

Axis tick labels placement in ggplot2

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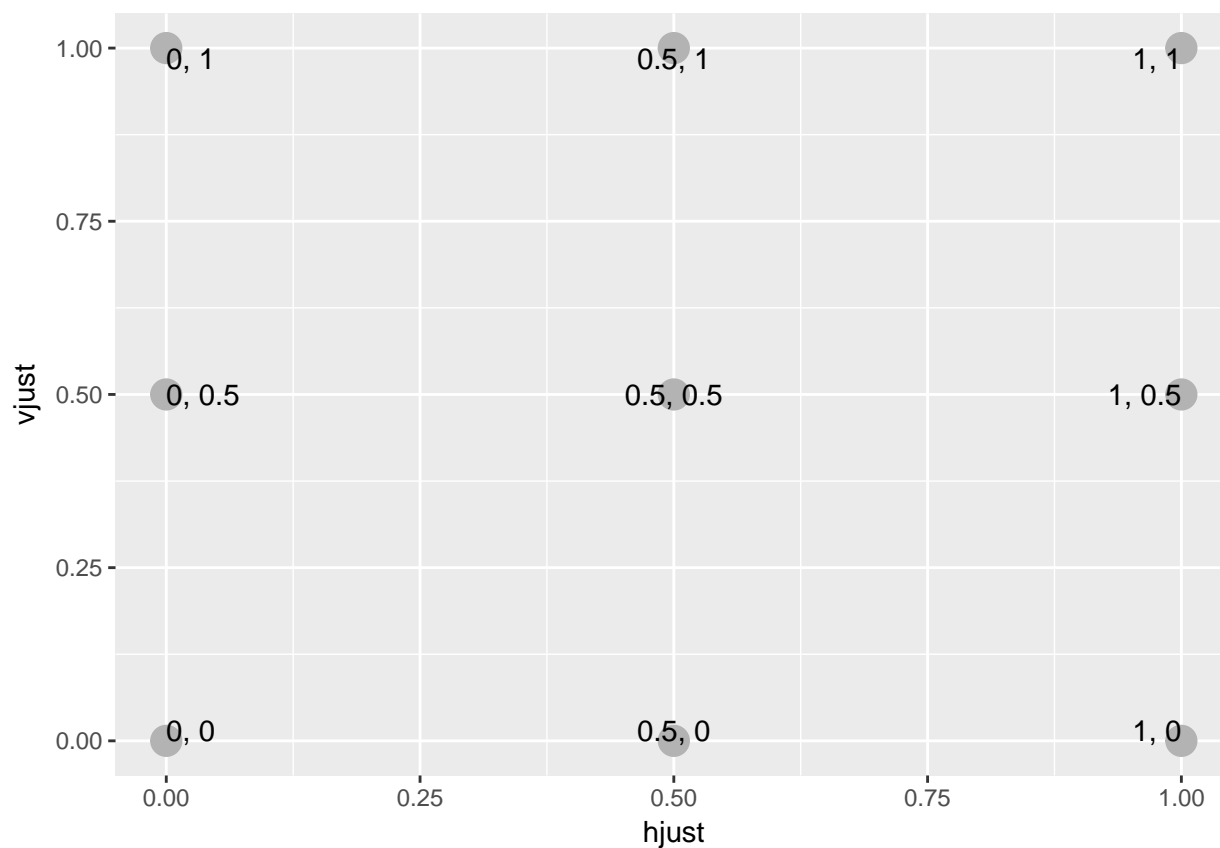
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Optimal placement of axis tick labels

