In [84]:
```
import os
import json
import pandas as pd
import numpy as np
from collections import Counter
import matplotlib.pyplot as plt
import seaborn as sns
```

In [ ]:
```
EVAL_DIR = "evaluations"
CSV_FILE = "evaluations/final_temp.csv"

leaders_evaluated = ["OP01-001", "ST02-001", "ST13-003", "OP07-079", "OP08-098"]
```

In [ ]:
```
def load_all_trials_json(leader_id):
    path_json = os.path.join(EVAL_DIR, leader_id, "all_trials.json")
    if not os.path.exists(path_json):
        print(f"Datei nicht gefunden: {path_json}")
        return pd.DataFrame()

    with open(path_json, "r", encoding="utf-8") as f:
        data = json.load(f)

    rows = []
    for trial_block in data:
        gnn_trial = trial_block["gnn_trial"]
        for deck_result in trial_block["deck_results"]:
            row = {
                "leader": leader_id,
                "gnn_trial": gnn_trial,
                "deck_trial": deck_result["deck_trial"],
                "deck": deck_result["deck"],  # Dictionary CardID -> copies
                "score": deck_result.get("score", np.nan),
                "meta_overlap": deck_result.get("meta_overlap", np.nan),
                "avg_synergy": deck_result.get("avg_synergy", np.nan),
                "num_singletons": deck_result.get("num_singletons", np.nan),
            }
            rows.append(row)

    return pd.DataFrame(rows)
```

In [ ]:
```
df_list = []
for ld in leaders_evaluated:
    df_ld = load_all_trials_json(ld)
    df_list.append(df_ld)

df_evals = pd.concat(df_list, ignore_index=True)
df_evals.head()
```

Out[ ]:

	leader	gnn_trial	deck_trial	deck	score	meta_overlap	avg_synergy	num_
0	OP01-001	1	1	{'OP01-030': 2, 'OP01-120': 2, 'OP01-010': 1, ...	2853.559082	0	2.063501	
1	OP01-001	1	2	{'ST01-011': 2, 'ST01-004': 2, 'ST01-010': 2, ...	2815.091309	1	2.047359	
2	OP01-001	1	3	{'OP01-024': 1, 'OP01-004': 2, 'OP01-022': 2, ...	2837.621826	1	2.053221	
3	OP01-001	1	4	{'OP01-014': 2, 'OP01-022': 2, 'OP01-013': 2, ...	2853.666748	1	2.061460	
4	OP01-001	1	5	{'OP01-016': 2, 'OP01-006': 2, 'OP02-005': 3, ...	2840.410645	3	2.057597	

In [ ]:

```
if os.path.exists(CSV_FILE):
    df_csv = pd.read_csv(CSV_FILE)
    print(f"\nCSV '{CSV_FILE}' geladen: {df_csv.shape[0]} Zeilen, {df_csv.shape[
    df_merged = pd.merge(
        df_evals,
        df_csv,
        on=["leader","gnn_trial", "deck_trial"],
        how="left"  # oder "inner"
    )
    print(f"\nNach Merge hat df_merged: {df_merged.shape[0]} Zeilen, {df_merged.
else:
    print(f"CSV '{CSV_FILE}' nicht gefunden. Es wird nur df_evals benutzt.")
    df_merged = df_evals.copy()
```

```
CSV 'evaluations/final_temp.csv' nicht gefunden. Es wird nur df_evals benutzt.
```

In [87]:
```
df_merged.head()
```

Out[87]:

	leader	gnn_trial	deck_trial	deck	score	meta_overlap	avg_synergy	num_s
0	OP01-001	1	1	{'OP01-030': 2, 'OP01-120': 2, 'OP01-010': 1, ...	2853.559082	0	2.063501	
1	OP01-001	1	2	{'ST01-011': 2, 'ST01-004': 2, 'ST01-010': 2, ...	2815.091309	1	2.047359	
2	OP01-001	1	3	{'OP01-024': 1, 'OP01-004': 2, 'OP01-022': 2, ...	2837.621826	1	2.053221	
3	OP01-001	1	4	{'OP01-014': 2, 'OP01-022': 2, 'OP01-013': 2, ...	2853.666748	1	2.061460	
4	OP01-001	1	5	{'OP01-016': 2, 'OP01-006': 2, 'OP02-005': 3, ...	2840.410645	3	2.057597	

