

# Package ‘SSDforR’

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**Description** Functions to visually and statistically analyze single system data.

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---

 ABanova

*Analysis of variance*


---

### Description

Computes one-way ANOVA and performs Tukey multiple comparison post-hoc test. Use ANOVA instead of a t-test when comparing more than two phases.

### Usage

```
ABanova(behavior, phaseX)
```

### Arguments

behavior	behavior variable
phaseX	phase variable

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data, 2nd ed. Oxford University Press, 2022. p91, p112-116, p191

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2,
1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B",
"B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABanova(cry,pcry)
```

---

 ABarrow

*Draw arrow on graph*


---

### Description

This function enables users to draw an arrow on a graph. For example, an arrow can be drawn from a text label of a critical event to a point on the graph.

**Usage**

```
ABarrow()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data 2nd ed. Oxford University Press, 2022. p180, p186

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2,  
1, 2, 1, 0, 0, 0)  
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B",  
"B", "B", NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")  
# now run ABplot(cry,pcry,"week","amount","Crying")  
# now run ABarrow()
```

---

ABautoacf

*Autocorrelation at any lag for a phase*

---

**Description**

This function tests for autocorrelation for any lag. Should be used with samples greater than or equal to six. Also produces significance graph for lags. The Box-Ljung test of significance is performed for all lags up to and including the specified one.

**Usage**

```
ABautoacf(behavior, phaseX, v, l)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v	letter for phase tested (e.g., "A")
l	number of lags (e.g. 1, 2, 3)

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University



---

 ABbinomial

*Binomial test*


---

### Description

Binomial test comparing the number of observations of a phase in a desired zone to another phase. User needs to select method for defining a desired zone (e.g., below one SD).

### Usage

```
ABbinomial(phaseX, v1, v2, successA, successB)
```

### Arguments

phaseX	phase variable
v1	letter of first phase (e.g., "A")
v2	letter of second phase (e.g., "B")
successA	occurrences in desired zone for first phase
successB	occurrences in desired zone for second phase

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p143

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
SD1(cry,pcry,"A","week","amount","Crying")
ABbinomial(pcry,"A","B1", 1, 8)
```

---

ABdescrip

*Descriptive Statistics*

---

### Description

This function produces descriptive statistics for all phases. Statistics produced are: mean, 10 percent trimmed mean, median, standard deviation (sd), coefficient of variation (CV), range, interquartile range, and quantiles. Graphical output for this function is a boxplot of data in each phase.

### Usage

```
ABdescrip(behavior, PhaseX)
```

### Arguments

behavior            behavior variable

PhaseX             phase variable

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p32, p44, p49, p98, p109, p134

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. Research on Social Work Practice, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# ABdescrip(cry,pcry)
```



---

 ABiqr

*Interquartile band graph through all phases*


---

### Description

Builds an iqr band graph through all phases based upon the user's selection of a phase

### Usage

```
ABiqr(behavior, phaseX, v1, ABxlab, ABylab, ABmain)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter of phase statistics are based upon in quotation marks
ABxlab	label for x-axis in quotation marks
ABylab	label for y-axis in quotation marks
ABmain	main title in quotation marks

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p133

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# ABiqr(cry,pcry,"week","amount","Crying")
```

ABlineD

*Add dashed line to a graph*

---

**Description**

Enables the user to draw dashed vertical lines between phases on a graph.

**Usage**

```
ABlineD(behavior)
```

**Arguments**

behavior            behavior variable

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p96

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABplot(cry,pcry,"week","amount","Crying")
# now run ABlineD(cry)
```

---

ABlines*Draw line*

---

**Description**

This function enables the user to draw solid vertical lines between phases on a graph.

**Usage**

```
ABlines(behavior)
```

**Arguments**

behavior            behavior variable

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46, p50, p51, p60, p61, p71, p75, p76, p79, p105, p108, p129

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABplot(cry,pcry,"week","amount","Crying")
# now run ABlines(cry)
```

---

ABma

*Moving average*

---

**Description**

Creates moving average transformation using every two observations. A graph is produced and the user is given the option to save the transformed data.

**Usage**

```
ABma(behavior, phaseX, v1)
```

**Arguments**

behavior            behavior variable  
phaseX              phase variable  
v1                    letter of phase to be transformed (e.g., "A")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p38-39, p67, p142

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABma(cry, pcry, "A")
```

---

ABplot

*Simple line graph*

---

## Description

This function builds a simple line graph for a given behavior across all phases. A space separates each phase.

## Usage

```
ABplot(behavior, phaseX, ABxlab, ABylab, ABmain)
```

## Arguments

behavior	behavior variable
phaseX	phase variable
ABxlab	label for x-axis between quotation marks
ABylab	label for y-axis between quotation marks
ABmain	main title for graph between quotation marks

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46, p48,p50, p108,p128

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. Research on Social Work Practice, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# ABplot(cry,pcry,"week","amount","Crying")
```

---

 ABplotm

*Multiple line plot*


---

**Description**

This function should be used to create multiple line charts. This function must be used after the environment is set up using the plotnum() function.

**Usage**

```
ABplotm(behavior, phaseX, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
ABxlab	label for x-axis between quotation marks
ABylab	label for y-axis between quotation marks
ABmain	main title for graph between quotation marks

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p108, p129

Go to [www.analysis.com](http://www.analysis.com) for more information.

**Examples**

```

cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
yell<-c(3, 4, 2, 5, 5, 4, NA, 1, 2, 2, 2, 0, 0)
pyell<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B")
plotnum(2, 1)
ABplotm(cry,pcry,"week","amount","Crying")
ABplotm(yell,pyell,"week","amount","Yelling")

```

ABregres

*OLS regression to compare phases***Description**

Conducts OLS regression comparing any two phases. Coefficients and residuals are produced for each phase. Also a graph with a regression line is displayed for each phase in the graph window.

**Usage**

```
ABregres(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

**Author(s)**

CCharles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p52, p53, p54, p135

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. Research on Social Work Practice, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```

cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABregres(cry,pcry,"A","B")

```

---

 ABrf2

*Lag-1 autocorrelation (rf2 for small sample size)*


---

### Description

This function tests for lag-1 autocorrelation. This should be used any time the sample size is less than six. Any phase can be tested. Also produces regression line graph.

### Usage

```
ABrf2(behavior, phaseX, v1)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter of phase being tested (e.g., "A")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Huitema, B.F. & McKean, J.W. (1994). Two reduced-biased autocorrelation estimators: rF1 and rF2. *Perceptual and Motor Skills*, 78(1), 323-330.

