

Model without custom starting values

```
library(lavaan)

## This is lavaan 0.6-1.1163
## lavaan is BETA software! Please report any bugs.
HS.model <- ' visual  =~ x1 + lam2*x2 + x3
            textual =~ x4 + x5 + x6
            speed   =~ x7 + x8 + x9
            x1  =~ x1 + psi1*x1
            x2  =~ x2 + psi2*x2
            x3  =~ x3 + psi3*x3
            x4  =~ x4 + psi4*x4
            x5  =~ x5 + psi5*x5
            x6  =~ x6 + psi6*x6
            x7  =~ x7 + psi7*x7
            x8  =~ x8 + psi8*x8
            x9  =~ x9 + psi9*x9
            stdlam2 := lam2/sqrt(lam2^2 + psi2)'
```

```
fit <- lavaan(HS.model, data=HolzingerSwineford1939,
              auto.var=TRUE, auto.fix.first=FALSE, std.lv=TRUE,
              auto.cov.lv.x=TRUE, estimator="MLM",
              meanstructure=TRUE, int.ov.free=TRUE)

const<-"stdlam2 == -0.8"
fit.const <- lavaan(HS.model, data=HolzingerSwineford1939,constraints=const,
                   auto.var=TRUE, auto.fix.first=FALSE, std.lv=TRUE,
                   auto.cov.lv.x=TRUE, estimator="MLM",
                   meanstructure=TRUE, int.ov.free=TRUE)

## Warning in lav_options_set(opt): lavaan WARNING: information will be set to
## "expected" for estimator = "MLM"

lavTestLRT(fit,fit.const,method="satorra.bentler.2001") # positive

## Scaled Chi Square Difference Test (method = "satorra.bentler.2001")
##
##           Df    AIC    BIC   Chisq Chisq diff Df diff Pr(>Chisq)
## fit           24 7535.5 7646.7  85.305
## fit.const     25 7586.8 7694.3 138.607      31.536      1 1.957e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lavTestLRT(fit,fit.const,method="satorra.bentler.2010") # positive

## Scaled Chi Square Difference Test (method = "satorra.bentler.2010")
##
##           Df    AIC    BIC   Chisq Chisq diff Df diff Pr(>Chisq)
## fit           24 7535.5 7646.7  85.305
## fit.const     25 7586.8 7694.3 138.607      29.904      1 4.54e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Model with custom start values: satorra.bentler.2010 goes negative
```

```

HS.model <- ' visual  =~ x1 + start(0.7)*lam2*x2 + x3
            textual =~ x4 + x5 + x6
            speed   =~ x7 + x8 + x9
            x1  ~~ start(0.5)*x1 + psi1*x1
            x2  ~~ x2 + psi2*x2
            x3  ~~ x3 + psi3*x3
            x4  ~~ x4 + psi4*x4
            x5  ~~ x5 + psi5*x5
            x6  ~~ x6 + psi6*x6
            x7  ~~ x7 + psi7*x7
            x8  ~~ x8 + psi8*x8
            x9  ~~ x9 + psi9*x9
            stdlam2 := lam2/sqrt(lam2^2 + psi2)'
fit <- lavaan(HS.model, data=HolzingerSwineford1939,
             auto.var=TRUE, auto.fix.first=FALSE, std.lv=TRUE,
             auto.cov.lv.x=TRUE, estimator="MLM",
             meanstructure=TRUE, int.ov.free=TRUE)

const<-"stdlam2 == -0.8"
fit.const <- lavaan(HS.model, data=HolzingerSwineford1939,constraints=const,
                  auto.var=TRUE, auto.fix.first=FALSE, std.lv=TRUE,
                  auto.cov.lv.x=TRUE, estimator="MLM",
                  meanstructure=TRUE, int.ov.free=TRUE)

```

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## Warning in lav_options_set(opt): lavaan WARNING: information will be set to
## "expected" for estimator = "MLM"
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lavTestLRT(fit,fit.const,method="satorra.bentler.2001") # positive
```

```
## Scaled Chi Square Difference Test (method = "satorra.bentler.2001")
##
##           Df    AIC    BIC   Chisq Chisq diff Df diff Pr(>Chisq)
## fit           24 7535.5 7646.7  85.305
## fit.const     25 7586.8 7694.3 138.607    31.536      1 1.958e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(fit,fit.const,method="satorra.bentler.2010") # positive
```

```
## Scaled Chi Square Difference Test (method = "satorra.bentler.2010")
##
##           Df    AIC    BIC   Chisq Chisq diff Df diff Pr(>Chisq)
## fit           24 7535.5 7646.7  85.305
## fit.const     25 7586.8 7694.3 138.607   -19.535      1      1
```