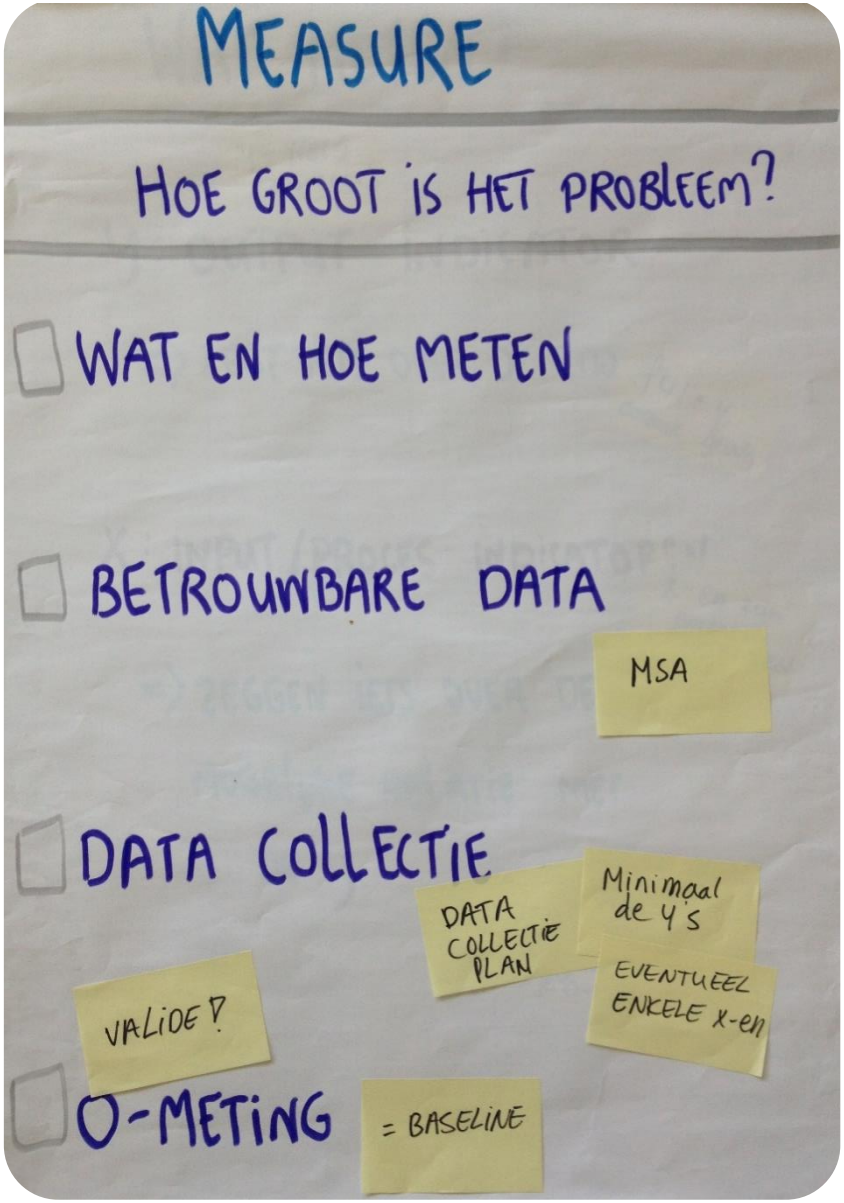
GreenBelt SixSigma

LSSP
LeanSixSigmaPartners

Minitab **Minitab wegwijzer**

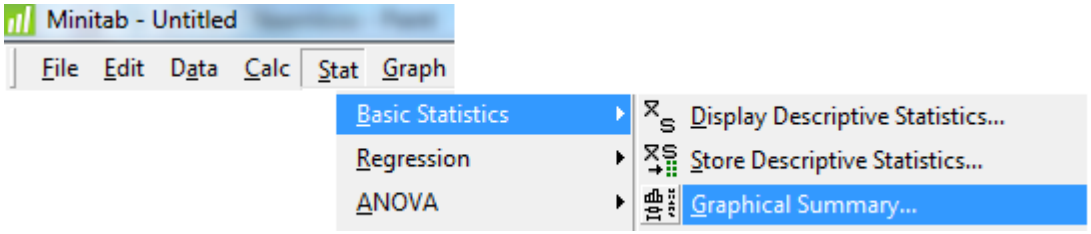


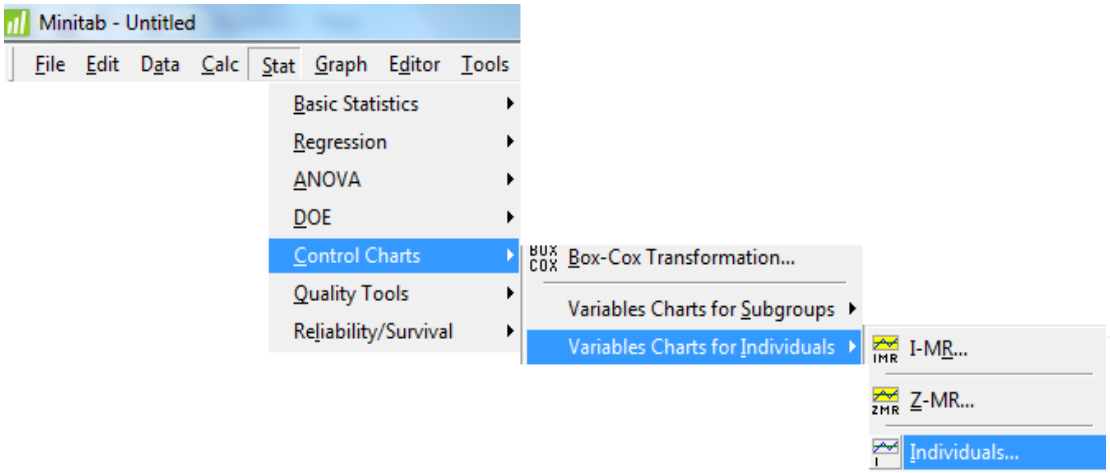
OH JA … Hoe ging de Meetfase ook al weer?

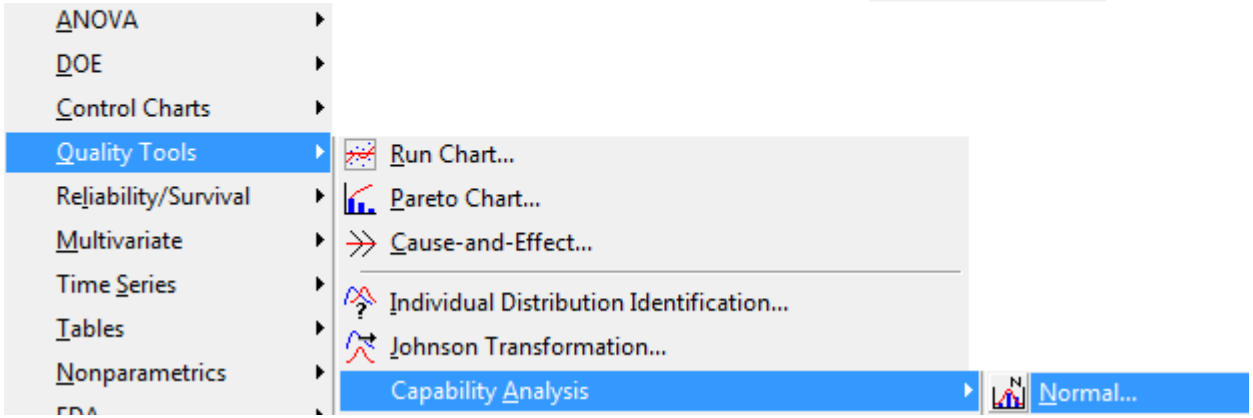
OH JA … Hoe ging een <u>Nulmeting</u> (0-meting) bij de GB?

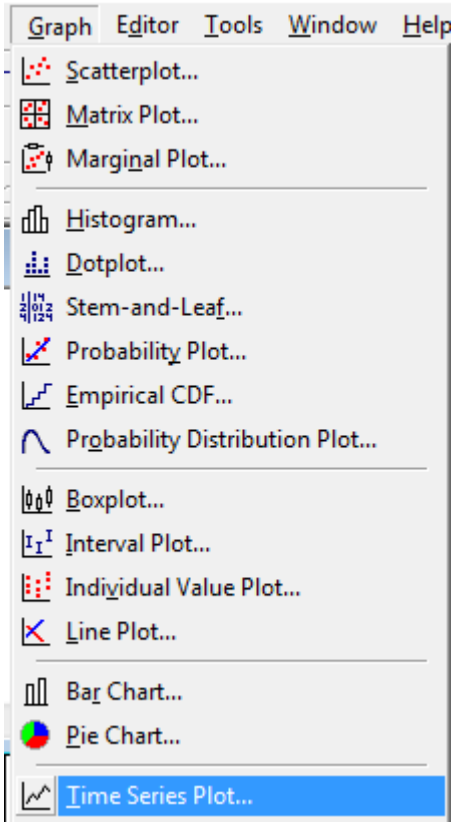
Continue Y

OH JA … Hoe ging een Nulmeting bij de GB?

