seaborn.lineplot

`seaborn.`**`lineplot`**`(`*`data=None, *, x=None, y=None, hue=None, size=None, style=None, units=None, weights=None, palette=None, hue_order=None, hue_norm=None, sizes=None, size_order=None, size_norm=None, dashes=True, markers=None, style_order=None, estimator='mean', errorbar=('ci', 95), n_boot=1000, seed=None, orient='x', sort=True, err_style='band', err_kws=None, legend='auto', ci='deprecated', ax=None, **kwargs`*`)`

Draw a line plot with possibility of several semantic groupings.

The relationship between `x` and `y` can be shown for different subsets of the data using the `hue`, `size`, and `style` parameters. These parameters control what visual semantics are used to identify the different subsets. It is possible to show up to three dimensions independently by using all three semantic types, but this style of plot can be hard to interpret and is often ineffective. Using redundant semantics (i.e. both `hue` and `style` for the same variable) can be helpful for making graphics more accessible.

See the tutorial for more information.

The default treatment of the `hue` (and to a lesser extent, `size`) semantic, if present, depends on whether the variable is inferred to represent “numeric” or “categorical” data. In particular, numeric variables are represented with a sequential colormap by default, and the legend entries show regular “ticks” with values that may or may not exist in the data. This behavior can be controlled through various parameters, as described and illustrated below.

By default, the plot aggregates over multiple `y` values at each value of `x` and shows an estimate of the central tendency and a confidence interval for that estimate.

Parameters:

data : *`pandas.DataFrame`, `numpy.ndarray`, mapping, or sequence*

Input data structure. Either a long-form collection of vectors that can be assigned to named variables or a wide-form dataset that will be internally reshaped.

x, y : *vectors or keys in `data`*

Variables that specify positions on the x and y axes.

hue : *vector or key in `data`*

Grouping variable that will produce lines with different colors. Can be either categorical or numeric, although color mapping will behave differently in latter case.

size : *vector or key in `data`*

Grouping variable that will produce lines with different widths. Can be either categorical or numeric, although size mapping will behave differently in latter case.

style : *vector or key in `data`*

Grouping variable that will produce lines with different dashes and/or markers. Can have a numeric dtype but will always be treated as categorical.

units : *vector or key in `data`*

Grouping variable identifying sampling units. When used, a separate line will be drawn for each unit with appropriate semantics, but no legend entry will be added. Useful for showing distribution of experimental replicates when exact identities are not needed.

weights : *vector or key in `data`*

Data values or column used to compute weighted estimation. Note that use of weights currently limits the choice of statistics to a ‘mean’ estimator and ‘ci’ errorbar.

palette : *string, list, dict, or `matplotlib.colors.Colormap`*

Method for choosing the colors to use when mapping the `hue` semantic. String values are passed to `color_palette()`. List or dict values imply categorical mapping, while a colormap object implies numeric mapping.

hue_order : *vector of strings*

Specify the order of processing and plotting for categorical levels of the `hue` semantic.

hue_norm : *tuple or `matplotlib.colors.Normalize`*

Either a pair of values that set the normalization range in data units or an object that will map from data units into a [0, 1] interval. Usage implies numeric mapping.

sizes : *list, dict, or tuple*

An object that determines how sizes are chosen when `size` is used. List or dict arguments should provide a size for each unique data value, which forces a categorical interpretation. The argument may also be a min, max tuple.

size_order : *list*

Specified order for appearance of the `size` variable levels, otherwise they are determined from the data. Not relevant when the `size` variable is numeric.

size_norm : *tuple or Normalize object*

Normalization in data units for scaling plot objects when the `size` variable is numeric.

dashes : *boolean, list, or dictionary*

Object determining how to draw the lines for different levels of the `style` variable. Setting to `True` will use default dash codes, or you can pass a list of dash codes or a dictionary mapping levels of the `style` variable to dash codes. Setting to `False` will use solid lines for all subsets. Dashes are specified as in matplotlib: a tuple of `(segment, gap)` lengths, or an empty string to draw a solid line.

markers : *boolean, list, or dictionary*

Object determining how to draw the markers for different levels of the `style` variable. Setting to `True` will use default markers, or you can pass a list of markers or a dictionary mapping levels of the `style` variable to markers. Setting to `False` will draw marker-less lines. Markers are specified as in matplotlib.

style_order : *list*

Specified order for appearance of the `style` variable levels otherwise they are determined from the data. Not relevant when the `style` variable is numeric.

estimator : *name of pandas method or callable or None*

Method for aggregating across multiple observations of the `y` variable at the same `x` level. If `None`, all observations will be drawn.

errorbar : *string, (string, number) tuple, or callable*

Name of errorbar method (either “ci”, “pi”, “se”, or “sd”), or a tuple with a method name and a level parameter, or a function that maps from a vector to a (min, max) interval, or None to hide errorbar. See the errorbar tutorial for more information.

n_boot : *int*

Number of bootstraps to use for computing the confidence interval.

seed : *int, numpy.random.Generator, or numpy.random.RandomState*

Seed or random number generator for reproducible bootstrapping.

orient : *“x” or “y”*

Dimension along which the data are sorted / aggregated. Equivalently, the “independent variable” of the resulting function.

sort : *boolean*

If True, the data will be sorted by the x and y variables, otherwise lines will connect points in the order they appear in the dataset.

err_style : *“band” or “bars”*

Whether to draw the confidence intervals with translucent error bands or discrete error bars.

err_kws : *dict of keyword arguments*

Additional parameters to control the aesthetics of the error bars. The kwargs are passed either to `matplotlib.axes.Axes.fill_between()` or `matplotlib.axes.Axes.errorbar()`, depending on `err_style`.

legend : *“auto”, “brief”, “full”, or False*

How to draw the legend. If “brief”, numeric `hue` and `size` variables will be represented with a sample of evenly spaced values. If “full”, every group will get an entry in the legend. If “auto”, choose between brief or full representation based on number of levels. If `False`, no legend data is added and no legend is drawn.

ci : *int or “sd” or None*

Size of the confidence interval to draw when aggregating.

> **Deprecated since version 0.12.0:** Use the new `errorbar` parameter for more flexibility.

ax : `matplotlib.axes.Axes`

Pre-existing axes for the plot. Otherwise, call `matplotlib.pyplot.gca()` internally.

kwargs : *key, value mappings*

Other keyword arguments are passed down to `matplotlib.axes.Axes.plot()`.

Returns: `matplotlib.axes.Axes`

The matplotlib axes containing the plot.

See also

`scatterplot`
: Plot data using points.

`pointplot`
: Plot point estimates and CIs using markers and lines.

