In [21]:

```
%matplotlib inline
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

sns.set_theme(style="ticks", color_codes=True)

# Custom colors
blue = "#3F83F4"
blue_dark = "#062089"
blue_light = "#8DC0F6"
blue_lighter = "#BBE4FA"
grey = "#9C9C9C"
grey_dark = "#777777"
grey_light = "#B2B2B2"
orange = "#EF8733"
my_colors = [blue, orange]
```

In [22]:

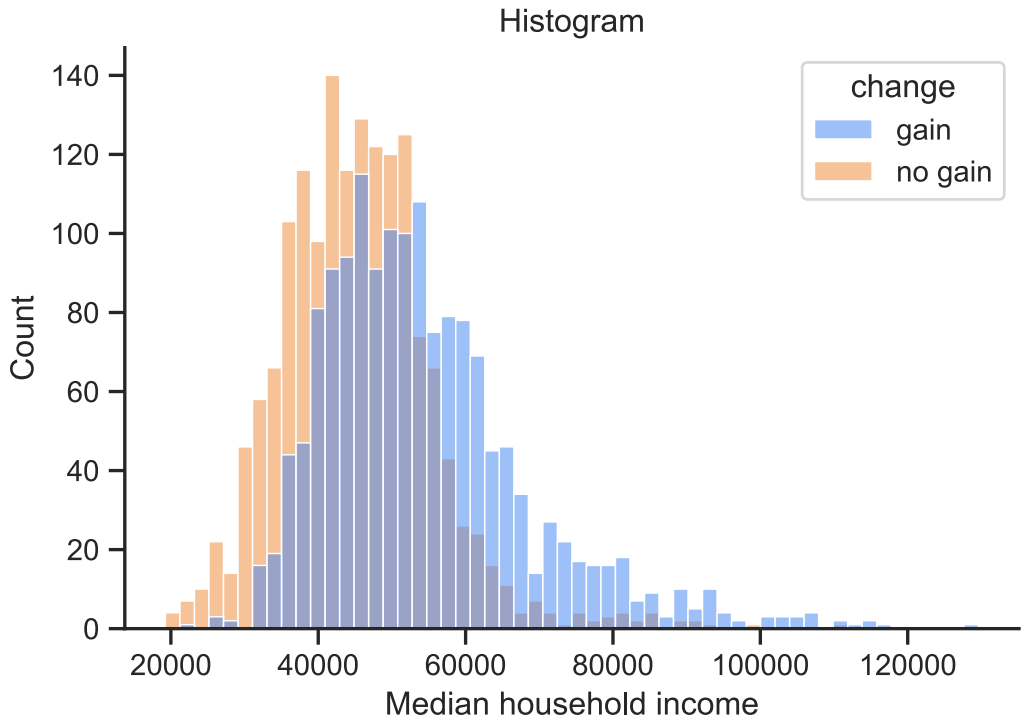
```
ROOT = "https://raw.githubusercontent.com/kirenz/modern-statistics/main/data/"
DATA = "county.csv"

df = pd.read_csv(ROOT + DATA)

# Select only relevant variables
data_selection = ["state", "name", "pop_change",
                  "population_change", "median_hh_income", "metro"]
df = df[data_selection]

# Data transformations
df.rename(columns={'population_change': 'change'}, inplace=True)
df['change'] = df['change'].astype("category")

df.head()
```

Out[22]:

	state	name	pop_change	change	median_hh_income	metro
0	Alabama	Autauga County	1.48	gain	55317.0	yes
1	Alabama	Baldwin County	9.19	gain	52562.0	yes
2	Alabama	Barbour County	-6.22	no gain	33368.0	no
3	Alabama	Bibb County	0.73	gain	43404.0	yes
4	Alabama	Blount County	0.68	gain	47412.0	yes