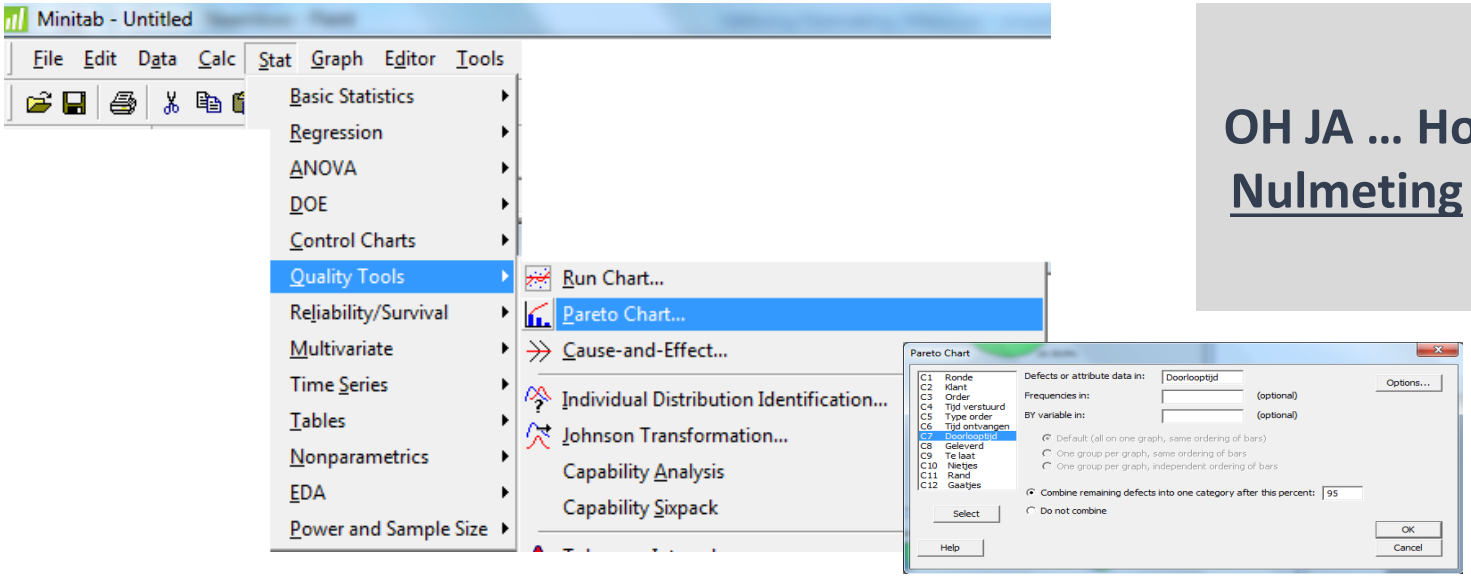


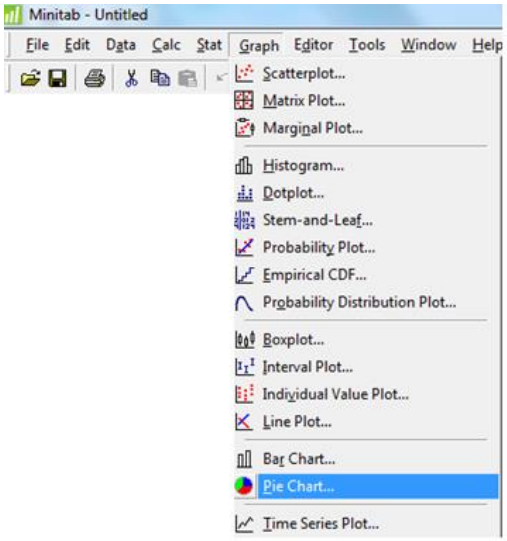


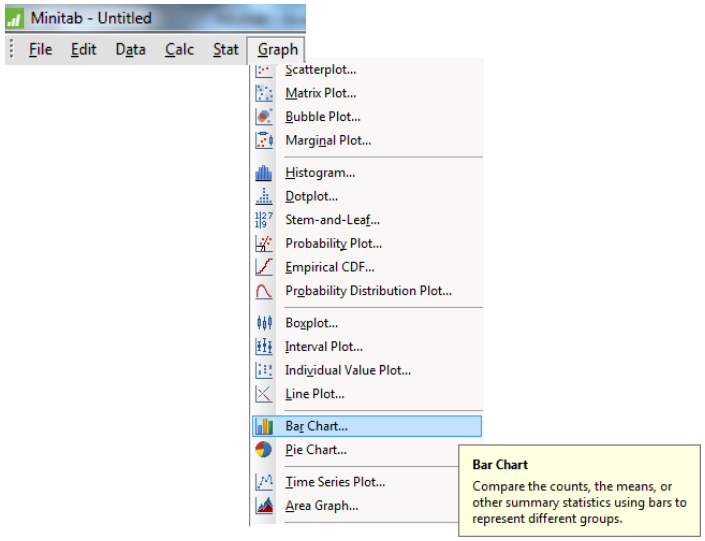




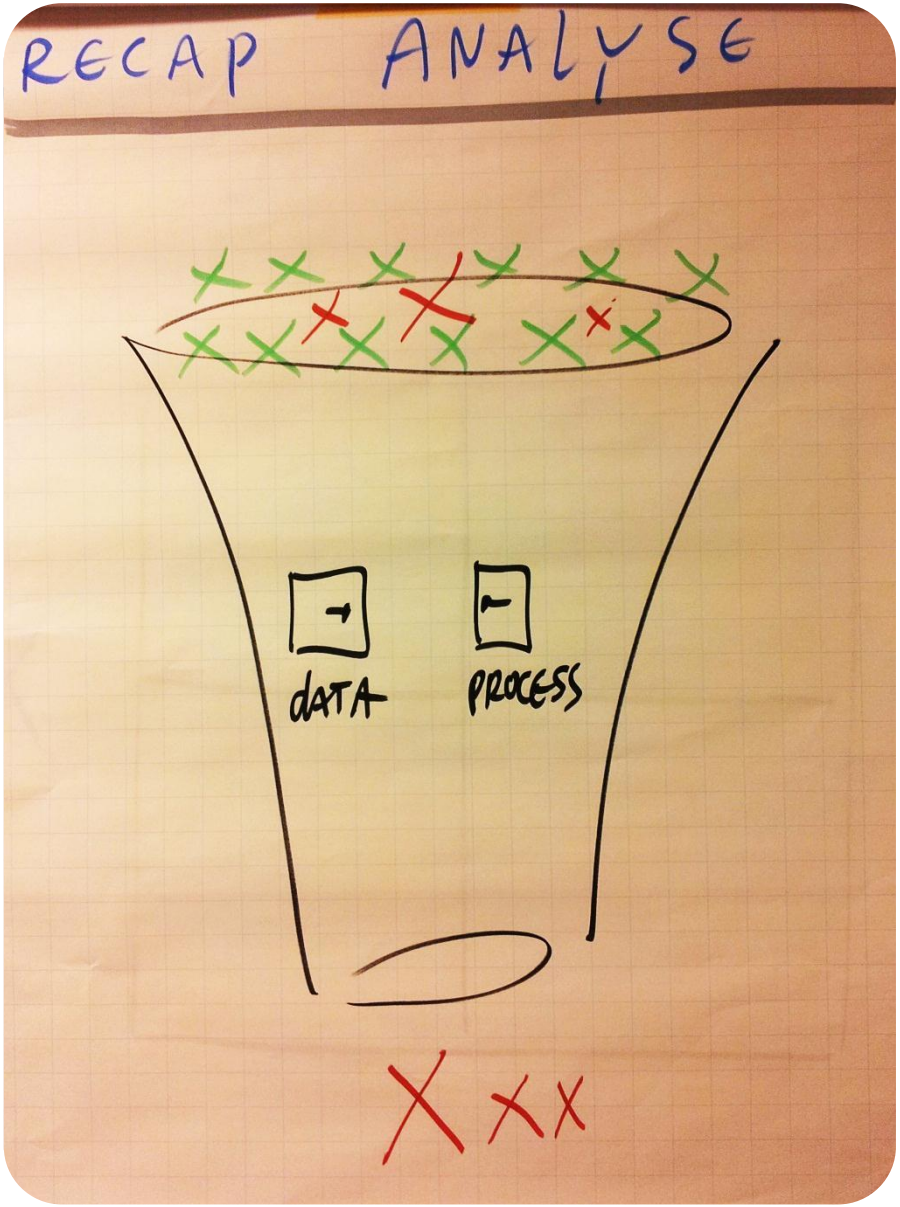
OH JA … Hoe ging een Nulmeting bij de GB?