Examples

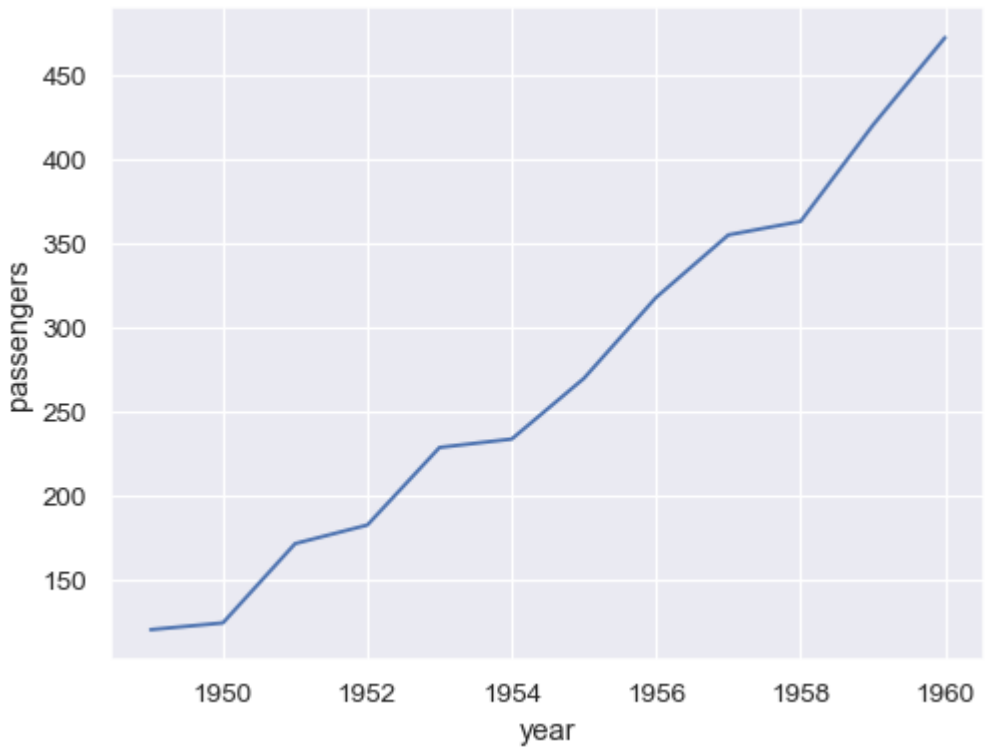
The `flights` dataset has 10 years of monthly airline passenger data:

```
flights = sns.load_dataset("flights")
flights.head()
```

	year	month	passengers
0	1949	Jan	112
1	1949	Feb	118
2	1949	Mar	132
3	1949	Apr	129
4	1949	May	121

To draw a line plot using long-form data, assign the `x` and `y` variables:

```
may_flights = flights.query("month == 'May'")
sns.lineplot(data=may_flights, x="year", y="passengers")
```



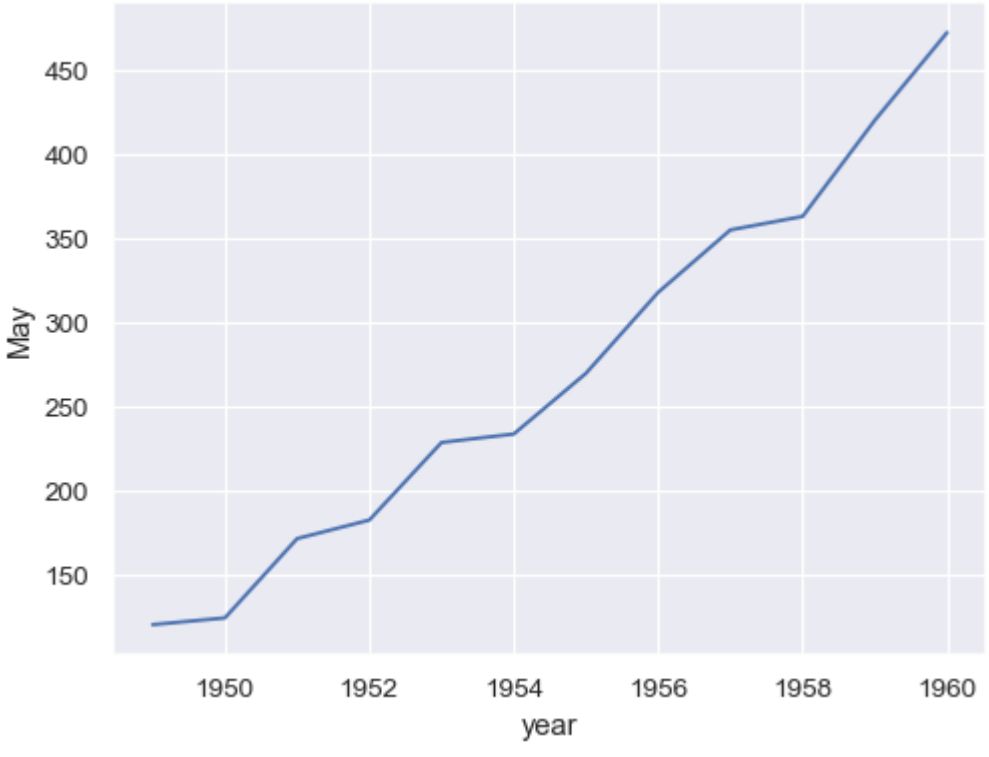
Pivot the dataframe to a wide-form representation:

```
flights_wide = flights.pivot(index="year", columns="month", values="passengers")
flights_wide.head()
```

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
year												
1949	112	118	132	129	121	135	148	148	136	119	104	118
1950	115	126	141	135	125	149	170	170	158	133	114	140
1951	145	150	178	163	172	178	199	199	184	162	146	166
1952	171	180	193	181	183	218	230	242	209	191	172	194
1953	196	196	236	235	229	243	264	272	237	211	180	201

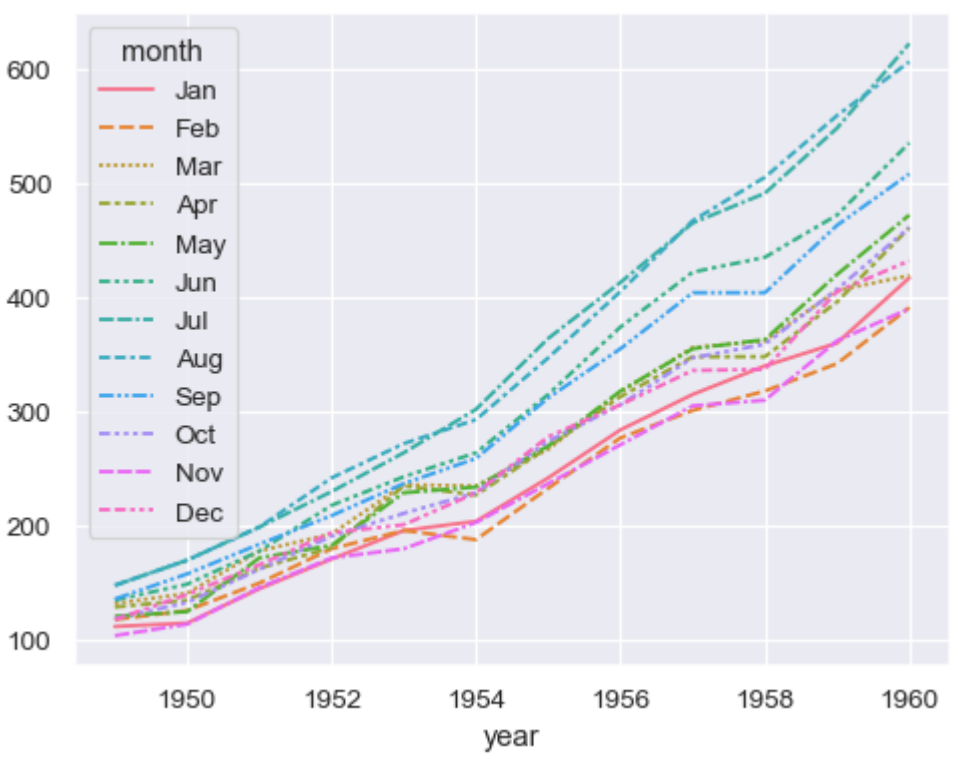
To plot a single vector, pass it to `data`. If the vector is a `pandas.Series`, it will be plotted against its index:

```
sns.lineplot(data=flights_wide["May"])
```