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p18, p37-41, p65, p66, p141

Auerbach, C. & Schudrich, W. Z. (2013). *SSD for R A Comprehensive Statistical Package to Analyze Single-System Data*. *Research on Social Work Practice*, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABrf2(cry, pcry, "B1")
```

---

 ARobust

*Robust regression*


---

### Description

Uses MASS package developed by Brian Ripley <ripley@stats.ox.ac.uk> to conduct robust regression comparing any two phases. Coefficients and residuals are produced for each phase. Also a graph with a regression line is displayed for each phase in the graph window.

### Usage

```
ABrobust(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter of first phase in quotation marks (e.g., "A")
v2	letter of second phase in quotation marks (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p135

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABrobust(cry,pcry,"A","B")
```



---

ABstat                      *Add statistic line(s)*

---

### Description

Add a mean and/or median line to an ABplot.

### Usage

```
ABstat(behavior, phaseX, v, statX)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v	phase letter in quotation marks (e.g., "A")
statX	statistic in quotation marks (i.e. "mean", "median")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p48, p50, p51, p138

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. Research on Social Work Practice, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run this ABplot(cry,pcry,"week","amount","Crying")
# run this statement ABstat(cry, pcry, "A", "median")
```

---

 ABtext

*Add text to graph*


---

**Description**

Add text to graphs. Text must appear between quotation marks.

**Usage**

```
ABtext(textx)
```

**Arguments**

textx            text string must be entered between quotation marks (e.g., "baseline")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p30, p46, p47, p48, p50, p51, p60, p61, p71, p73, p75

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# run this ABplot(cry,pcry,"week","amount","Crying")
# now run ABtext("A")
```

---

 ABtsplo

*Time series plot for SSD Data*


---

**Description**

This function builds a time series chart for a given behavior across all phases. A space separates each phase. There are no connecting dots.

**Usage**

```
ABtsplo(behavior, phaseX, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
ABxlab	label for x-axis between quotation marks (e.g., "week")
ABylab	label for y-axis between quotation marks (e.g., "amount")
ABmain	main title graph between quotation mark (e.g., "Crying")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABtspplot(cry,pcry,"week","amount","Crying")
```

---

ABttest	<i>T-test comparing phases</i>
---------	--------------------------------

---

**Description**

Computes t-test comparing any twp phases selected by user. Bar graph displaying means for each phase is displayed in the graph window.

**Usage**

```
ABttest(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	letter of first phase (e.g., "A")
v2	letter of second phase (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p87, p91, p146-147

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. *Research on Social Work Practice*, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABttest(cry,pcry,"A","B")
```

---

ABWilcox

*Wilcoxon rank-sum test between two phases*

---

## Description

Performs a two-sample Wilcoxon rank-sum nonparametric test between any two phases.

## Usage

```
ABWilcox(behavior, phaseX, v1, v2)
```

## Arguments

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p147

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABWilcox(cry,pcry,"A","B")
```

---

Append

*Append data sets with additional data*


---

**Description**

This function combines data files. This is useful after data are created during transformations when using the diffchart or ABma functions. Once files with different phases are combined, you can use the saved file for significance testing.

**Usage**

```
Append()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p67, p91, p143

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
# type Append()
```

---

Aregres

*Regression for single phase*


---

**Description**

Conducts OLS regression for any phase. Coefficients and residuals are produced. Also a simple line graph for the specified phase with a regression line is displayed in the graph window.

**Usage**

```
Aregres(behavior, phaseX, v1)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	phase letter (e.g., "A")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p34, p35-36, p134

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Aregres(cry,pcry,"A")
```

---

Arimadiff

*Difference for ARIMA*

---

**Description**

Differencing in any phase. Graphs display both original data and differenced data.

**Usage**

```
Arimadiff(behavior, phaseX, v, d)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v	phase letter in quotation marks (e.g., "A")
d	integer for order of difference

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p142

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Arimadiff(cry,pcry,"B1",2)
```

---

Arimama

*Moving average for ARIMA*

---

**Description**

Moving average over any period for ARIMA. Uses TTR Package.

**Usage**

```
Arimama(behavior, phaseX, v, m)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v	phase letter in quotation markse (e.g., "A")
m	number of periods to average over (e.g., 2)

**Author(s)**

CCharles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p142-143

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Arimama(cry,pcry,"B1",2)
```

---

Arobust

*Robust regression for a single phase*

---

## Description

Uses MASS package developed by Brian Ripley <ripley@stats.ox.ac.uk> to conduct robust regression for a single phase. Coefficients and residuals are produced. Also a graph with a regression line is displayed for the phase in the graph window.

## Usage

```
Arobust(behavior, phaseX, v1)
```

## Arguments

behavior	behavior variable
phaseX	phase variable
v1	phase letter (e.g., "A")

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p143

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Arobust(cry,pcry,"A")
```



Cchart

*SPC C-chart***Description**

This function builds a C-chart and is used with individual (i.e., ungrouped) data. A space separates each phase. For use when the outcome variable is a count (i.e., ratio-level) variable.

**Usage**

```
Cchart(behavior, phaseX, v1, bandX, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	phase letter analysis is based upon in quotation marks (e.g., "A")
bandX	number of standard deviations desired (e.g., 2)
ABxlab	label for x-axis between quotation marks (e.g., "weeks")
ABylab	label for y-axis between quotation marks (e.g., "amount")
ABmain	main title between quotation marks (e.g., Crying)

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p77, p140

Bloom, M., Fischer, J. & Orme, J.G. (2009). *Evaluating practice: Guidelines for the accountable professional* (6th ed.). New York: Pearson.

Orme, J. & Cox, M.E. (2001). Analyzing single-subject design data using statistical proces control charts. *Social Work Research*, 25(2), 115-127.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Cchart(cry,pcry,"A",2,"week","amount","Crying")
```

---

 CDCabove

---

*Conservative Dual Criteria (CDC) desired zone above lines*


---

### Description

The conservative dual-criteria (CDC) is a relatively new approach to comparing phases that works well when data have a moderate lag-1 autocorrelation (lower than 0.6). This function uses two lines to define the desired zone: the mean and the regression line of the comparison phase.

