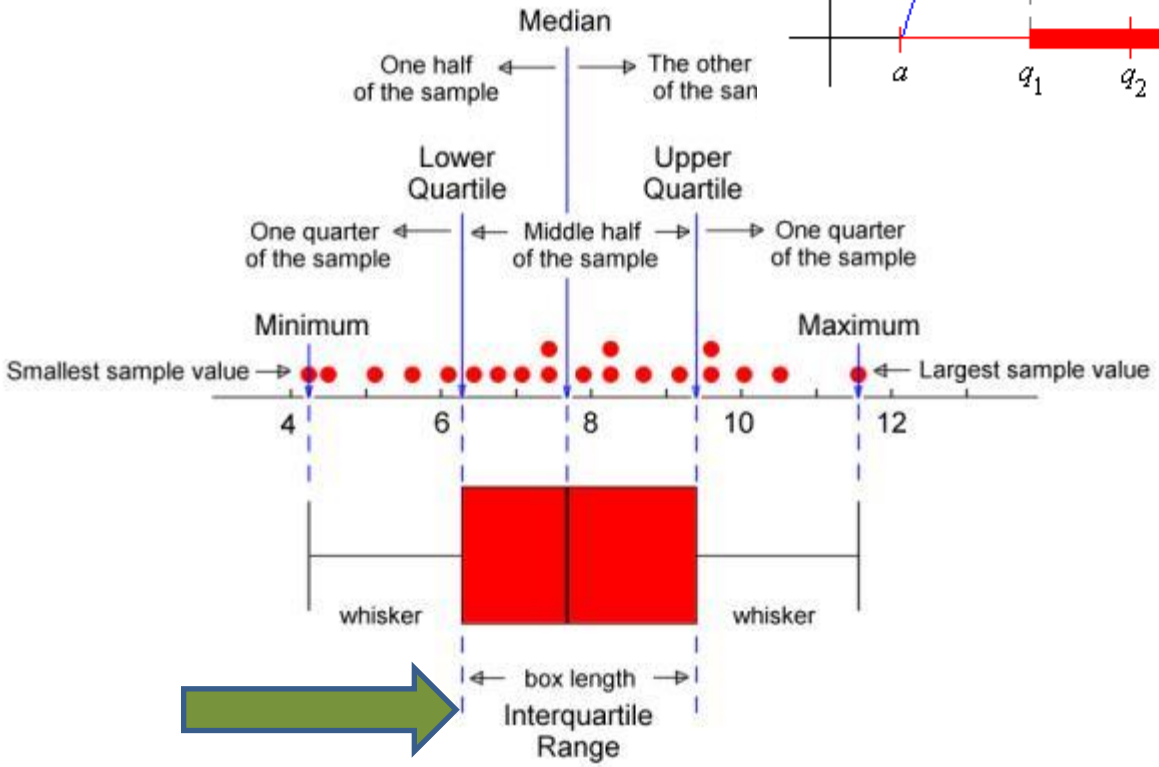
1.6 (95%CI=1.58-1.63)



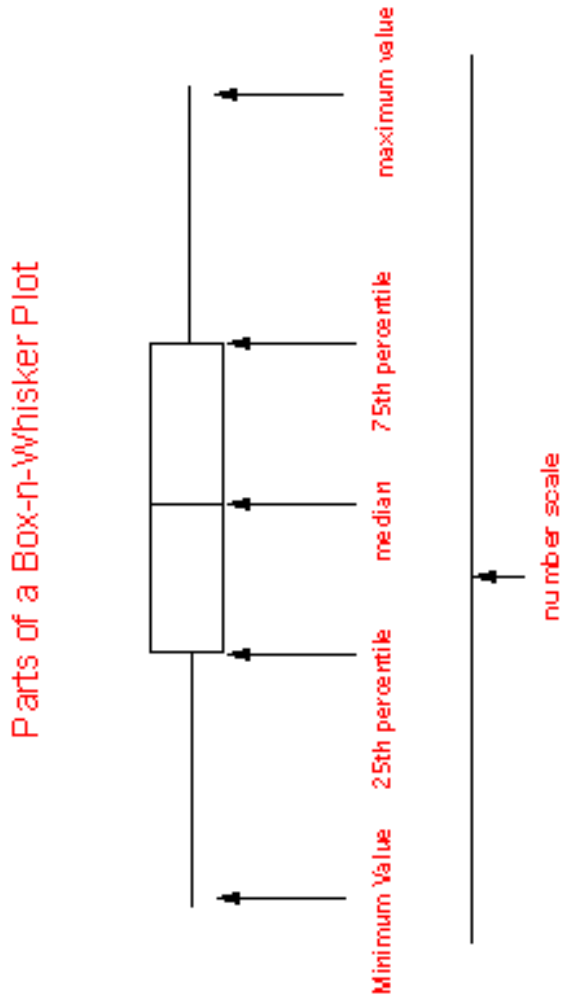
Aynı hastada dört farklı antikor ölçümü yaptım, bu ölçümlerin dağılımlarını aynı grafikte nasıl gösterebilirim?

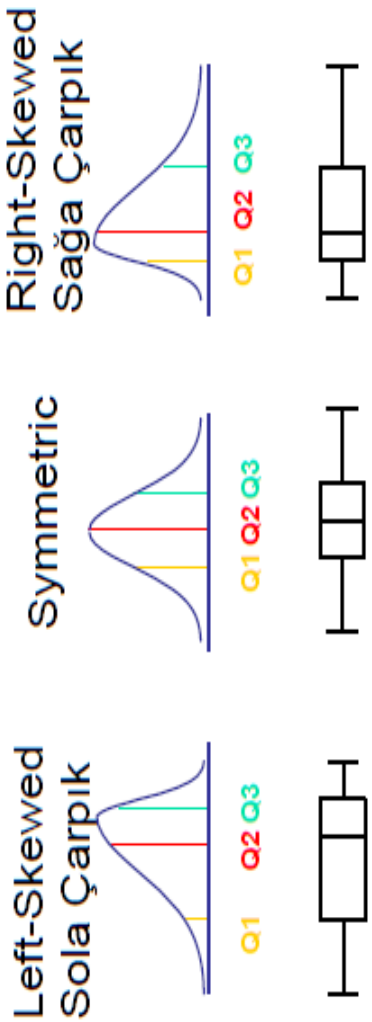
Kutu çizgi grafikleri - - “Box Plot” - - “Box and Whiskort plot”

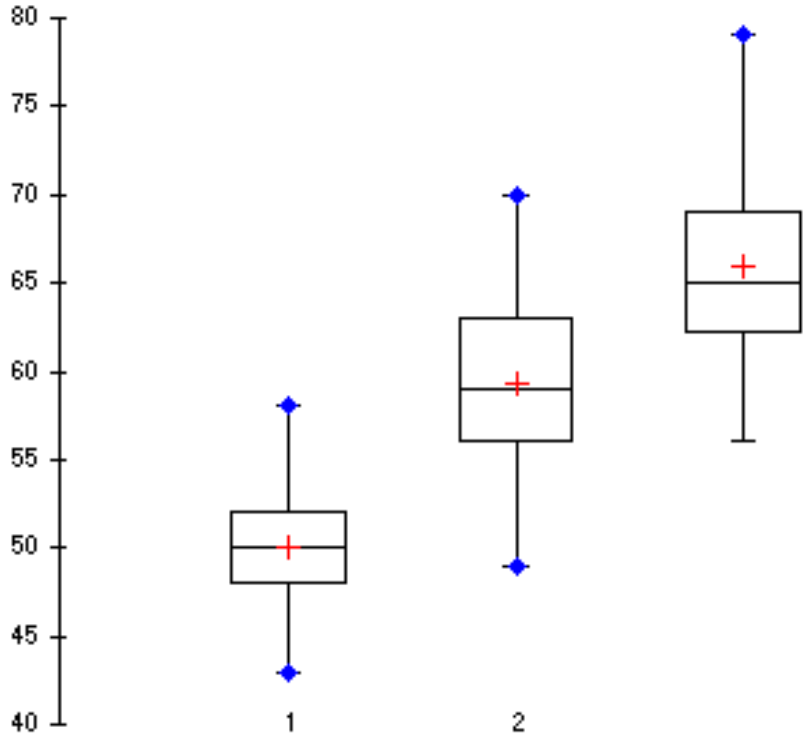


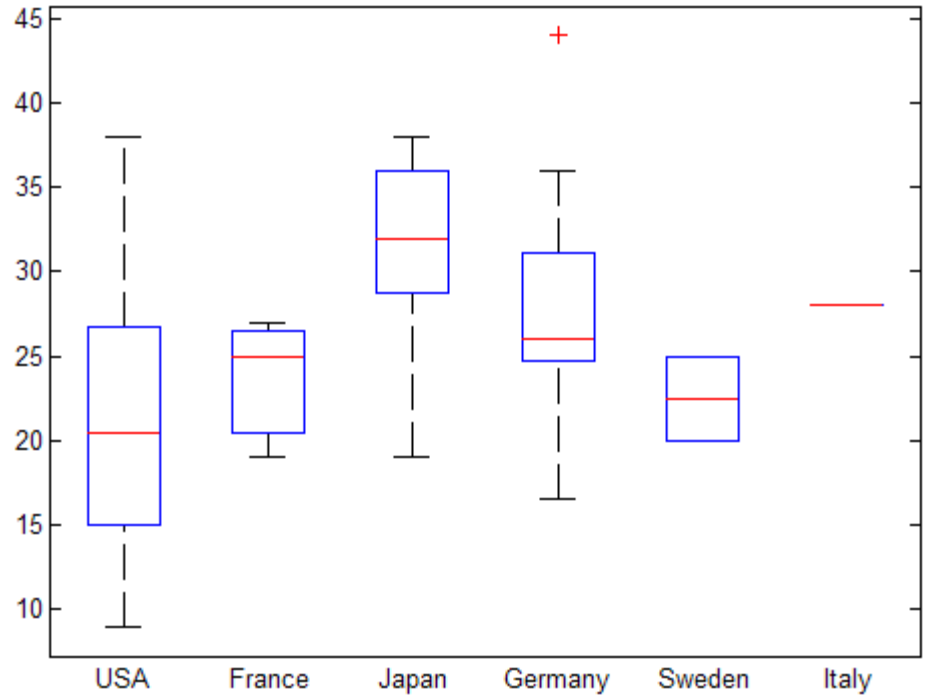


Kutu çizgi grafikleri - - “Box Plot” - - “Box and Whiskort plot”