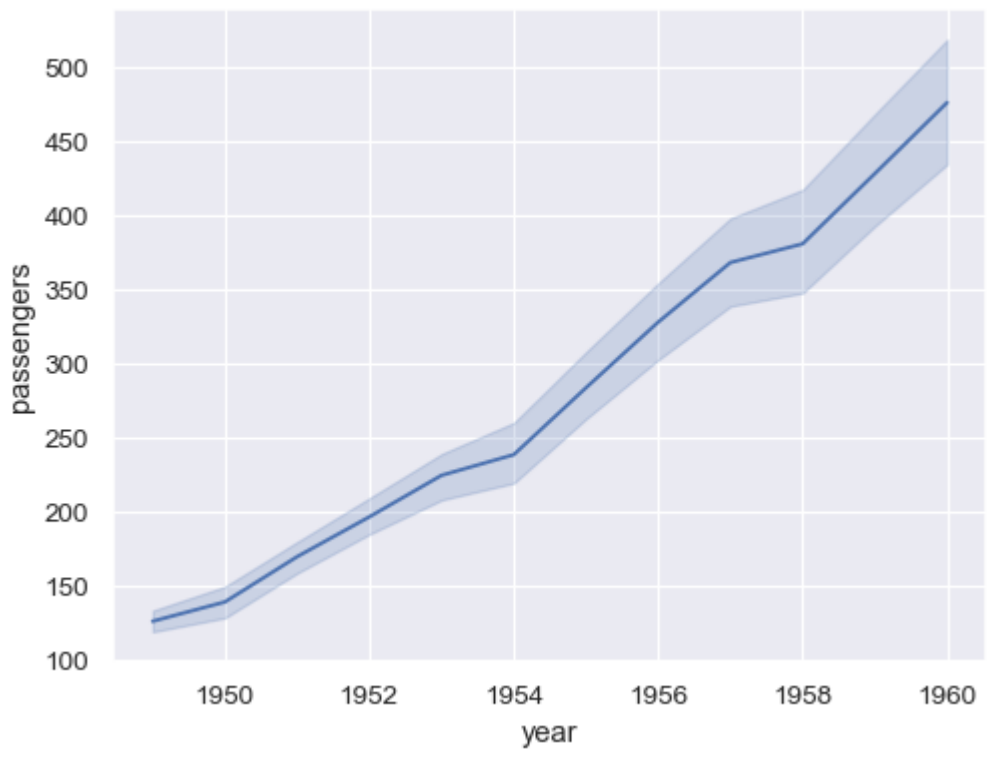
Passing the entire wide-form dataset to `data` plots a separate line for each column:

```
sns.lineplot(data=flights_wide)
```



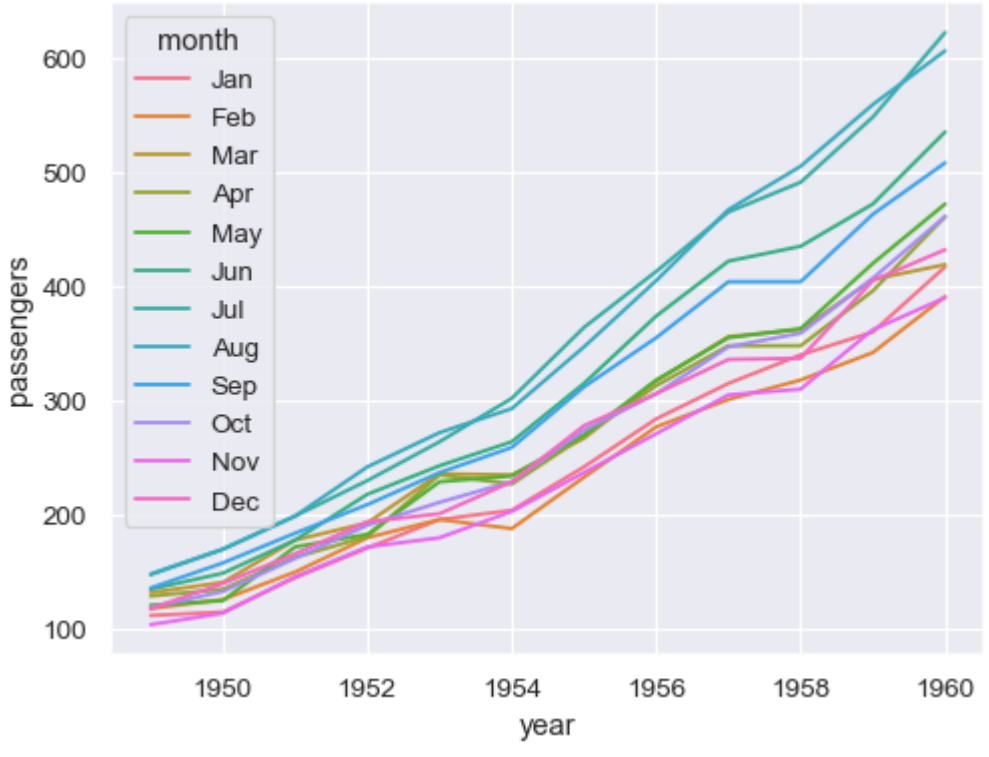
Passing the entire dataset in long-form mode will aggregate over repeated values (each year) to show the mean and 95% confidence interval:

```
sns.lineplot(data=flights, x="year", y="passengers")
```