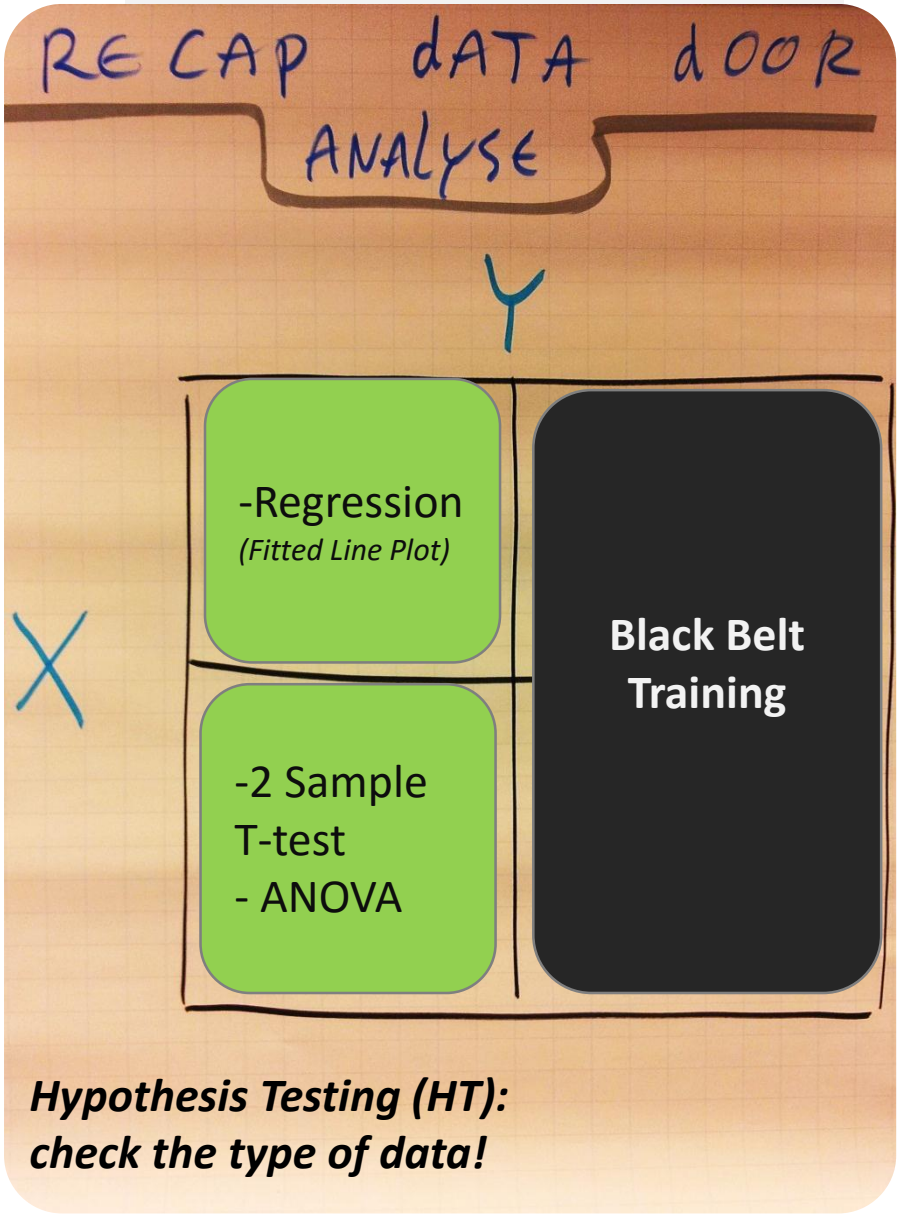






Continue & Discrete Y-X DATA





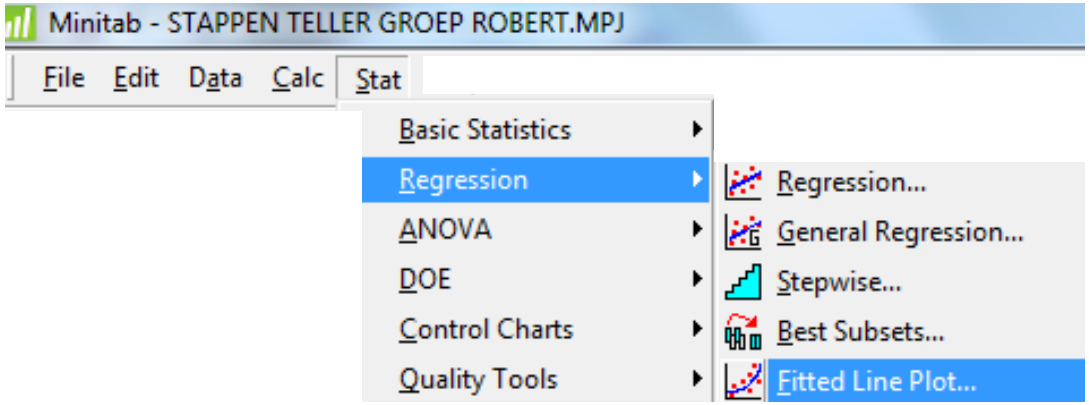
Hypothesis Testing (HT):
check the type of data!

Het Hypothesetoetsen stappenplan:

1) Bepaal de hypothesen
2) Visualiseer (maak een grafiek)
3) Voer de toets uit (p-waarde?)
4) Vertaal significantie in praktische, getalsmatige impact

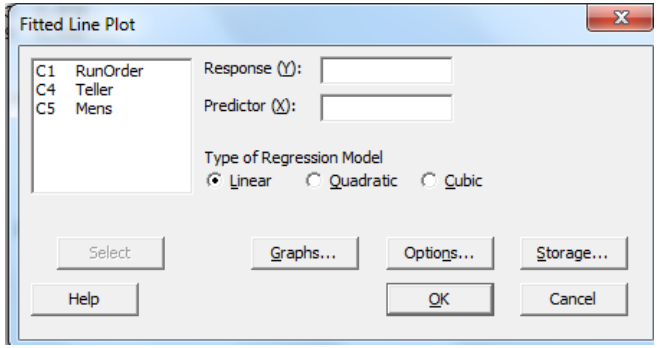
Aannames:

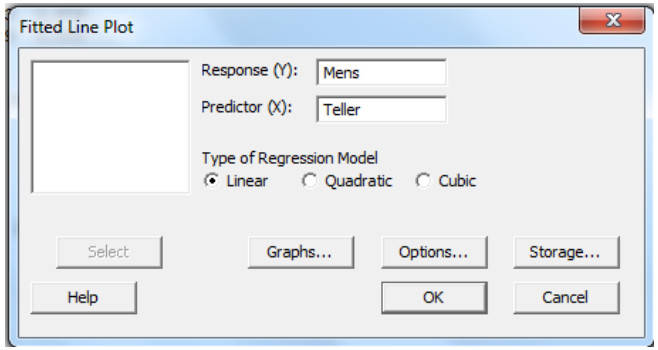
- Data is steekproef (anders beschrijvende statistiek voldoende)
- H_0 is altijd 'saai' ofwel 'onschuldig' ofwel geen afwijking



INPUT
Regressie

Continue Y
Continue X





<u>Continue data</u> testen op relaties kan met behulp van de Regressie / Fitted Line Plot

OUTPUT

Minitab - Untitled

File Edit Data Calc Stat

Session

Regression Analysis: Mens versus Teller

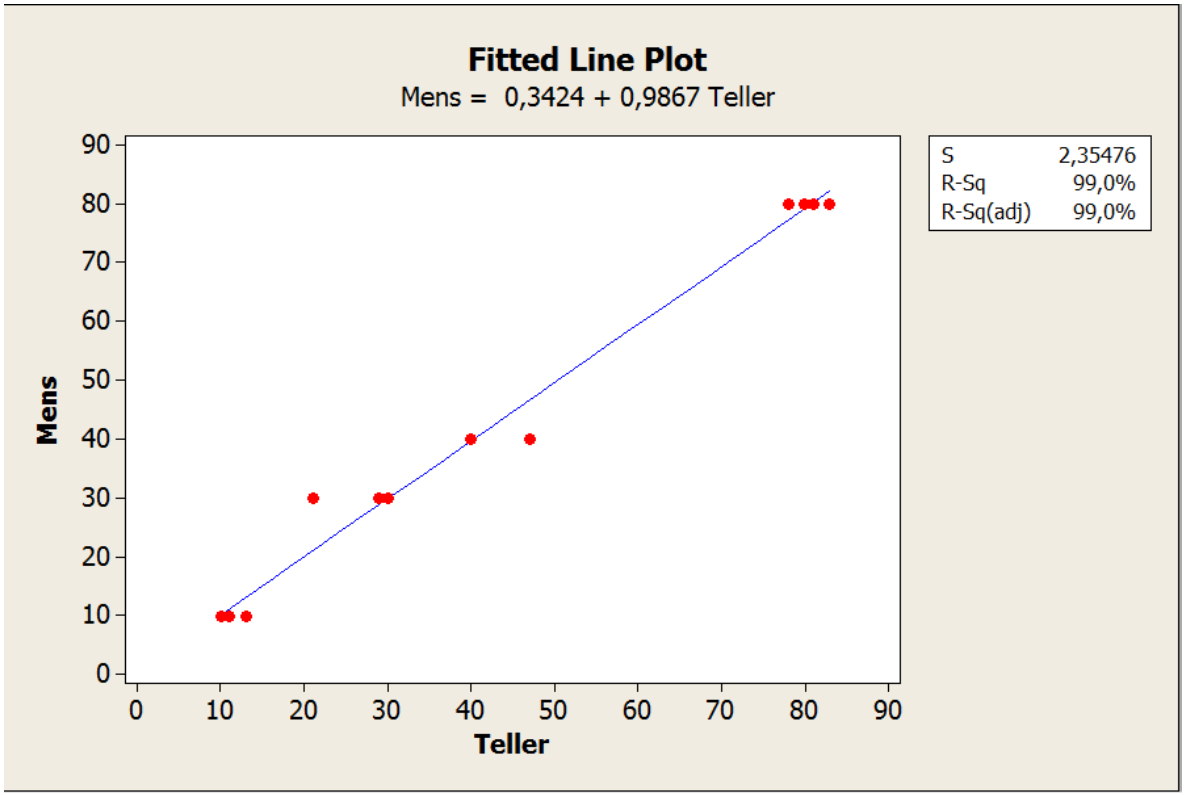
The regression equation is
Mens = 0,3424 + 0,9867 Teller

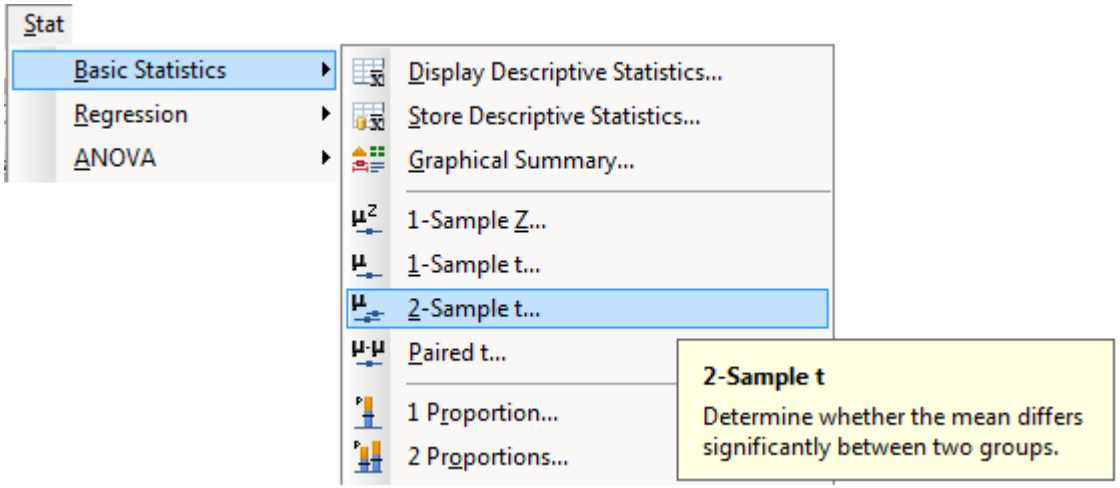
S = 2,35476 R-Sq = 99,0% R-Sq(adj) = 99,0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	15924,7	15924,7	2871,97	0,000
Error	28	155,3	5,5		
Total	29	16080,0			

Fitted Line: Mens versus Teller



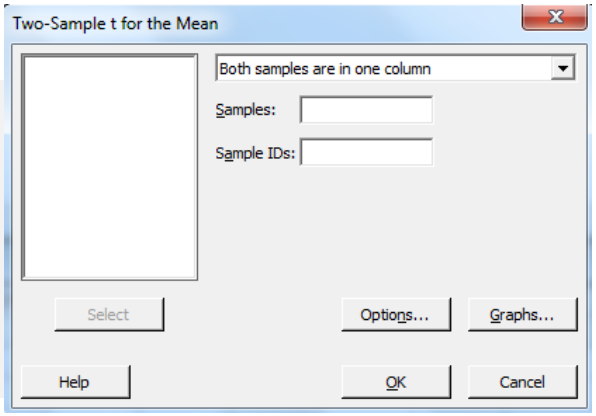


INPUT
2 Sample
T- Test

Continue Y
Discrete X

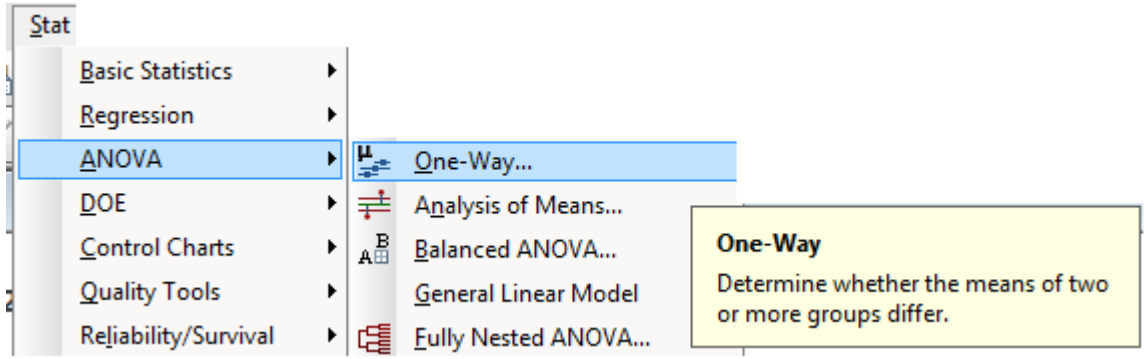
Noot: enkel indien variabele *X* maar 2 uitkomsten (2 groepen) telt.