### Usage

```
CDCabove(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	phase letter of first (i.e., comparison) phase between quotation marks (e.g., "A")
v2	phase letter of second phase between quotation marks (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p85, p143

Fisher, W.W., Kelley, M.E. & Lomas, J.E. (2003). Visual aids and structured criteria for improving visual inspection and interpretation of single-case designs. *Journal of Applied Behavior Analysis*, 36(3), 387-406.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
CDCabove(cry,pcry,"A","B")
```

---

 CDCbelow

---

*Conservative Dual Criteria (CDC) desired zone below lines*


---

## Description

The conservative dual-criteria (CDC) is a relatively new approach to comparing phases that works well when data have a moderate lag-1 autocorrelation (lower than 0.6). This function uses two lines to define the desired zone: the mean and the regression line of the comparison phase.

## Usage

```
CDCbelow(behavior, phaseX, v1, v2)
```

## Arguments

behavior	behavior variable
phaseX	phase variable
v1	phase letter of first (i.e., comparison) phase between quotation marks (e.g., "A")
v2	phase letter of second phase between quotation marks (e.g., "B")

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p85, p143

Fisher, W.W., Kelley, M.E. & Lomas, J.E. (2003). Visual aids and structured criteria for improving visual inspection and interpretation of single-case designs. *Journal of Applied Behavior Analysis*, 36(3), 387-406.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
CDCbelow(cry,pcry,"A","B")
```

---

 diffchart

*Difference transformation*


---

### Description

Produces first difference transformation on any phase.

### Usage

```
diffchart(behavior, phaseX, v1)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter for phase to be transformed between quotation marks (e.g., "A")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p39, p40, p65-66, p90, p142

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
diffchart(cry,pcry,"A")
```

---

 Effectsize

*Effect size*


---

### Description

The effect size function automatically displays the percent change and calculated values for both the ES and d-index for any two phases. Information for interpreting calculated values appears in the Console.

**Usage**

```
Effectsize(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter between quotation marks (e.g., "A")
v2	second phase letter between quotation marks (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p56-57, p103, p135

Cohen, J.(1988).Statistical Power analysis for the behavioral sciences (2nd ed). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Glass, G. V., McGaw, B., & Smith, M. L. (1981) Meta-analysis in social research. Thousand Oaks, CA: SAGE Publications, Inc.

Bloom, M., Fischer, J. & Orme, J.G. (2009). Evaluating practice: Guidelines for the accountable professional (6th ed.). New York: Pearson.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Effectsize(cry,pcry,"A","B")
```

---

GABrf2

*Autocorrelation for group data*


---

**Description**

This function tests for lag-1 autocorrelation for group data. This should be used any time the sample size is less than six. Any phase can be tested. Also produces regression line graph.

**Usage**

```
GABrf2(behavior, phaseX, timeX, v1)
```



**Arguments**

behavior	behavior variable
phaseX	phase variable
timeX	time variable (e.g., week)
v1	first phase letter between quotation marks (e.g., "A")
v2	second phase letter between quotation marks (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p104, p108

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
attend<-c(0,0,0,1,0,0,1,0,0,1,0,0,1,0,1,0,0,0,0,0,1,1,0,0,1,NA,
0,1,1,0,1,1,0,1,1,1,0,1,0,0,1,1,1,1,0,0,1,1,0,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1)

week<-c(1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,5,5,5,5,5,NA,6,6,
6,6,6,7,7,7,7,7,
8,8,8,8,8,9,9,9,9,9,10,10,10,10,10,11,11,11,11,11,12,
12,12,12,12,13,
13,13,13,13,14,14,14,14,14,15,15,15,15,15)

pattend<-c("A","A","A","A","A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A","A","A","A",
"A","A","A",NA,"B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B")
# now run GABttest(attend, pattend, week, "A", "B")
```

---

Getcsv

*Import .csv file*

---

**Description**

Imports .csv file created in any software package. Uses dialogue box to acquire file. IMPORTANT NOTE: After the file is open type 'attach(ssd)' in the Console and press <RETURN> to manipulate file. Also, can type 'listnames()' to review variable names. Before you open another file type 'detach(ssd)' in the console and press <RETURN>.

**Usage**

```
Getcsv()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p22, p29, p44, p66, p90, p91, pp95, p128

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
# type Getcsv()
```

---

Gindex

*G-index*

---

**Description**

The g-index is a measure of effect size calculated using the proportion of scores in the desired zone. Used when there is a trend in the data.

**Usage**

```
Gindex(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter between quotation marks (e.g., "A")
v2	second phase letter between quotation marks (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p57-59

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.



**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Gindex(cry,pcry,"A","B")
```

---

Gline

*Goal Line*


---

**Description**

Draws a goal line

**Usage**

Gline()

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p22, p29, p44, p66, p90, p91, pp95, p128

Go to [www.ssanalysis.com](http://www.ssanalysis.com) for more information.

**Examples**

```
# type Getcsv()
```

---

Gmedian

*Median line for group data*


---

**Description**

Places median line for baseline in group boxplot.

**Usage**

Gmedian(behavior, phaseX, v)

**Arguments**

behavior	behavior variable
phaseX	phase variable
v	phase letter for baseline (e.g., "A")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p96, p148

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```

cohesion<-c(85,90,80,84,82,79,75,76,80,84,75,80,79,83,88,78,80,85,83,
82,89,84,89,91,87,84,77,86,80,
89,81,86,88,83,86,90,86,85,85,87,80,89,NA,86,87,88,89,79,73,75,
74,70,75,81,85,75,73,75,
79,70,72,71,69,70,64,60,59,54,53,55,50,54,51,49,
48,50,46,55,51,55,49,50,48,51,33)

week<-c(1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,3,4,4,4,4,4,4,4,5,
5,5,5,5,5,6,6,6,6,6,6,6,NA,7,7,7,7,7,7,8,8,8,8,8,8,9,
9,9,9,9,9,10,10,10,10,10,10,11,11,11,11,11,11,11,12,
12,12,12,12,12,12)

pcohesion<-c("A","A","A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A","A","A","A","A",
"B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B")
ABdescrip(cohesion,week)
Gmedian(cohesion,pcohesion,"A")

```

---

insert

*insert*

---

**Description**

Insert function - this function is not in use by SSD for R end-users.

**Usage**

```
insert(v, e, pos)
```

**Arguments**

v	not used
e	not used
pos	not used

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
# This function is not in use by SSD for R end-users.
```

---

IQRbandgraph	<i>Interquartile band graph for one phase</i>
--------------	---

---

**Description**

Draws an interquartile band graph for any phase.