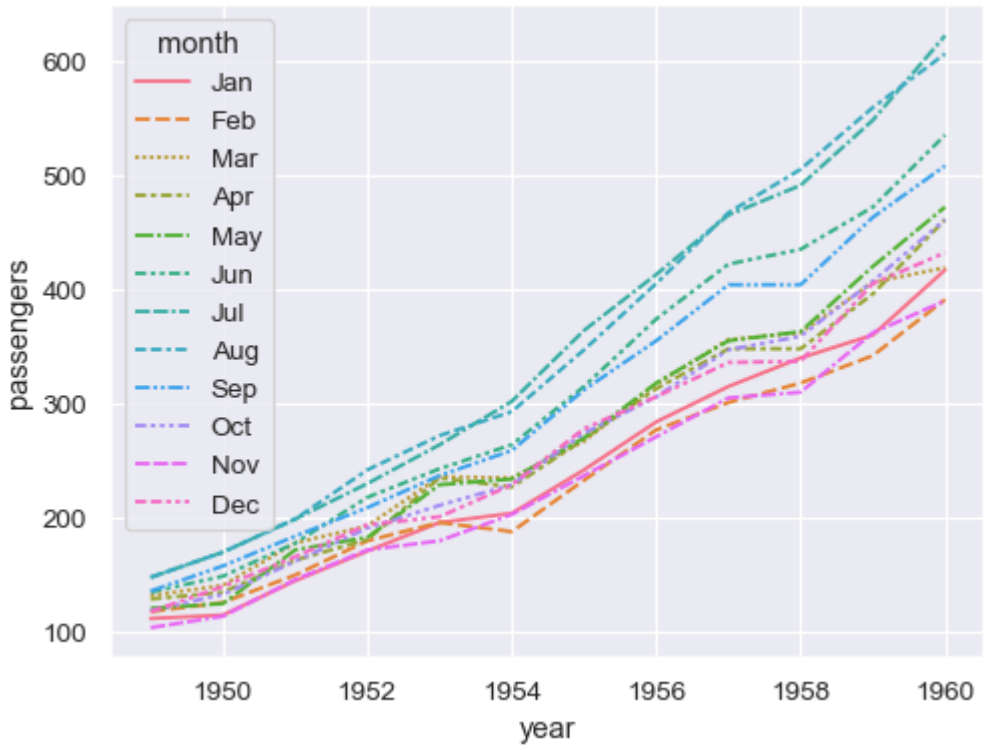
Assign a grouping semantic (`hue`, `size`, or `style`) to plot separate lines

```
sns.lineplot(data=flights, x="year", y="passengers", hue="month")
```



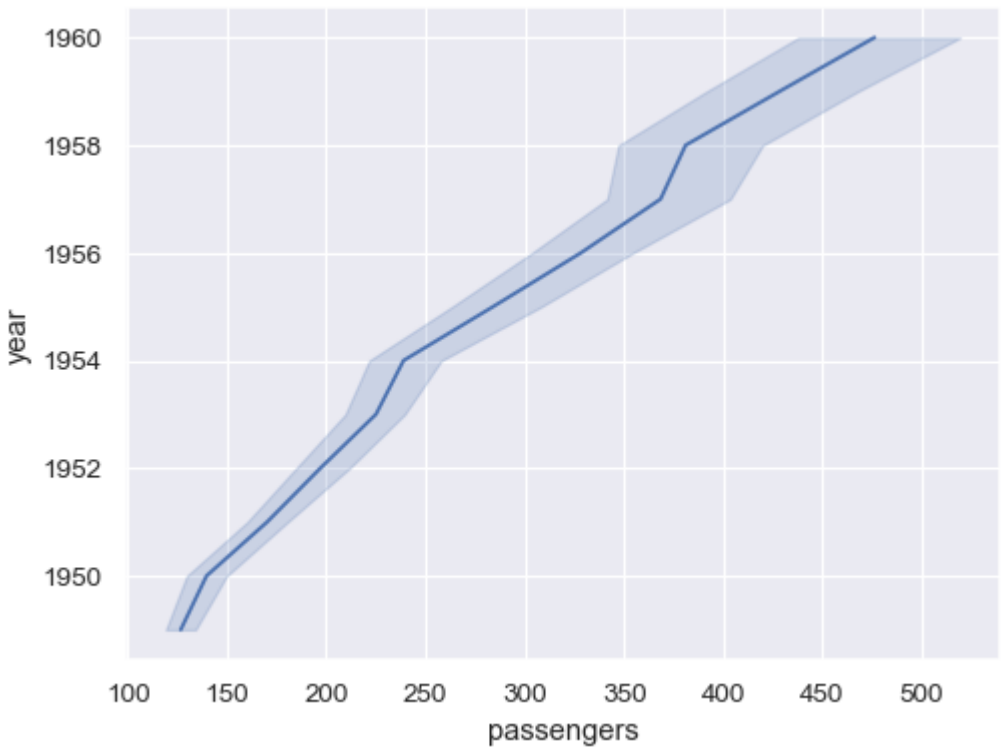
The same column can be assigned to multiple semantic variables, which can increase the accessibility of the plot:

```
sns.lineplot(data=flights, x="year", y="passengers", hue="month", style="month")
```



Use the `orient` parameter to aggregate and sort along the vertical dimension of the plot:

```
sns.lineplot(data=flights, x="passengers", y="year", orient="y")
```



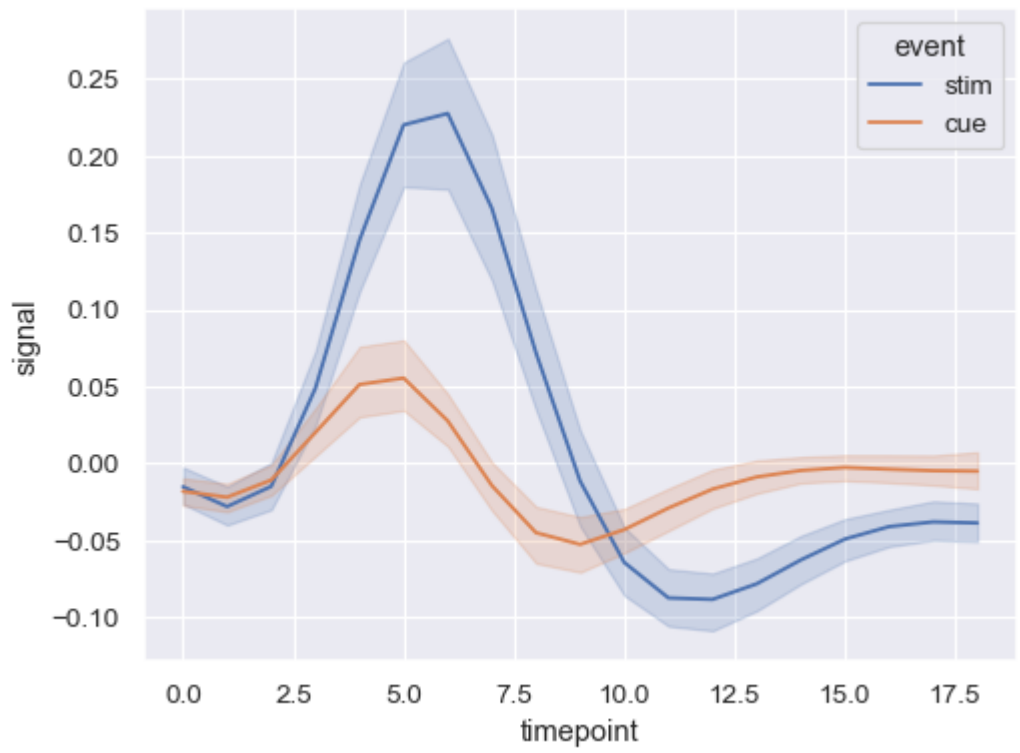
Each semantic variable can also represent a different column. For that, we'll need a more complex dataset:

```
fmri = sns.load_dataset("fmri")
fmri.head()
```

	subject	timepoint	event	region	signal
0	s13	18	stim	parietal	-0.017552
1	s5	14	stim	parietal	-0.080883
2	s12	18	stim	parietal	-0.081033
3	s11	18	stim	parietal	-0.046134
4	s10	18	stim	parietal	-0.037970