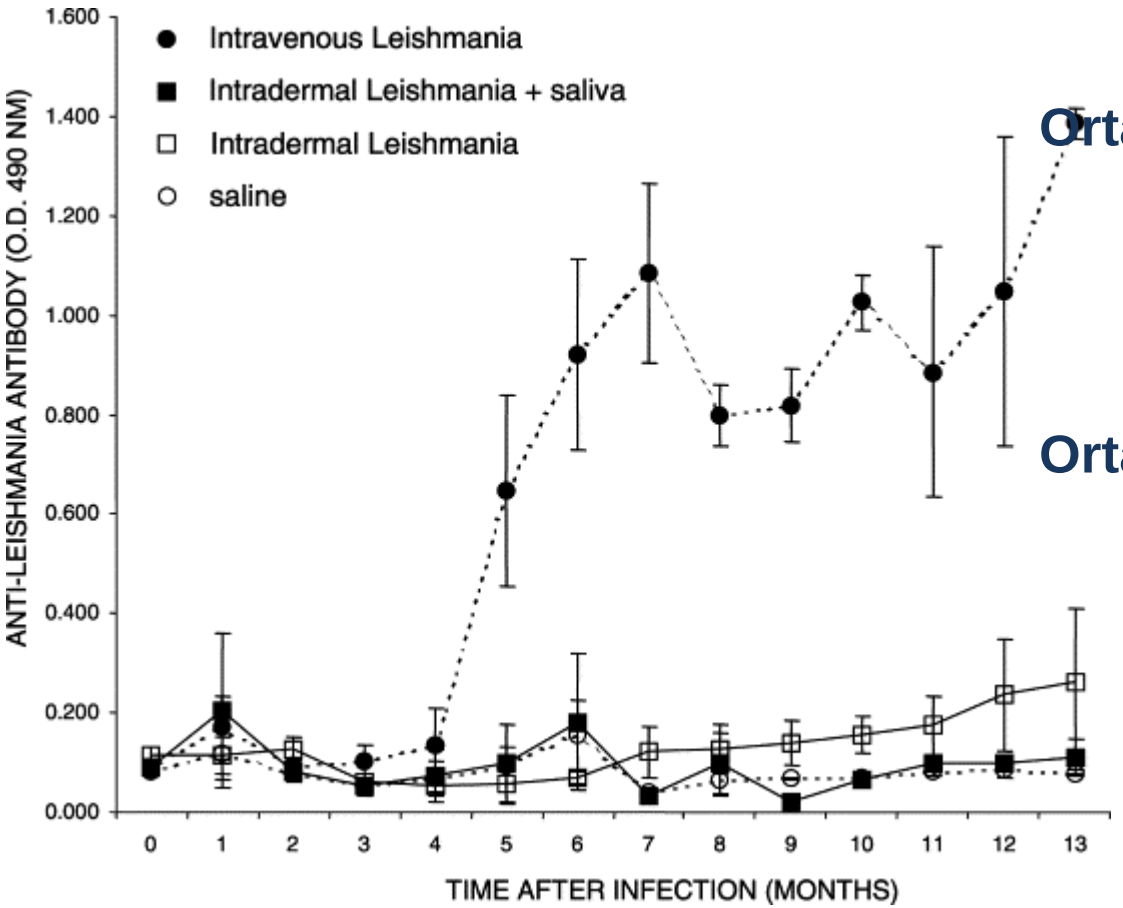





80
75
70
65
60
55
50
45
40
1
2

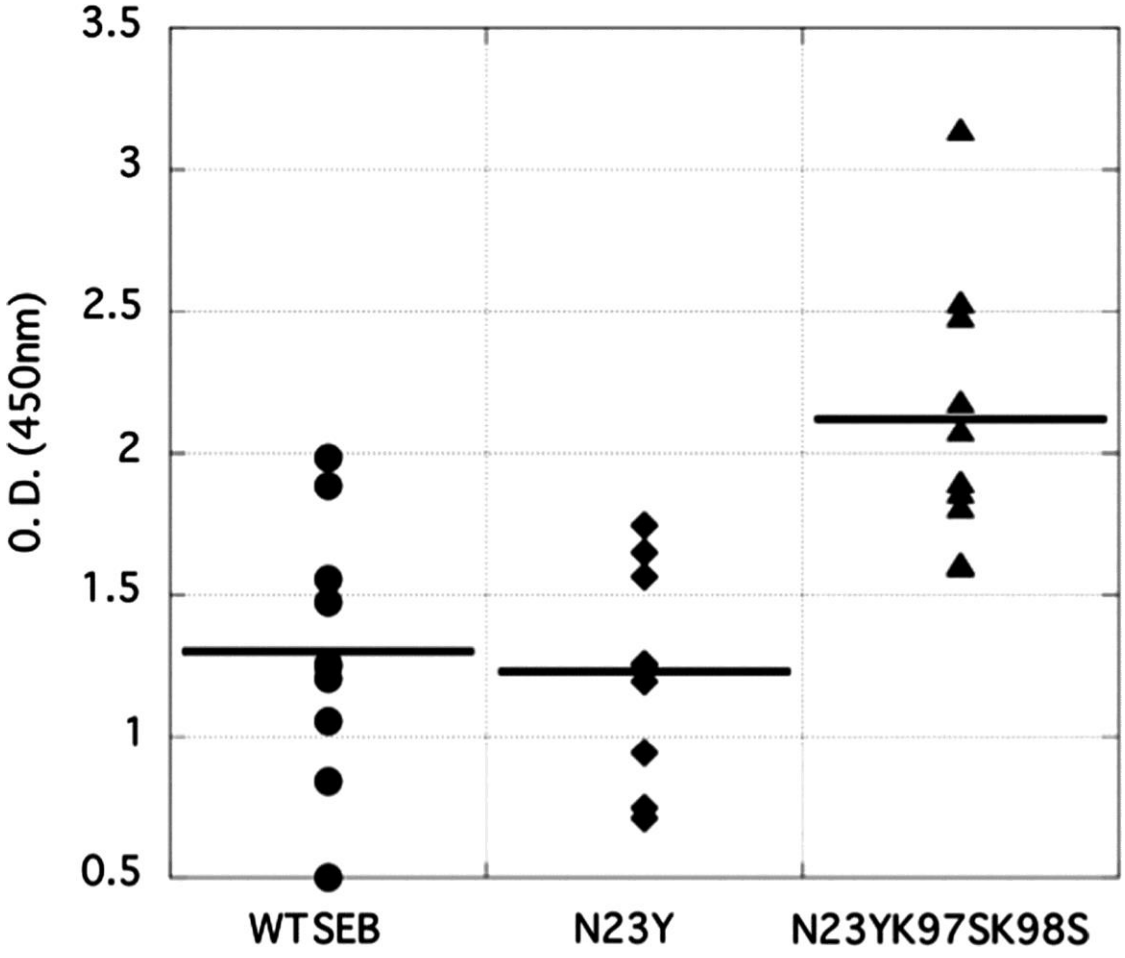

45
40
35
30
25
20
15
10
USA
France
Japan
Germany
Sweden
Italy

“Error” grafiği - - Hata grafiği



Ortalama + 1.S

Ortalama - 1.S

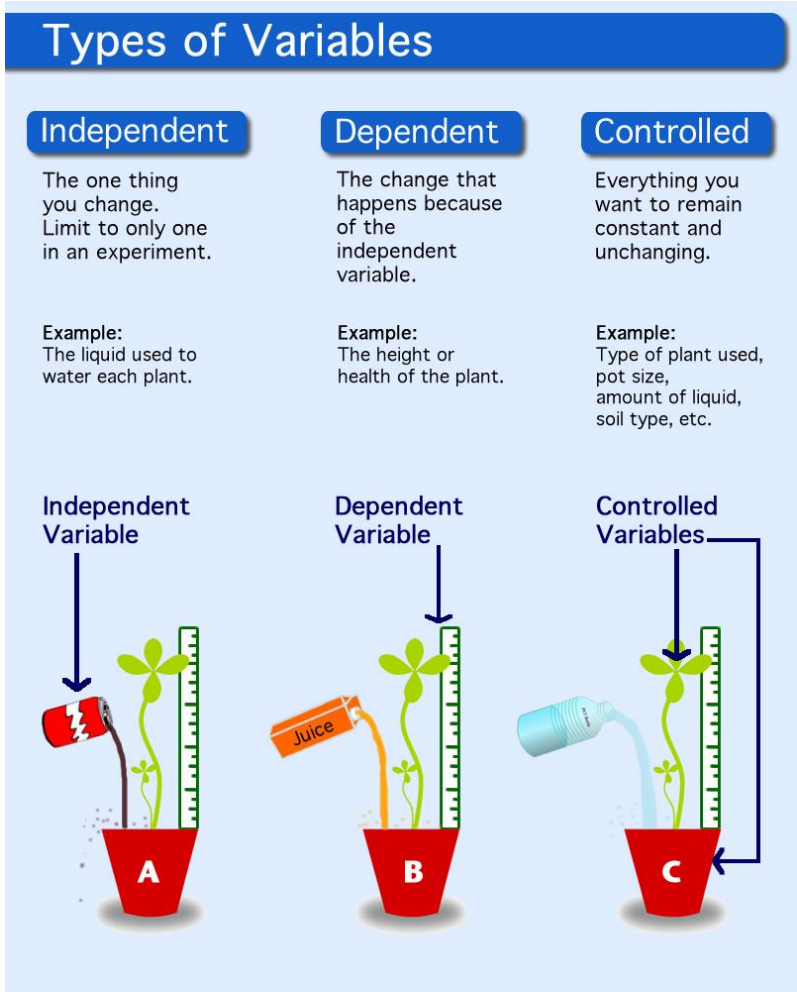

3.5
3
2.5
2
1.5
1
0.5
O. D. (450nm)
WTSEB
N23Y
N23YK97SK98S

- ✓ Serum örneklerinde tularemi antikor titresi ile cinsiyet arasındaki fark istatiksel olarak anlamlı bulunmuştur ($p \leq 0.05$).