In [ ]:
```
df_analysis = df_merged.copy()
print("\n==== Basis-Statistiken (Scores) pro Leader ====")
stats_score = df_analysis.groupby("leader")["score"].describe()
print(stats_score)

print("\n==== Verteilung von 'avg_synergy' pro Leader ====")
stats_synergy = df_analysis.groupby("leader")["avg_synergy"].describe()
print(stats_synergy)
```

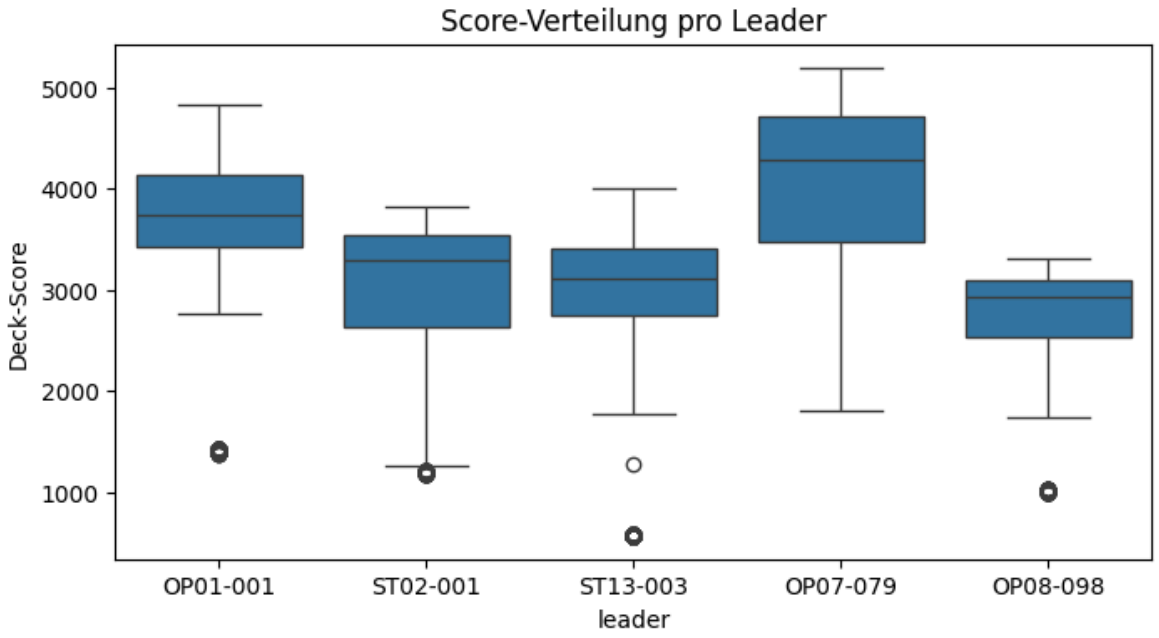
```
==== Basis-Statistiken (Scores) pro Leader ====
           count         mean         std          min          25%  \
leader
OP01-001  5000.0  3542.614992  835.453784  1378.026855  3429.828369
OP07-079  5000.0  4020.627794  916.417622  1798.153442  3468.422974
OP08-098  5000.0  2741.871736  498.446855   998.655884  2534.976562
ST02-001  5000.0  2993.521822  738.179364  1171.397217  2623.720703
ST13-003  5000.0  2936.864106  727.283671   568.514404  2746.909485

                  50%          75%          max
leader
OP01-001  3744.445557  4131.174072  4829.105469
OP07-079  4279.718018  4710.378906  5197.020996
OP08-098  2919.773804  3086.703674  3310.768555
ST02-001  3288.600220  3545.678406  3817.153809
ST13-003  3105.371704  3404.007141  3994.910645

==== Verteilung von 'avg_synergy' pro Leader ====
           count      mean       std       min       25%       50%       75%  \
leader
OP01-001  5000.0  2.648854  0.705494  0.914646  2.504780  2.885268  3.091889
OP07-079  5000.0  2.559113  0.607359  0.987925  2.085322  2.931277  3.035498
OP08-098  5000.0  2.328871  0.427996  0.854625  2.139125  2.473820  2.632723
ST02-001  5000.0  2.339288  0.612242  0.859761  2.010152  2.585045  2.786369
ST13-003  5000.0  2.227817  0.604963  0.311729  1.986612  2.422358  2.658001

              max
leader
OP01-001  3.733522
OP07-079  3.196242
OP08-098  2.805426
ST02-001  2.971559
ST13-003  3.054866
```

