

# Package ‘blocs’

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**Type** Package

**Title** Estimate and Visualize Voting Blocs' Partisan Contributions

**Version** 0.1.0

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**Description** Functions to combine data on voting blocs' size, turnout, and vote choice to estimate each bloc's vote contributions to the Democratic and Republican parties. The package also includes functions for uncertainty estimation and plotting. Users may define voting blocs along a discrete or continuous variable. The package implements methods described in Grimmer, Marble, and Tanigawa-Lau (2022) <[doi:10.31235/osf.io/c9fkg](https://doi.org/10.31235/osf.io/c9fkg)>.

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**Suggests** devtools (>= 2.4.3), questionr (>= 0.7.7), reldist (>= 1.7.0), testthat (>= 3.1.3)

**Config/testthat/edition** 3

**RoxygenNote** 7.2.0

**Imports** collapse (>= 1.7.6), dplyr (>= 1.0.6), ggplot2 (>= 3.2.0), ks (>= 1.13.4), mgcv (>= 1.8.39), rlang (>= 1.0.0), tibble (>= 3.0.0)

**Depends** R (>= 3.6.0)

**NeedsCompilation** no

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anes	<i>Sample of 2020 ANES cumulative data file</i>
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### Description

Selected columns from the American National Election Studies' 2020 cumulative data file. The final column is an example of the three-valued variable for voting behavior, to be passed to the 'dv\_vote3' argument,

### Usage

```
anes
```

### Format

A data frame with 68,224 rows and 13 columns:

**year** election year

**respid** respondent identifier

**weight** survey weight

**race** respondent race

**gender** respondent gender

**educ** respondent education level

**age** respondent age

**voted** respondent's voter turnout

**vote\_pres** respondent's presidential vote

**vote\_pres\_dem** flag indicating Democratic presidential vote choice

**vote\_pres\_rep** flag indicating Republican presidential vote choice

**vote\_pres3** Three-valued voting behavior DV coded as follows: -1 for Democrat vote choice, 0 for no or third-party vote, 1 for Republican vote choice.

**Source**

<https://electionstudies.org/data-center/anes-time-series-cumulative-data-file/>

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check_vbdf	<i>Validator for class vbdf</i>
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**Description**

Validator for class vbdf

**Usage**

```
check_vbdf(x, tol = sqrt(.Machine$double.eps))
```

**Arguments**

x	object to check
tol	tolerance used when checking bounds of net Republican votes

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estimate_density	<i>Estimate density</i>
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**Description**

Run [kde](#) for weighted density estimation of a x at n\_points evenly spaced points between min and max.

**Usage**

```
estimate_density(x, min, max, n_points = 100, w = NULL, ...)
```

**Arguments**

x	numeric vector or matrix
min	numeric vector giving the lower bound of evaluation points for each variable in x
max	numeric vector giving the upper bound of evaluation points for each variable in x
n_points	number of evaluation points (estimates)
w	vector of weights. Default uses uniform weighting.
...	further arguments to pass to <a href="#">kde</a>

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new\_vbdf *Constructor for class vbdf*

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### Description

Constructor for class vbdf

### Usage

```
new_vbdf(x, bloc_var = character(), var_type = c("discrete", "continuous"))
```

### Arguments

x	a data.frame
bloc_var	character vector naming the variables to define voting blocs
var_type	string, the type, discrete or continuous

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new\_vbsum *Constructor for vbdf summaries*

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### Description

Constructor for vbdf summaries

### Usage

```
new_vbsum(x, bloc_var, var_type, summary_type, resamples)
```

### Arguments

x	data.frame of uncertainty summary
bloc_var	string, the name of the variable that defines the voting blocs
var_type	string, the type of variable, discrete or continuous
summary_type	string, the type of variable, discrete or continuous
resamples	numeric, the number of bootstrap resamples

### Value

A vbsum object

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vbf	<i>Create a vbf object</i>
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### Description

Create a vbf object holding bloc-level estimates of composition, turnout, and/or vote choice. This function is mostly for internal use, but you may want it to create a vbf object from your own voting bloc analysis. A valid vbf object can be used in [vb\_difference] and [vb\_plot].

