




# ggsignif: Displaying Significance Brackets for 'ggplot2'

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## Summary

Research hypotheses often concern the difference between two groups and statistical tests provide indicators (e.g.,  $p$ -values or Bayes factors) about the evidence for or against such differences. Our R package, **ggsignif** provides a quick way to visualize those pairwise indicators as an annotation in a plot, for example showing if a difference is statistically significant. **ggsignif** follows the principles of the grammar of graphics (Wilkinson, 2012) and provides a new layer that can be added to plots made with the **ggplot2** package (Wickham, 2016).

## Statement of Need

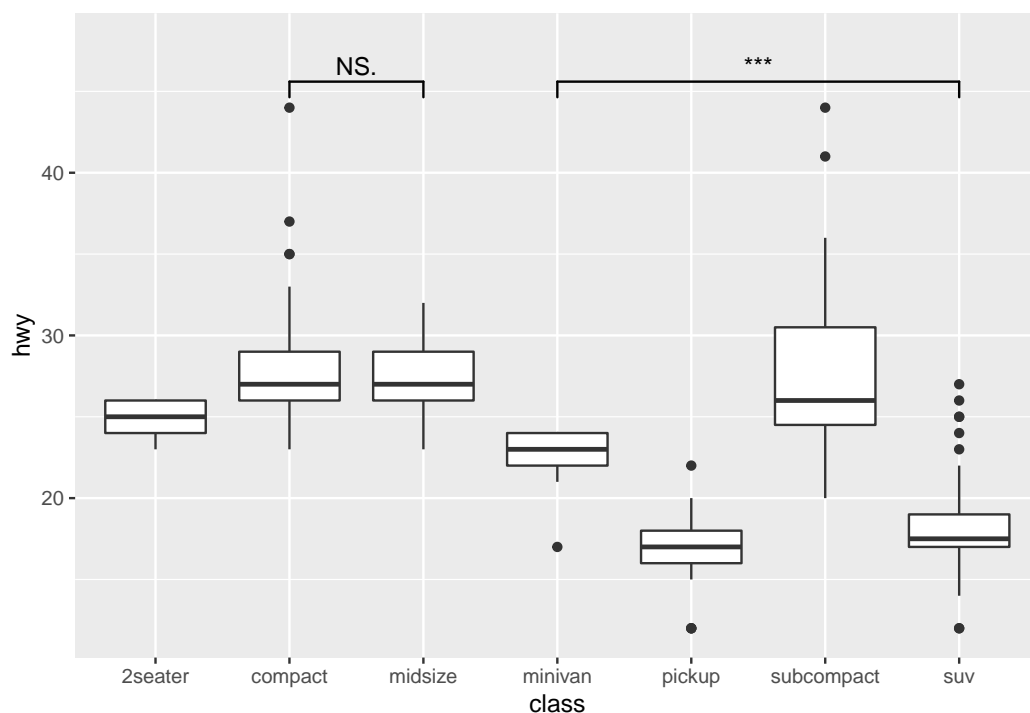
During the exploratory analysis of data with discrete covariates, researchers commonly start with a one-way ANOVA to see if there are any differences in the group means. This is typically followed up with multiple comparisons to see if specific levels of the discrete covariates differ significantly. The **ggsignif** package provides a way to graphically display all or a few (depending on the context of the research hypotheses ) of such comparisons. It is also used by other R package developers as the back-end for graphical display of pairwise comparisons, such as **ggpubr** (Kassambara, 2020), **ggstatsplot** (Patil, 2018), and more. These packages demonstrate how **ggsignif** can be extended to display results from any type of pairwise comparisons test (e.g. Bayesian  $t$ -test or Dunn test).

## Features

The following is a simple example demonstrating how a group difference can be annotated using **geom\_signif** layers from **ggsignif** package.

```
library(ggplot2)
library(ggsignif)

ggplot(mpg, aes(class, hwy)) +
  geom_boxplot() +
  geom_signif(
    comparisons = list(c("compact", "midsize"), c("minivan", "suv")),
    map_signif_level = TRUE
  ) +
  ylim(NA, 48)
```



For more advanced examples, the readers are encouraged to read the package website: <https://const-ae.github.io/ggsignif/>.

## Licensing and Availability

`ggsignif` is licensed under the GNU General Public License (v3.0), with all source code stored at [GitHub](#), and with a corresponding issue tracker for bug reporting and feature enhancements. In the spirit of honest and open science, we encourage requests/tips for fixes, feature updates, as well as general questions and concerns via direct interaction with contributors and developers, by [filing an issue](#). See the [Contribution Guidelines](#) for this package.

## Acknowledgements

We would like to thanks the users of `ggsignif` package for reporting bugs and for providing valuable feedback.

## References

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