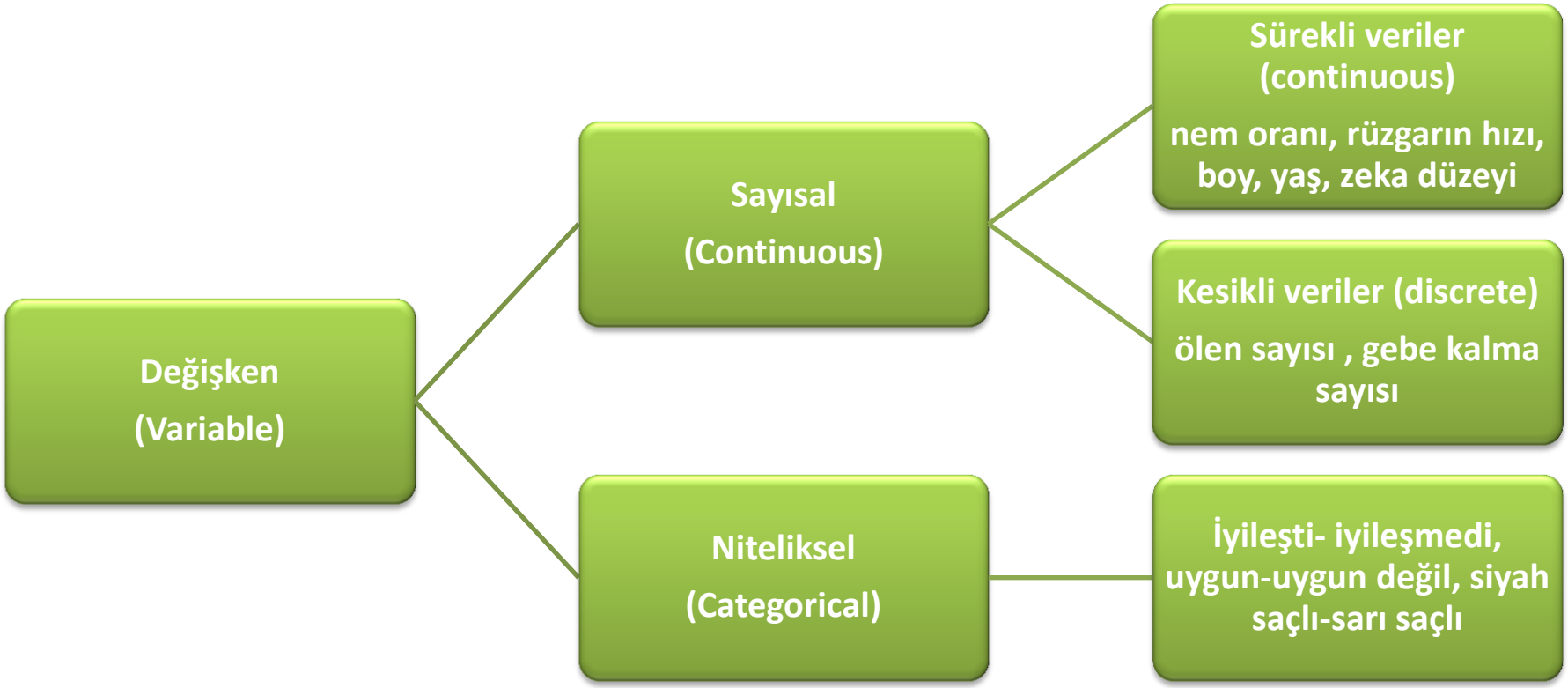
- ✓ Tularemi seropozitivitesi yönünden kadın ve erkekler arasında anlamlı fark bulunmuştur ($p < 0.05$).

- ✓ Fare ile temas eden seropozitif bulunan kişilerde risk temas etmeyenlerden yüksekti, ilişki anlamlı bulunmuştur ($p = 0.011$).

- Kızamık olan çocuklar olmayan çocuklardan farklı okullara mı gitti?
- Gastroenterit vakaları, gastroenterit olmayan kişilerin yediklerinden farklı ne yediler?
- Diabetli çocuklar coxsackie virus infeksiyonuna sağlıklı çocuklardan daha mı sık yakalanıyor?
- HIV pozitif kişilerde TBC vakaları, HIV negatif kişilerden daha mı sık görülüyor?


Types of Variables
Independent
The one thing you change. Limit to only one in an experiment.
Example: The liquid used to water each plant.
Dependent
The change that happens because of the independent variable.
Example: The height or health of the plant.
Controlled
Everything you want to remain constant and unchanging.
Example: Type of plant used, pot size, amount of liquid, soil type, etc.
Independent Variable
Dependent Variable
Controlled Variables
Juice
A
B
C

Nothing you do affects me — I'm independent.
Something you do affect me.
Independent variable
Dependent variable


Değişken
(Variable)
Sayısal
(Continuous)
Niteliksel
(Categorical)
Sürekli veriler
(continuous)
nem oranı, rüzgarın hızı, boy, yaş, zeka düzeyi
Kesikli veriler (discrete)
ölen sayısı , gebe kalma sayısı
İyileşti- iyileşmedi, uygun-uygun değil, siyah saçlı-sarı saçlı

Data Type Transformation

CATEGORICAL	ORDINAL	NUMERICAL	
		Interval	Ratio
Male / Female	Small / Med / Large	Time	Time
Asia / Africa / Europe	Low / High	Latitude/Longitude	Length
True / False	Yes / Maybe / No	Compass direction	Count

Binning/Categorizing

Differencing/ Normalization

Independent Variable (X)	Dependent Variable (Y): Continuous	Dependent Variable (Y): Categorical
Continuous	Regression	Logistic Regression
Categorical	ANOVA	Chi-Square (χ^2) Test

Verileri kategorize ederken hangi Cut-off' ları ve neden kullandığımızı **materyal ve metod** bölümünde mutlaka belirtmeliyiz

Fare ile temas

Kategorik=Var (1)

Yok (0)