### Usage

```
vbf(data, bloc_var, var_type = c("discrete", "continuous"))
```

### Arguments

data	data.frame of voting-bloc results to convert to a vbf object
bloc_var	string, the name of the variable that defines the voting blocs
var_type	string, the type of variable, discrete or continuous

### Value

A vbf object.

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vb_continuous	<i>Continuous voting bloc analysis</i>
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### Description

Define voting blocs along a **continuous** variable and estimate their partisan vote contributions.

### Usage

```
vb_continuous(
  data,
  data_density = data,
  data_turnout = data,
  data_vote = data,
  indep,
  dv_vote3,
  dv_turnout,
  weight = NULL,
  min_val = NULL,
  max_val = NULL,
  n_points = 100,
  boot_iters = FALSE,
```

```

    verbose = FALSE,
    ...
  )

```

### Arguments

<code>data</code>	default data.frame to use as the source for density, turnout, and vote choice data.
<code>data_density</code>	data.frame of blocs' composition/density data. Must include any columns named by <code>indep</code> and <code>weight</code> .
<code>data_turnout</code>	data.frame of blocs' turnout data. Must include any columns named by <code>dv_turnout</code> , <code>indep</code> and <code>weight</code> .
<code>data_vote</code>	data.frame of blocs' vote choice data. Must include any columns named by <code>dv_vote3</code> , <code>indep</code> , and <code>weight</code> .
<code>indep</code>	string, column name of the independent variable defining discrete voting blocs.
<code>dv_vote3</code>	string, column name of the dependent variable in <code>data_vote</code> , coded as follows: -1 for Democrat vote choice, 0 for no or third-party vote, 1 for Republican vote choice.
<code>dv_turnout</code>	string, column name of the dependent variable flagging voter turnout in <code>data_turnout</code> . That column must be coded 0 = no vote, 1 = voted.
<code>weight</code>	optional string naming the column of sample weights.
<code>min_val</code>	numeric vector of the same length as <code>indep</code> , Lower bound for the density estimation of each respective <code>indep</code> . See <code>[estimate_density]</code> .
<code>max_val</code>	numeric vector of the same length as <code>indep</code> , Upper bound for the density estimation of each respective <code>indep</code> . See <code>[estimate_density]</code> .
<code>n_points</code>	scalar, number of points at which to estimate density. See <code>[estimate_density]</code> .
<code>boot_iters</code>	integer, number of bootstrap iterations for uncertainty estimation. The default FALSE is equivalent to 0 and does not estimate uncertainty.
<code>verbose</code>	logical, whether to print iteration number.
<code>...</code>	further arguments to pass to <code>kde</code> for density estimation.

### Value

a `vbdf` data.frame with columns for the resample, bloc variable, and, for each resample-bloc combination, four estimates: probability density, turnout, Republican vote choice conditional on turnout, and net Republican votes.

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vb_difference	<i>Calculate differences in bloc contributions</i>
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### Description

Use vbdf output to calculate differences in blocs' net Republican vote contributions.

### Usage

```
vb_difference(
  vbdf,
  estimates = grep("prob|pr_turnout|pr_votedem|pr_voterep|cond_rep|net_rep",
    names(vbdf), value = TRUE),
  sort_col = "year"
)
```

### Arguments

vbdf	data.frame holding the results of voting bloc analyses.
estimates	character vector naming the column(s) in vbdf with which to compute differences.
sort_col	character vector naming the column(s) in vbdf to use for sorting before calling <a href="#">diff</a> .

### Value

A vbdf object, plus two types of columns: for each column named in estimates, a column named diff\_\* containing the difference in each estimate across sort\_col values, comp, which contains a string tag for the rows compared (e.g., 2020-2016),

A vbdf object.

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vb_discrete	<i>Discrete voting bloc analysis</i>
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### Description

Define voting blocs along a **discrete** variable and estimate their partisan vote contributions.