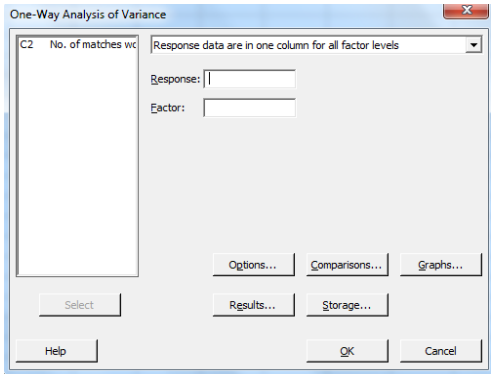
Tip: wordt vaak in de **Control-fase** gebruikt (verschil tussen nul- en nameting Y van DMAIC)

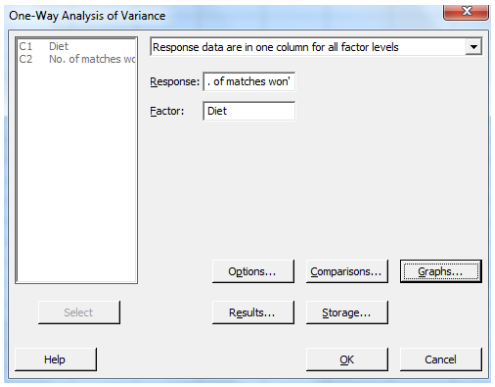


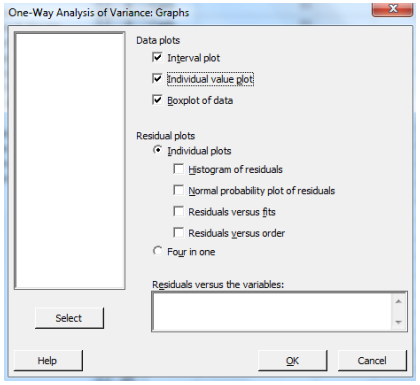
INPUT
ANOVA Test

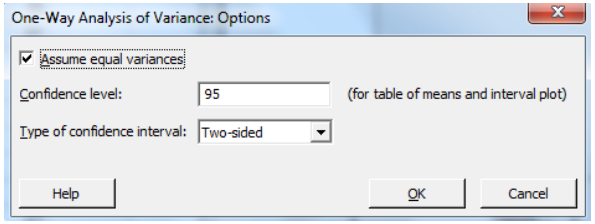
Continue Y Discrete X



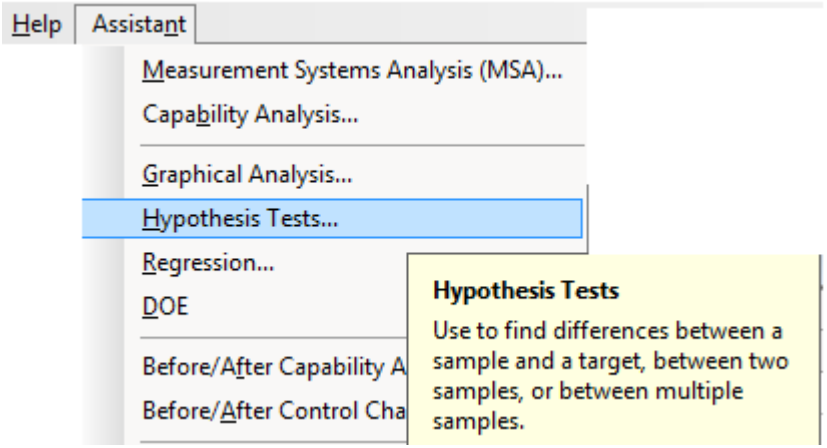


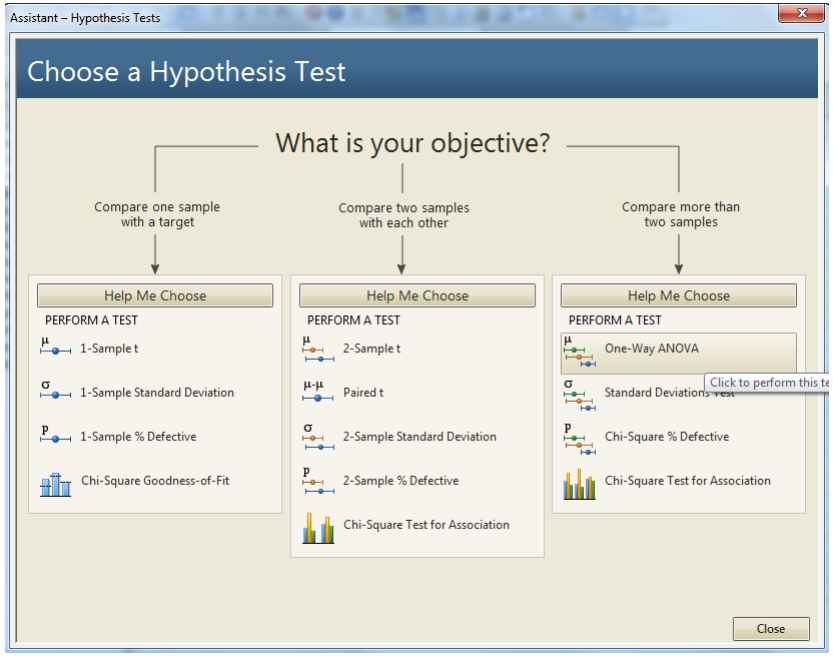






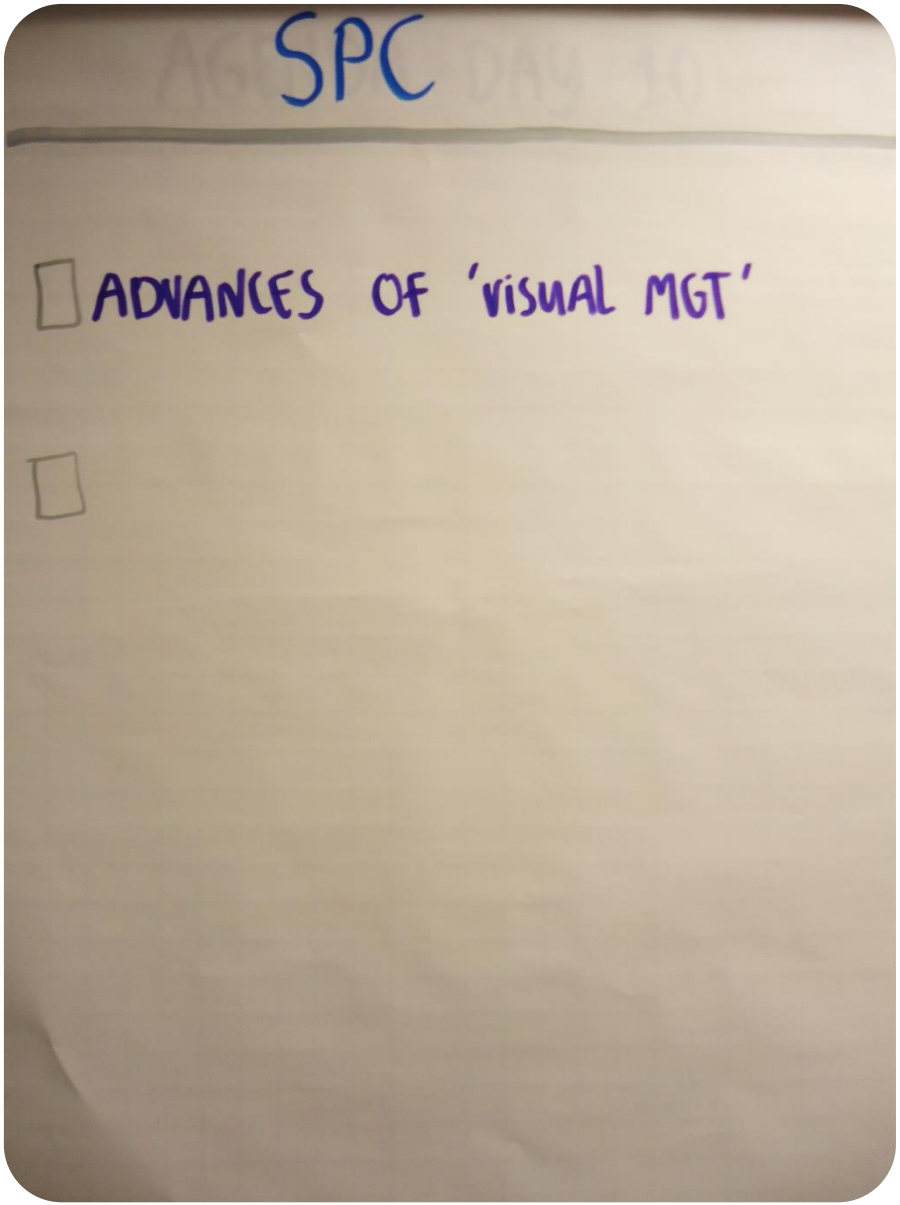
Alternatieve Minitab-route





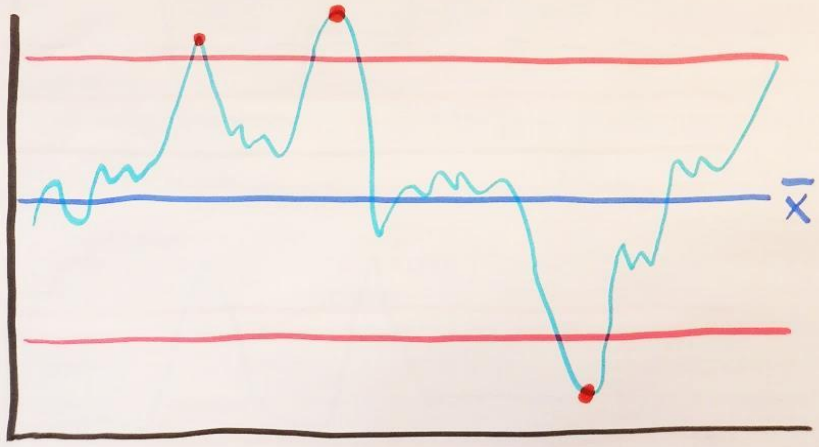
INPUT ANOVA Test

Continue Y Discrete X

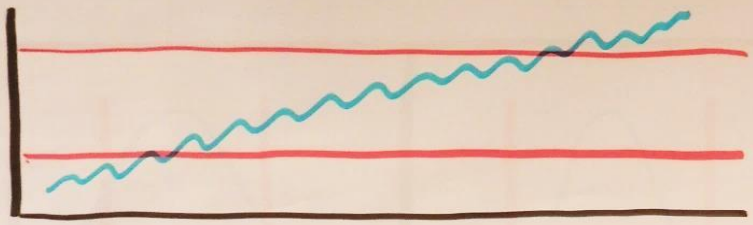

SPC
ADVANCES OF 'visual MGT'