**Usage**

```
IQRbandgraph(behavior, phaseX, v1, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	letter for phase for which bands will be drawn (e.g., "A")
ABxlab	label for x-axis in quotation marks (e.g., "weeks")
ABylab	lable for y-axis in quotation marks (e.g., "amount")
ABmain	main title for graph in quotation marks (e.g., "Crying")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p133

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
IQRbandgraph(cry,pcry,"A","week","amount","Crying")
```

---

IQRlegend

*IQR legend*


---

**Description**

This function creates a legend on an IQR band graph. NOTE: Once this legend is in place, the graph can no longer be altered.

**Usage**

```
IQRlegend()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p133

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
IQRbandgraph(cry,pcry,"A","week","amount","Crying")
IQRlegend()
```

---

IQRline	<i>IQR line for ABplot</i>
---------	----------------------------

---

### Description

This function enables a user to add lines representing the interquartile range to any phase of an ABplot.

### Usage

```
IQRline(behavior, phaseX, v)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v	phase letter upon which IQR stats are based - in quotation marks (e.g., "A")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p50, p131

Go [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABplot(cry,pcry,"week","amount","Crying")
# type IQRline(cry, pcry, "A")
```



---

 IRDbelow

*Improvement Rate Difference (IRD) calculation*


---

### Description

This effect size function will compute the IRD and display a graph in the graph window. The desired improvement is a decrease in the baseline behavior.

### Usage

```
IRDbelow(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p62-65, p136

Bloom, M., Fischer, J. & Orme, J.G. (2009). Evaluating practice: Guidelines for the accountable professional (6th ed.). New York: Pearson.

Parker, R. I., Vannest, K. J., & Brown, L. (2009). The improvement rate difference for single-case research. *Exceptional Children*, 75(2), 135-150.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
#IQRbandgraph(cry,pcry,"A","week","amount","Crying")
IRDbelow(cry,pcry,"A","B")
```

listnames

*List variable names*

---

**Description**

Lists variable names in active data.

**Usage**

```
listnames()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p22, p71, p74, p95, p128

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
# type: listnames()
```

---

meanabove

*Chi-square - desired values above the mean*

---

**Description**

Chi-square test comparing the frequency of observations above the reference phase mean in any two phases.

**Usage**

```
meanabove(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")



**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2,
NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A",
NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
meanabove(cry,pcry,"A","B1")
```

---

meanbelow

*Chi-square - desired values below the mean*

---

**Description**

Chi-square test comparing the frequency of observations below the reference phase mean in any two phases.

**Usage**

```
meanbelow(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2,
NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A",
NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
meanbelow(cry,pcry,"A","B1")
```

---

meanES

*Mean Effect Size*


---

**Description**

This function calculates a mean and SD for Cohen's D effect sizes. A file containing saved effect sizes must be opened by `Getcvts()` and then attached.

**Usage**

```
meanES(es, lab, esmain)
```

**Arguments**

es	effect size variable
lab	Label variable
esmain	main title for graph between quotation marks

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46, p48,p50, p108,p128

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. *Research on Social Work Practice*, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
#need to open a file
```

---

meanNAP	<i>Mean Effect Size</i>
---------	-------------------------

---

**Description**

This function calculates a mean and SD for a file containing NAP effect sizes. A file containing saved effect sizes must be opened by `GetcvS()` and then attached.

**Usage**

```
meanNAP(es, lab, esmain)
```

**Arguments**

es	effect size variable
lab	Label variable
esmain	main title for graph between quotation marks

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work  
Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p46, p48,p50, p108,p128

Auerbach, C. & Schudrich, W. Z. (2013). *SSD for R A Comprehensive Statistical Package to Analyze Single-System Data*. *Research on Social Work Practice*, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
#need to open a file
```



---

medbelow	<i>Chi-square - desired values below the median</i>
----------	---

---

**Description**

Chi-square test comparing the frequency of observations below the reference phase median in any two phases.

**Usage**

```
medbelow(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p84, p144

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
medbelow(cry,pcry,"A","B1")
```

---

`metareg`*Meta Regression*

---

**Description**

Meta regression for saved effect sizes in SSDforR. Use the `Getcsv()` function to open the saved effect size file.

**Usage**

```
#metareg(es, v)
```

**Arguments**

<code>es</code>	effect size variable
<code>v</code>	variance of effect size

**Author(s)**

Charles Auerbach, PhD & Wendy Zeitlin, PhD; Yeshiva University, Wurzweiler School of Social Work

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

Del Re, A. C. (2015). A practical tutorial on conducting meta-analysis in R. *The Quantitative Methods for Psychology*, 11(1), 37-50.

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014.

**Examples**

```
ES<-c(.3, .4, .2, .5, .3, .4)
V<-c(.01, .03, .04, .02, .03, .02)

metareg(ES,V)
```

---

metaregi

*Meta Regression with Moderator*

---

## Description

Meta regression for saved effect sizes in SSDforR. Use the Getcsv() function to open the saved effect size file.

## Usage

```
metaregi(es, i, v)
```

## Arguments

es	effect size variable
i	moderator
v	variance of effect size

## Author(s)

Charles Auerbach, PhD & Wendy Zeitlin, PhD; Yeshiva University, Wurzweiler School of Social Work

## References

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

Del Re, A. C. (2015). A practical tutorial on conducting meta-analysis in R. *The Quantitative Methods for Psychology*, 11(1), 37-50.

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014.

## Examples

```
ES<-c(.3, .4, .2, .5, .3, .4)
V<-c(.01, .03, .04, .02, .03, .02)
I<-c(1,3,5,4,6,7)
metaregi(ES,I,V)
```









---

PANDbelow

*PAND - desired values below the reference line*


---

### Description

This effect size function evaluates the percentage of all non-overlapping Data (PAND) above the reference line in the comparison phase. Users will be prompted to enter a value for the reference line.

### Usage

```
PANDbelow(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	first phase variable (e.g., "A")
v2	second phase variable (e.g., "B")

### Author(s)

Charles Auerbach, PhD & Wendy Zeitlin, PhD; Yeshiva University, Wurzweiler School of Social Work

### References

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p62, p136

Lenz, A.S. (2012). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, 46(1), 64-73.

Parker, R.I. & Hagan-Burker, S. & Vannest, K. (2007). Percentage of all non-overlapping data: An alternative to PND. *The Journal of Special Education*, 40(4), 194-204.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
PANDbelow(cry,pcry,"A","B1")
```

---

PANDlegend

*PAND legend*


---

### Description

Adds a legend to PAND graph. The graph can not be modified in any way after the legend is added.