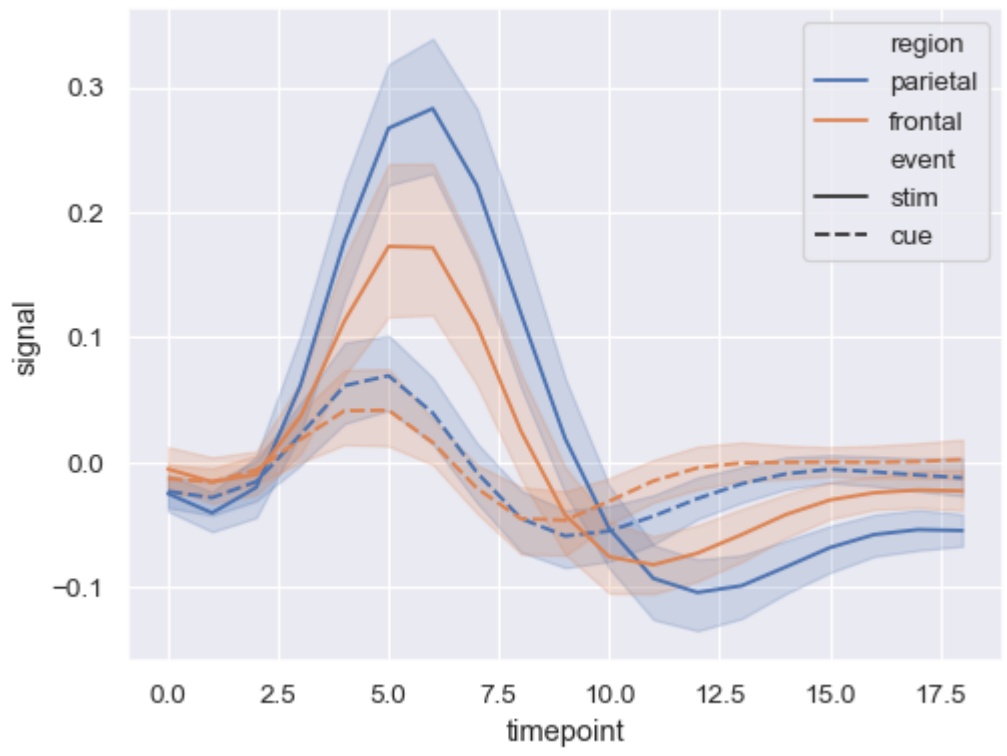
Repeated observations are aggregated even when semantic grouping is used:

```
sns.lineplot(data=fmri, x="timepoint", y="signal", hue="event")
```



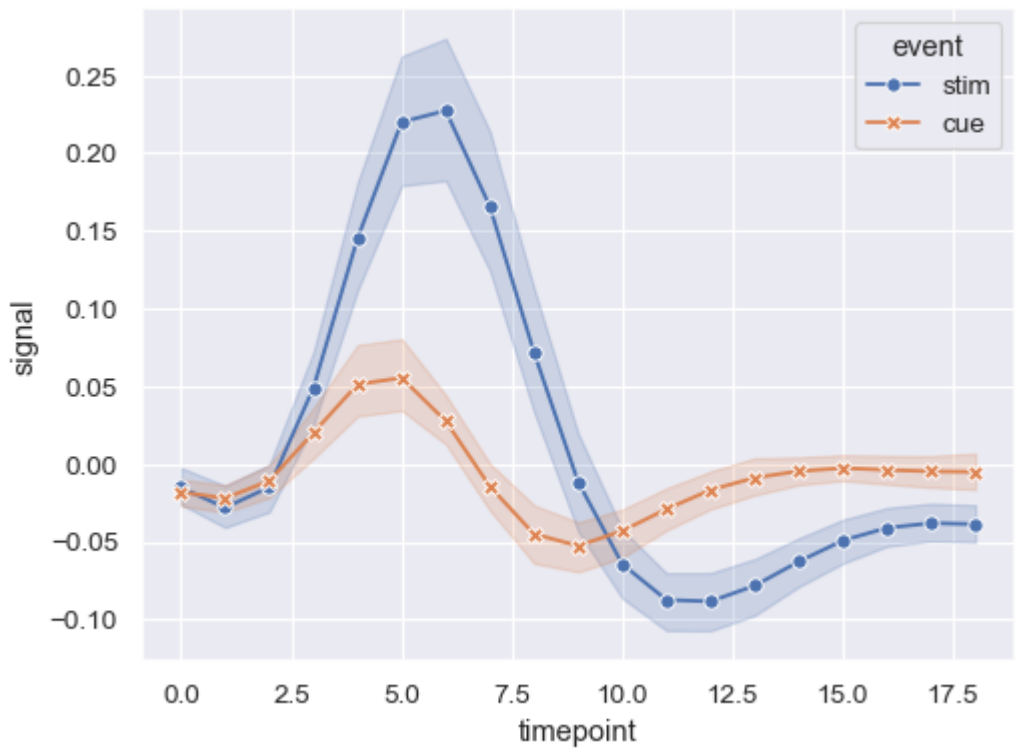
Assign both `hue` and `style` to represent two different grouping variables:

```
sns.lineplot(data=fmri, x="timepoint", y="signal", hue="region", style="event")
```