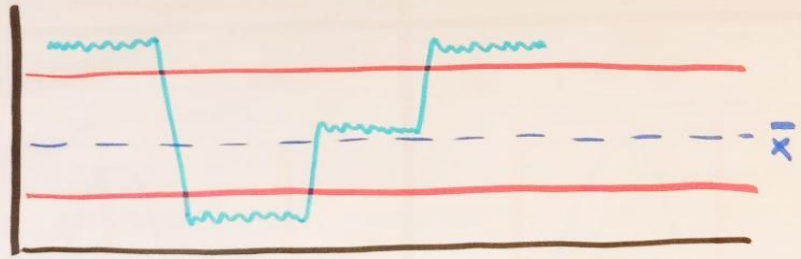
CONTROL CHARTS

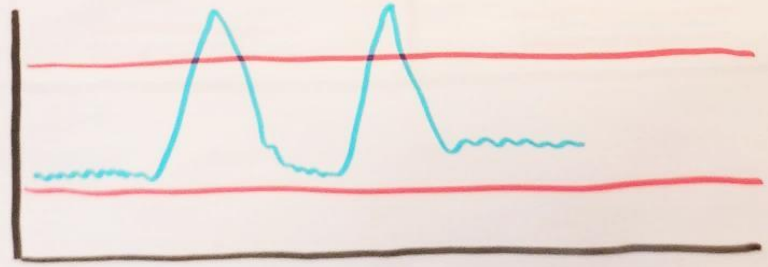
- ONDERSCHEID MAKEN IN:
  - EIGEN RUIS PROCES
  - BIJZONDERE SIGNALEN

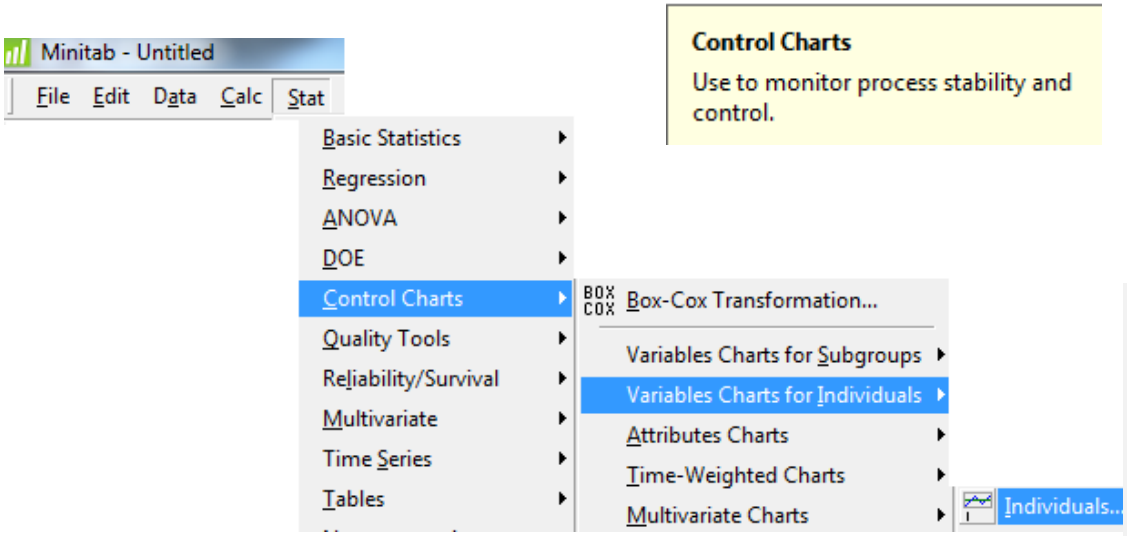


STABILITEIT



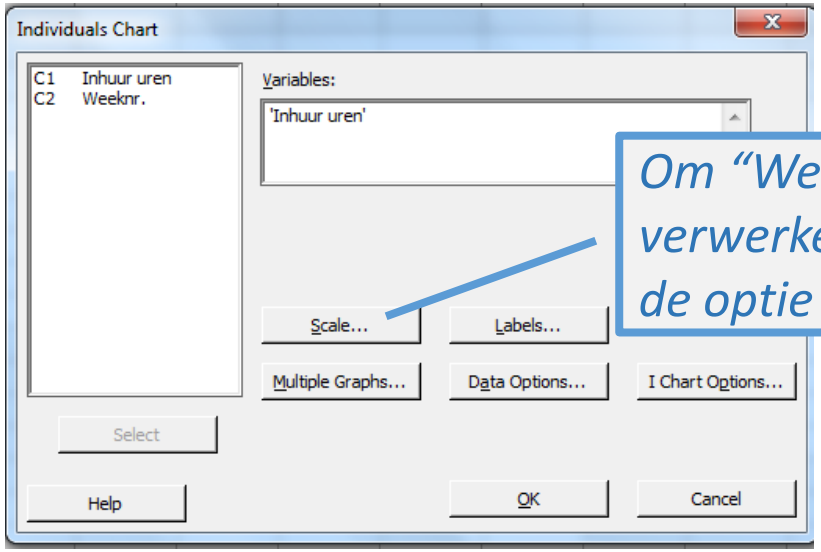




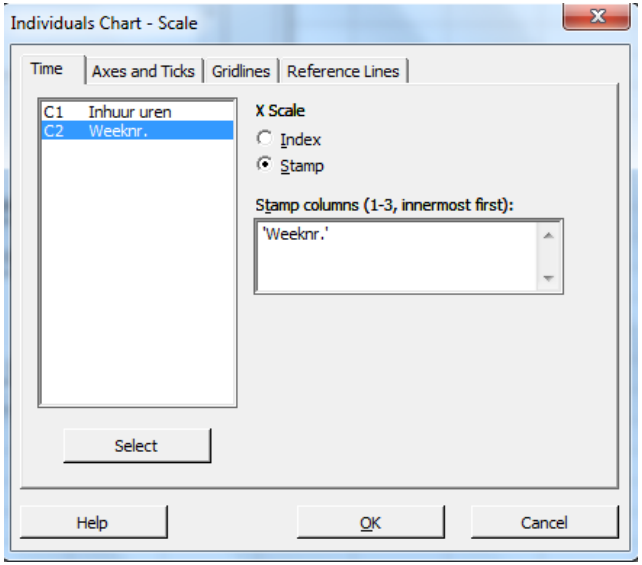


INPUT Control Chart (de "I Chart")

De route van de 'standaard' Control Chart (Individual Chart van Shewhart) in Minitab …



Om "Weeknr." te verwerken, gebruik de optie "Scale"

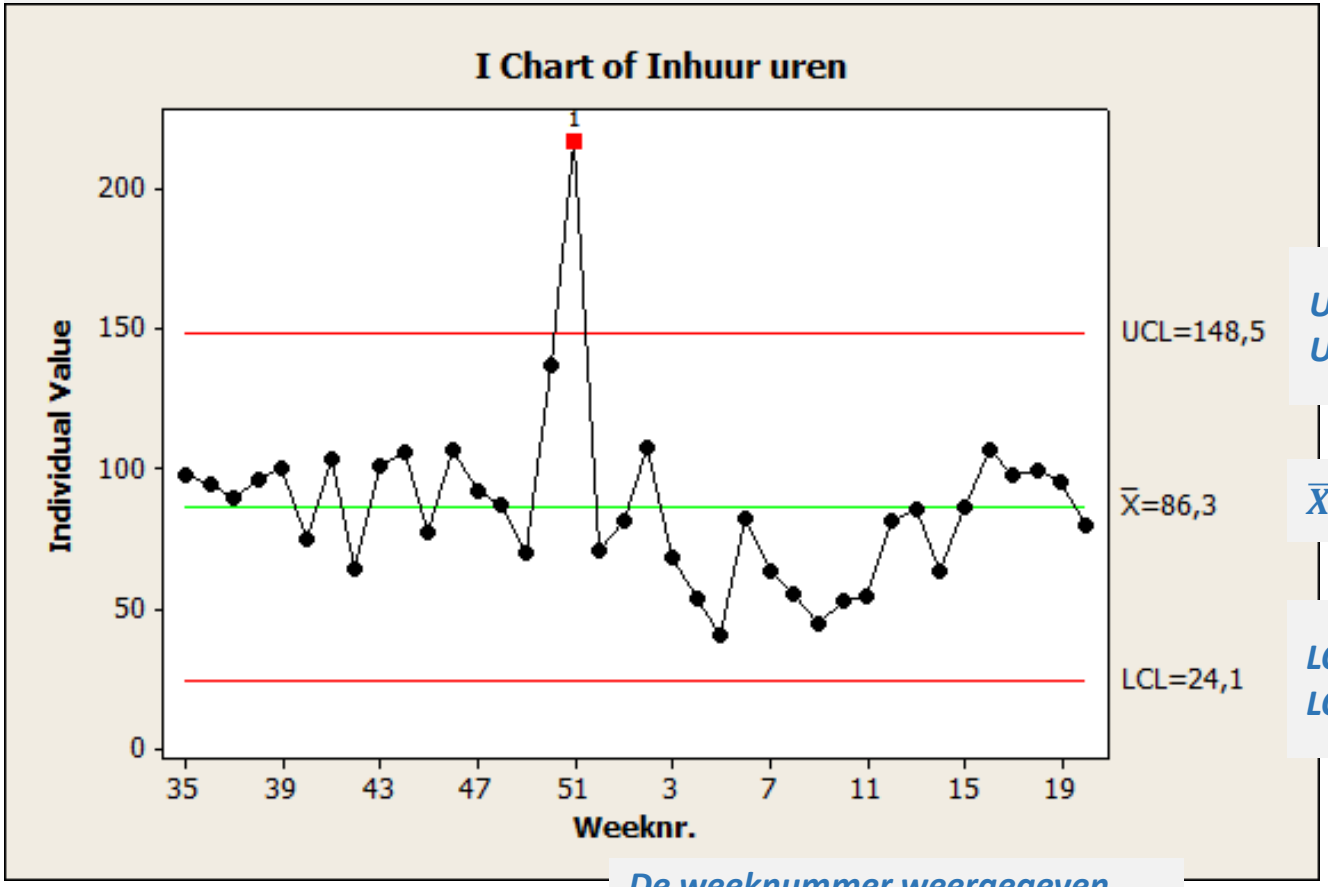


Control Charts

Use to monitor process stability and control.