### Usage

```
PANDlegend()
```

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p136

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
PANDbelow(cry,pcry,"A","B1")
PNDlegend()
```

---

Pchart

*SPC P-chart*


---

### Description

This function builds a P-chart and can be used when the target behavior has a binary outcome. This chart allows for a comparison of the proportion of tasks completed over time or between phases. A space separates each phase.

### Usage

```
Pchart(behavior, groupX, bandX, ABxlab, ABylab, ABmain)
```



**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase variable (e.g., "A")
v2	second phase variable (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p60, p137

Lenz, A.S. (2012). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, 46(1), 64-73.

Ma, H-H. (2009). The effectiveness of intervention on the behavior of individuals with autism: A meta-analysis using percentage of data points exceeding the median of baseline phase. *Behavior Modification*, 33(3), 339-359.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
esteem<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pesteem<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
PEMabove(esteem,pesteem,"A","B1")
```

---

PEMbelow

*PEM - desired values below the reference line*

---

**Description**

Percentage of Data Exceeding the Median (PEM). The PEM procedure offers a method to assess effect size and adjust for the influence of outliers in the baseline phase when desired values are below the reference line.

**Usage**

```
PEMbelow(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase variable (e.g., "A")
v2	second phase variable (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Lenz, A.S. (2012). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, 46(1), 64-73.

Ma, H-H. (2009). The effectiveness of intervention on the behavior of individuals with autism: A meta-analysis using percentage of data points exceeding the median of baseline phase. *Behavior Modification*, 33(3), 339-359.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
PEMbelow(cry,pcry,"A","B")
```

---

PEMlegend

*PEM legend*

---

**Description**

Adds a legend to a PEM graph. The graph can not be modified in any way after the legend is added.

**Usage**

```
PEMlegend()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```

cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
#run first
PEMbelow(cry,pcry,"A","B1")
#run after complete steps above
PEMlegend()

```

---

plotnum	<i>Set graphic environment</i>
---------	--------------------------------

---

**Description**

Used prior to ABplotm to set up graphic environment.

**Usage**

```
plotnum(nr, nc)
```

**Arguments**

nr	number of rows of graphs desired (e.g., 2)
nc	number of columns of graphs desired (e.g., 3)

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p107

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```

cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
yell<-c(3, 4, 2, 5, 5, 4, NA, 1, 2, 2, 2, 0, 0)
pyell<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B")
plotnum(2, 1)
ABplotm(cry,pcry,"week","amount","Crying")
ABplotm(yell,pyell,"week","amount","Yelling")

```



---

PNDabove

*PND - desired values above the reference line*


---

### Description

This effect size function evaluates the percentage of non-overlapping data (PND) above highest data point in the comparison phase.

### Usage

```
PNDabove(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	comparison phase variable (e.g., "A")
v2	letter of second phase (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Lenz, A.S. (2012). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, 46(1), 64-73.

Scruggs, T.E. & Mastropieri, M.A. (2012). PND at 25: Past, present, and future trends in summarizing single-subject research. *Remedial and Special Education*, 34(1), 9-19.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
esteem<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pesteem<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
PNDabove(esteem, pesteem, "A", "B1")
```

---

PNDbelow

*PND - desired values below the reference line*


---

### Description

This effect size function evaluates the percentage of non-overlapping data (PND) below the lowest data point in the comparison phase.

### Usage

```
PNDbelow(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	comparison phase variable (e.g., "A")
v2	second phase variable (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Lenz, A.S. (2012). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, 46(1), 64-73.

Scruggs, T.E. & Mastropieri, M.A. (2012). PND at 25: Past, present, and future trends in summarizing single-subject research. *Remedial and Special Education*, 34(1), 9-19.

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p60, p137

Lenz, A.S. (2012). Calculating effect size in single-case research: A comparison of nonoverlap methods. *Measurement and Evaluation in Counseling and Development*, 46(1), 64-73.

Parker, R.I. & Hagan-Burker, S. & Vannest, K. (2007). Percentage of all non-overlapping data: An alternative to PND. *The Journal of Special Education*, 40(4), 194-204.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
PNDbelow(cry,pcry,"A","B1")
```

---

PNDlegend

*PND legend*


---

**Description**

Adds a legend to a PND graph. The graph can not be modified in any way after the legend is added.

**Usage**

```
PNDlegend()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p62, p136

Parker, R.I. & Hagan-Burker, S. & Vannest, K. (2007). Percentage of all non-overlapping data: An alternative to PND. *The Journal of Special Education*, 40(4), 194-204.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
#run first
PNDbelow(cry,pcry,"A","B1") #run after complete steps above
PNDlegend()
```

---

Rchart

*SPC R-chart using mean range*


---

**Description**

The R-Chart is designed to detect changes in variation over time. This is one of two forms of the R-chart and should be used with small samples. This function uses the mean range of samples to track variation.

**Usage**

```
Rchart(behavior, groupX, bandX, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
groupX	grouping variables (e.g., day)
bandX	number of standard deviations desired (e.g., 2)
ABxlab	x-axis label in quotation marks (e.g., "weeks")
ABylab	y-axis label in quotation marks (e.g., "amount")
ABmain	main title for graph in quotation marks (e.g., "Problem Range")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p73-74, p136, p106-107, p138-139

Orme, J. & Cox, M.E. (2001). Analyzing single-subject design data using statistical process control charts. *Social Work Research*, 25(2), 115-127.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
admit<-c(85,90,80,84,82,79,75,76,80,84,75,80,79,83,88,78,80,85,83,
82,89,84,89,91,87,84,77,86,80,
89,81,86,88,83,86,90,86,85,85,87,80,89,
NA,86,87,88,89,79,73,75,74,70,75,81,85,75,73,75,
79,70,72,71,69,70,64,60,59,54,53,55,50,54,51,
49,48,50,46,55,51,55,49,50,48,51,33)

day<-c(1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,5,
5,5,5,5,5,6,6,6,6,6,6,NA,7,7,7,7,7,7,8,8,8,8,8,8,9,
9,9,9,9,9,10,10,10,10,10,10,10,11,11,11,11,11,11,
11,12,12,12,12,12,12,12)

padmit<-c("A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A",
NA,"B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B",
"B","B","B","B","B","B","B")
Rchart(admit, day, 2, "week", "amount", "Admits to Hospital")
```

Rchartsd

*SPC R-chart using standard deviation***Description**

The R-Chart is designed to detect changes in variation over time. This is one of two forms of the R-chart and should be used with samples larger than ten. This function uses the standard deviation of samples to track variation.

**Usage**

```
Rchartsd(behavior, groupX, bandX, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
groupX	grouping variable (e.g., day)
bandX	number of standard deviations desired (e.g., 2)
ABxlab	label for x-axis in quotation marks, (e.g., "day")
ABylab	label for y-axis in quotation marks (e.g., "amount")
ABmain	main title for graph in quotation marks (e.g., "Variation in Admits")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work  
Wendy Zeitlin, PhD Montclair State University

**References**

Orme, J. & Cox, M.E. (2001). Analyzing single-subject design data using statistical process control charts. *Social Work Research*, 25(2), 115-127.