The parameters `vjust` and `hjust` control the horizontal and vertical justification of the text labels. This can be demonstrated in detail by playing around with the example given in the specs which is reproduced here.

```
just <- expand.grid(hjust = c(0, 0.5, 1), vjust = c(0, 0.5, 1))
just$label <- paste0(just$hjust, ", ", just$vjust)

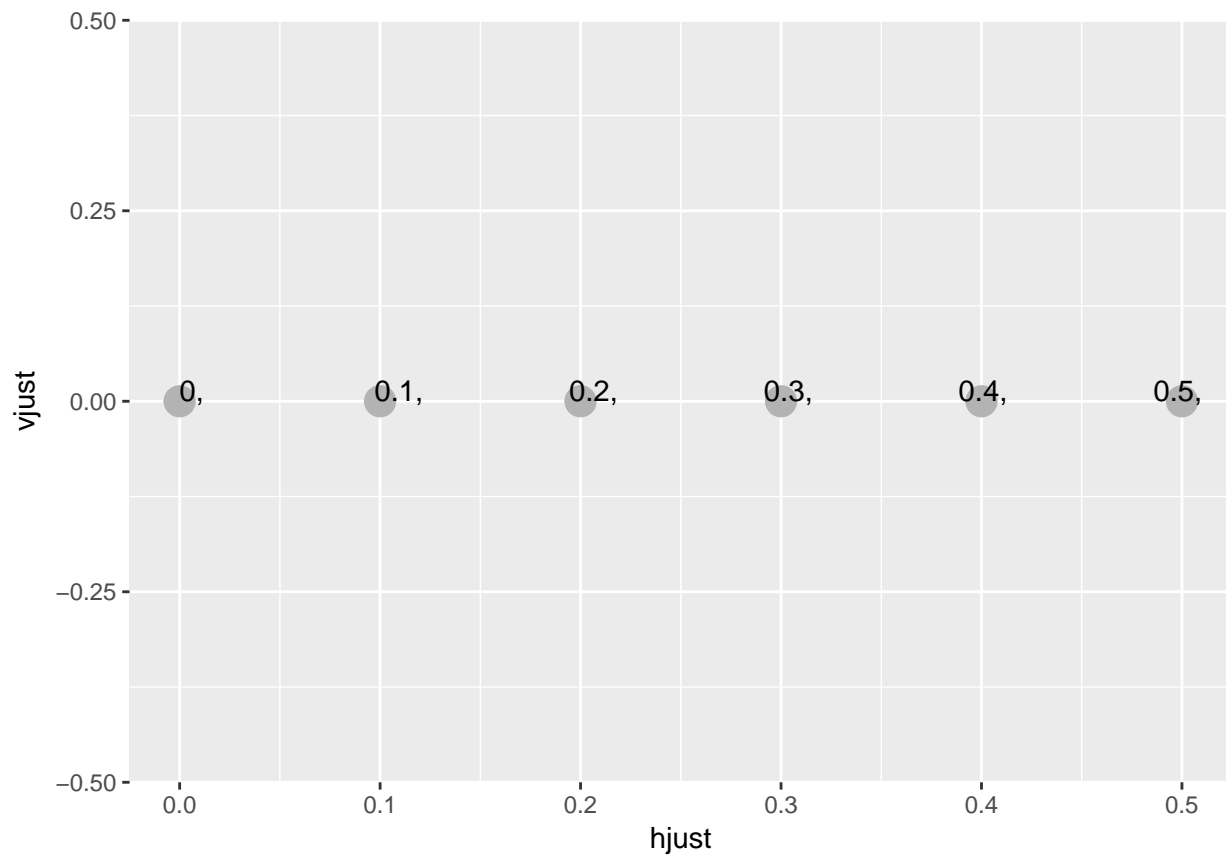
ggplot(just, aes(hjust, vjust)) +
  geom_point(colour = "grey70", size = 5) +
  geom_text(aes(label = label, hjust = hjust, vjust = vjust))
```



So the value of `hjust` moves the label left; the bigger the value, the more left of the point is the label placed.

```
just <- expand.grid(hjust = seq(0, 0.5, by = 0.1), vjust = 0)
just$label <- paste0(just$hjust, ", ")

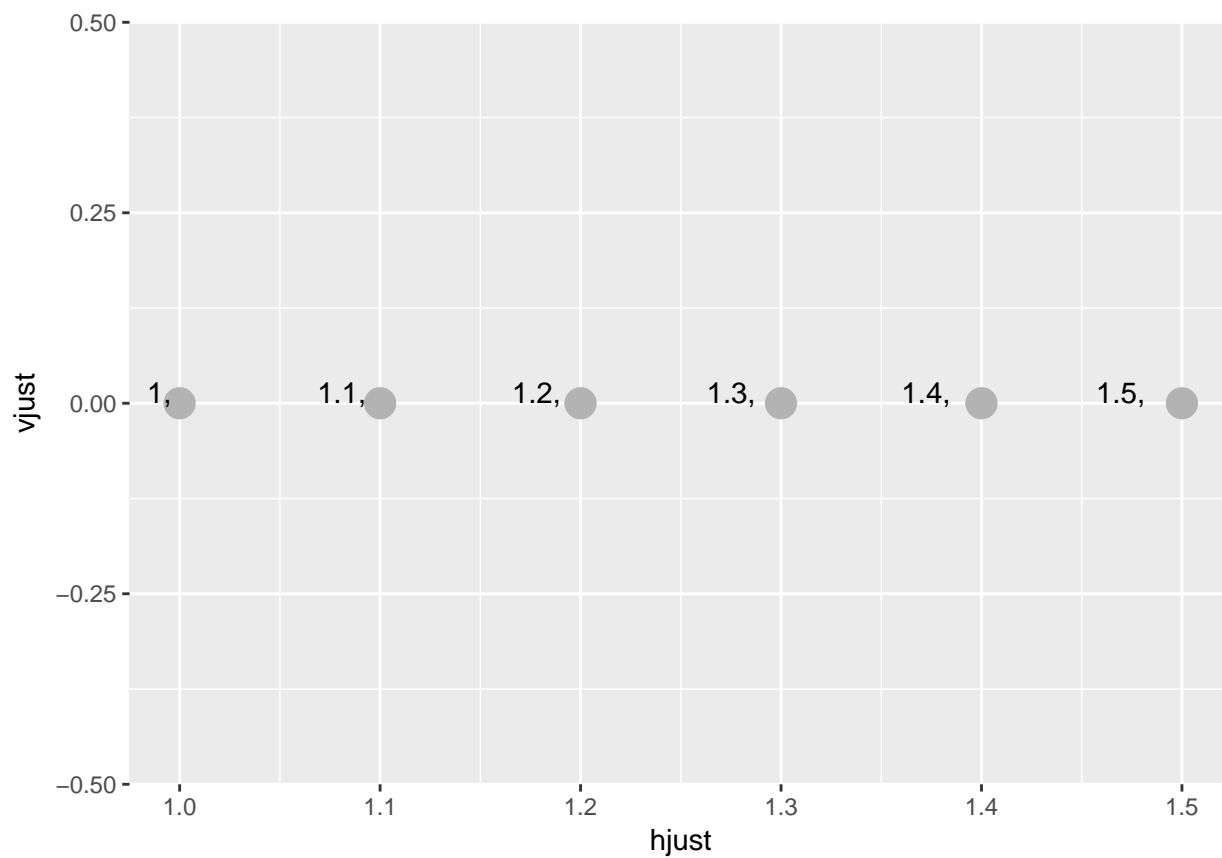
ggplot(just, aes(hjust, vjust)) +
  geom_point(colour = "grey70", size = 5) +
  geom_text(aes(label = label, hjust = hjust, vjust = vjust))
```



