

# vipor package usage example (version 0.4.1)

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## Abstract

This is a collection of examples of usage for the **vipor** package.

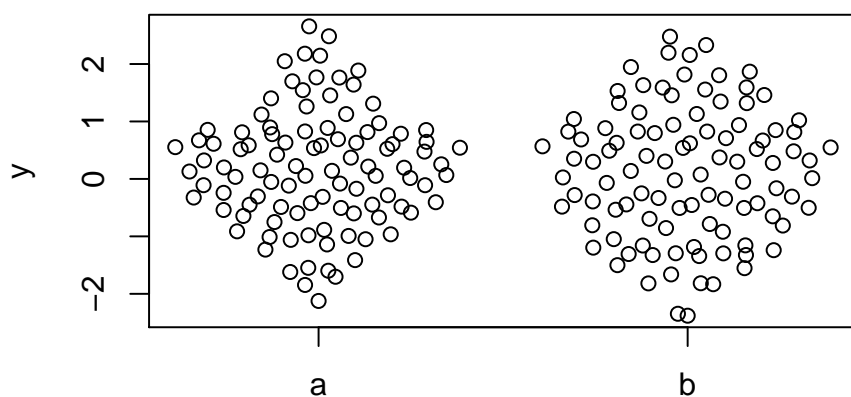
*Keywords:* visualization, display, one dimensional, grouped, groups, violin, scatter, points, quasirandom, beeswarm, van der Corput.

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## 1. The basics

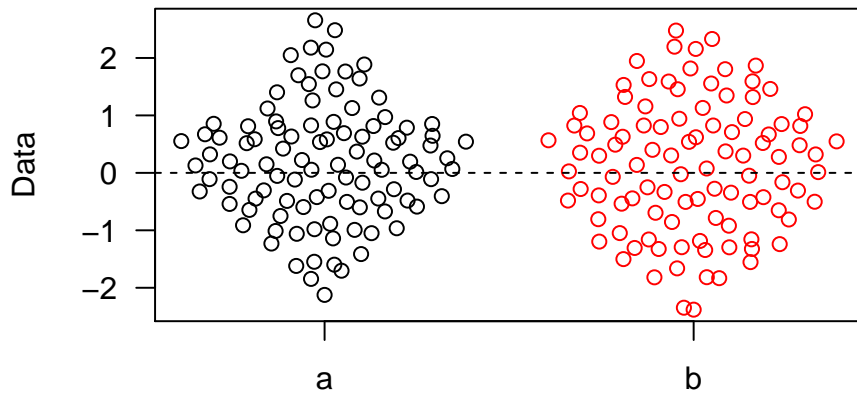
This is the simplest example of using the `vpPlot` function to generate violin scatter plots:

```
> library(vipor)
> set.seed(12345)
> n<-100
> dat<-rnorm(n*2)
> labs<-rep(c('a', 'b'),n)
> vpPlot(labs,dat)
```



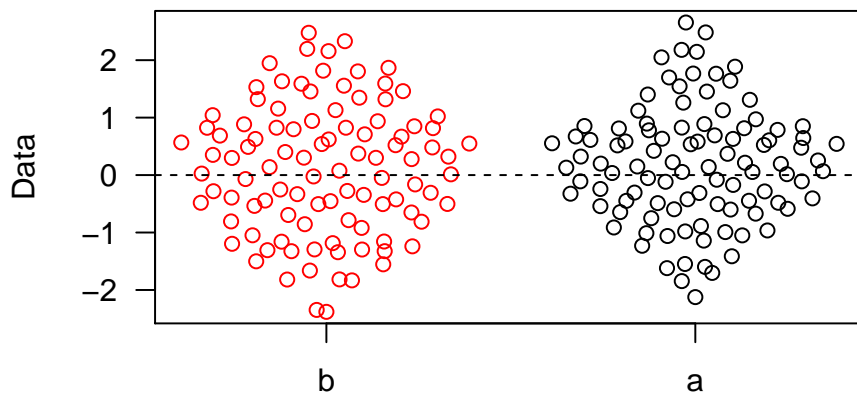
`vpPlot` is just a wrapper around `plot` so standard graphical options can be used and the plot can be annotated with R plotting functions:

```
> vpPlot(labs,dat,las=1,ylab='Data',col=rep(1:2,n))
> abline(h=0,lty=2)
```



Factors can be used to generate custom group orderings:

```
> labs2<-factor(labs,levels=c('b','a'))
> vpPlot(labs2,dat,las=1,ylab='Data',col=rep(1:2,n))
> abline(h=0,lty=2)
```



For custom plotting, the offsets for a group of points can be calculated using the `offsetX` function. The adjusted x position of the points is also returned invisibly from `vpPlot`:

```
> offsets<-offsetX(dat,labs)
> head(offsets,4)

[1] -0.18939738  0.10387013  0.28854590  0.01104955

> xPos<-vpPlot(labs,dat)
> head(xPos,4)

[1] 0.8106026 2.1038701 1.2885459 2.0110496

> xPos2<-rep(1:2,n)+offsets
> head(xPos2,4)

[1] 0.8106026 2.1038701 1.2885459 2.0110496

> all(xPos==xPos2)

[1] TRUE
```

Note that `offsetX` returns offsets centered around 0 which will need to be added to the original x positions.