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p76, p109, p139

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
admit<-c(85,90,80,84,82,79,75,76,80,84,75,80,79,83,88,78,80,85,83,82,89,84,89,91,87,84,77,86,80,
89,81,86,88,83,86,90,86,85,85,87,80,89,NA,86,87,88,89,79,73,75,74,70,75,81,85,75,73,75,
79,70,72,71,69,70,64,60,59,54,53,55,50,54,51,49,48,50,46,55,51,55,49,50,48,51,33)
```

```
day<-c(1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,5,
5,5,5,5,5,6,6,6,6,6,6,NA,7,7,7,7,7,7,8,8,8,8,8,8,9,
9,9,9,9,9,10,10,10,10,10,10,10,11,11,11,11,11,11,11,
12,12,12,12,12,12,12)
```

```
padmit<-c("A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A","A",
"A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A",NA,"B",
"B","B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B",
"B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B")
Rchartsd(admit, day, 2, "week", "amount", "Admits to Hospital")
```

---

regabove

*Chi-square - desired values above regression line*


---

### Description

Chi-square test comparing the frequency of observations above the regression line in a comparison phase to another phase.

### Usage

```
regabove(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter of comparison phase in quotation marks (e.g., "A")
v2	letter of second phase in quotation marks (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p84, p1145-146  
Go to [www.ssddanalysis.com](http://www.ssddanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
regabove(cry,pcry,"A","B1")
```

---

regbelow	<i>Chi-square - desired values below regression line</i>
----------	--

---

### Description

Chi-square test comparing the frequency of observations below the regression line in a comparison phase to another phase.

### Usage

```
regbelow(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter of comparison phase in quotation marks (e.g., "A")
v2	letter of second phase in quotation marks (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p83, p146

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
regbelow(cry,pcry,"A","B1")
```

---

 RMarrow

---

*Draw arrow on graph. For use with Rmarkdown.*


---

## Description

This function enables users to draw an arrow on a graph. For example, an arrow can be drawn from a text label of a critical event to a point on the graph. For Use with Rmarkdown.

## Usage

```
RMarrow(X1, Y1, X2, Y2)
```

## Arguments

X1	X1 coordinate
Y1	Y1 coordinate
X2	X2 coordinate
Y2	Y2 coordinate

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46-p50

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2,
1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B",
"B", "B", NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABplot(cry,pcry,"week","amount","Crying")
# now run RMarrow(9,10,11,10)
```



---

RMGline *Goal Line for Rmarkdown*

---

**Description**

Draws a goal line for RMarkdown

**Usage**

```
RMGline(y)
```

**Arguments**

y                    ordinate on y axis / goal level

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p22, p29, p44, p66, p90, p91, pp95, p128

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
# type Getcsv()
```

---

Rmlines *Draws line. For use with Rmarkdown*

---

**Description**

This function enables the user to draw solid vertical lines between phases on a graph. For use with Rmarkdown.

**Usage**

```
Rmlines(behavior, x)
```

**Arguments**

behavior            behavior variable  
x                    X coordinate

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46, p50, p51, p60, p61, p71, p75, p76, p79, p105, p108, p129

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABplot(cry,pcry,"week","amount","Crying")
# now run RMLines(cry,13.5)
```

---

RMstat

*Add statistic line(s) for RMarkdown*

---

**Description**

Add a mean and/or median line to an ABplot for RMarkdown.

**Usage**

```
RMstat(behavior, phaseX, v, statX,l)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v	phase letter in quotation marks (e.g., "A")
statX	statistic in quotation marks (i.e. "mean", "median")
l	x ordinate to start line (e.g., 1)

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p48, p50, p51, p138

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. *Research on Social Work Practice*, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run this ABplot(cry,pcry,"week","amount","Crying")
# run this statement RMstat(cry, pcry, "A", "median",1)
```

---

RMtext

*Add text to graph. For use with Rmarkdown*

---

## Description

Add text to graphs. Text must appear between quotation marks. For use with Rmarkdown.

## Usage

```
RMtext(textx,x,y)
```

## Arguments

textx	text string must be entered between quotation marks (e.g., "baseline")
x	X coordinate
y	Y coordinate

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p30, p46, p47, p48, p50, p51, p60, p61, p71, p73, p75

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# run this ABplot(cry,pcry,"week","amount","Crying")
# now run RMtext("A",10)
```

---

robregabove

*Chi-square - desired values above robust regression line*


---

**Description**

Chi-square test comparing the frequency of observations above the robust regression line in a comparison phase to another phase.

**Usage**

```
robregabove(behavior, phaseX, v1, v2)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	letter of comparison phase in quotation marks (e.g., "A")
v2	letter of second phase in quotation marks (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p85, p146

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"NA", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
robregabove(cry,pcry,"A","B1")
```

---

robregbelow	<i>Chi-square - desired values below robust regression line</i>
-------------	---

---

### Description

Chi-square test comparing the frequency of observations below the robust regression line in a comparison phase to another phase.

### Usage

```
robregbelow(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	letter of comparison phase in quotation marks (e.g., "A")
v2	letter of second phase in quotation marks (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p85, p146

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
robregbelow(cry,pcry,"A","B1")
```





---

 RSarrow

*Draw arrow on graph. For use with no interactive.*


---

## Description

This function enables users to draw an arrow on a graph. For example, an arrow can be drawn from a text label of a critical event to a point on the graph. For noninteractive use .

## Usage

```
RSarrow(X1, Y1, X2, Y2)
```

## Arguments

X1	X1 coordinate
Y1	Y1 coordinate
X2	X2 coordinate
Y2	Y2 coordinate

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46-p50

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2,
1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B",
"B", "B", NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABplot(cry,pcry,"week","amount","Crying")
# now run RSarrow(9,10,11,10)
```



---

RSlines *Draws line. For use with Rmarkdown*

---

## Description

This function enables the user to draw solid vertical lines between phases on a graph. For use noninteractive use.