In [71]:
```
stats_synergy.head()
```

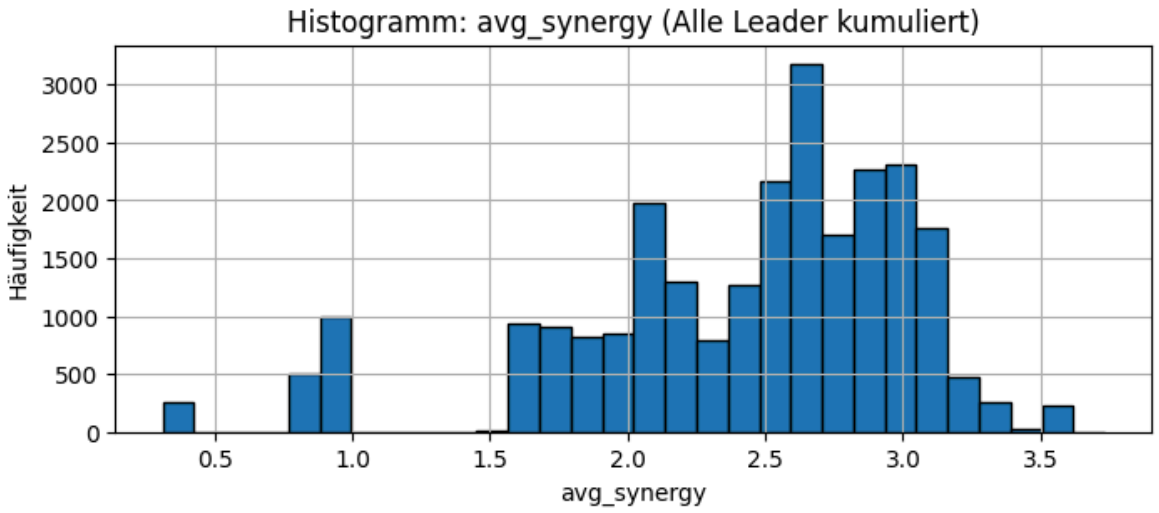
Out[71]:

leader	count	mean	std	min	25%	50%	75%	max
OP01-001	5000.0	2.648854	0.705494	0.914646	2.504780	2.885268	3.091889	3.733522
OP07-079	5000.0	2.559113	0.607359	0.987925	2.085322	2.931277	3.035498	3.196242
OP08-098	5000.0	2.328871	0.427996	0.854625	2.139125	2.473820	2.632723	2.805426
ST02-001	5000.0	2.339288	0.612242	0.859761	2.010152	2.585045	2.786369	2.971559
ST13-003	5000.0	2.227817	0.604963	0.311729	1.986612	2.422358	2.658001	3.054866

In [ ]:
```
plt.figure(figsize=(8, 4))
sns.boxplot(data=df_analysis, x="leader", y="score")
plt.title("Score-Verteilung pro Leader")
plt.ylabel("Deck-Score")
plt.show()
```



In [ ]:
```
plt.figure(figsize=(8,3))
df_analysis["avg_synergy"].hist(bins=30, edgecolor="k")
plt.title("Histogramm: avg_synergy (Alle Leader kumuliert)")
plt.xlabel("avg_synergy")
plt.ylabel("Häufigkeit")
plt.show()
```