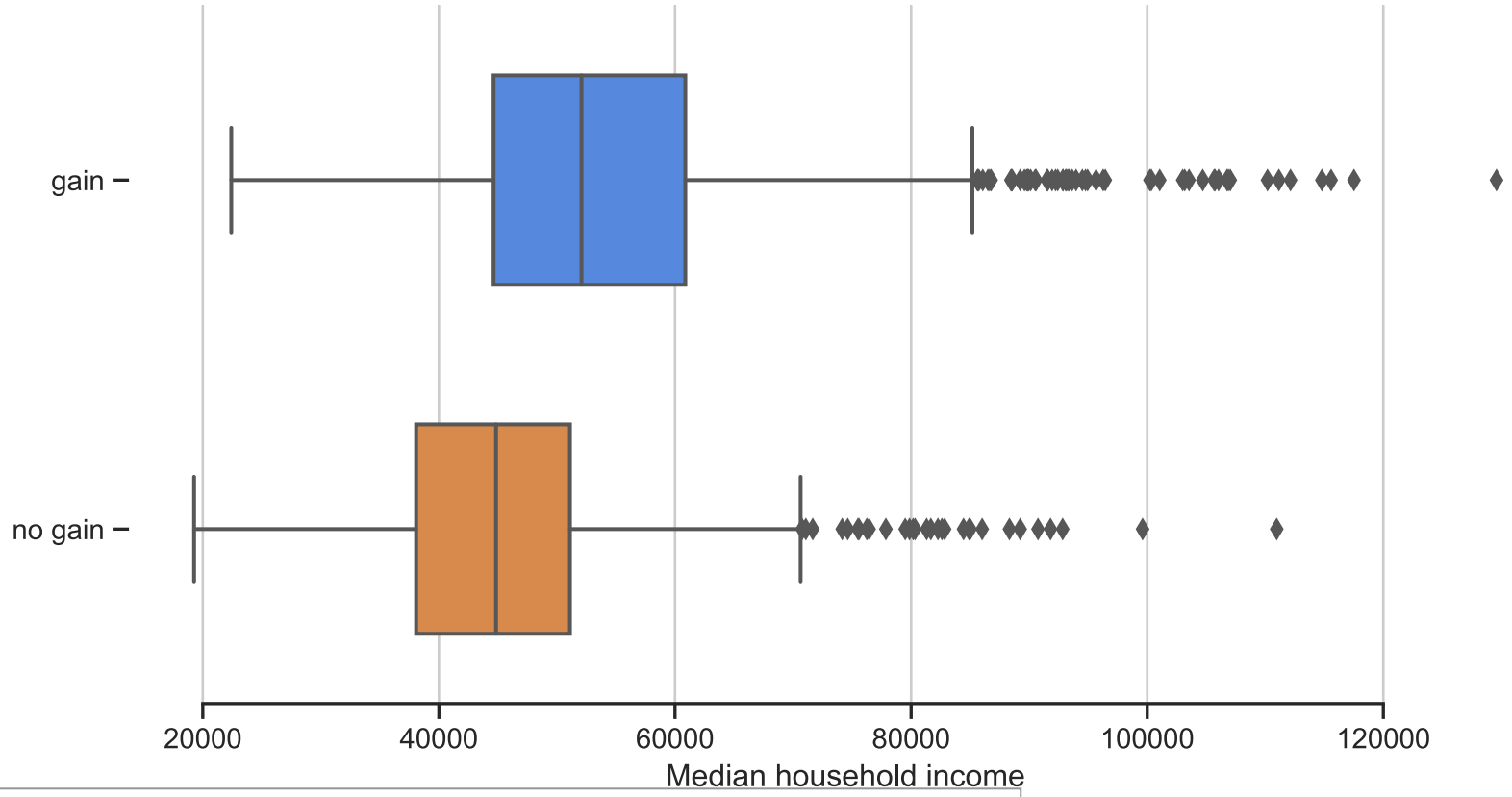
In [44]:

```
sns.histplot(data=df, x="median_hh_income", hue="change", palette=my_colors)

plt.title("Histogram")
plt.xlabel("Median household income")
sns.despine()
```