## Usage

```
RSlines(behavior,x)
```

## Arguments

behavior	behavior variable
x	X coordinate

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p46, p50, p51, p60, p61, p71, p75, p76, p79, p105, p108, p129

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run ABplot(cry,pcry,"week","amount","Crying")
# now run RSlines(cry,13.5)
```

---

 RSstat

*Add statistic line(s) for RMarkdown*


---

## Description

Noninteractive add a mean and/or median line to an ABplot.

## Usage

```
RSstat(behavior, phaseX, v, statX,l)
```

## Arguments

behavior	behavior variable
phaseX	phase variable
v	phase letter in quotation marks (e.g., "A")
statX	statistic in quotation marks (i.e. "mean", "median")
l	x ordinate to start line (e.g., 1)

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p48, p50, p51, p138

Auerbach, C. & Schudrich, W. Z. (2013). SSD for R A Comprehensive Statistical Package to Analyze Single-System Data. *Research on Social Work Practice*, 23(3), 346-353. doi:10.1177/104973153477213

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# now run this ABplot(cry,pcry,"week","amount","Crying")
# run this statement RSstat(cry, pcry, "A", "median",1)
```

---

RStext *Add non interactive text to graph.*

---

### Description

Add text to graphs. Text must appear between quotation marks.

### Usage

```
RStext(textx,x,y)
```

### Arguments

textx	text string must be entered between quotation marks (e.g., "baseline")
x	X coordinate
y	Y coordinate

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p30, p46, p47, p48, p50, p51, p60, p61, p71, p73, p75

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
# run this ABplot(cry,pcry,"week","amount","Crying")
# now run RStext("A",10)
```

---

RSTrimline	<i>Trimmed mean line added to ABplot</i>
------------	--

---

### Description

Adds trimmed mean line to ABplot. Click in the phase of the ABplot to add line.

### Usage

```
RSTrimline(behavior, phaseX, v,l)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v	letter of phase for which trimmed mean is desired in quotation marks (e.g., "A")
l	start point on x axis

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p48, p130-131

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABplot(cry,pcry,"week","amount","Crying")
# now run RSTrimline(cry,pcry,"A",1)
```

---

Savecsv	<i>Save data file</i>
---------	-----------------------

---

**Description**

Save .csv file edited in SSDforR. Uses dialogue box to save file.

**Usage**

```
Savecsv()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p125, p126, p128

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
# type Savecsv()
```

---

SD1	<i>1-standard deviation band graph</i>
-----	--

---

**Description**

Produces graph for all phases with mean and one standard deviation bands displayed for a comparison phase across all phases. Output in the Console displays the sd, the mean, and values for the sd bands.

**Usage**

```
SD1(behavior, phaseX, v1, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	letter for phase variable stats are base upon in quotation marks (e.g., "A")
ABxlab	x-axis label in quotation marks (e.g., "week")
ABylab	y-axis label in quotation marks (e.g., "amount")
ABmain	main title label in quotation marks (e.g., "Crying")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p51, p79, p132 Go to [www.ssdanalysis](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
SD1(cry,pcry,"A","week","amount","Crying")
```

---

sd1bandgraph

*1-standard deviation band graph for one phase*

---

**Description**

Produces graph for one phase with mean and one standard deviation bands displayed. Output in the Console displays the sd, the mean, and values for the sd bands.

**Usage**

```
sd1bandgraph(behavior, phaseX, v1, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	phase letter (e.g., "A")
ABxlab	x-axis label in quotation marks (e.g., "week")
ABylab	y-axis label in quotation marks (e.g., "amount")
ABmain	main title in quotation marks (e.g., "Crying")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p131

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
sd1bandgraph(cry,pcry,"A","week","amount","Crying")
```

---

SD1legend

*SD1 legend*


---

**Description**

Adds legend to SD1 band graph. The graph can not be modified in any way after the legend is added.

**Usage**

```
SD1legend()
```

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p132

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA,
2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A",
NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
SD1(cry,pcry,"A","week","amount","Crying")
SD1legend()
```

SD2

*2-standard deviation band graph***Description**

Produces graph for all phases with mean and two standard deviation bands displayed for a comparison phase across all phases. Output in the Console displays the sd, the mean, and values for the sd bands.

**Usage**

```
SD2(behavior, phaseX, v1, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	letter for phase variable stats are base upon in quotation marks (e.g., "A")
ABxlab	x-axis label in quotation marks (e.g., "week")
ABylab	y-axis label in quotation marks (e.g., "amount")
ABmain	main title in quotation marks (e.g., "Crying")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p32-133

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2,
1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA,
"B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
SD2(cry,pcry,"A","week","amount","Crying")
```



---

sd2bandgraph	<i>2-standard deviation band graph for one phase</i>
--------------	--

---

### Description

Produces graph for one phase with mean and two standard deviation bands displayed. Output in the Console displays the sd, the mean, and values for the sd bands.

### Usage

```
sd2bandgraph(behavior, phaseX, v1, ABxlab, ABylab, ABmain)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	phase letter (e.g., "A")
ABxlab	x-axis label in quotation marks (e.g., "week")
ABylab	y-axis label in quotation marks (e.g., "amount")
ABmain	main title in quotation marks (e.g., "Crying")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p34, p132

Go [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA,
2, 2, 3, 2, 1, 2, NA,
2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA,
"B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
sd2bandgraph(cry,pcry,"A","week","amount","Crying")
```

---

SD2legend

*SD2 legend*


---

### Description

Adds legend to SD2 band graph. The graph can not be modified in any way after the legend is added.

### Usage

```
SD2legend()
```

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. p133

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1")
SD2(cry,pcry,"A","week","amount","Crying")
SD2legend()
```

---

SDAband

*Adds standard deviation bands to an ABplot*


---

### Description

Adds standard deviation bands to an ABplot. Click in the phase twice to add upper and lower bands.

### Usage

```
SDAband(behavior, phaseX, v, bandX)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v	phase band is based upon (e.g., "A")
bandX	number of standard deviations desired (e.g., 2)

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p131

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABplot(cry,pcry,"week","amount","Crying")
# now run SDAband(cry,pcry,"A",2)
```

---

 SN

*Scientific notation*


---

**Description**

Converts scientific notation to decimals.

**Usage**

```
SN(value)
```

**Arguments**

value	value to be converted from scientific notation
-------	--

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University





```

"A","A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A","A","A","A","A","A",
"A","A","A","A","A","A","A","A","A","A","A","A","A","A","A","A",
"B","B","B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B",
"B","B","B","B","B","B","B","B","B","B","B","B",
"B","B","B","B","B","B")
Rchart(admit, day, 2, "week", "amount", "Admits to Hospital")
# now run SPCline()

```

---

SSDforR

---

*List of all functions in SSD for R*


---

## Description

Lists all the functions available in the SSD for R package.

## Usage

```
SSDforR()
```

## Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

## References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p18

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

## Examples

```
SSDforR()
```

---

 TauUabove

*TAU\_U - Calculates Tau U index increase is desired*


---

**Description**

This Calculates the Tau-U index Parker, Vannest, Davis, & Sauber 2011.

**Usage**

TauUabove(behavior, phaseX, v1, v2)

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Parker, Vannest, Davis, & Sauber 2011  
 Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
esteem<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pesteem<-c("A", "A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
TauUabove(esteem,pesteem,"A","B1")
```

---

 TauUbelow

*TAU\_U - Calculates Tau U index decrease is desired*


---

**Description**

This Calculates the Tau-U index Parker, Vannest, Davis, & Sauber 2011.