## 2. Options

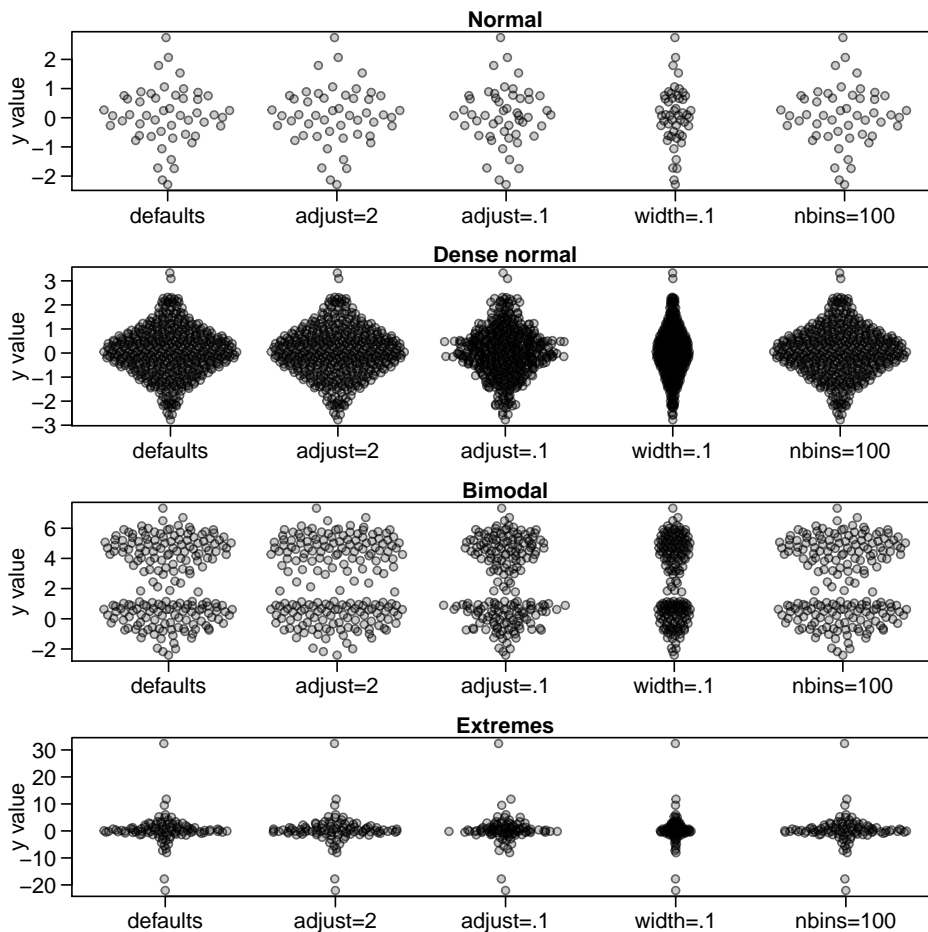
`offsetX` calls `stats::density` to compute kernel density estimates. The tightness of the fit can be adjusted with the `adjust` option and the width of the offset with `width`. `nbins` to adjust the number of bins used in the kernel density is also provided but this can usually be left at its default when using quasirandom offsets:

```
> dat <- list(
+   'Normal'=rnorm(50),
+   'Dense normal'= rnorm(500),
+   'Bimodal'=c(rnorm(100), rnorm(100,5)),
+   'Extremes'=rcauchy(100)
+ )
> par(mfrow=c(4,1), mar=c(2.5,3.1, 1.2, 0.5),mgp=c(2.1,.75,0),
+   cex.axis=1.2,cex.lab=1.2,cex.main=1.2)
> dummy<-sapply(names(dat),function(label) {
+   y<-dat[[label]]
+   offsets <- list(
+     'defaults'=offsetX(y), # Default
+     'adjust=2'=offsetX(y, adjust=2), # More smoothing
+     'adjust=.1'=offsetX(y, adjust=0.1), # Tighter fit
```

```

+   'width=.1'=offsetX(y, width=0.1),      # Less wide
+   'nbins=100'=offsetX(y, nbins=100)      # Less bins
+ )
+ ids <- rep(1:length(offsets), each=length(y))
+ plot(unlist(offsets) + ids, rep(y, length(offsets)), ylab='y value',
+      xlab='', xaxt='n', pch=21,
+      col='#00000099',bg='#00000033',las=1,main=label)
+ axis(1, 1:length(offsets), names(offsets))
+ })