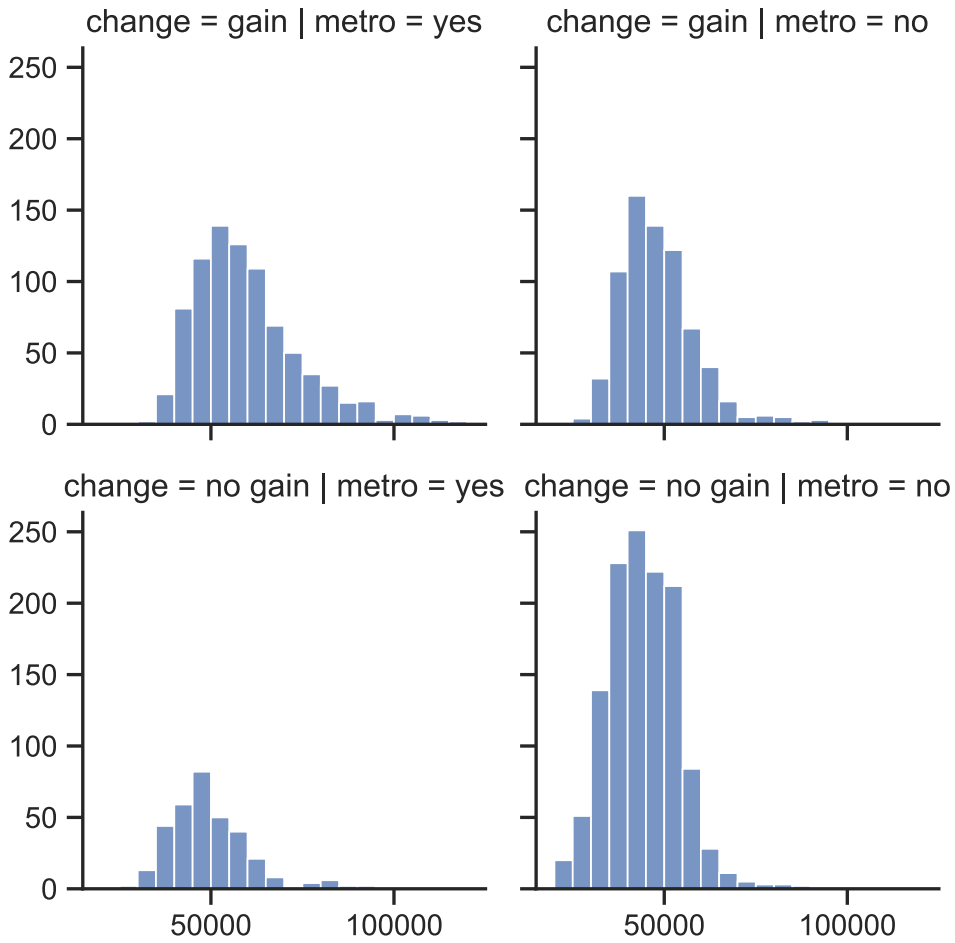
In [46]:

```
# Initialize the figure
fig, ax = plt.subplots(figsize=(10, 5))

sns.boxplot(y="change", x="median_hh_income", palette=my_colors, width=.6, data=df)

ax.xaxis.grid(True)
ax.set(xlabel="Median household income", ylabel="")
sns.despine(trim=True, left=True)
```



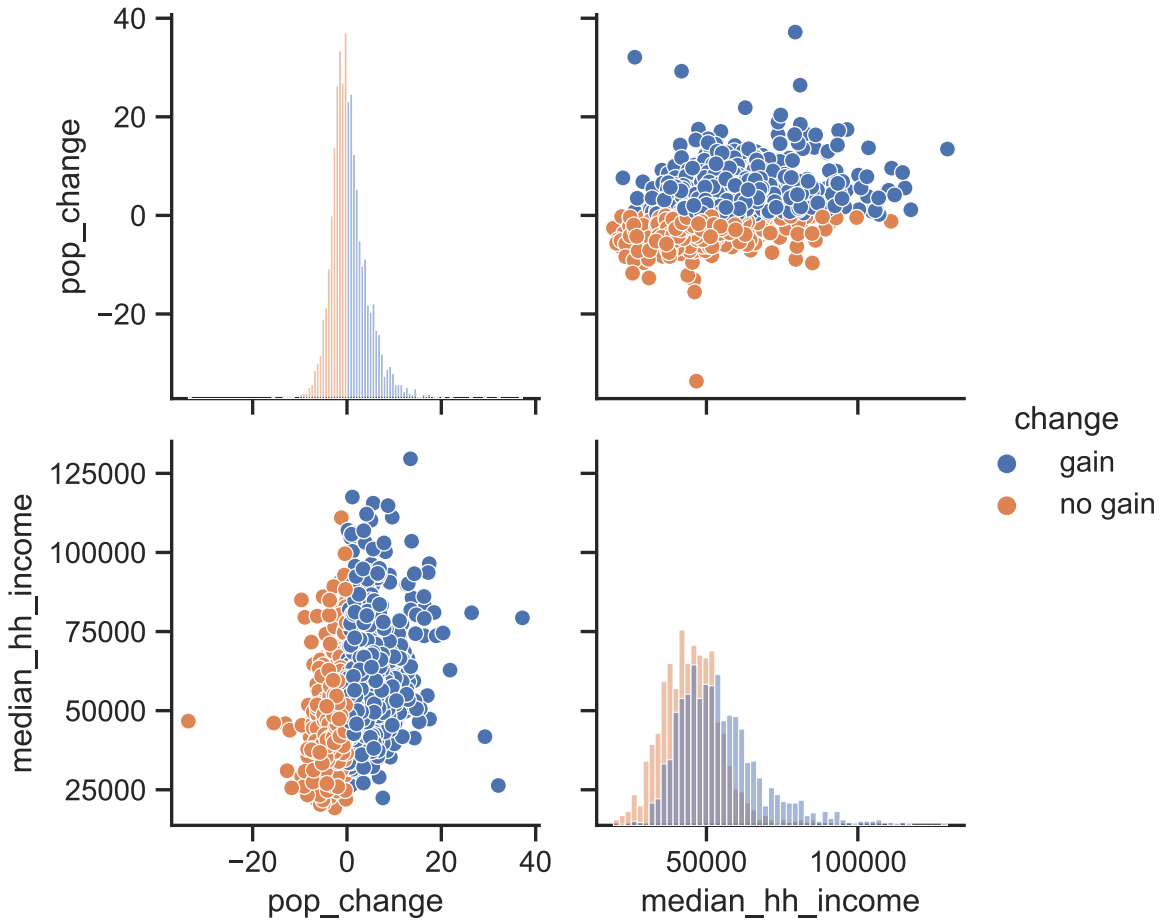
In [48]:

```
g = sns.FacetGrid(df, col="metro",  row="change", height=2.6)
g.map_dataframe(sns.histplot, x="median_hh_income", binwidth=5000, binrange=(20000, 120000));
```