OUTPUT Control Chart (de "I Chart")

- Wat zien we in de tijd? Stabiel? Is het beheerst?
- Zijn er incidenten / out-of-control situaties?

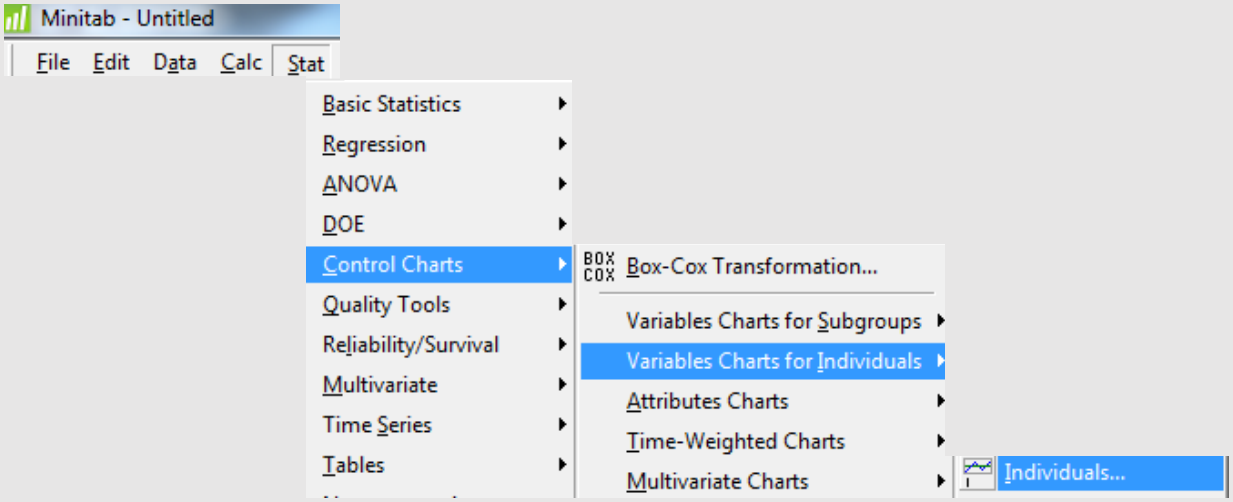


UCL = Upper Control Limit
UCL = Xbar + 3*S_{within}

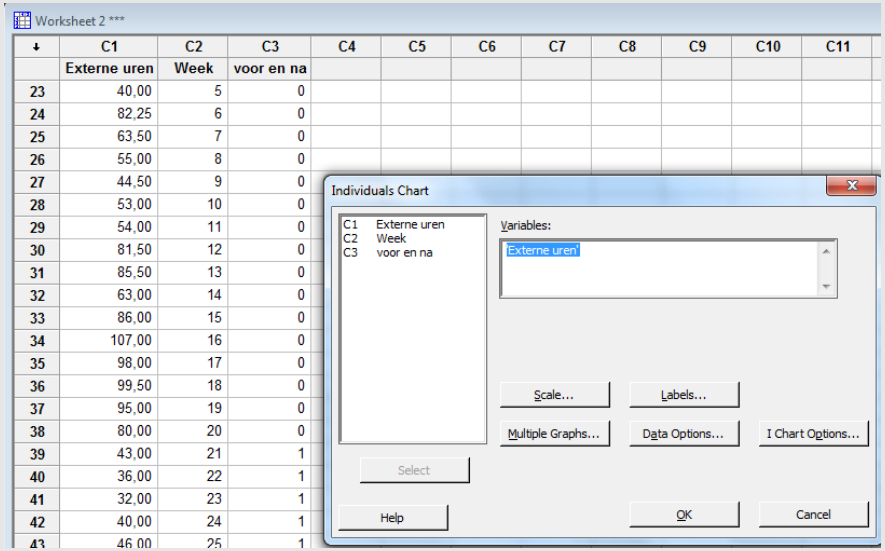
$\overline{X}$ = Xbar = Gemiddelde

LCL = Lower Control Limit
LCL = Xbar - 3*S_{within}

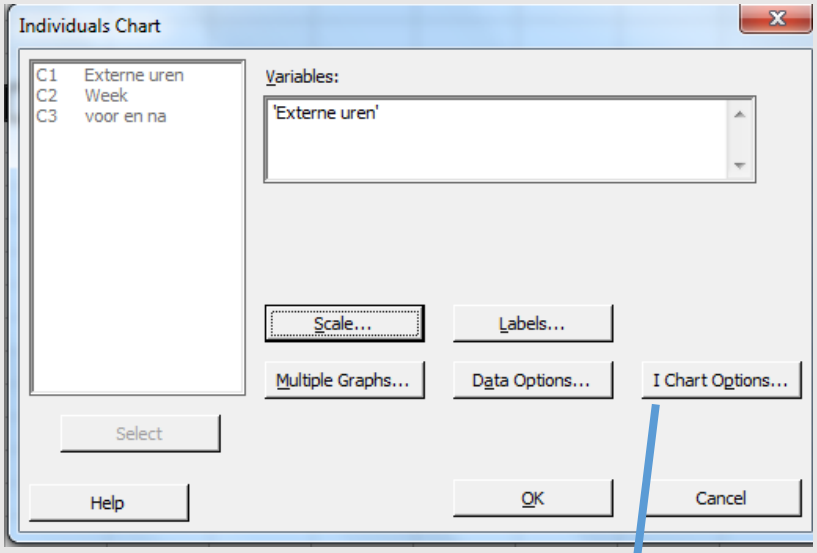
De weeknummer weergegeven (i.p.v. standaard "Observation")



INPUT
"Management-samenvatting"

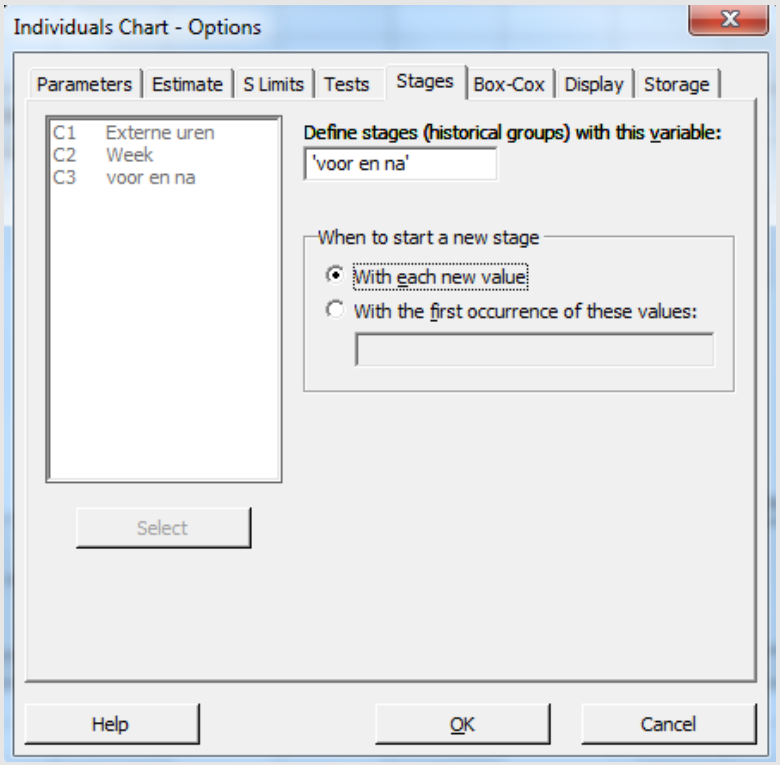


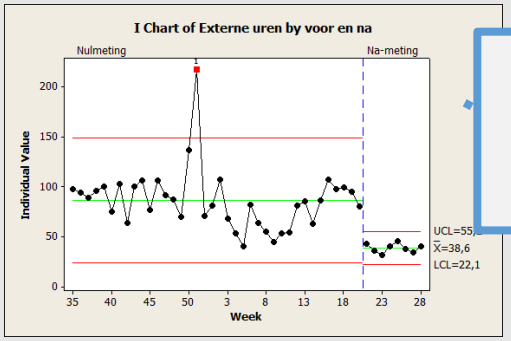
Gebruik dataset inclusief
- ***"Externe uren" (Y)***
- ***"Week" (tijdsfactor X1)***
- ***"voor en na" (factor X2)***



INPUT
"Management-samenvatting"

*Om 'nulmeting' en 'na-meting' in 1 Control Chart te laten zien, gebruik de optie "**I Chart Options/ Stages**"*