```



The `varwidth` argument scales the width of a group by the square root of the number of observations in that group (as in the function `boxplot`). Arguments to `offsetX` can be passed into `vpPlot` as a list through the `offsetXArgs` argument.

```

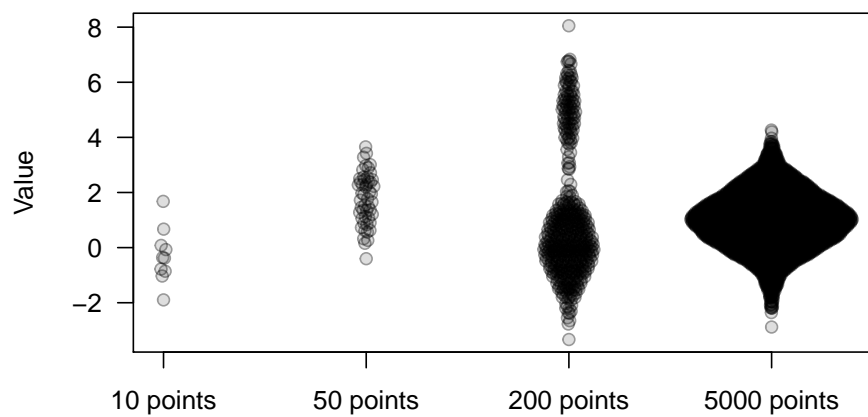
> dat <- list(
+   '10 points'=rnorm(10),
+   '50 points'=rnorm(50,2),
+   '200 points'=c(rnorm(400), rnorm(100,5)),
+   '5000 points'= rnorm(5000,1)
+ )

```

```

> labs<-rep(names(dat),sapply(dat,length))
> labs<-factor(labs,levels=unique(labs))
> vpPlot( labs,unlist(dat),offsetXArgs=list(varwidth=TRUE),
+   las=1,ylab='Value',col='#00000066',bg='#00000022',pch=21)