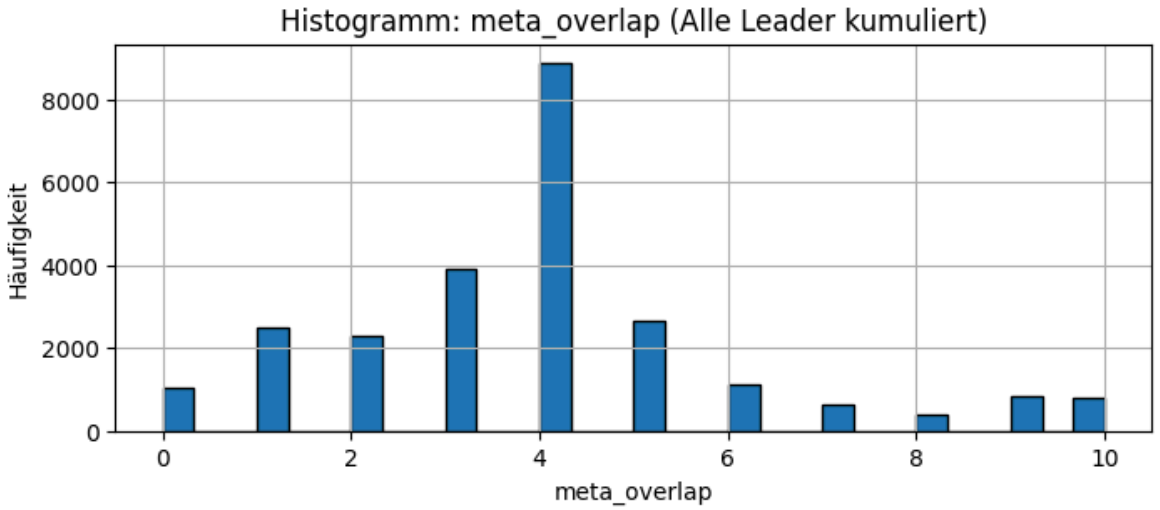


In [ ]:
```
print("\n==== Verteilung von 'meta_overlap' pro Leader ====")
stats_overlap = df_analysis.groupby("leader")["meta_overlap"].describe()
print(stats_overlap)
```

```
==== Verteilung von 'meta_overlap' pro Leader ====
           count    mean       std  min  25%  50%  75%   max
leader
OP01-001  5000.0  3.8000  1.472153  0.0  3.0  4.0  5.0   9.0
OP07-079  5000.0  3.7654  1.327070  0.0  3.0  4.0  4.0   8.0
OP08-098  5000.0  5.6300  3.228558  0.0  3.0  5.0  9.0  10.0
ST02-001  5000.0  2.8012  1.839444  0.0  1.0  2.0  4.0  10.0
ST13-003  5000.0  3.4010  1.336921  0.0  4.0  4.0  4.0   7.0
```

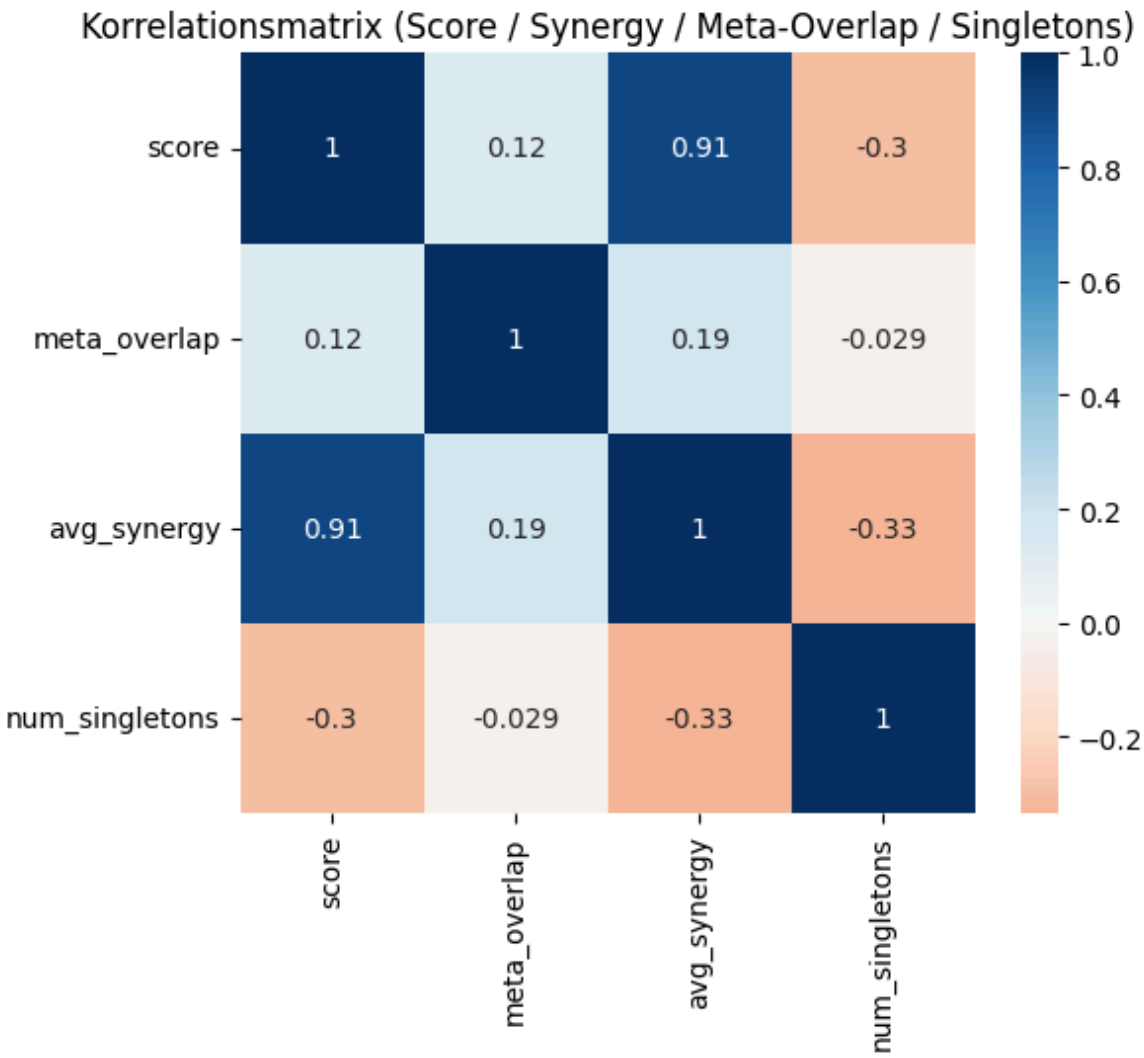
In [ ]:
```
plt.figure(figsize=(8,3))
df_analysis["meta_overlap"].hist(bins=30, edgecolor="k")
plt.title("Histogramm: meta_overlap (Alle Leader kumuliert)")
```

```
plt.xlabel("meta_overlap")
plt.ylabel("Häufigkeit")
plt.show()
```