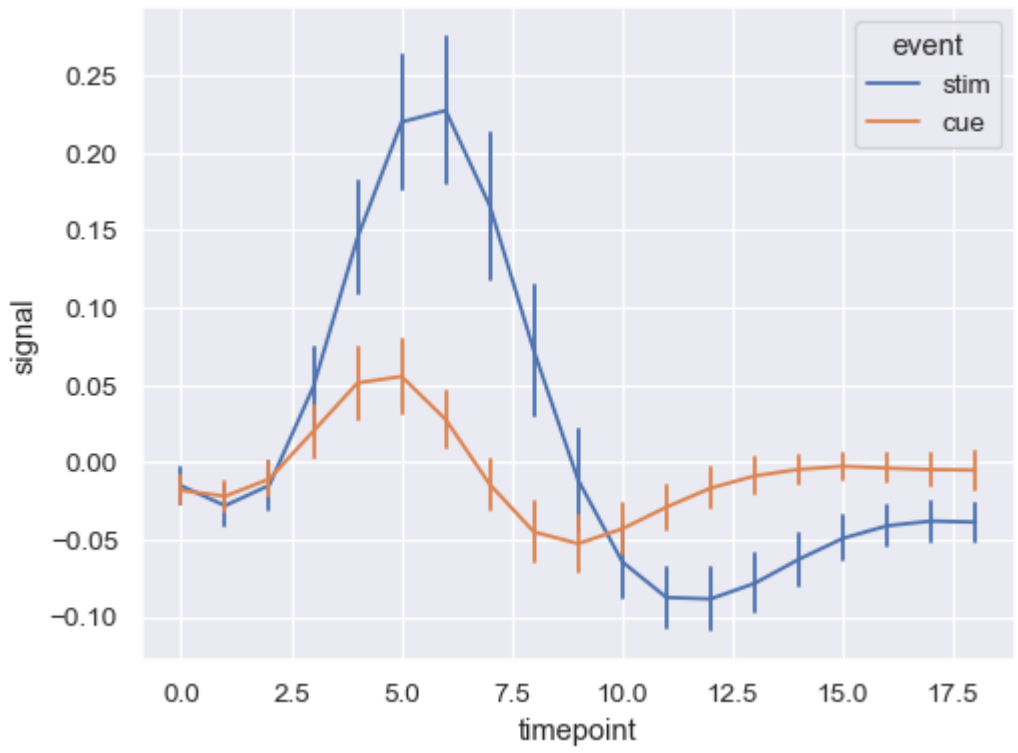
When assigning a `style` variable, markers can be used instead of (or along with) dashes to distinguish the groups:

```
sns.lineplot(
    data=fmri,
    x="timepoint", y="signal", hue="event", style="event",
    markers=True, dashes=False
)
```



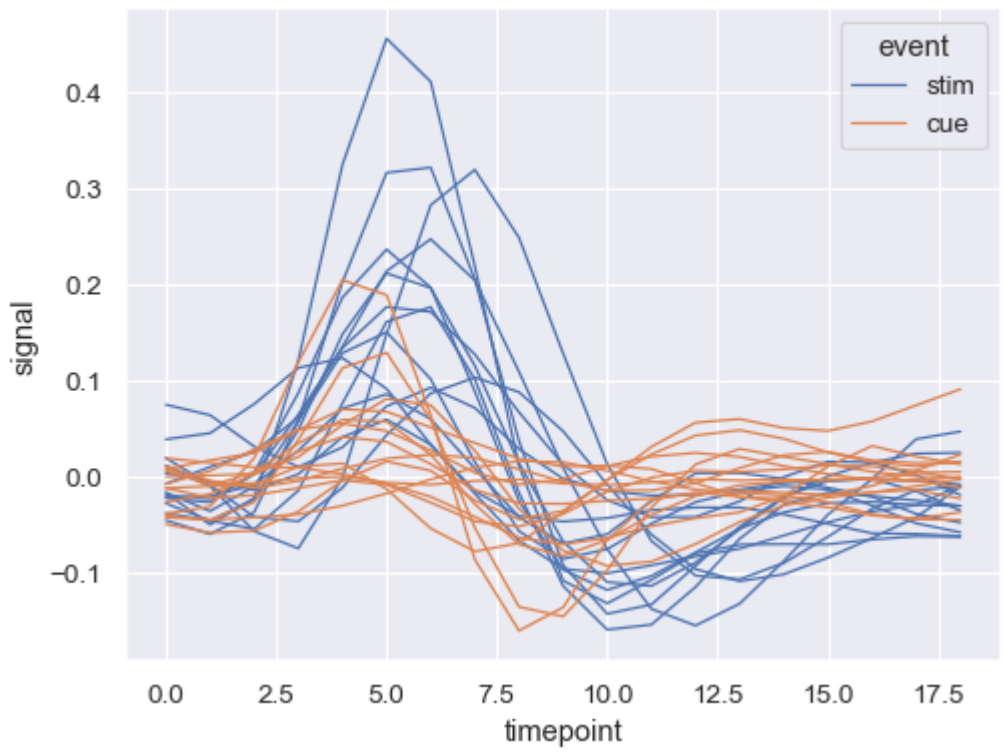
Show error bars instead of error bands and extend them to two standard error widths:

```
sns.lineplot(
    data=fmri, x="timepoint", y="signal", hue="event", err_style="bars", errorbar=("se", 2),
)
```



Assigning the `units` variable will plot multiple lines without applying a semantic mapping:

```
sns.lineplot(
    data=fmri.query("region == 'frontal'"),
    x="timepoint", y="signal", hue="event", units="subject",
    estimator=None, lw=1,
)
```



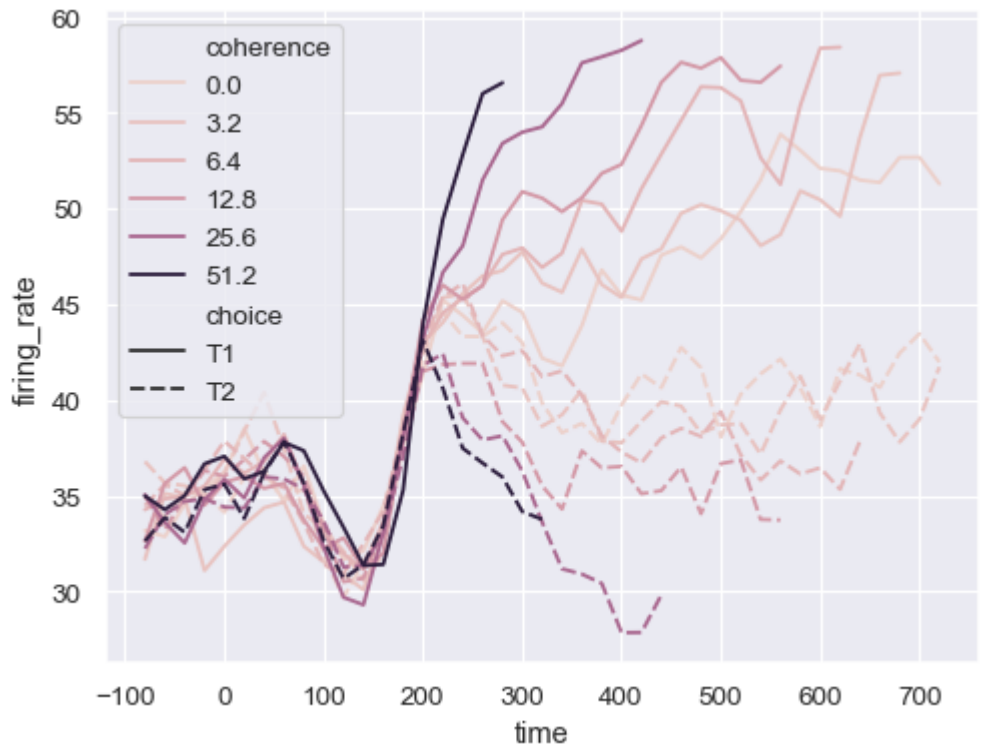
Load another dataset with a numeric grouping variable:

```
dots = sns.load_dataset("dots").query("align == 'dots'")
dots.head()
```

	align	choice	time	coherence	firing_rate
0	dots	T1	-80	0.0	33.189967
1	dots	T1	-80	3.2	31.691726
2	dots	T1	-80	6.4	34.279840
3	dots	T1	-80	12.8	32.631874
4	dots	T1	-80	25.6	35.060487