**Usage**

TauUbelow(behavior, phaseX, v1, v2)

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	first phase letter (e.g., "A")
v2	second phase letter (e.g., "B")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Parker, Vannest, Davis, & Sauber 2011  
Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
esteem<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pesteem<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
TauUbelow(esteem,pesteem,"A","B1")
```

---

trendtests

*Tau Trend test and Sen's slope test for single phase*

---

**Description**

Conducts a Mann-Kendall trend test for any phase.

**Usage**

```
trendtest(behavior, phaseX, v1)
```

**Arguments**

behavior	behavior variable
phaseX	phase variable
v1	phase letter (e.g., "A")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University





---

 trimbelow

*Chi-square - desired values below the trimmed mean*


---

### Description

Chi-square test comparing the frequency of observations below the reference phase trimmed mean in any two phases.

### Usage

```
trimbelow(behavior, phaseX, v1, v2)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	first phase letter in quotation marks (e.g., "A")
v2	second phase letter in quotation marks (e.g., "B")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p84, p145

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B",
NA, "B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
trimbelow(cry,pcry,"A","B")
```

---

Trimline	<i>Trimmed mean line added to ABplot</i>
----------	--

---

### Description

Adds trimmed mean line to ABplot. Click in the phase of the ABplot to add line.

### Usage

```
Trimline(behavior, phaseX, v)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v	letter of phase for which trimmed mean is desired in quotation marks (e.g., "A")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p48, p130-131

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
ABplot(cry,pcry,"week","amount","Crying")
# now run Trimline(cry,pcry,"A")
```

---

Xmrchart

*SPC XMR-chart*


---

### Description

The X-mR-chart can be use to detect changes within and between phases. Can be used with individual data, but it is not appropriate for group data.

### Usage

```
Xmrchart(behavior, phaseX, v1, bandX, ABxlab, ABylab, ABmain)
```

### Arguments

behavior	behavior variable
phaseX	phase variable
v1	phase bands are based upon in quotation marks (e.g., "A")
bandX	number of standard deviations desired (e.g., 2)
ABxlab	x-axis label in quotation marks (e.g., "week")
ABylab	y-axis label in quotation marks (e.g., "amount")
ABmain	main title for chart in quotation marks (e.g., "X-mR-Chart")

### Author(s)

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

### References

Bloom, M., Fischer, J. & Orme, J.G. (2009). Evaluating practice: Guidelines for the accountable professional (6th ed.). New York: Pearson.

Orme, J. & Cox, M.E. (2001). Analyzing single-subject design data using statistical proces control charts. *Social Work Research*, 25(2), 115-127.

Auerbach, Charles, and Zeitlin Wendy. *SSD for R: An R Package for Analyzing Single-Subject Data*. Oxford University Press, 2014. P75-76

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

### Examples

```
cry<-c(3, 4, 2, 5, 3, 4, NA, 2, 2, 3, 2, 1, 2, NA, 2, 2, 1, 2, 1, 0, 0, 0)
pcry<-c("A", "A", "A", "A", "A", "A", NA, "B", "B", "B", "B", "B", "B", NA,
"B1", "B1", "B1", "B1", "B1", "B1", "B1", "B1")
Xmrchart(cry, pcry, "A", 2, "week", "amount", "X-mR-Chart")
```

XRchart

*SPC XR-Chart***Description**

This chart can be used when there are multiple observations per sample and uses the mean of each sample to create the chart.

**Usage**

```
XRchart(behavior, groupX, bandX, ABxlab, ABylab, ABmain)
```

**Arguments**

behavior	behavior variable
groupX	grouping variable
bandX	number of standard deviations desired (e.g., 2)
ABxlab	x-axis label in quotation marks (e.g., "week")
ABylab	y-axis label in quotation marks (e.g., "mean amount")
ABmain	main title for chart in quotation marks (e.g., "Admits to Hospital")

**Author(s)**

Charles Auerbach, PhD Wurzweiler School of Social Work Wendy Zeitlin, PhD Montclair State University

**References**

Auerbach, Charles, and Zeitlin Wendy. SSD for R: An R Package for Analyzing Single-Subject Data. Oxford University Press, 2014. p71, p105

Orme, J. & Cox, M.E. (2001). Analyzing single-subject design data using statistical process control charts. *Social Work Research*, 25(2), 115-127.

Go to [www.ssdanalysis.com](http://www.ssdanalysis.com) for more information.

**Examples**

```
admit<-c(85,90,80,84,82,79,75,76,80,84,75,80,79,83,88,78,80,85,83,
82,89,84,89,91,87,84,77,86,80,
89,81,86,88,83,86,90,86,85,85,87,80,89,NA,86,87,88,89,79,73,75,
74,70,75,81,85,75,73,75,
79,70,72,71,69,70,64,60,59,54,53,55,50,54,51,49,48,50,46,55,51,
55,49,50,48,51,33)
```

```
day<-c(1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,5,
5,5,5,5,5,6,6,6,6,6,6,NA,7,7,7,7,7,7,8,8,8,8,8,8,9,
9,9,9,9,9,10,10,10,10,10,10,10,11,11,11,11,11,11,11,12,
```

```
12,12,12,12,12,12)
```

```
padmit<-c("A","A","A","A","A","A","A","A","A","A",  
"A","A","A","A","A","A",  
"A","A","A","A","A","A","A","A","A","A","A","A","A","A","A",  
"A","A","A","A","A","A","A","A","A","A","A","A","A","A","A",  
"B","B","B","B","B","B",  
"B","B","B","B","B","B","B","B","B","B","B","B",  
"B","B","B","B",  
"B","B","B","B","B","B","B","B","B","B","B","B",  
"B","B","B","B","B")  
XRchart(admit, day, 2, "week", "amount", "Admits to Hospital")
```

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