```



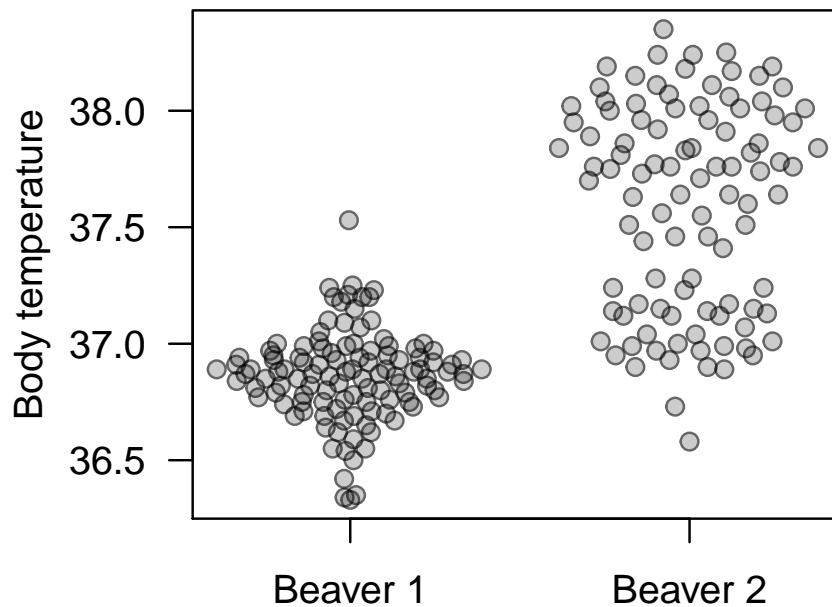
### 3. Real data

An example using the `beaver1` and `beaver2` data from the `datasets` package:

```

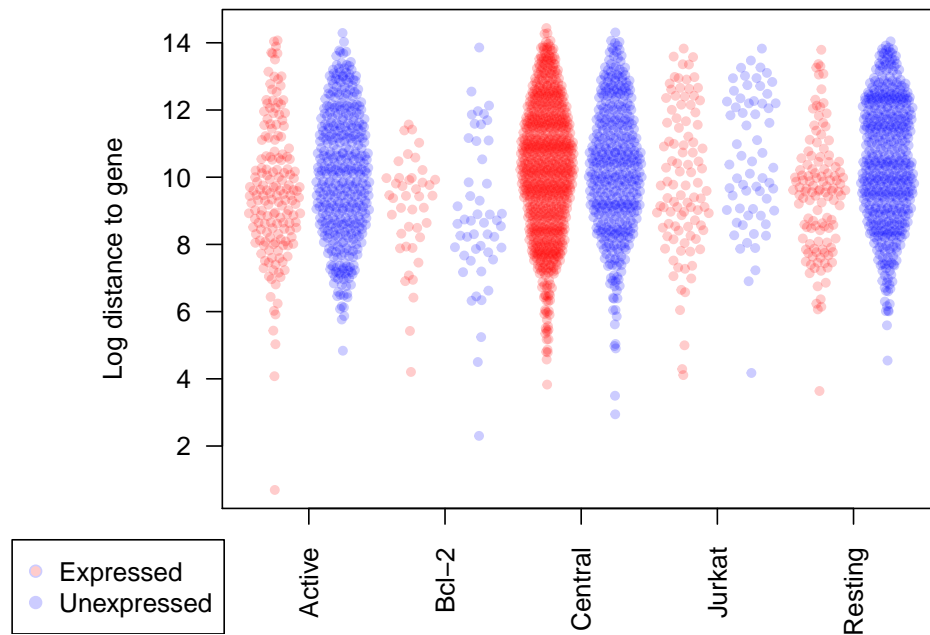
> y<-c(beaver1$temp,beaver2$temp)
> x<-rep(
+   c('Beaver 1','Beaver 2'),
+   c(nrow(beaver1),nrow(beaver2))
+ )
> vpPlot(x,y,las=1, ylab='Body temperature',
+   pch=21, col='#00000099',bg='#00000033')

```



An example using the `integrations` data from this package:

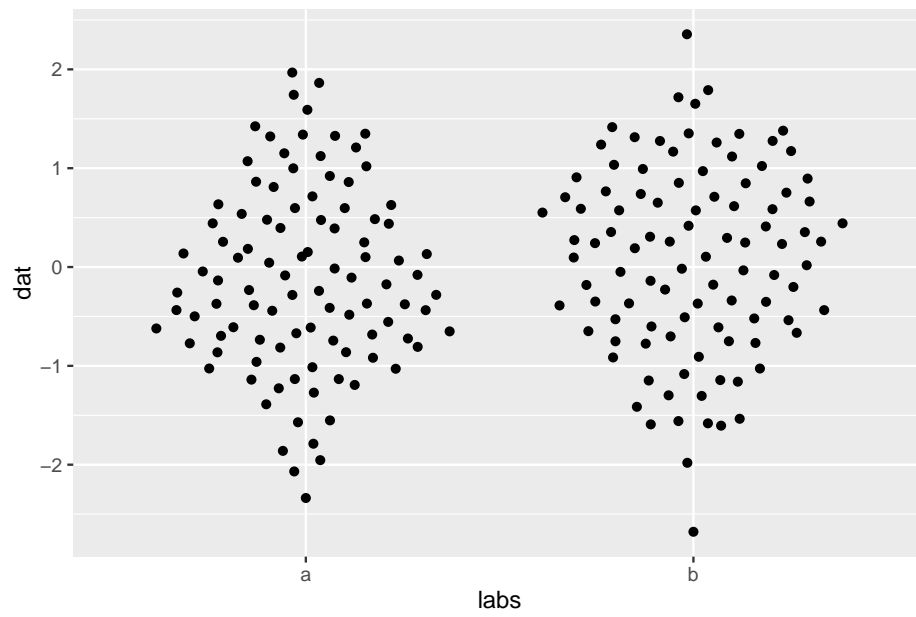
```
> ints<-integrations[integrations$nearestGene>0,]
> y<-log(ints$nearestGene)
> x<-as.factor(paste(ints$study,ints$latent))
> activeCols<-c('Expressed'='#FF000033','Unexpressed'='#0000FF33')
> cols<-activeCols[ints$latent]
> par(mar=c(4,7,.1,.1))
> vpPlot(x,y,las=2, ylab='Log distance to gene',xaxt='n',
+   pch=21, col=cols,bg=cols,cex=.7)
> uniqX<-levels(x)
> prettyX<-tapply(1:length(uniqX),sub('(Une|E)xpressed$','',uniqX),mean)
> axis(1,prettyX,names(prettyX),las=2)
> legend(grconvertX(0.01,from='ndc'),grconvertY(0.15,from='ndc'),
+   names(activeCols),pch=21,col=cols,pt.bg=activeCols,xpd=NA)
```



#### 4. ggbeeswarm package

This package is also wrapped by the **ggbeeswarm** package so if you prefer **ggplot** then you can do something like:

```
> library(ggbeeswarm)
> n<-100
> dat<-rnorm(n*2)
> labs<-rep(c('a','b'),n)
> ggplot(mapping=aes(labs,dat))+geom_quasirandom()
```

**Affiliation:**

Github: <http://github.com/sherrillmix/vipor>