Cinsiyet

Kategorik=Kadın

Erkek

Yaş

Sayısal

Kategorik= 30 yaş ve altı

30 yaş üzeri

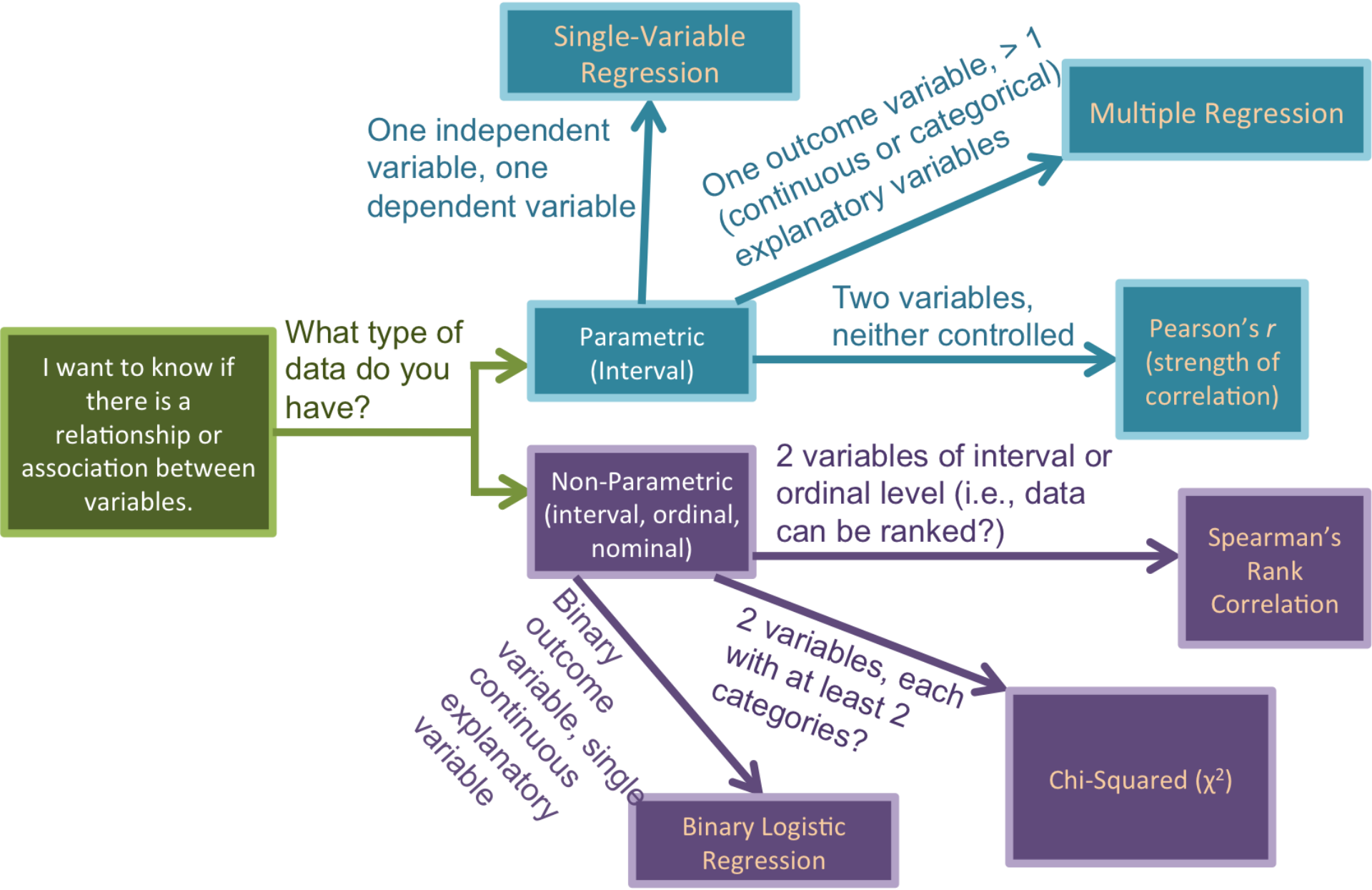
Bağımlı değişken

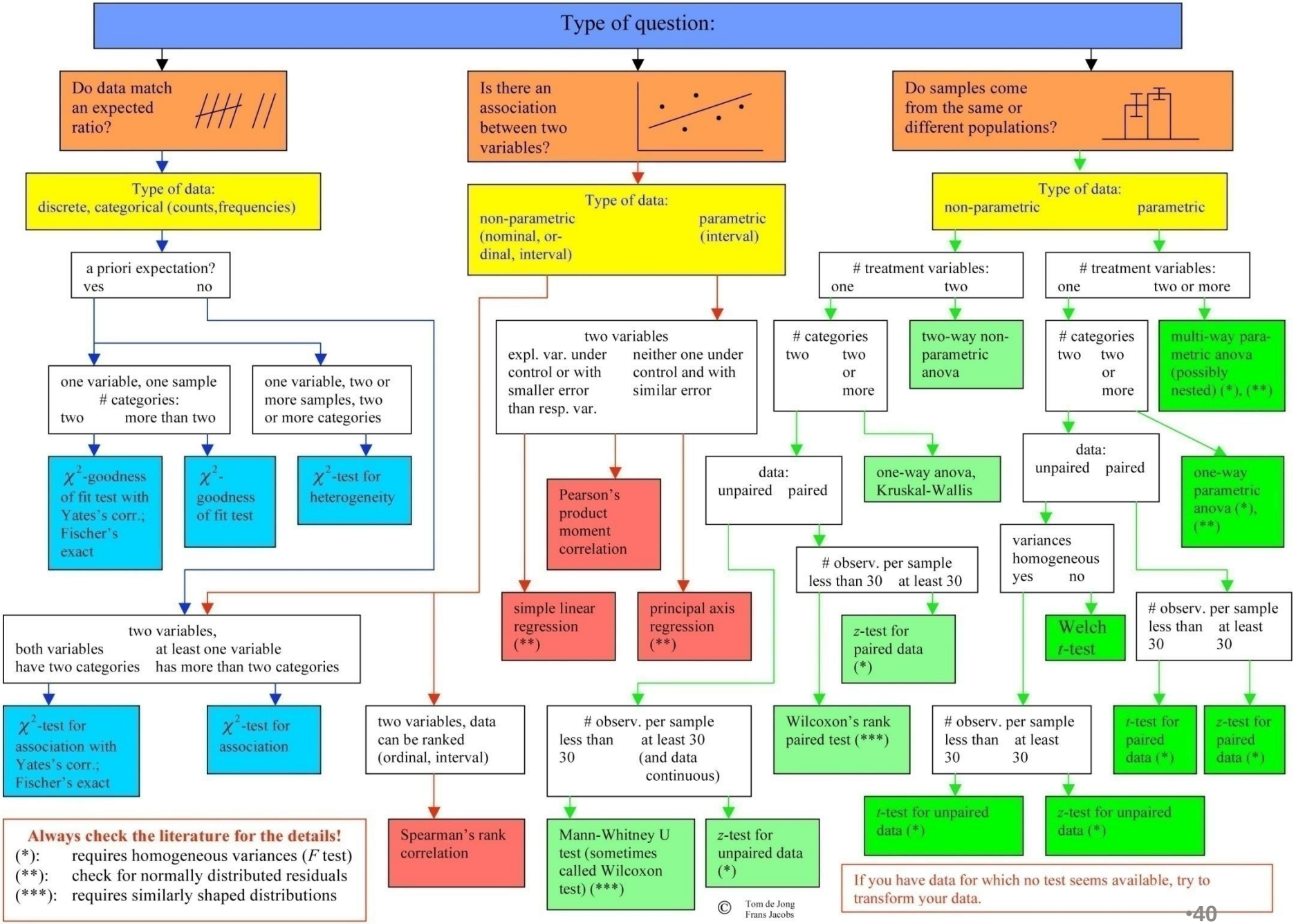
Sayısal=Antikor titresi

Kategorik=IgG pozitif (1)

IgG negatif (0)

Analize başlayalım?


I want to know if there is a relationship or association between variables.
What type of data do you have?
Parametric (Interval)
Non-Parametric (interval, ordinal, nominal)
One independent variable, one dependent variable
Single-Variable Regression
One outcome variable, > 1 (continuous or categorical) explanatory variables
Multiple Regression
Two variables, neither controlled
Pearson's r (strength of correlation)
2 variables of interval or ordinal level (i.e., data can be ranked?)
Spearman's Rank Correlation
Binary outcome variable, single continuous explanatory variable
Binary Logistic Regression
2 variables, each with at least 2 categories?
Chi-Squared (χ²)


Type of question:
Do data match an expected ratio?
Type of data: discrete, categorical (counts,frequencies)
a priori expectation? yes no
one variable, one sample # categories: two more than two
one variable, two or more samples, two or more categories
χ²-goodness of fit test with Yates's corr.; Fischer's exact
χ²-goodness of fit test
χ²-test for heterogeneity
two variables, both variables have two categories at least one variable has more than two categories
χ²-test for association with Yates's corr.; Fischer's exact
χ²-test for association
Is there an association between two variables?
Type of data: non-parametric (nominal, ordinal, interval) parametric (interval)
two variables expl. var. under control or with smaller error than resp. var. neither one under control and with similar error
Pearson's product moment correlation
simple linear regression (**)
principal axis regression (**)
two variables, data can be ranked (ordinal, interval)
Spearman's rank correlation
observ. per sample less than 30 at least 30 (and data continuous)
Mann-Whitney U test (sometimes called Wilcoxon test) (***)
z-test for unpaired data (*)
Do samples come from the same or different populations?
Type of data: non-parametric parametric
treatment variables: one two
categories two two or more
two-way non-parametric anova
data: unpaired paired
one-way anova, Kruskal-Wallis
observ. per sample less than 30 at least 30
z-test for paired data (*)
Wilcoxon's rank paired test (***)
treatment variables: one two or more
categories two two or more
multi-way parametric anova (possibly nested) (*), (**)
data: unpaired paired
one-way parametric anova (*), (**)
variances homogeneous yes no
Welch t-test
observ. per sample less than 30 at least 30
t-test for paired data (*)
z-test for paired data (*)
observ. per sample less than 30 at least 30
t-test for unpaired data (*)
z-test for unpaired data (*)
Always check the literature for the details!
(*): requires homogeneous variances (F test)
(**): check for normally distributed residuals
(***): requires similarly shaped distributions
© Tom de Jong Frans Jacobs
If you have data for which no test seems available, try to transform your data.

DataSet1] - PASW Statistics Data Editor

ew Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

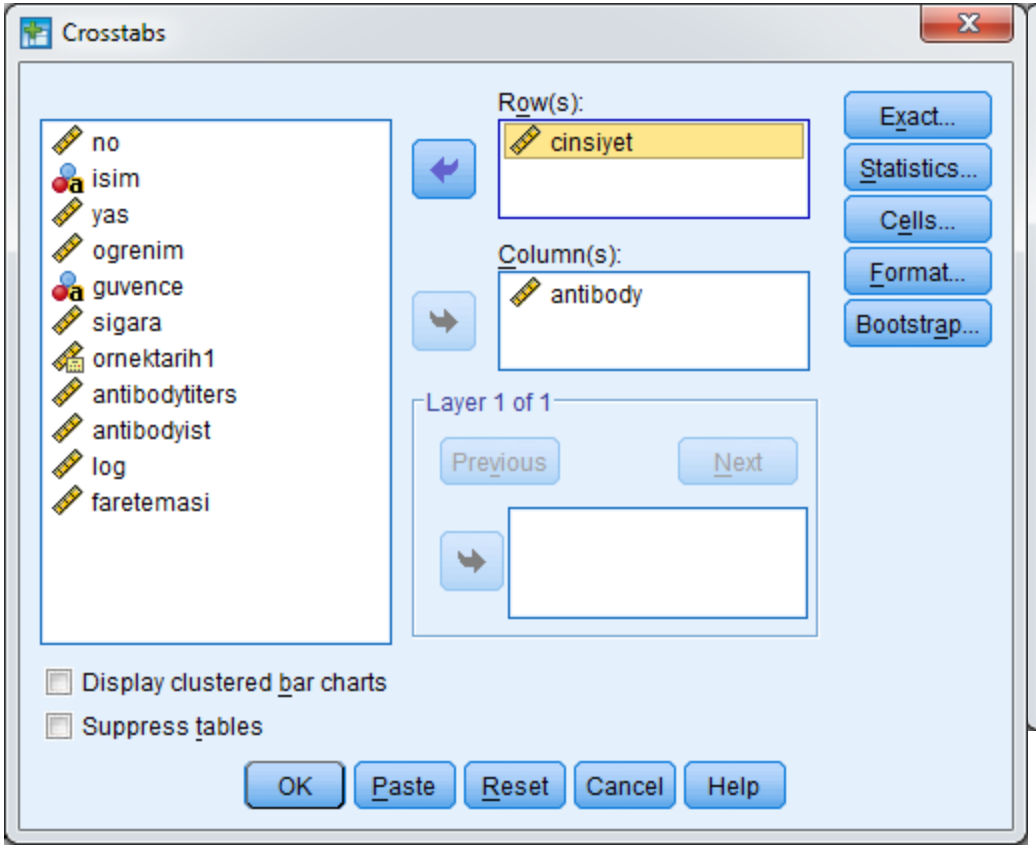
- Reports
- Descriptive Statistics
  - Frequencies...
  - Descriptives...
  - Explore...
  - Crosstabs...
  - Ratio...
  - P-P Plots...
  - Q-Q Plots...
- Tables
- Compare Means
- General Linear Model
- Generalized Linear Models
- Mixed Models
- Correlate
- Regression
- Loglinear
- Neural Networks
- Classify
- Dimension Reduction
- Scale
- Nonparametric Tests
- Forecasting
- Survival
- Multiple Response
- Missing Value Analysis...
- Multiple Imputation
- Complex Samples
- Quality Control
- ROC Curve...