The specs do not recommend the use of values outside the range 0 to 1. However, at least in this particular case, the behavior is as expected.

```
just <- expand.grid(hjust = seq(1.0, 1.5, by = 0.1), vjust = 0)
just$label <- paste0(just$hjust, ", ")

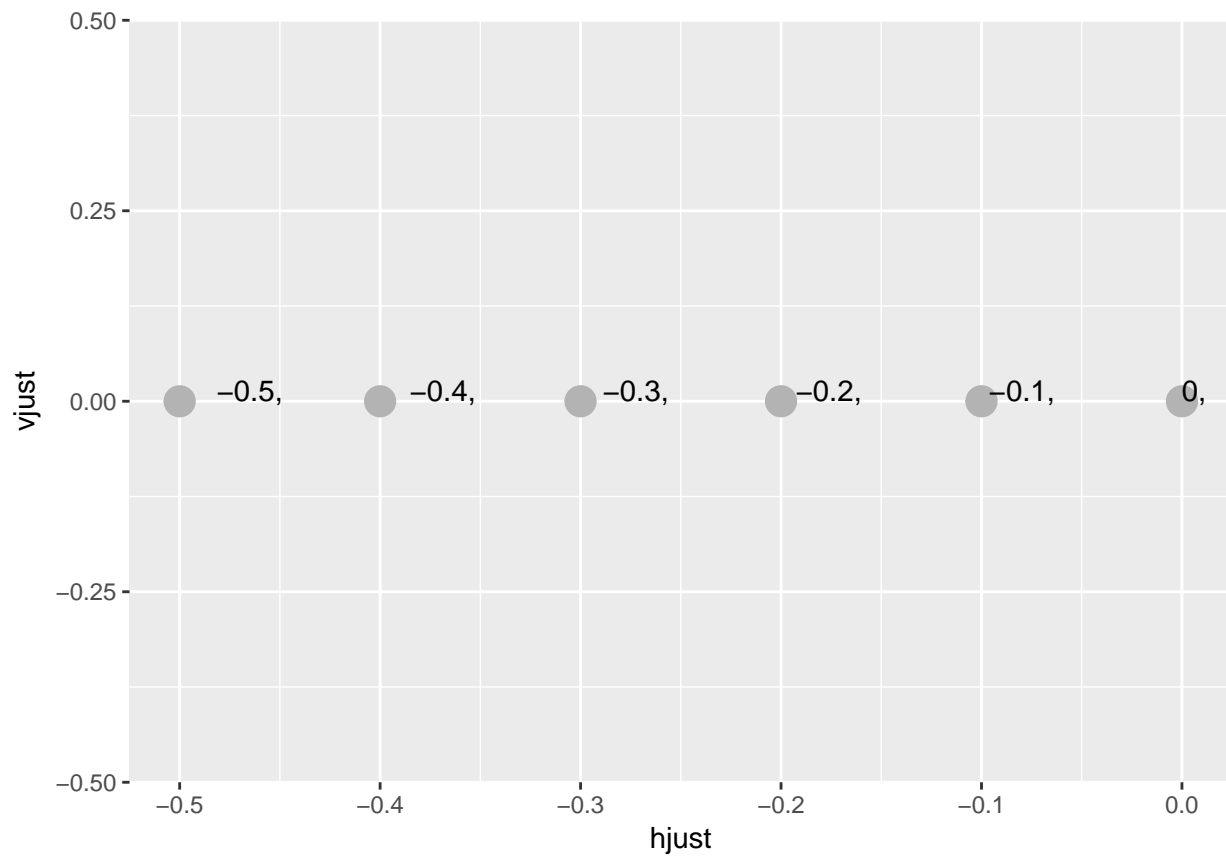
ggplot(just, aes(hjust, vjust)) +
  geom_point(colour = "grey70", size = 5) +
  geom_text(aes(label = label, hjust = hjust, vjust = vjust))
```