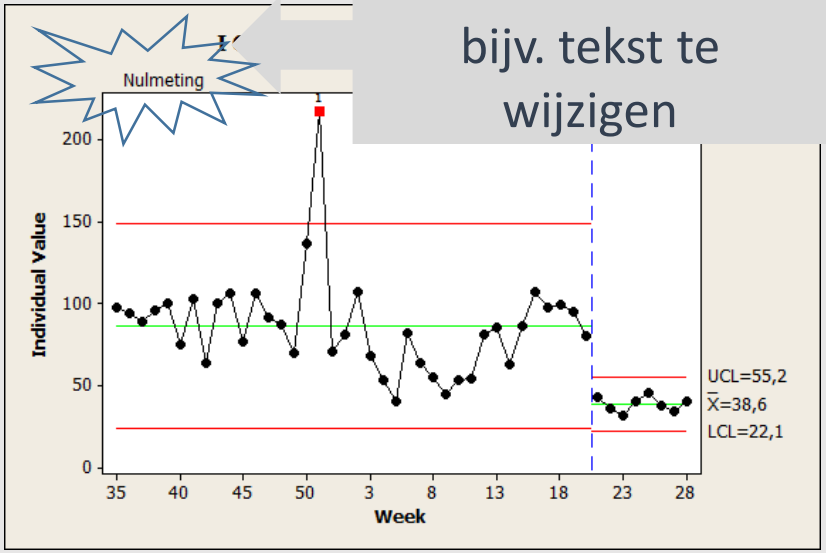


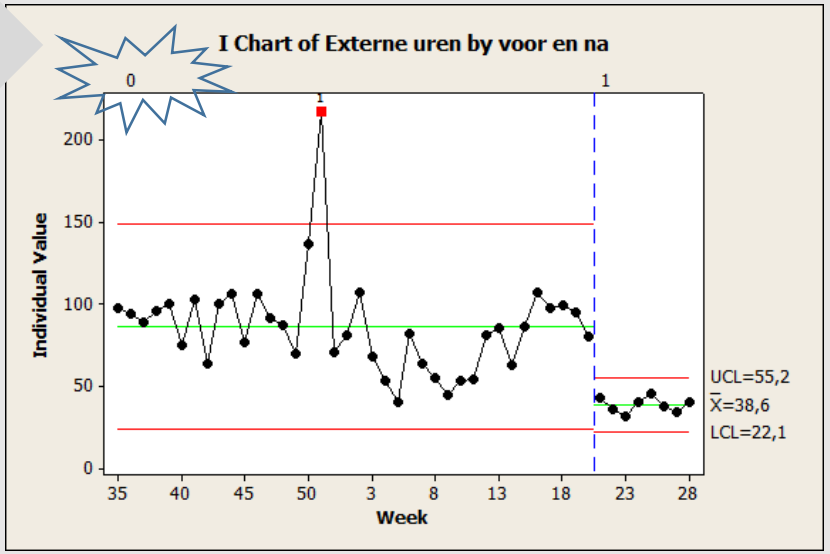


Om de verbetering samenvattend te visualiseren!

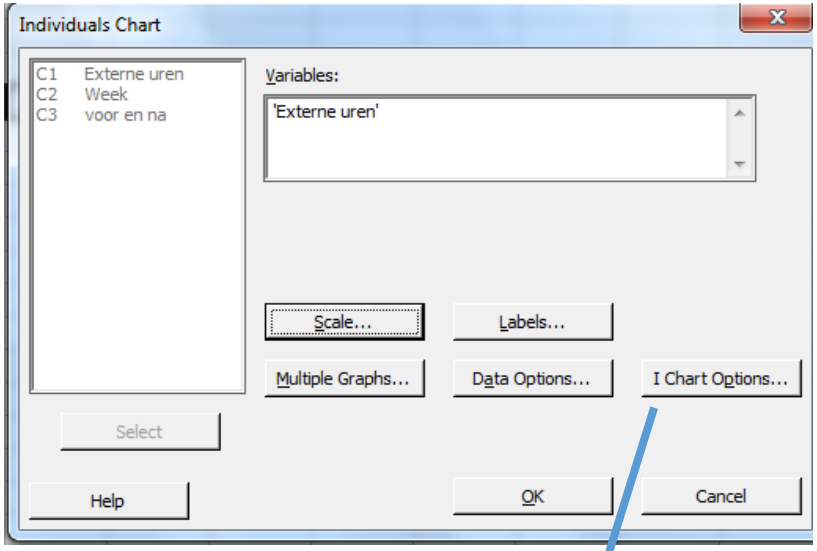
OUTPUT "Management-samenvatting"

"dubbelklik" om bijv. tekst te wijzigen



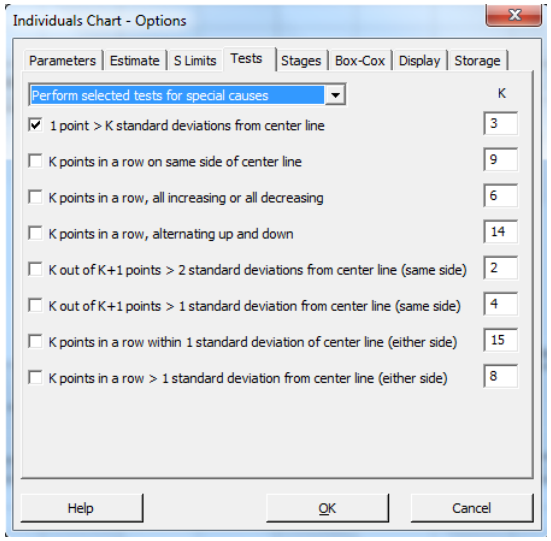


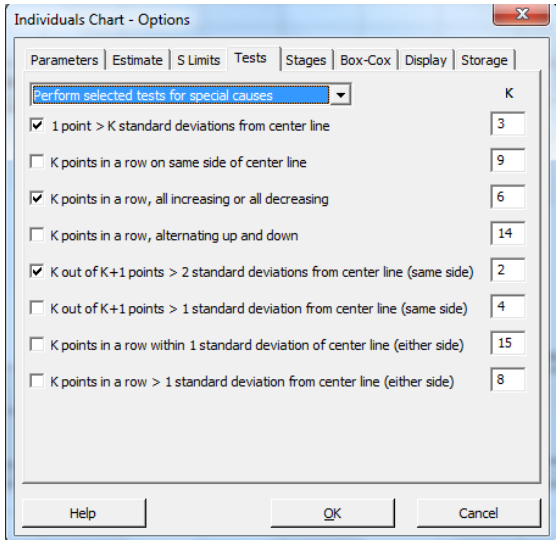
INPUT Tests I Chart



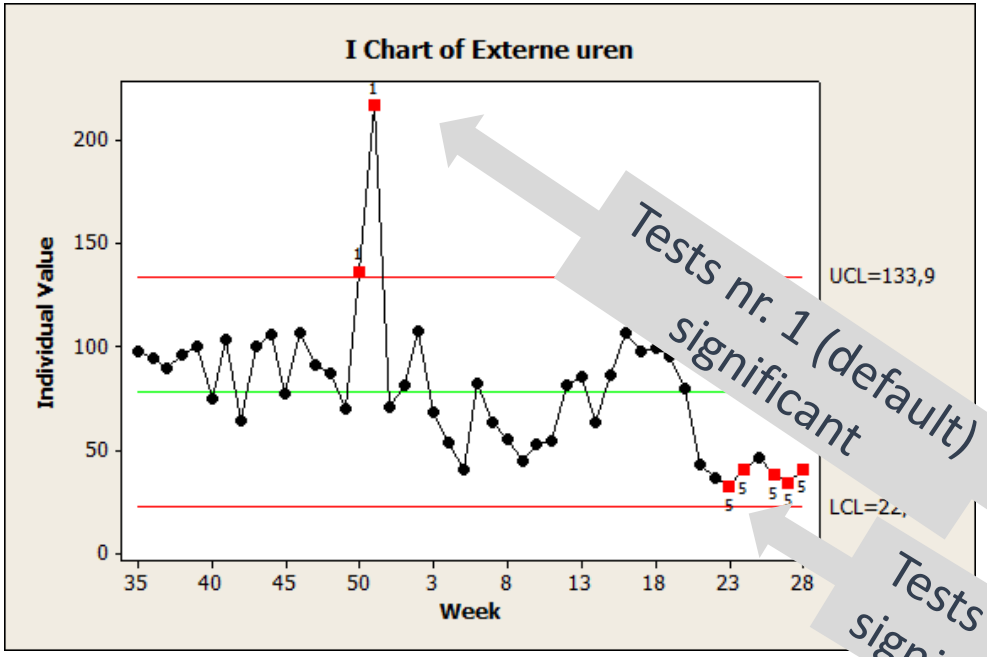
'Vink' de gewenste, extra toetsen ("tests") aan.
Tip: niet teveel!

Om meer te toetsen dan enkel de 'default' van 'buiten de regelgrenzen' (test nr. 1), gebruik de optie
"I Chart Options/ Tests".