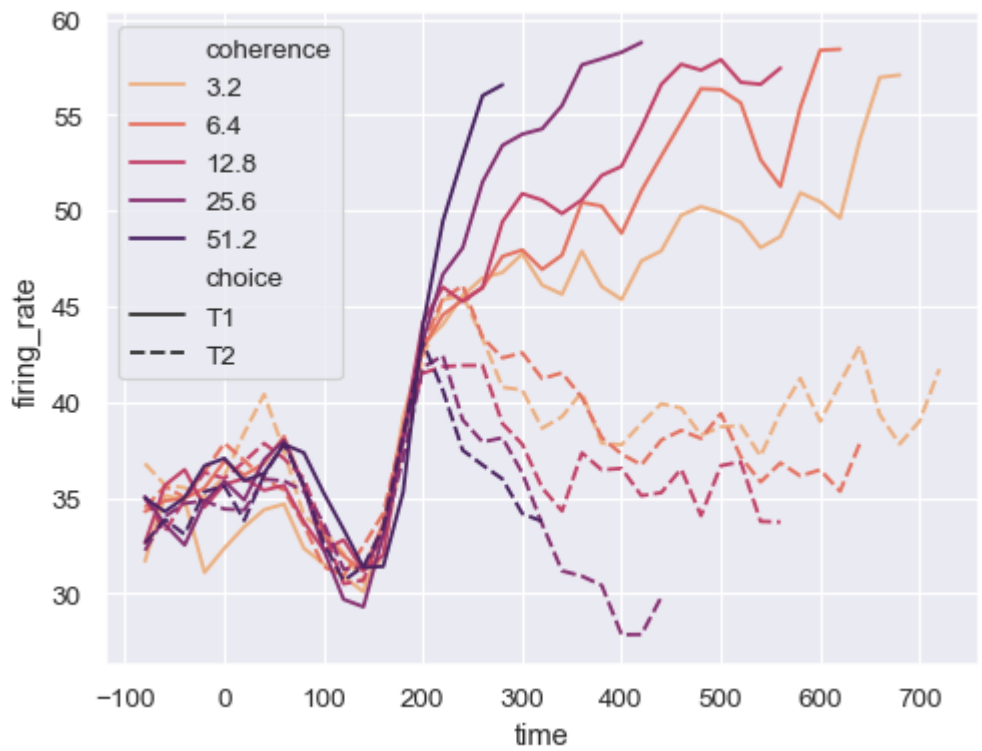
Assigning a numeric variable to `hue` maps it differently, using a different default palette and a quantitative color mapping:

```
sns.lineplot(
    data=dots, x="time", y="firing_rate", hue="coherence", style="choice",
)
```



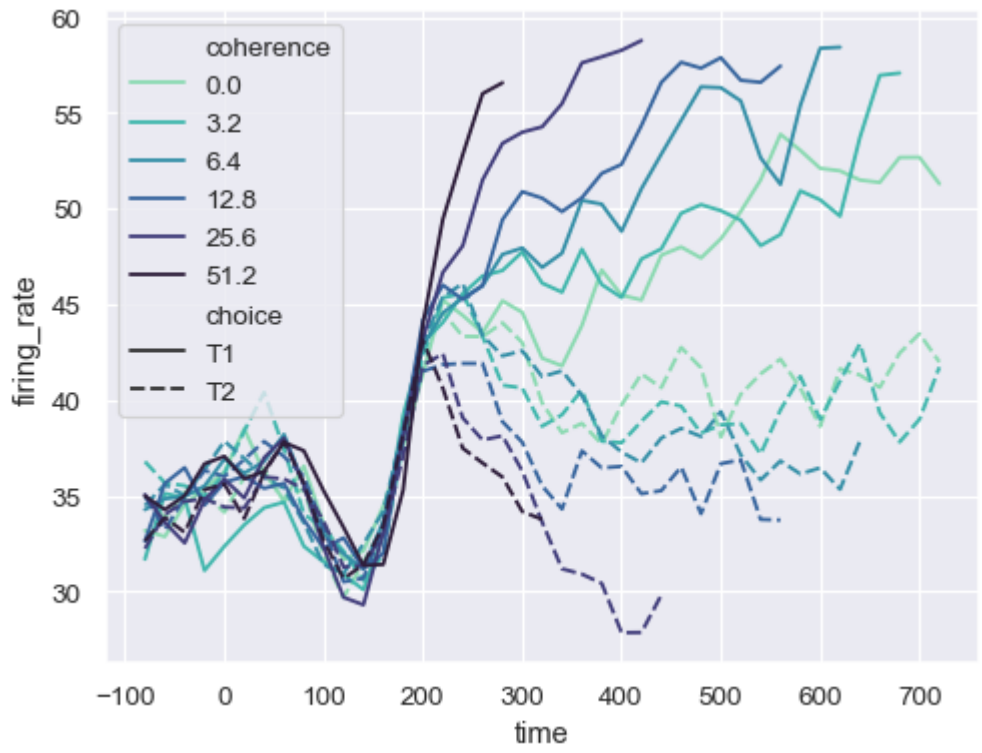
Control the color mapping by setting the `palette` and passing a `matplotlib.colors.Normalize` object:

```
sns.lineplot(
    data=dots.query("coherence > 0"),
    x="time", y="firing_rate", hue="coherence", style="choice",
     palette="flare", hue_norm=mpl.colors.LogNorm(),
)
```



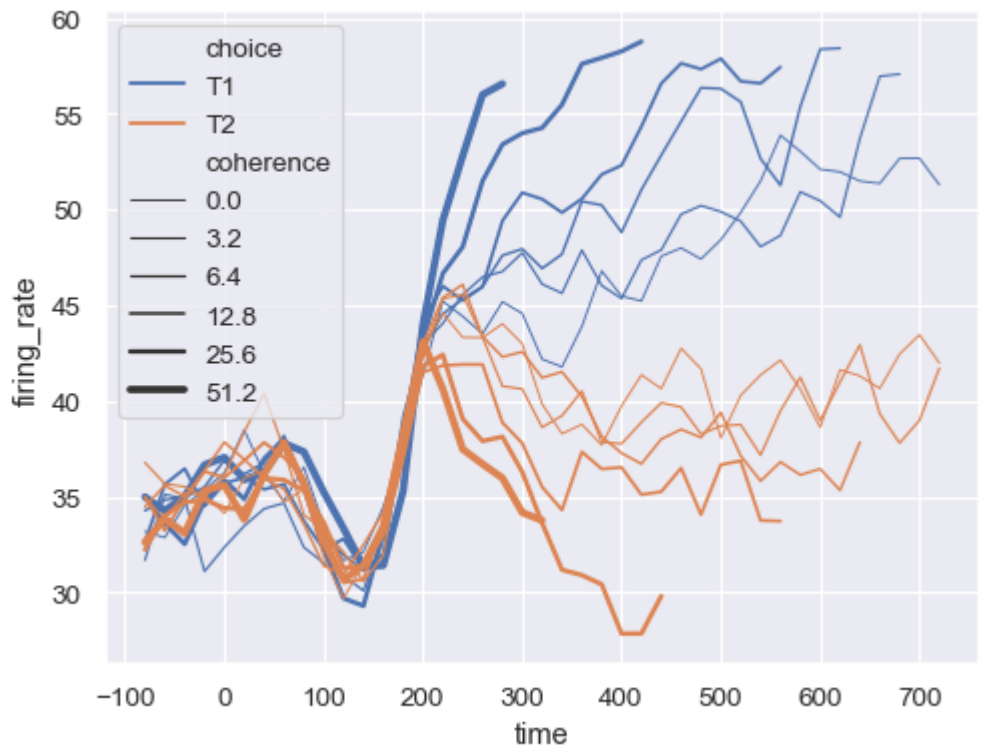
Or pass specific colors, either as a Python list or dictionary:

```
palette = sns.color_palette("mako_r", 6)
sns.lineplot(
    data=dots, x="time", y="firing_rate",
    hue="coherence", style="choice",
    palette=palette
)
```