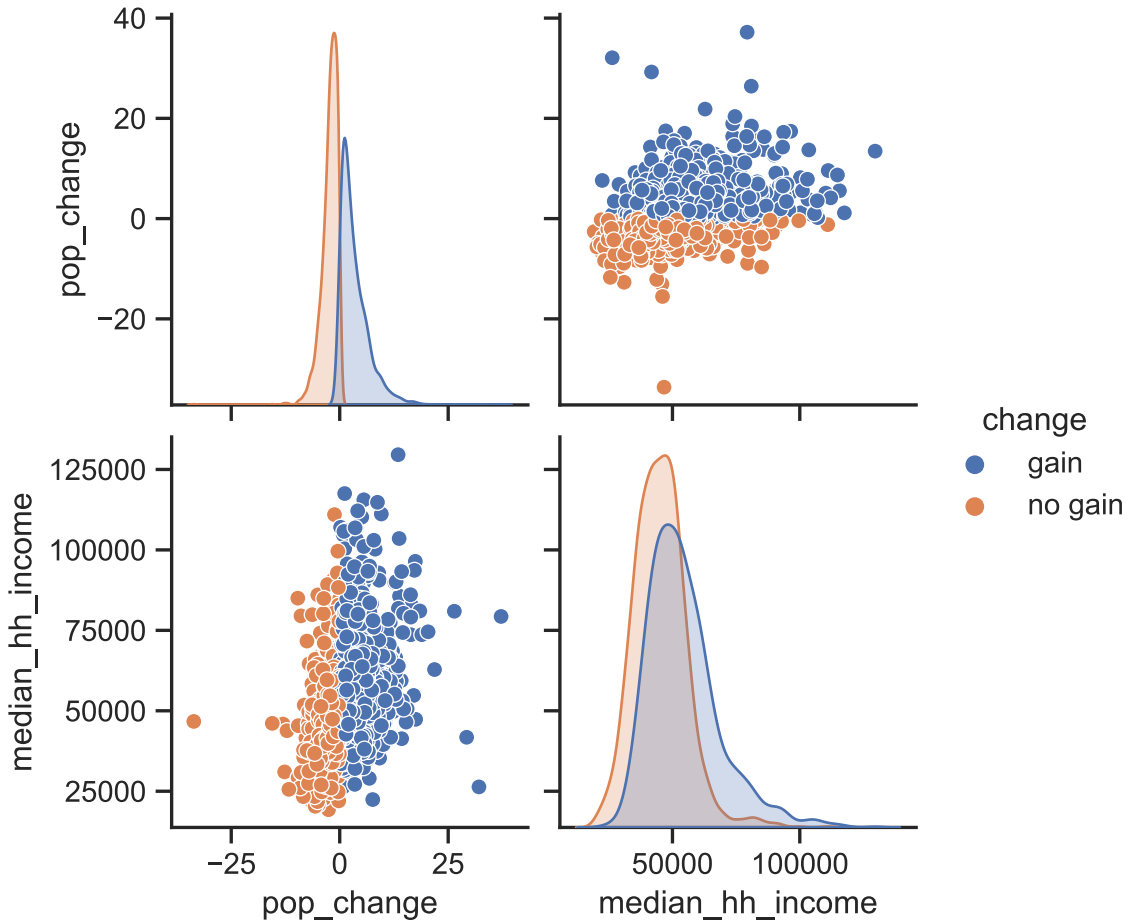
In [49]:

```
g = sns.PairGrid(df, hue="change")
g.map_diag(sns.histplot)
g.map_offdiag(sns.scatterplot)
g.add_legend();
```