What about negative values? Yep, works as expected.

```
just <- expand.grid(hjust = seq(-0.5, 0, by = 0.1), vjust = 0)
just$label <- paste0(just$hjust, ", ")

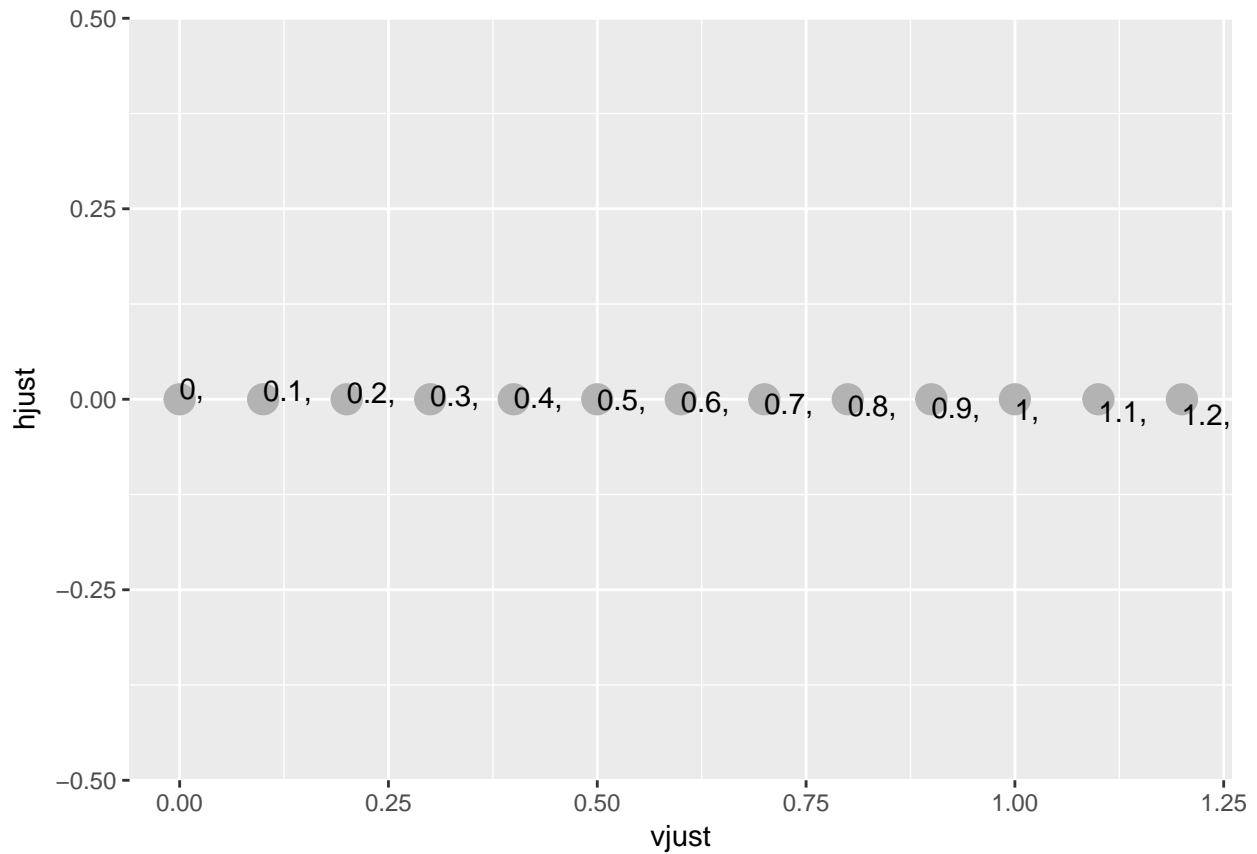
ggplot(just, aes(hjust, vjust)) +
  geom_point(colour = "grey70", size = 5) +
  geom_text(aes(label = label, hjust = hjust, vjust = vjust))
```



The same holds true for vjust.

```
just <- expand.grid(vjust = seq(0, 1.2, by = 0.1), hjust = 0)
just$label <- paste0(just$vjust, ", ")

ggplot(just, aes(vjust, hjust)) +
  geom_point(colour = "grey70", size = 5) +
  geom_text(aes(label = label, hjust = hjust, vjust = vjust))
```