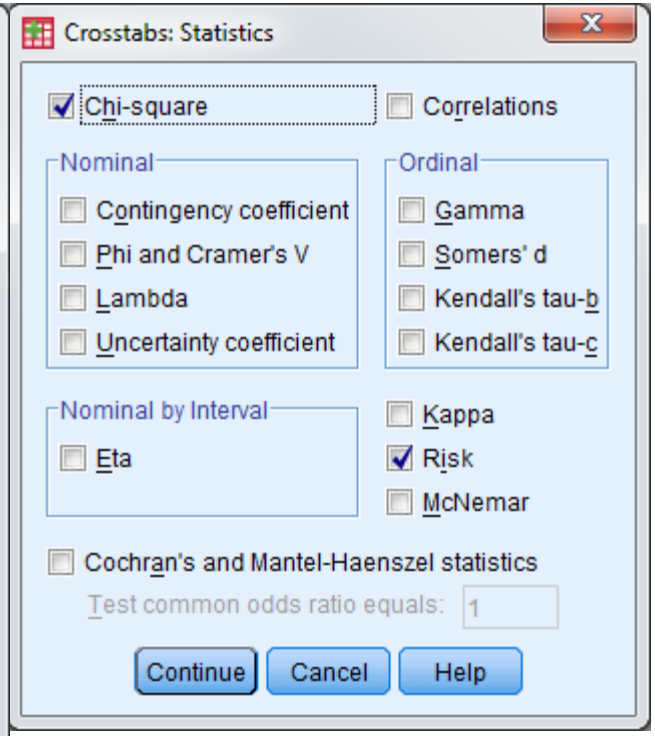
GY

no	isim	yas					ornektarih1	antibodytiters	antibodyist	log	antibody
52	B...	13					.	35,67	100 alti	1,55	negatif
487	NA	14					04.04.2012	23,29	100 alti	1,37	negatif
518	GS	17					24.05.2012	38,30	100 alti	1,58	negatif
470	GA	13					06.03.2012	16,13	100 alti	1,21	negatif
36	BK	16					16.02.2011	39,70	100 alti	1,60	negatif
233	CT	17			SGK	hayir	24.09.2012	15,71	100 alti	1,20	negatif
304	YÖ	17			SSK	evet	05.12.2012	32,40	100 alti	1,51	negatif
280	BY	18			SGK	evet	19.10.2012	10,04	100 alti	1,00	negatif
375	HŞ	18				hayir	18.12.2012	29,15	100 alti	1,46	negatif
273	UÖ	19			YOK	evet	31.10.2012	42,28	100 alti	1,63	negatif
243	SK	19			SSK	evet	28.09.2012	45,90	100 alti	1,66	negatif
5	FA	20			ssk	hayir	03.11.2011	14,38	100 alti	1,16	negatif
485	SA	20			Bağkur	hayir	03.04.2012	15,00	100 alti	1,18	negatif
410	GA	20				hayir	04.02.2013	58,15	100 alti	1,76	negatif
494	TB	21			Emekli Sa...	hayir	12.04.2012	14,55	100 alti	1,16	negatif
260	GÖ	21			emekli san...	evet	01.10.2012	15,18	100 alti	1,18	negatif
175	AY	21			SSKB	hayir	21.05.2012	22,79	100 alti	1,36	negatif
9	GY	21			ssk	hayir	10.11.2011	69,28	100 alti	1,84	negatif
182	EA	22			emekli san...	evet	29.05.2012	28,22	100 alti	1,45	negatif
345	DK	22			SSK	hayir	21.12.2012	63,70	100 alti	1,80	negatif
183	HB	23	erkek	.		evet	28.05.2012	50,20	100 alti	1,70	negatif
66	TÇ	23	kadin	.	SGK1	hayir	27.03.2012	68,49	100 alti	1,84	negatif

ariable View

PASW St


Crosstabs
no
isim
yas
ogrenim
guvence
sigara
ornektarih1
antibodytiters
antibodyist
log
faretemasi
Row(s):
cinsiyet
Column(s):
antibody
Layer 1 of 1
Previous
Next
Exact...
Statistics...
Cells...
Format...
Bootstrap...
Display clustered bar charts
Suppress tables
OK
Paste
Reset
Cancel
Help


Crosstabs: Statistics
Chi-square
Correlations
Nominal
Contingency coefficient
Phi and Cramer's V
Lambda
Uncertainty coefficient
Ordinal
Gamma
Somers' d
Kendall's tau-b
Kendall's tau-c
Nominal by Interval
Eta
Kappa
Risk
McNemar
Cochran's and Mantel-Haenszel statistics
Test common odds ratio equals:
1
Continue
Cancel
Help

*Output1 [Document1] - PASW Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

- Title
- Notes
- Active Dataset
- Case Processi
- cinsiyet * antibo
- Chi-Square Tes
- Risk Estimate
- Log
- Crosstabs
  - Title
  - Notes
  - Active Dataset
  - Case Processi
  - cinsiyet * antibo
  - Chi-Square Tes
  - Risk Estimate
- Log
- Crosstabs
  - Title
  - Notes
  - Active Dataset
  - Case Processi
  - cinsiyet * antibo
  - Chi-Square Tes
  - Risk Estimate
- Log
- Crosstabs
  - Title
  - Notes
  - Active Dataset
  - Case Processi
  - cinsiyet * antibo
  - Chi-Square Tes
  - Risk Estimate

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
cinsiyet * antibody	476	100,0%	0	,0%	476	100,0%

cinsiyet * antibody Crosstabulation

			antibody		Total
			negatif	pozitif	
cinsiyet	erkek	Count	189	25	214
		% within cinsiyet	88,3%	11,7%	100,0%
	kadin	Count	257	5	262
		% within cinsiyet	98,1%	1,9%	100,0%
Total		Count	446	30	476
		% within cinsiyet	93,7%	6,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	19,054[a]	1	,000		
Continuity Correction[b]	17,435	1	,000		
Likelihood Ratio	20,115	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	19,014	1	,000		
N of Valid Cases	476				

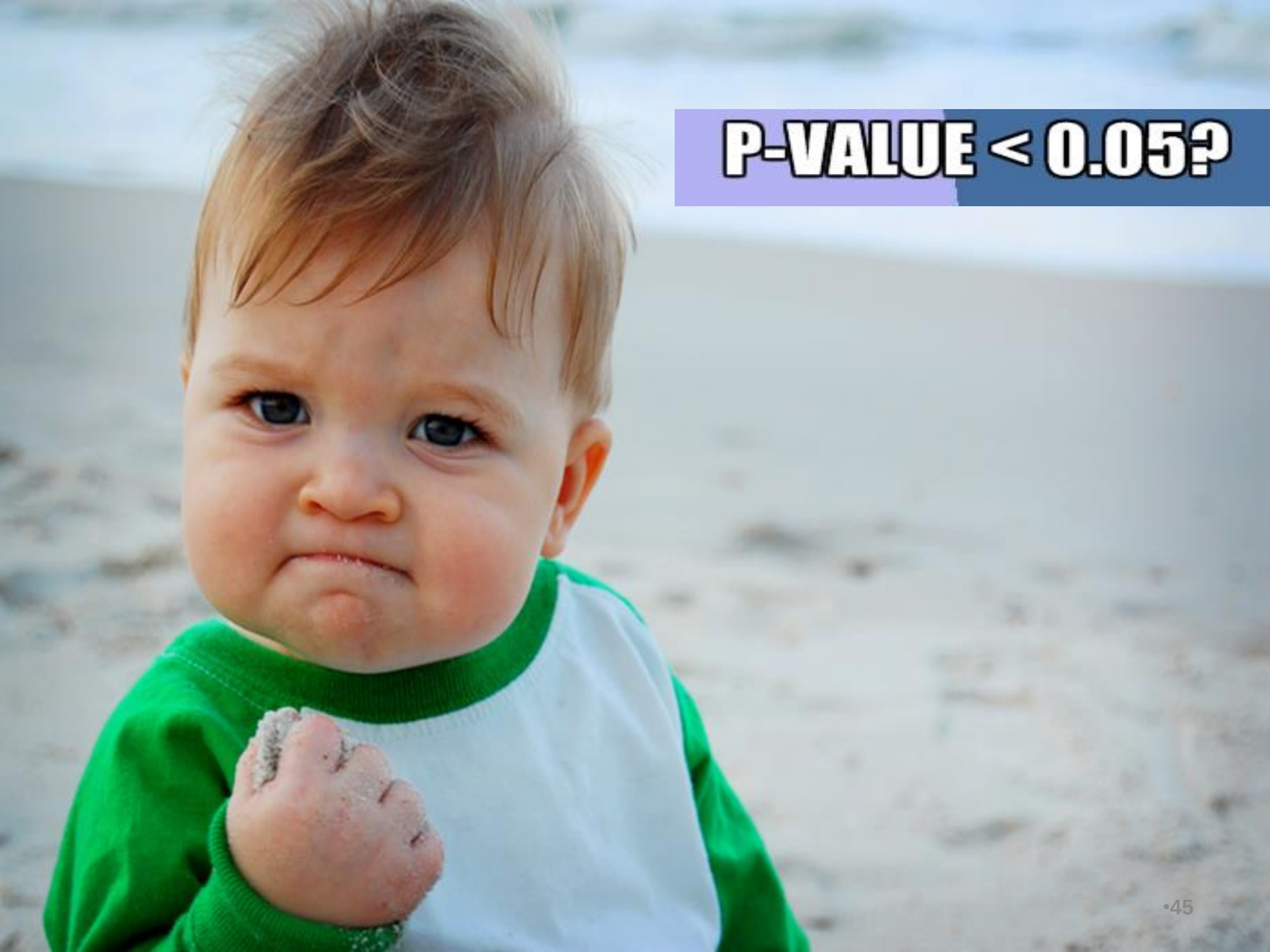
a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 13,49.