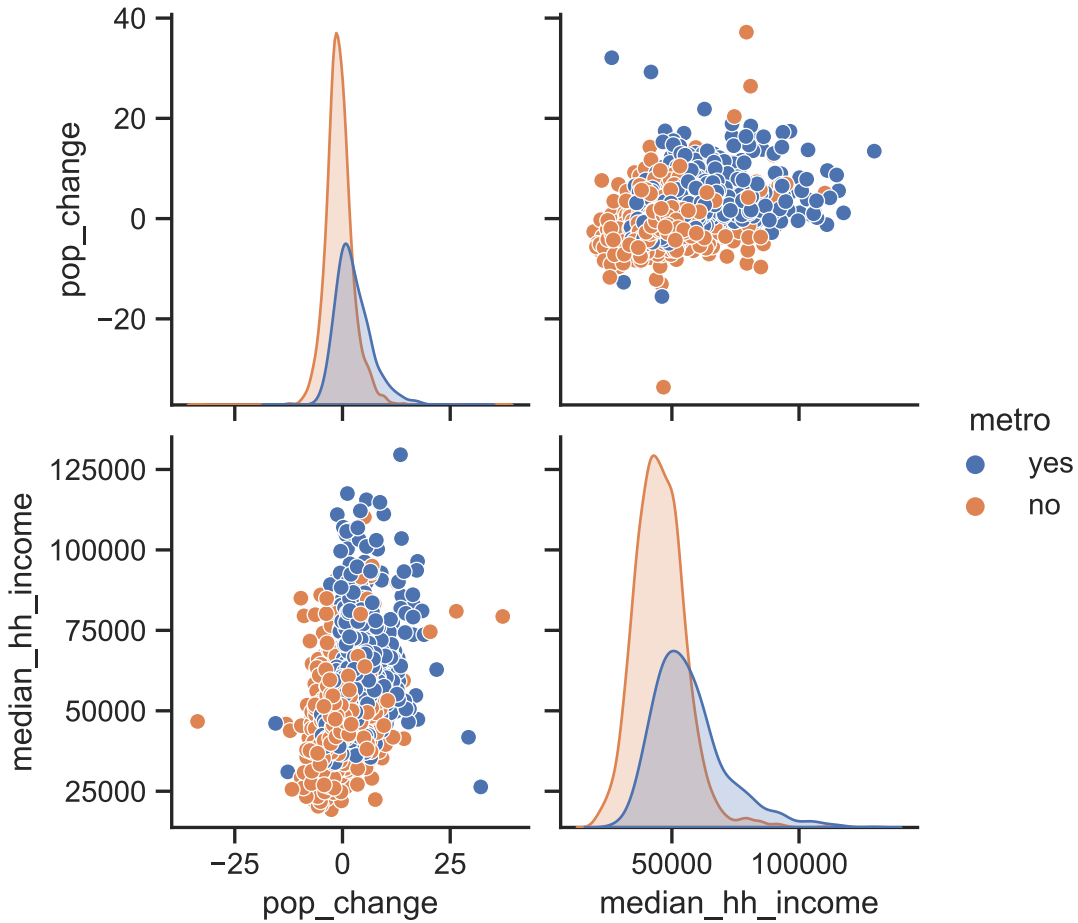
In [33]:

```
sns.pairplot(df, hue="change");
```



In [34]:

```
sns.pairplot(df, hue="metro");
```



In [50]:

```
g = sns.PairGrid(df, hue="metro")
g.map_diag(sns.histplot)
g.map_offdiag(sns.scatterplot)
g.add_legend();
```