**Usage**

```

vb_discrete(
  data,
  data_density = data,
  data_turnout = data,
  data_vote = data,
  indep,
  dv_vote3,
  dv_turnout,
  weight = NULL,
  boot_iters = FALSE,
  verbose = FALSE,
  check_discrete = TRUE
)

```

**Arguments**

<code>data</code>	default data.frame to use as the source for density, turnout, and vote choice data.
<code>data_density</code>	data.frame of blocs' composition/density data. Must include any columns named by <code>indep</code> and <code>weight</code> .
<code>data_turnout</code>	data.frame of blocs' turnout data. Must include any columns named by <code>dv_turnout</code> , <code>indep</code> and <code>weight</code> .
<code>data_vote</code>	data.frame of blocs' vote choice data. Must include any columns named by <code>dv_vote3</code> , <code>indep</code> , and <code>weight</code> .
<code>indep</code>	string, column name of the independent variable defining discrete voting blocs.
<code>dv_vote3</code>	string, column name of the dependent variable in <code>data_vote</code> , coded as follows: -1 for Democrat vote choice, 0 for no or third-party vote, 1 for Republican vote choice.
<code>dv_turnout</code>	string, column name of the dependent variable flagging voter turnout in <code>data_turnout</code> . That column must be coded 0 = no vote, 1 = voted.
<code>weight</code>	optional string naming the column of sample weights.
<code>boot_iters</code>	integer, number of bootstrap iterations for uncertainty estimation. The default FALSE is equivalent to 0 and does not estimate uncertainty.
<code>verbose</code>	logical, whether to print iteration number.
<code>check_discrete</code>	logical, whether to check if <code>indep</code> is a discrete variable.

**Value**

A vbdf object.



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vb_plot	<i>Plot the summary of a voting bloc analysis</i>
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**Description**

Plot the summary of a voting bloc analysis

**Usage**

```
vb_plot(
  data,
  x_col = get_bloc_var(data),
  y_col,
  ymin_col,
  ymax_col,
  discrete = length(unique(data[[x_col]])) < 20
)
```

**Arguments**

data	a vbsum data.frame, the result of [vb_summary].
x_col	string naming the column that defines voting blocs.
y_col	string naming the column of point estimates.
ymin_col	string naming the column to plot as the lower bound of the confidence interval.
ymax_col	string naming the column to plot as the upper bound of the confidence interval.
discrete	logical indicating whether voting blocs are defined along a discrete (not continuous) variable.

**Value**

a ggplot object

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vb_summary	<i>Uncertainty for a vbdf objects</i>
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**Description**

Uncertainty for a vbdf objects

**Usage**

```

vb_summary(
  object,
  type = c("discrete", "continuous", "binned"),
  estimates = grep("prob|pr_turnout|pr_votedem|pr_voterep|cond_rep|net_rep",
    names(object), value = TRUE),
  na.rm = FALSE,
  funcs = c("mean", "median", "low", "high"),
  low_ci = 0.025,
  high_ci = 0.975,
  bin_col
)

```

**Arguments**

object	a vbdf object, usually the output of [vb_discrete], [vb_continuous], or [vb_difference].
type	a string naming the type of independent variable summary. Use "binned" when using the output of [vb_continuous] plus a binned version of the continuous bloc variable.
estimates	character vector naming columns for which to calculate uncertainty estimates.
na.rm	logical indicating whether to remove NA values in estimates.
funcs	character vector of summary functions to apply to estimates. Alternatively, supply your own list of functions, which should accept a numeric vector input and return a scalar.
low_ci	numeric. If you include the string "low" in funcs, then use this argument to control the lower bound of the confidence interval.
high_ci	numeric. If you include the string "high" in funcs, then use this argument to control the upper bound of the confidence interval.
bin_col	character vector naming the column(s) that define the bins. Used only when type is "binned".

**Value**

A summary object with additional columns for each combination of estimates and funcs.

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wtd\_table

*Weighted frequency table or proportions*


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**Description**

Weighted frequency table or proportions

**Usage**

```
wtd_table(  
  ...,  
  weight = NULL,  
  na.rm = FALSE,  
  prop = FALSE,  
  return_tibble = FALSE,  
  normwt = FALSE  
)
```

**Arguments**

...	vectors of class factor or character, or a list/data.frame of such vectors.
weight	optional vector of weights. The default uses uniform weights of 1.
na.rm	logical, whether to remove NA values.
prop	logical, whether to return proportions or counts. Default returns counts.
return_tibble	logical, whether to return a tibble or named vector.
normwt	logical, whether to normalize weights such that they sum to 1.

**Value**

a vector or tibble of counts or proportions by group

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