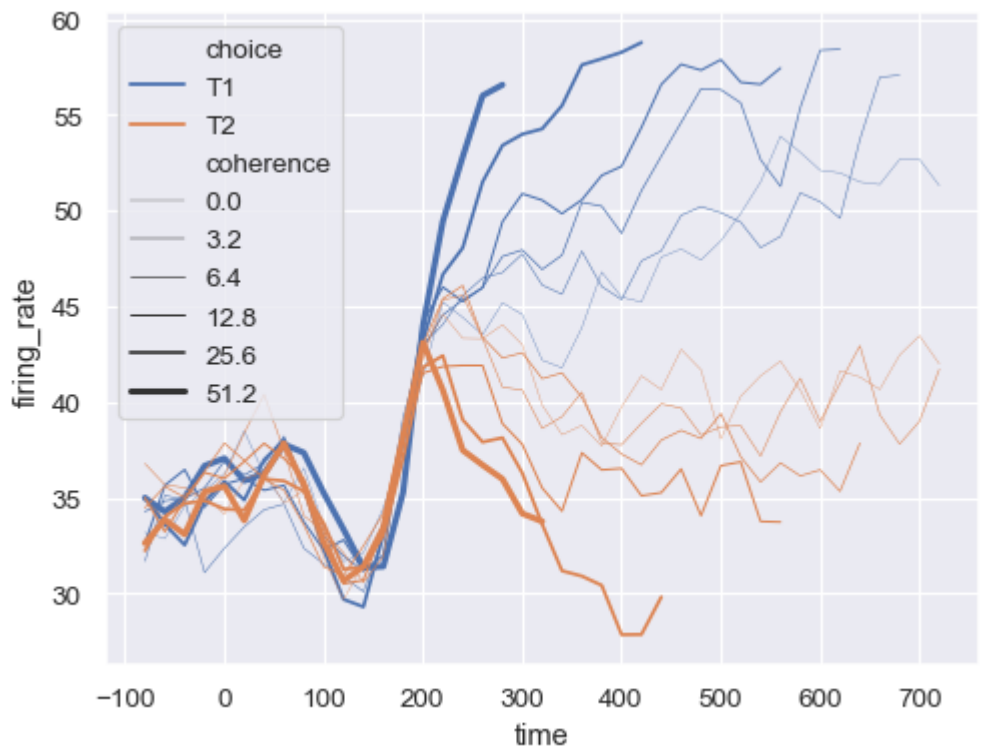
Assign the `size` semantic to map the width of the lines with a numeric variable:

```
sns.lineplot(
    data=dots, x="time", y="firing_rate",
    size="coherence", hue="choice",
    legend="full"
)
```



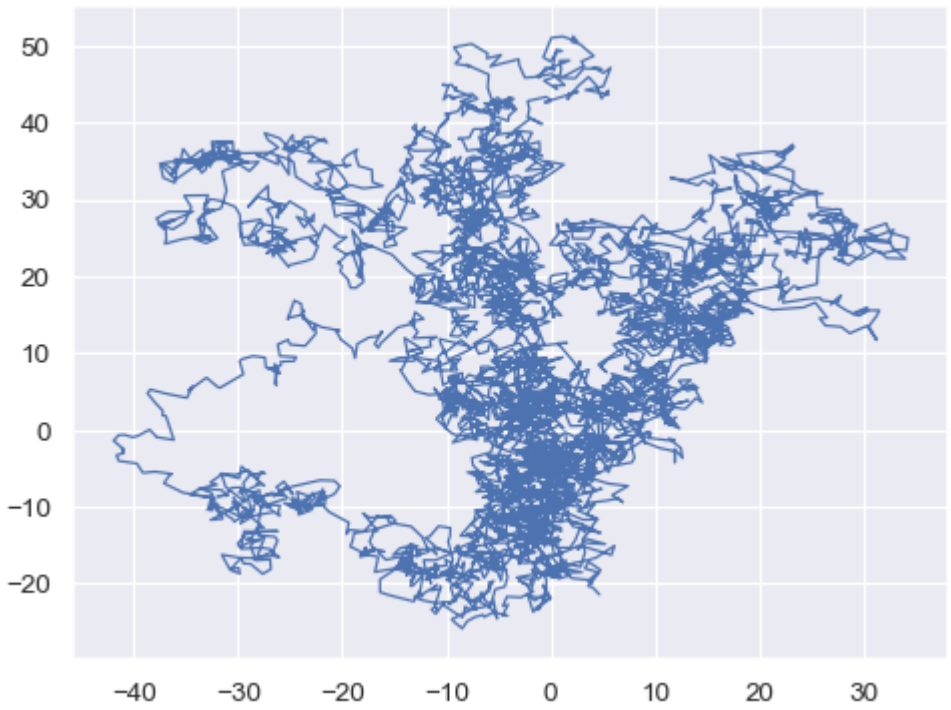
Pass a a tuple, `sizes=(smallest, largest)`, to control the range of linewidths used to map the `size` semantic:

```
sns.lineplot(
    data=dots, x="time", y="firing_rate",
    size="coherence", hue="choice",
    sizes=(.25, 2.5)
)
```



By default, the observations are sorted by `x`. Disable this to plot a line with the order that observations appear in the dataset:

```
x, y = np.random.normal(size=(2, 5000)).cumsum(axis=1)
sns.lineplot(x=x, y=y, sort=False, lw=1)
```



Use `relplot()` to combine `lineplot()` and `FacetGrid`. This allows grouping within additional categorical variables. Using `relplot()` is safer than using `FacetGrid` directly, as it ensures synchronization of the semantic mappings across facets:

```
sns.relplot(
    data=fmri, x="timepoint", y="signal",
    col="region", hue="event", style="event",
    kind="line"
)
```