Axis tick labels

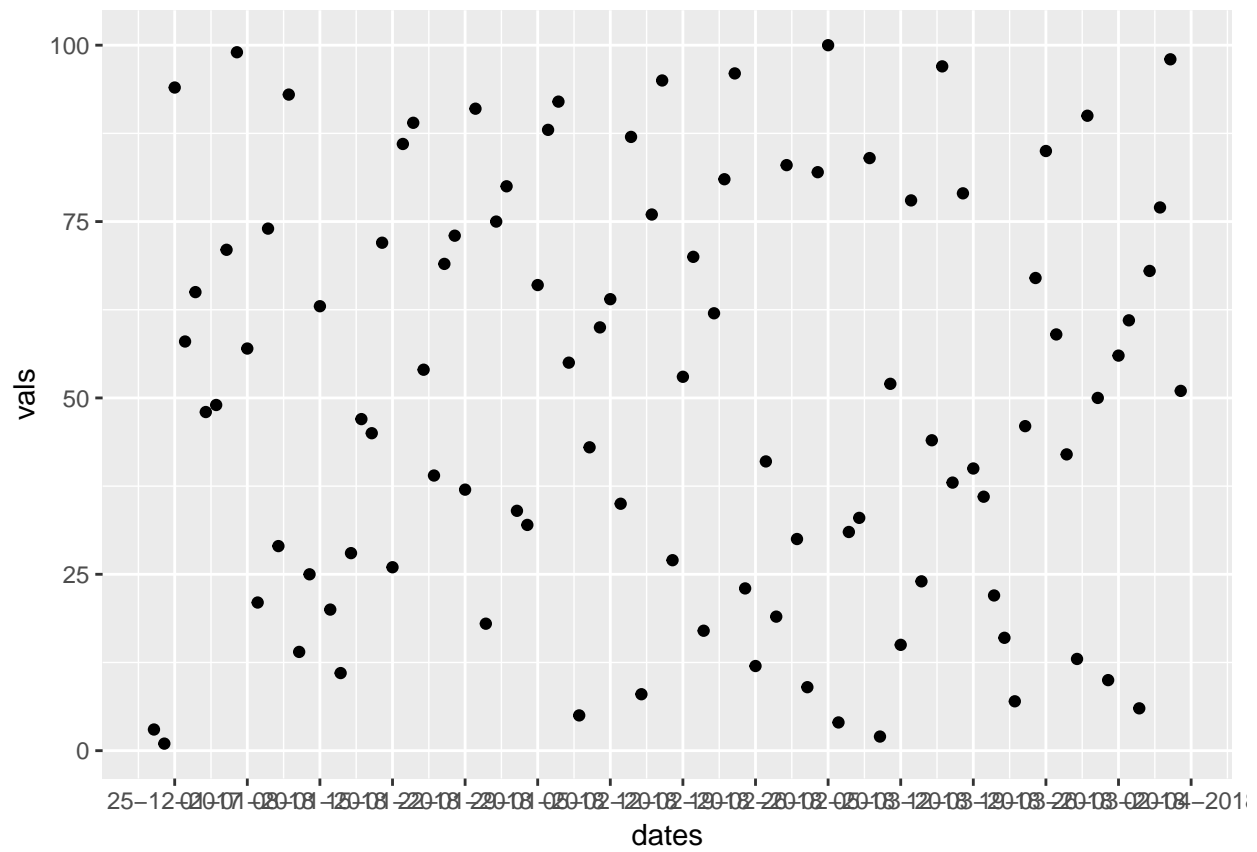
What happens when the axis tick labels are long and have to be rotated? How do the parameters `vjust` and `hjust` interact with the angle? In the plot below, the x-axis tick labels begin to overlap each other making the text illegible.

```
dates <- Sys.Date() + sort(sample(1:100, 100))
```

```
## Warning in as.POSIXlt.POSIXct(Sys.time()): unknown timezone 'zone/tz/2017c.  
## 1.0/zoneinfo/Europe/London'
```