- ✓ Serum örneklerinde tularemi antikor titresi ile cinsiyet arasındaki fark istatiksel olarak anlamlı bulunmuştur ($p \leq 0.05$).

- ✓ Tularemi seropozitivitesi yönünden kadın ve erkekler arasında anlamlı fark bulunmuştur ($p < 0,05$).

- ✓ Fare ile temas eden seropozitif bulunan kişilerde risk temas etmeyenlerden yüksekti, ilişki anlamlı bulunmuştur ($p = 0,011$).

Anti-*Francisella tularensis* IgG antikor pozitiflik oranı erkeklerde (%11.7) kadınlardan (%1.9) istatistiksel olarak anlamlı düzeyde yüksektir (p=0.001)


P-VALUE < 0.05?

Type 1 and Type 2 Errors

Type 1 error

Rejecting a null hypothesis when we should not
P level too tight

Type 2 error

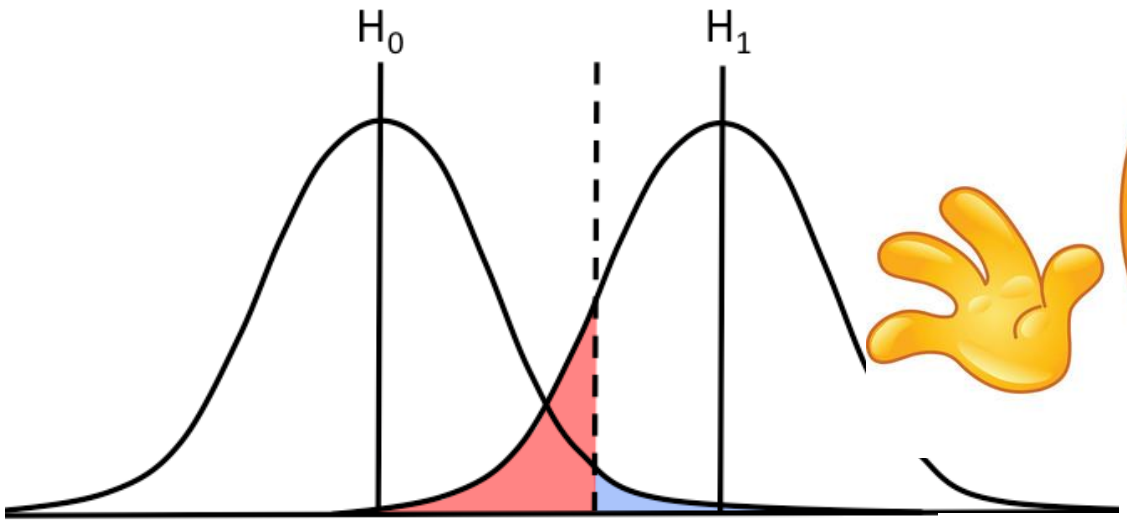
Accepting a null hypothesis when we should not
P level too loose

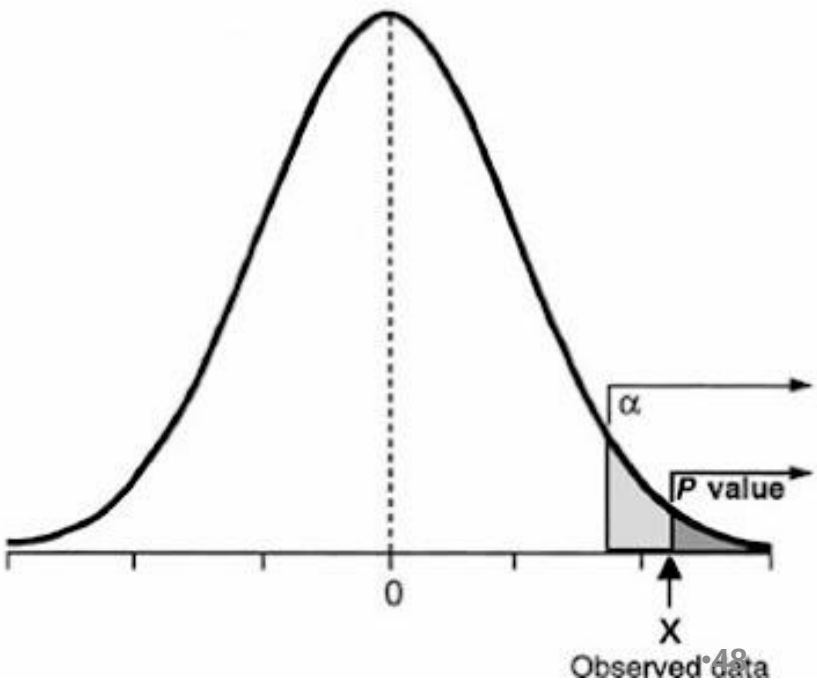
	Gerçek durum	
Test sonucu	İki grubun fare ile temas yüzdeleri arasında fark yok	İki grubun fare ile temas yüzdeleri arasında fark var
İki grubun fare ile temas yüzdeleri arasında fark yok	Doğru Karar	II. Tip Hata (β)
İki grubun fare ile temas yüzdeleri arasında fark var	I. Tip Hata (α)	Doğru Karar

α : Anlamlılık Düzeyi

$1-\alpha$= Güven Düzeyi

$1-\beta$: Testin Gücü(Power analysis)


H_0
H_1
β
α
Type II error
Type I error


α
P value
0
X
Observed data

P değeri= şansa bağlı olarak bulunma olasılığı, yanılma olasılığı, yanılma payı

The significance rollercoaster

Yöntem

- Bu çalışmada %80 güç ve %5 tip-1 hata ile, kontrol grubunda beklenen ortalamanın Y, standart sapmasının Z olduğu durumlarda X birimlik farkın anlamlı olarak gösterilebilmesi için her gruba N bireyin alınması gereklidir.

*klimud.sav [DataSet1] - PASW Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

1 : antibodytiter 27,48

- Reports
- Descriptive Statistics
- Tables
- Compare Means
  - Means...
  - One-Sample T Test...
  - Independent-Samples T Test...
  - Paired-Samples T Test...
  - One-Way ANOVA...
- General Linear Model
- Generalized Linear Models
- Mixed Models
- Correlate
- Regression
- Loglinear
- Neural Networks
- Classify
- Dimension Reduction
- Scale
- Nonparametric Tests
- Forecasting
- Survival
- Multiple Response
- Missing Value Analysis...
- Multiple Imputation
- Complex Samples
- Quality Control
- ROC Curve...

	no	isim	yas						antibodytiters	antibodytiter	antibodyist
1	52	B...						.	35,67	27,48	100 alti
2	49	YÇ	30					12	10,04	27,65	100 alti
3	468	MÇ	38					12	10,35	27,68	100 alti
4	107	ÖD	73					12	10,62	27,87	100 alti
5	228	BK	26					12	11,38	28,22	100 alti
6	83	ŞK	55				evet	18.04.2012	11,77	28,26	100 alti
7	179	LA	58			SSKB	evet	30.05.2012	13,26	29,15	100 alti
8	492	BŞ	25			SSK	evet	05.04.2012	13,85	29,56	100 alti
9	5	FA	20			ssk	hayir	03.11.2011	14,38	29,60	100 alti
10	70	AK	59			bağkur	hayir	30.03.2012	14,38	29,85	100 alti
11	494	TB	21			Emekli Sa...	hayir	12.04.2012	14,55	29,87	100 alti
12	76	TK	30			SGK1	hayir	10.04.2012	14,69	30,35	100 alti
13	260	GÖ	21			emekli san...	evet	01.10.2012	15,18	30,44	100 alti
14	96	RU	65			SGK1	hayir	25.04.2012	15,28	30,56	100 alti
15	269	ŞÇ	47			SGK	evet	31.10.2012	15,67	30,74	100 alti
16	154	MK	69			yeşil kart	evet	24.05.2012	15,84	30,84	100 alti
17	53	AB	66			SGK1	evet	13.03.2012	16,31	31,06	100 alti
18	265	KK	63			emekli san...	evet	10.10.2012	16,31	31,25	100 alti
19	267	NŞ	78			SGK	evet	10.10.2012	16,39	31,29	100 alti
20	213	MY	36				hayir	13.08.2012	16,40	31,47	100 alti
21	2	HS	30	erkek	ilköğrenim ve dengi		evet	02.11.2011	17,33	31,56	100 alti
22	414	YP	53	erkek	.		hayir	05.02.2013	18,36	31,96	100 alti

Data View | Variable View

Independent-Samples T Test...

T-Test

[DataSet1] C:\Users\Asus\Desktop\klimud 2015\klimud.sav

Group Statistics

	cinsiyet	N	Mean	Std. Deviation	Std. Error Mean
VAR00003	erkek	214	66,2991	34,63680	2,36772
	kadin	262	39,2244	34,31065	2,11972

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
VAR00003	Equal variances assumed	2,474	,116	8,528	474	,000	27,07474	3,17491	20,83611	33,31337
	Equal variances not assumed			8,520	453,511	,000	27,07474	3,17794	20,82942	33,32006

- ✓ Serum örneklerinde tularemi antikor titresi ile cinsiyet arasındaki fark istatiksel olarak anlamlı bulunmuştur ($p \leq 0.05$).

- ✓ Tularemi seropozitivitesi yönünden kadın ve erkekler arasında anlamlı fark bulunmuştur ($p<0,05$).

- ✓ Fare ile temas eden seropozitif bulunan kişilerde risk temas etmeyenlerden yüksekti, ilişki anlamlı bulunmuştur ($p=0,011$).