In [ ]:
```
corr_cols = ["score","meta_overlap","avg_synergy","num_singletons"]
corr_cols = [c for c in corr_cols if c in df_analysis.columns]  # Nur existieren
corr_matrix = df_analysis[corr_cols].corr()
print("\nKorrelationsmatrix:")
print(corr_matrix)

plt.figure(figsize=(6,5))
sns.heatmap(corr_matrix, annot=True, cmap="RdBu", center=0)
plt.title("Korrelationsmatrix (Score / Synergy / Meta-Overlap / Singletons)")
plt.show()

# calculate correlation between score and avg_synergy for each leader
for leader in leaders_evaluated:
    df_leader = df_analysis[df_analysis["leader"] == leader]
    corr = df_leader["score"].corr(df_leader["avg_synergy"])
    print(f"Korrelation (Score vs. avg_synergy) für Leader '{leader}': {corr:.3f

# calculate correlation between score and meta_overlap for each leader
for leader in leaders_evaluated:
    df_leader = df_analysis[df_analysis["leader"] == leader]
    corr = df_leader["score"].corr(df_leader["meta_overlap"])
    print(f"Korrelation (Score vs. meta_overlap) für Leader '{leader}': {corr:.3

# calculate correlation between score and num_singletons for each leader
for leader in leaders_evaluated:
    df_leader = df_analysis[df_analysis["leader"] == leader]
    corr = df_leader["score"].corr(df_leader["num_singletons"])
    print(f"Korrelation (Score vs. num_singletons) für Leader '{leader}': {corr:
```

```
Korrelationsmatrix:
                  score  meta_overlap  avg_synergy  num_singletons
score          1.000000      0.119072     0.905983       -0.299682
meta_overlap   0.119072      1.000000     0.190070       -0.028505
avg_synergy    0.905983      0.190070     1.000000       -0.334926
num_singletons -0.299682     -0.028505    -0.334926        1.000000
```