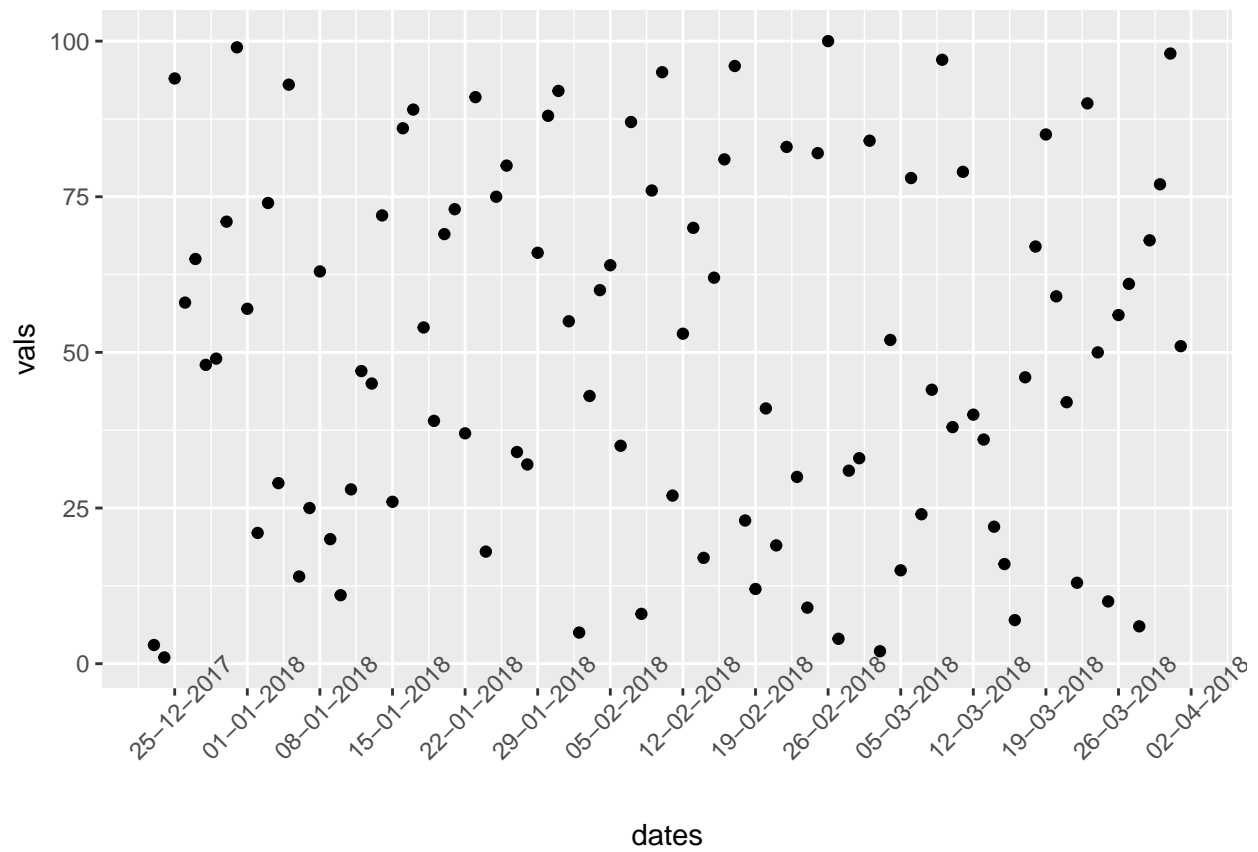
```
vals <- sample(1:100, 100)  
p <- ggplot(NULL, aes(dates, vals)) +  
  geom_point() +  
  scale_x_date(date_labels = "%d-%m-%Y", date_breaks = "1 week")
```

```
p
```



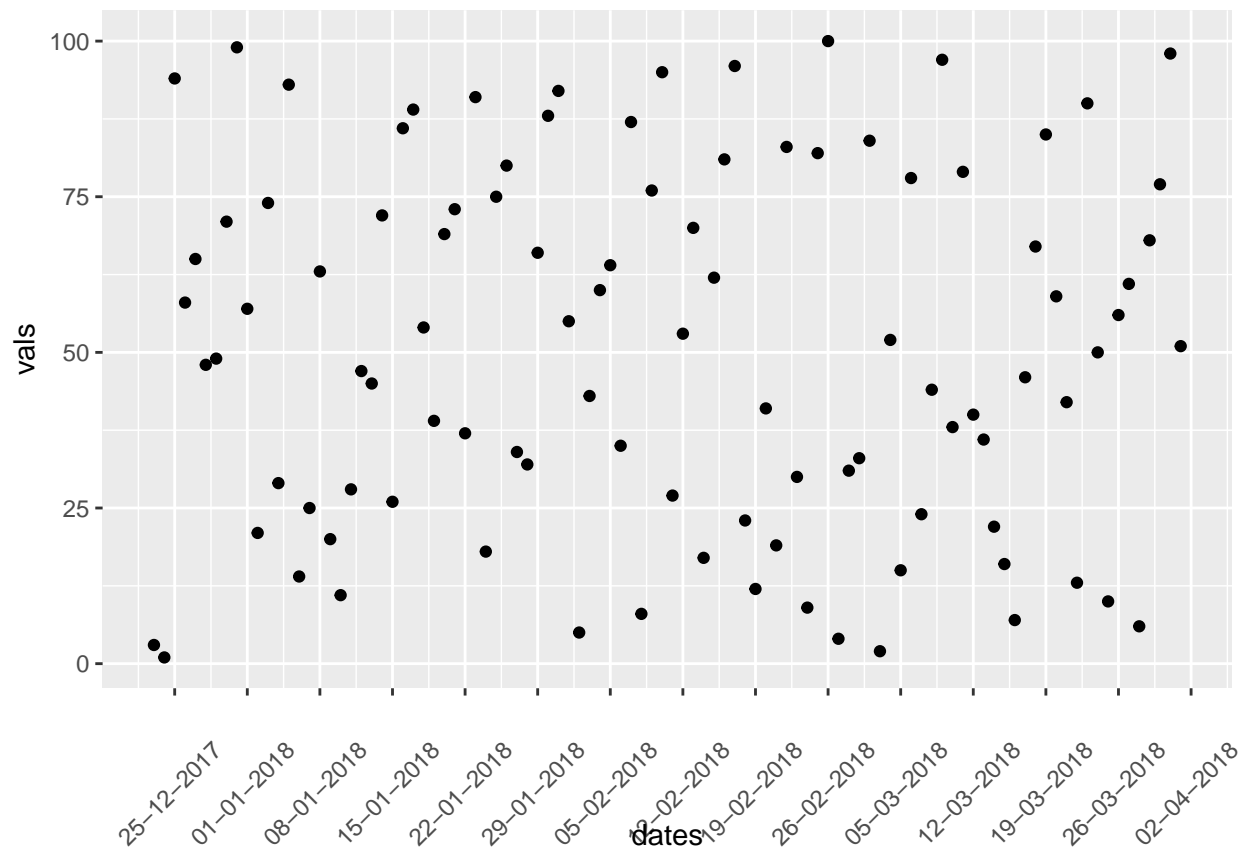
Placing the labels at an angle makes sense.

```
p1 <- p + theme(axis.text.x = element_text(angle = 45))
p1
```