Anti-*Francisella tularensis* IgG antikor titre ortalamaları erkeklerde 66.3 (SD=34.6), kadınlarda 39.2 (SD=34.3) olarak bulunmuştur (p=0.001)

Erkeklerde kadınlara göre Anti-*Francisella tularensis* IgG antikor titre ortalamaları arasındaki 27.1'lik (%güven aralığı=20.8-33.3) fark istatistiksel olarak anlamlıdır (p=0.001)

- ✓ Serum örneklerinde tularemi antikor titresi ile cinsiyet arasındaki fark istatiksel olarak anlamlı bulunmuştur ($p \leq 0.05$).
- ✓ Tularemi seropozitivitesi yönünden kadın ve erkekler arasında anlamlı fark bulunmuştur ($p<0,05$).
- ✓ Fare ile temas eden seropozitif bulunan kişilerde risk temas etmeyenlerden yüksekti, ilişki anlamlı bulunmuştur ($p=0,011$).

Analitik epidemiyolojik çalışmalar

Vaka-Kontrol

- Case-control study

Kohort

- Cohort Study

Kesitsel

- Cross-sectional study

fareiletemas * antibody Crosstabulation

			antibody		Total
			negatif	pozitif	
fareiletemas	yok	Count	352	12	364
		% within fareiletemas	96,7%	3,3%	100,0%
	var	Count	94	18	112
		% within fareiletemas	83,9%	16,1%	100,0%
Total		Count	446	30	476
		% within fareiletemas	93,7%	6,3%	100,0%

Chi-Square Tests

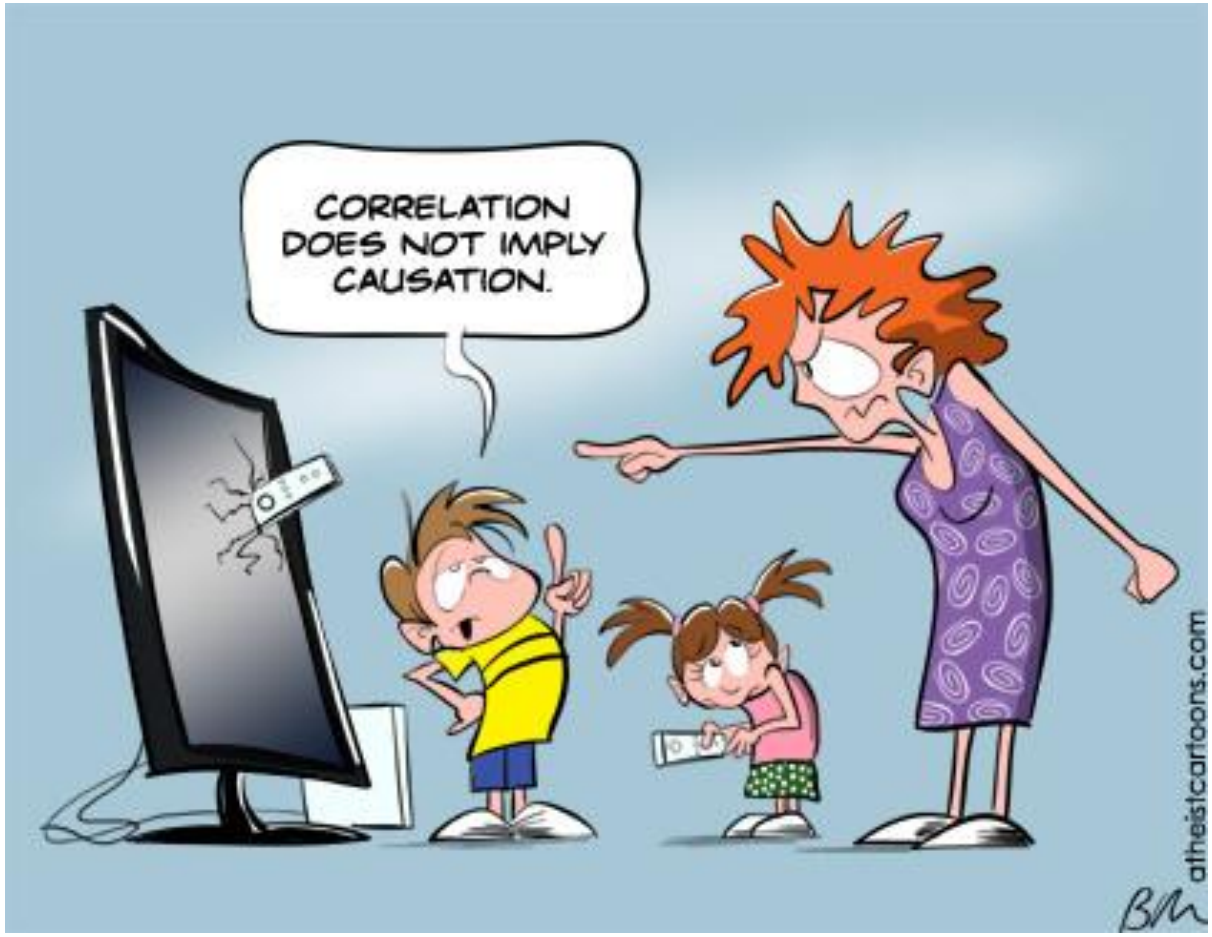
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	23,669[a]	1	,000		
Continuity Correction[b]	21,555	1	,000		
Likelihood Ratio	19,677	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	23,619	1	,000		
N of Valid Cases	476				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,06.

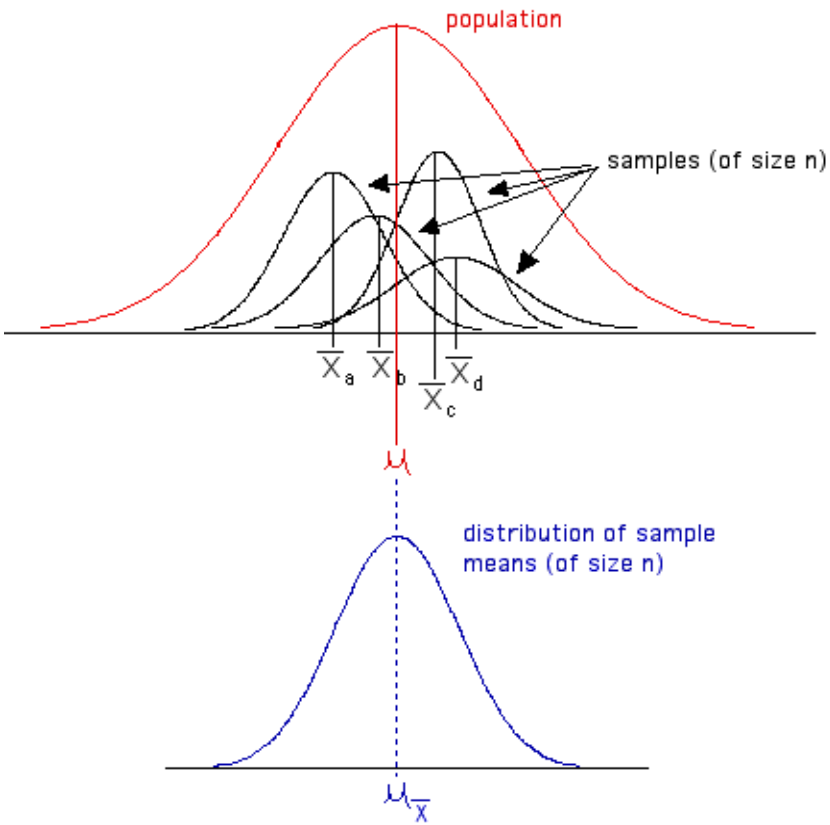
b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for fareiletemas (yok / var)	5,617	2,614	12,072
For cohort antibody = negatif	1,152	1,060	1,252
For cohort antibody = pozitif	,205	,102	,413
N of Valid Cases	476		

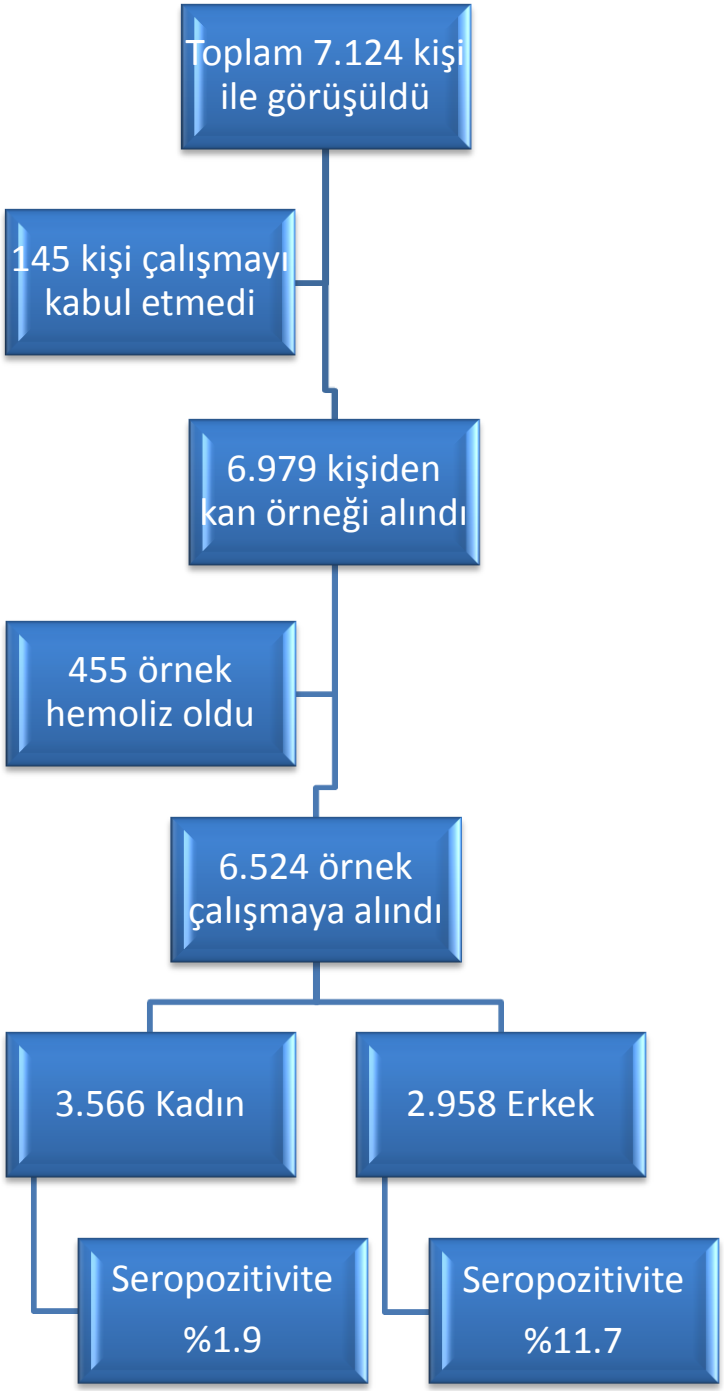


Fare ile temas edenlerde tularemi riski temas etmeyenlerden 5.6 kat (%95 güven aralığı= 2.6-12.1) yüksek olarak bulunmuştur (p=0.001)