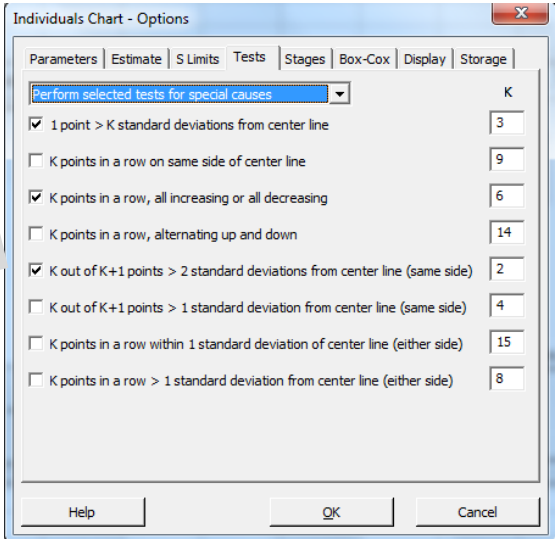


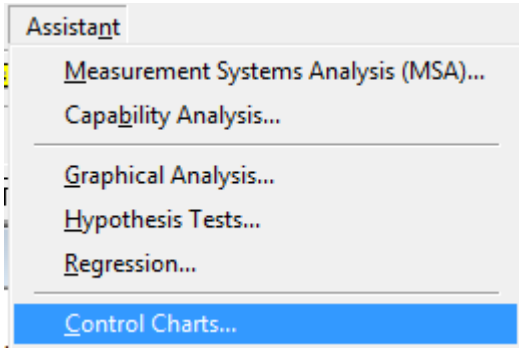
OUTPUT Tests I Chart



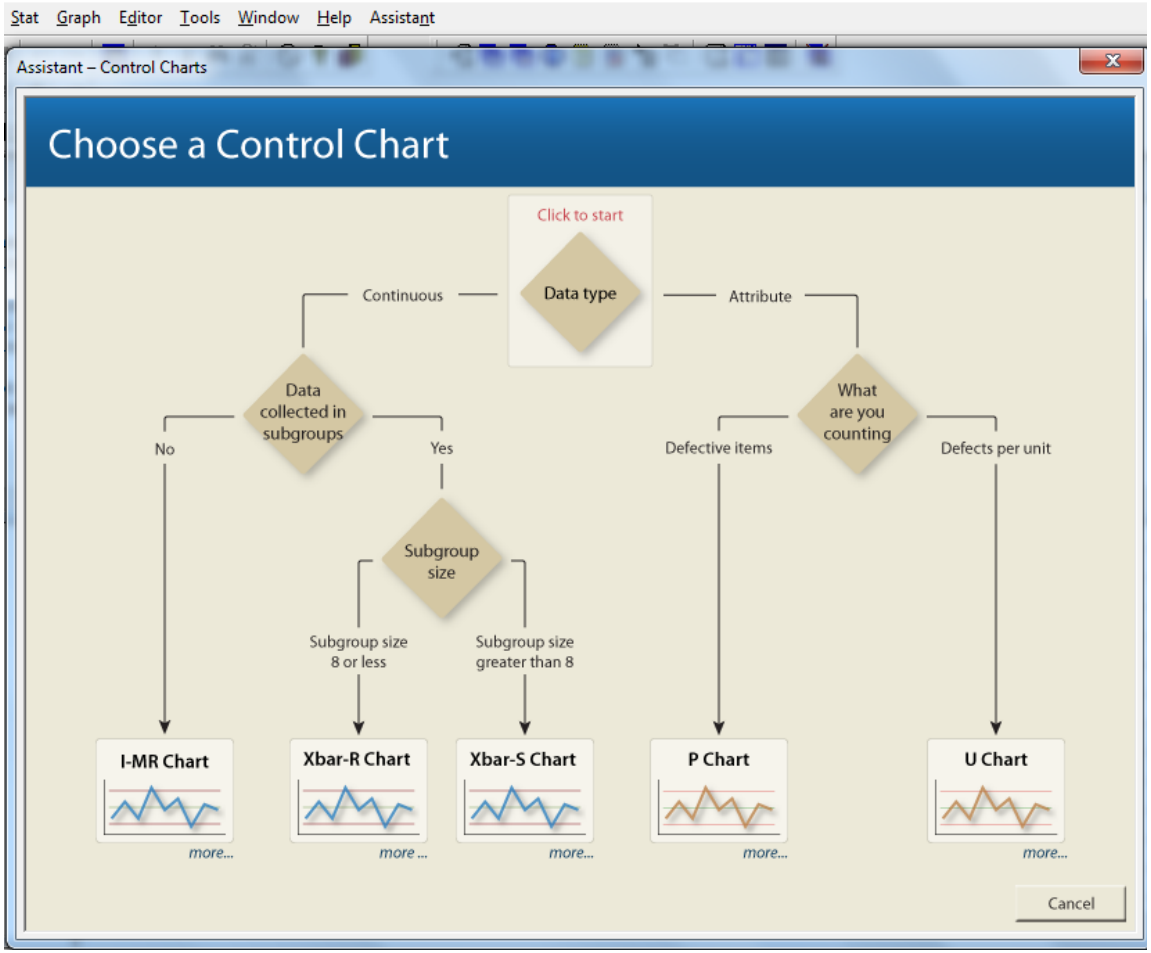
Tests nr. 1 (default) significant

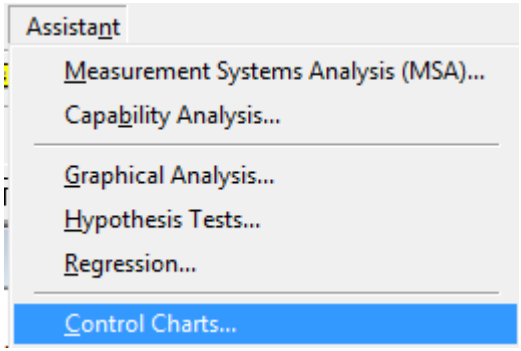
Tests nr. 5 significant



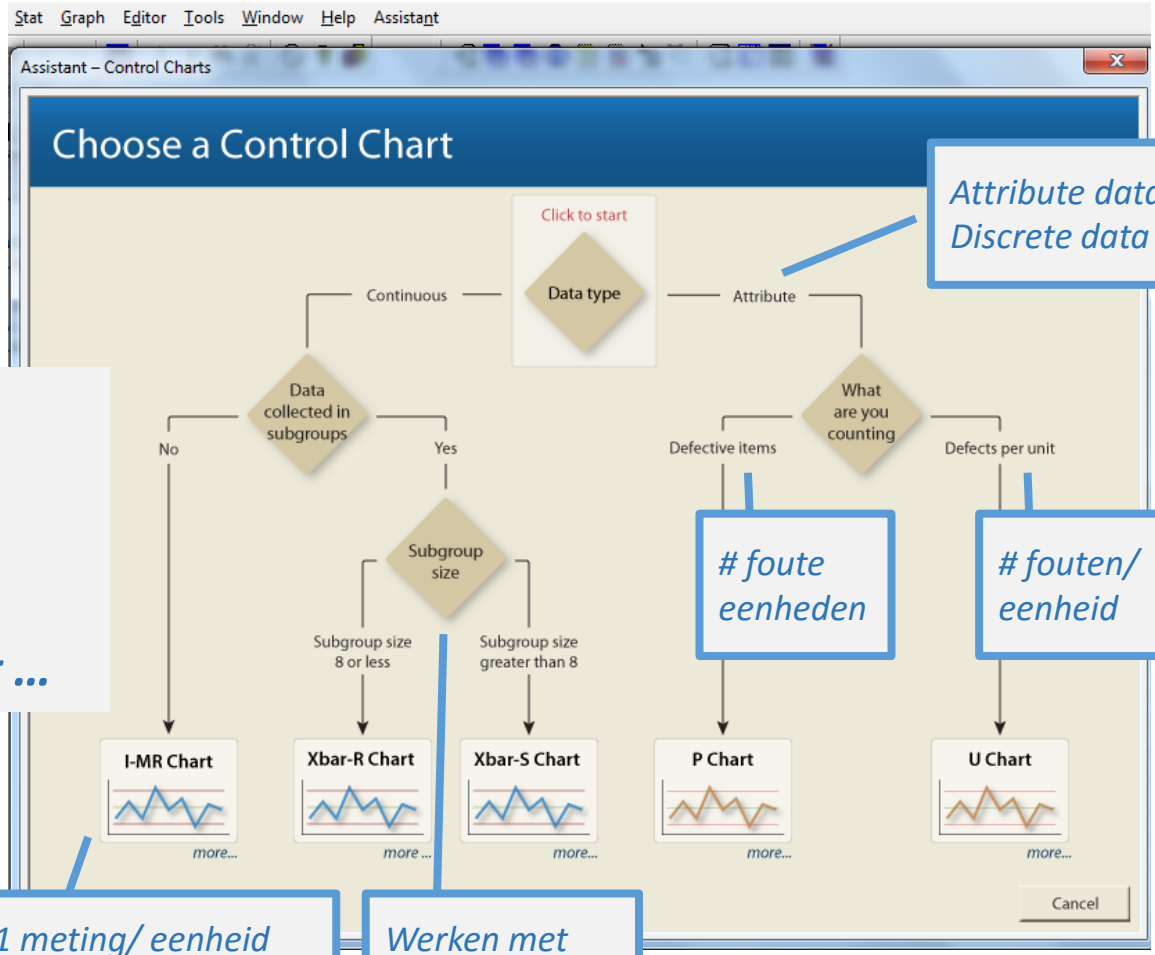


Selectie type Control Chart





Selectie type Control Chart



Attribute data = Discrete data

De 'standaard' Control Chart (I Chart) is via de "Assistent" in Minitab vervangen door de complexere I-MR Chart …

 # foute eenheden

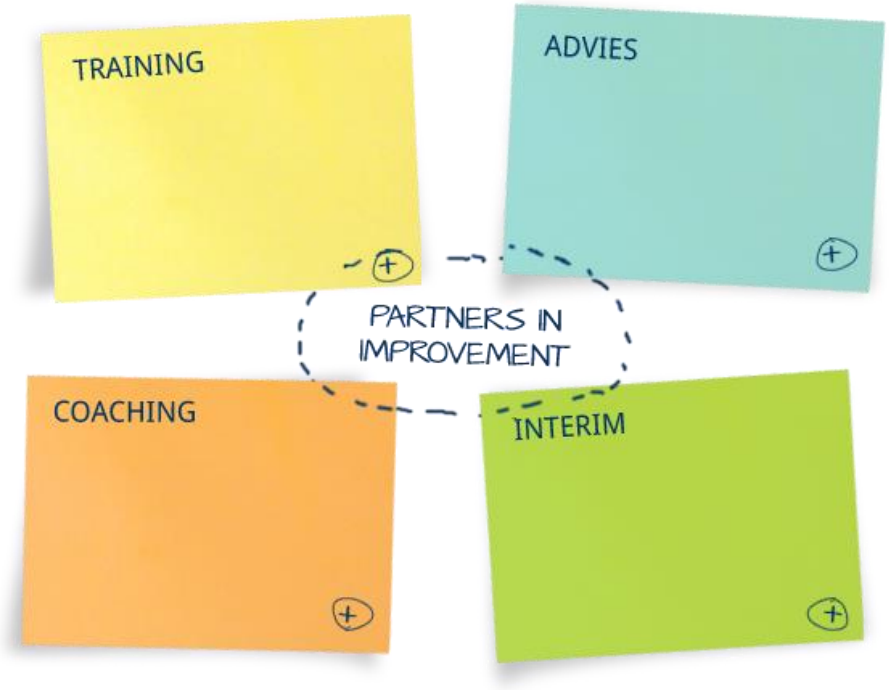
 # fouten/ eenheid

1 meting/ eenheid (géén gemiddelden!)

Werken met gemiddelden!

Over LSSP

- Facts & Figures



Lean Six Sigma Ervaring	**Meer dan 50 jaar**
# mensen getraind	**Meer dan 5000**
# mensen gecoacht	**Meer dan 400**
# verbeterprogramma's begeleid	**Meer dan 70**
# verbeterprojecten begeleid	**Meer dan 400**
Gemiddelde ROI	**Meer dan factor 10**
Verbeteringen	**Meer dan € 400 mln op jaarbasis**
Aantal Managing Partners	**4**
Aantal Master Black Belts en Black Belts	**8**
Aantal Associates en medewerkers	**10+**