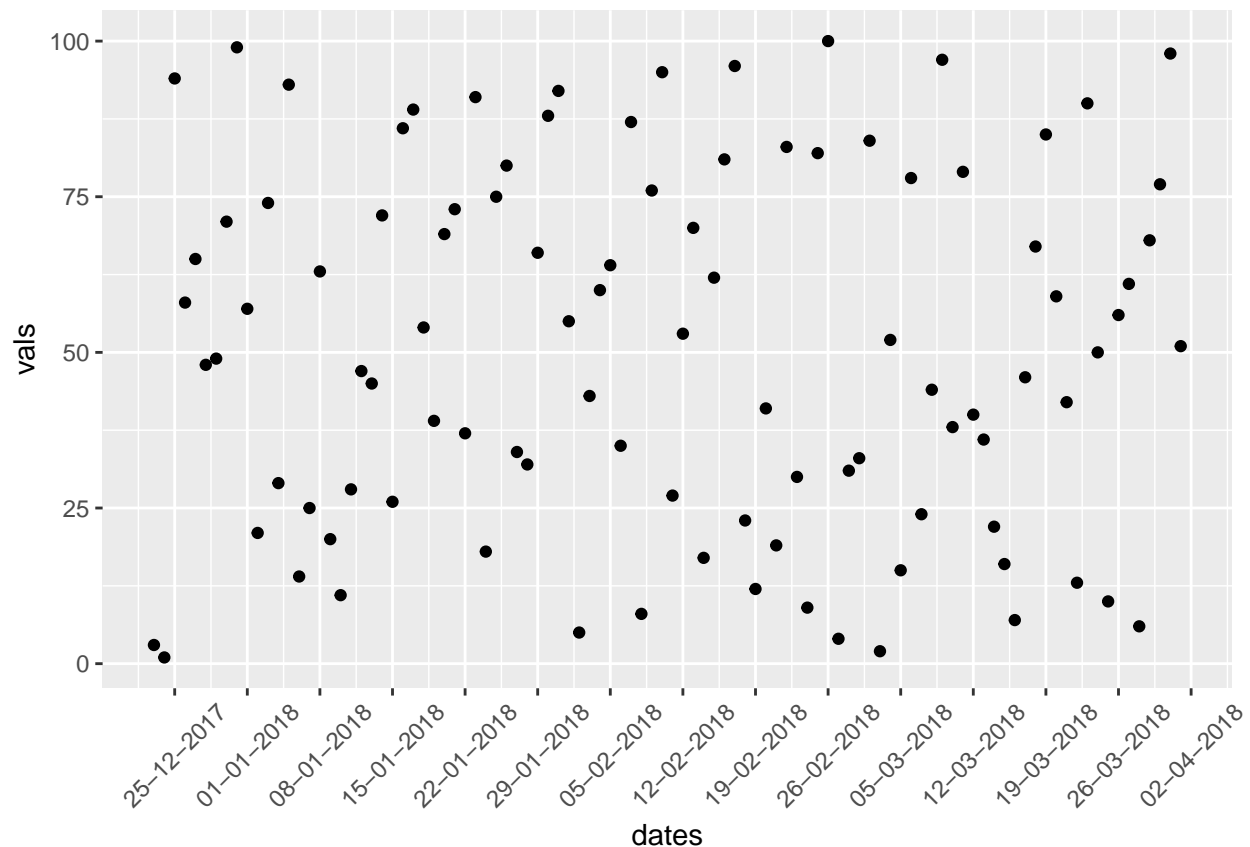
But the labels push into the plot area, which of course makes the plot ugly.

```
p2 <- p1 + theme(axis.text.x = element_text(vjust = 0.1))
p2
```



But now the labels are placed too far away from the ticks. Perhaps increase vjust?