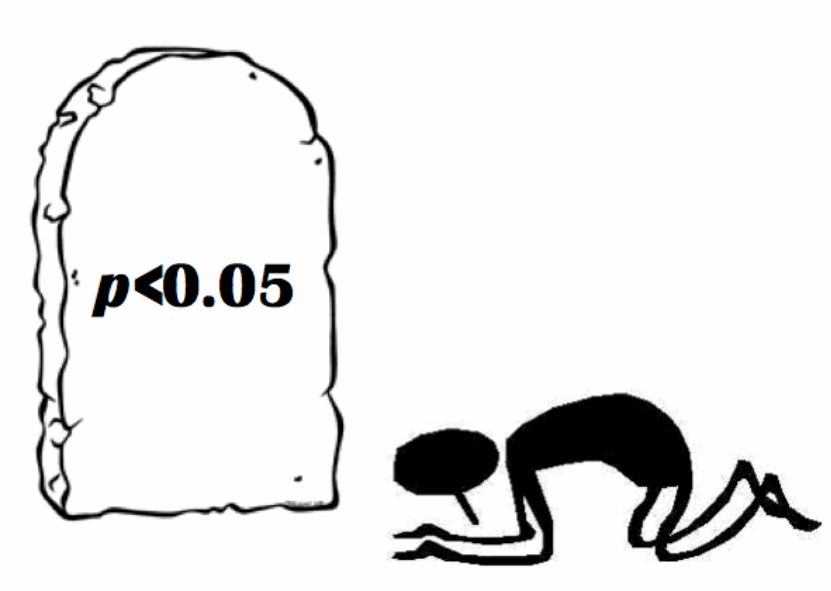


Ben bu çalışmayı 100 kez yapsaydım 95' inde 2.6 ile 12.1 arasında bulacaktım.....değişecekti

Eksik veriler?


Toplam 7.124 kişi ile görüşüldü
145 kişi çalışmayı kabul etmedi
6.979 kişiden kan örneği alındı
455 örnek hemoliz oldu
6.524 örnek çalışmaya alındı
3.566 Kadın
2.958 Erkek
Seropozitivite %1.9
Seropozitivite %11.7

Ig G antikor	Erkek	Kadın	P değeri
Pozitif			
Negatif			
Toplam			



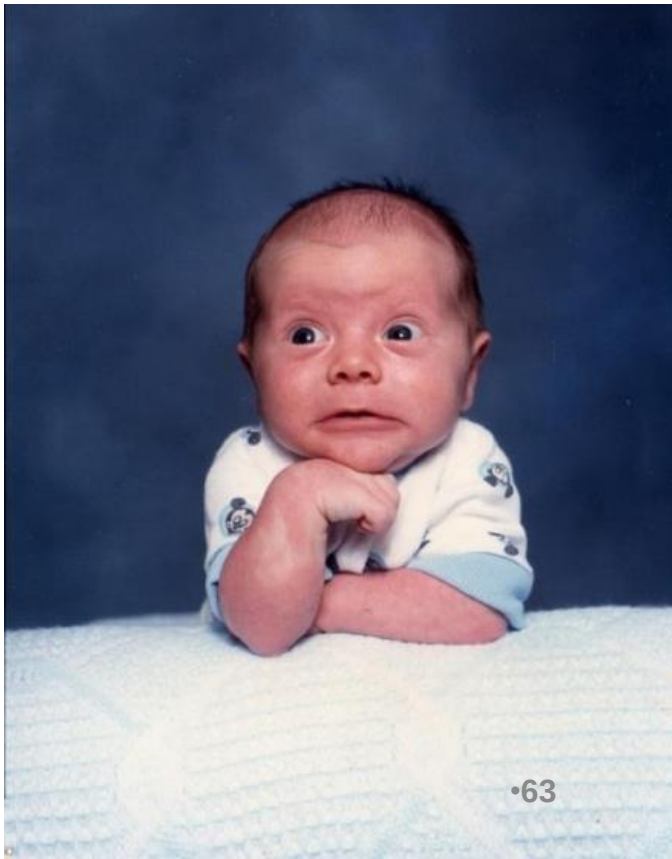
Data Tables

Cinsiyet

e Title (IV/DV)

Independent Variable	Dependent Variable Trial 1	Dependent Variable Trial 2	Dependent Variable Trial 3	Calculated Value
Level One				
Level Two				
Level Three				

Antikor



Özellik		Seropozitif		Seronegatif		Odds ratio	%95 Güven aralığı	P değeri
		Sayı	%	Sayı	%			
Cinsiyet								
	Kadın							
	Erkek							
Fare ile temas								
	Var							
	Yok							

•*Fisher's exact test kullanılmıştır*

Table 3. A table for reporting 3 variables (nationality, sex, and age group) may take any of 8 forms:

Form 1

	Men		Women	
Age (years)	US	China	US	China
0-21				
22-49				
50+				

Form 2

	China		US	
Age (years)	men	women	men	women
0-21				
22-49				
50+				

Form 3

	0-21 years		22-49 years		50+ years	
	men	women	men	women	men	women
US						
China						

Form 4

	Men (age, years)			Women (age, years)		
	0-21	22-49	50+	0-21	22-49	50+
US						
China						

Form 5

	0-21 years		22-49 years		50+ years	
	US	China	US	China	US	China
Men						
Women						

Form 6

	US (age, years)			China (age, years)		
	0-21	22-49	50+	0-21	22-49	50+
Men						
Women						

Form 7

	0-21 years	22-49 years	50+ years
Men:			
US			
China			
Women:			
US			
China			

Form 8

	0-21 years	22-49 years	50+ years
US:			
men			
women			
China:			
men			
women			

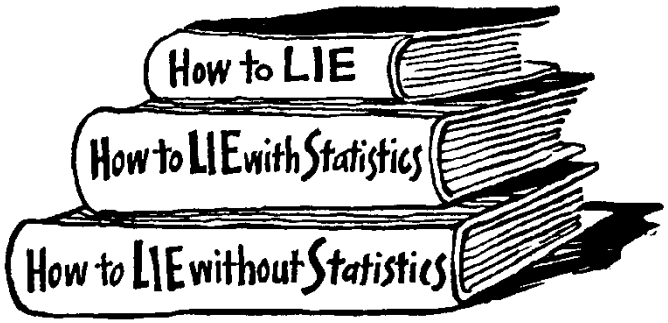
You are a well written manuscript, everything is gonna be Fine!
I'm well written, right? I'm neat and ready to be accepted!

Yöntem

- İstatistiksel analizler **SPSS** versiyon 18.0 yazılımı kullanılarak yapıldı. Değişkenlerin **normal dağılıma** uygunluğu görsel (histogram ve olasılık grafikleri) ve analitik yöntemler ile değerlendirildi. Tanımlayıcı analizler normal dağılan değişkenler için **ortalama** ve **standart sapmalar** kullanılarak verildi. **Logaritmik transformasyon** uygulanan Anti-*Francisella tularensis* IgG antikor titre değerleri ile cinsiyet değişkeni **student t testi** kullanılarak karşılaştırıldı. *Francisella tularensis* seropozitivitesi ile cinsiyet, yaş grupları ve fare teması arasındaki ilişki yerine göre **Ki-kare** veya **Fisher** testleri kullanılarak belirlendi. **P-değerinin** 0.05'in altında olduğu durumlar istatistiksel olarak anlamlı sonuçlar şeklinde değerlendirildi.

Sonuç

- Yalnızca “**haklı çıkarıcı**” sonuçları tartışmak
- Veri analizi veya istatistik test yapılmadan “**significant**” teriminin kulanılması
- “**non significant**” kelimesini “**no difference**” veya “**no effect**” olarak kullanmak
- İstatistiksel **kısaltmaları** fazla kullanmak
- Muhtemel “**bias**” ya da “**confounding**” lerden bahsetmemek



- ✓ Hayran M, Hayran M. Sağlık Araştırmaları için temel istatistik. 2011, Art Ofset Matbaacılık Yayıncılık Organizasyon Ltd. Şti., Ankara.
- ✓ Clark GT, Mulligan R. Fifteen common mistakes encountered in clinical research. J Prosthodont Res. 2011, 55(1):1-6.
- ✓ Olsen CH. Review of the use of statistics in infection and immunity. Infect Immun. 2003,71(12):6689-92.
- ✓ Strasak M, Zaman Q, Pfeiffer KP, Göbel G, Ulmer H. Statistical errors inmedical research—a review of common pitfalls. Swiss Med Wkly. 2007,27:137(3-4):44-9.
- ✓ Lang T. Twenty statistical errors even you can find in biomedical research articles. Croat Med J. 2004, 45(4):361-70.
- ✓ Haque SB, George S. Use of statistics in the psychiatric bulletin:author guidelines. Psychiatric Bulletin, 2007, 31:265-267.
- ✓ Lee CM, Soin HK, Einarson TR. Statistics in the Pramacy literature. Ann Pharmacother, 2004:38:1412-8;4(3):128-134