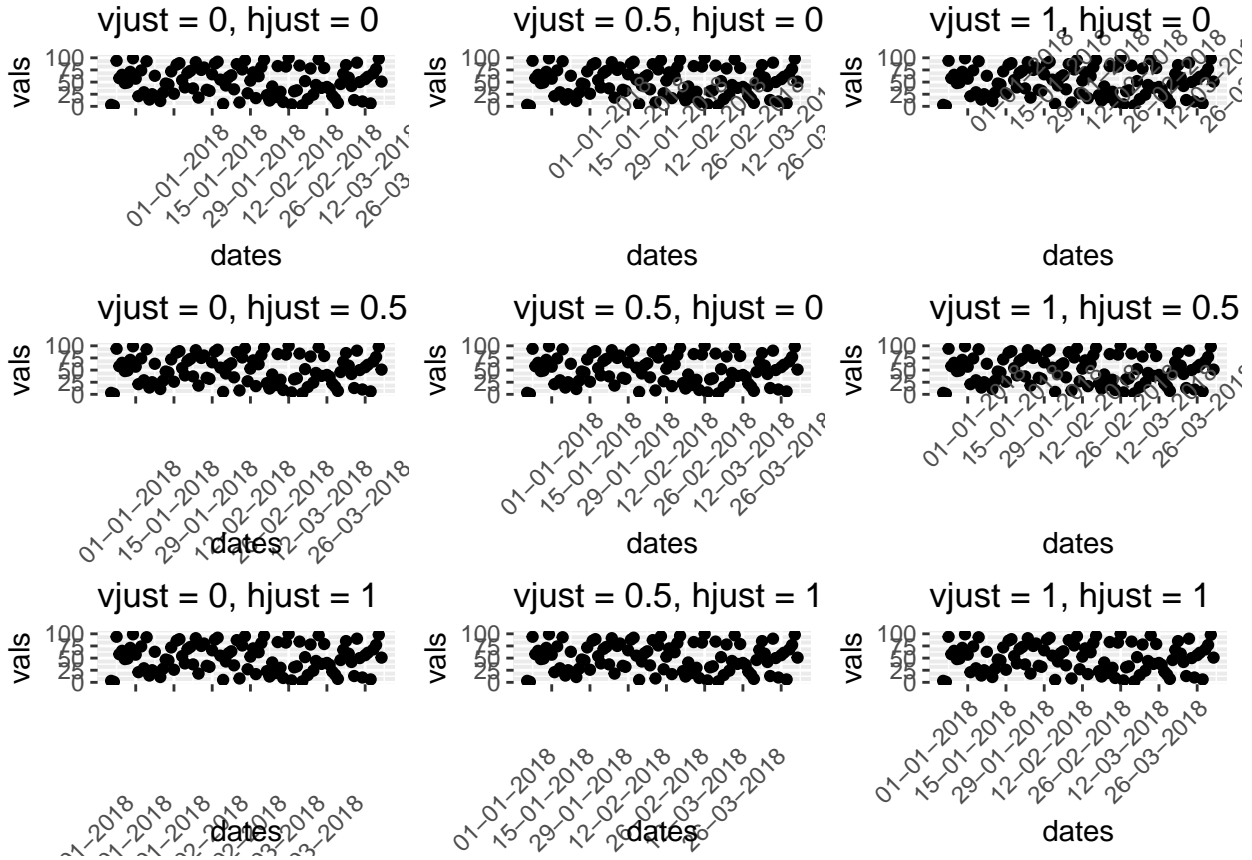
```
p1 + theme(axis.text.x = element_text(vjust = 0.5))
```

The labels are now midway between ticks, which is a bit annoying. Let us change both params at the same time and see how that influences the label placement.

```
just <- expand.grid(vjust = c(0, 0.5, 1), hjust = c(0, 0.5, 1))
plots <- apply(just, 1, function(row){
  vjust <- row[1]
  hjust <- row[2]
  ggplot(NULL, aes(dates, vals)) +
    geom_point() +
    scale_x_date(date_labels = "%d-%m-%Y", date_breaks = "2 weeks") +
    theme(axis.text.x = element_text(angle = 45, vjust = vjust, hjust = hjust)) +
    ggtitle(paste0("vjust = ", vjust, ", hjust = ", hjust))
})

cowplot::plot_grid(plotlist = plots)
```



In this case, $vjust = 1$, $hjust = 1$ brings us closest to the optimal placement!

TD;DR

1. The bigger the value of $hjust$, the more left the label is placed;
2. The bigger the value of $vjust$, the lower the label is placed;
3. It is best not to use values outside the interval $[0, 1]$ for the parameters.