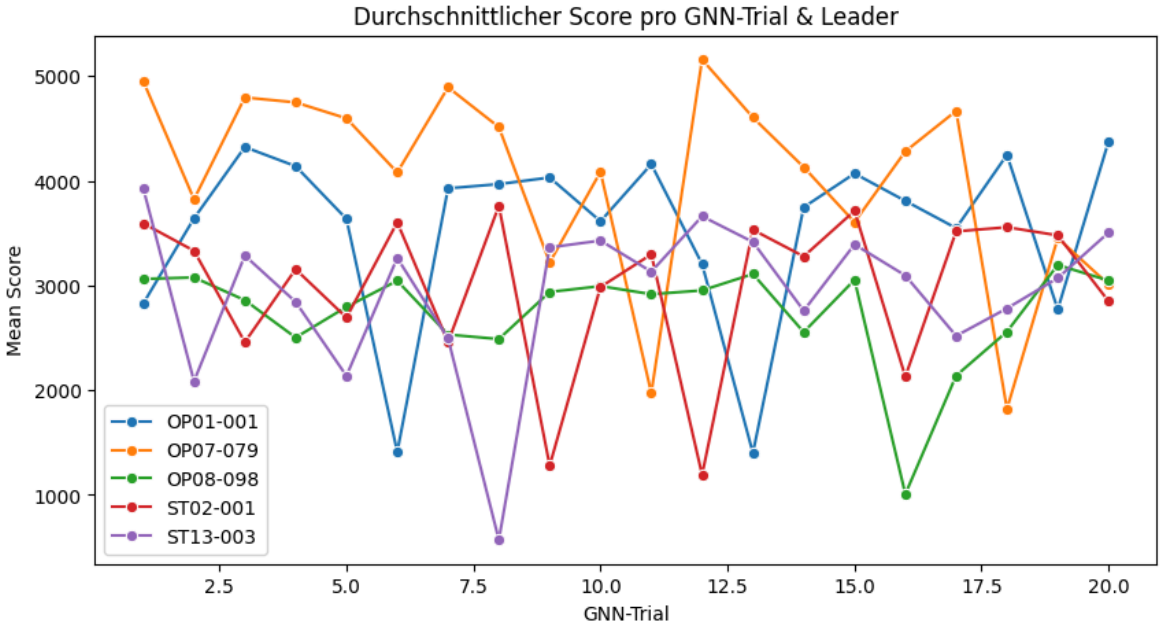

```
Korrelation (Score vs. avg_synergy) für Leader 'OP01-001': 0.991
Korrelation (Score vs. avg_synergy) für Leader 'ST02-001': 0.994
Korrelation (Score vs. avg_synergy) für Leader 'ST13-003': 0.989
Korrelation (Score vs. avg_synergy) für Leader 'OP07-079': 0.920
Korrelation (Score vs. avg_synergy) für Leader 'OP08-098': 0.998
Korrelation (Score vs. meta_overlap) für Leader 'OP01-001': 0.444
Korrelation (Score vs. meta_overlap) für Leader 'ST02-001': 0.390
Korrelation (Score vs. meta_overlap) für Leader 'ST13-003': 0.495
Korrelation (Score vs. meta_overlap) für Leader 'OP07-079': 0.410
Korrelation (Score vs. meta_overlap) für Leader 'OP08-098': -0.199
Korrelation (Score vs. num_singletons) für Leader 'OP01-001': -0.388
Korrelation (Score vs. num_singletons) für Leader 'ST02-001': -0.522
Korrelation (Score vs. num_singletons) für Leader 'ST13-003': -0.151
Korrelation (Score vs. num_singletons) für Leader 'OP07-079': -0.421
Korrelation (Score vs. num_singletons) für Leader 'OP08-098': -0.256
```

In [ ]:

```python
grouped_trial = df_analysis.groupby(["leader","gnn_trial"]).agg({
    "score":["mean","std","min","max"],
    "avg_synergy":["mean","std"],
    "meta_overlap":["mean","std"]
}).reset_index()
grouped_trial.columns = [
    "leader","gnn_trial",
    "score_mean","score_std","score_min","score_max",
    "synergy_mean","synergy_std",
    "metaover_mean","metaover_std"
]
print("\nAggregationen auf Leader, gnn_trial-Ebene:")
```

```
print(grouped_trial.head(10))

# Beispiel: Liniendiagramm Score_mean über gnn_trial
plt.figure(figsize=(10,5))
sns.lineplot(data=grouped_trial, x="gnn_trial", y="score_mean", hue="leader", ma
plt.title("Durchschnittlicher Score pro GNN-Trial & Leader")
plt.xlabel("GNN-Trial")
plt.ylabel("Mean Score")
plt.legend()
plt.show()
```

```
Aggregationen auf Leader, gnn_trial-Ebene:
     leader  gnn_trial   score_mean   score_std    score_min    score_max  \
0  OP01-001          1  2827.200840   18.476005  2770.776367  2870.863525
1  OP01-001          2  3641.587732   31.236039  3576.410889  3707.558594
2  OP01-001          3  4322.173488   49.594973  4240.314453  4417.889648
3  OP01-001          4  4139.423146   15.675461  4115.425293  4177.508789
4  OP01-001          5  3635.925144   26.764131  3577.267334  3694.268799
5  OP01-001          6  1410.872969    7.467871  1389.035278  1426.633789
6  OP01-001          7  3928.043354   16.090940  3903.228760  3971.607666
7  OP01-001          8  3968.431752   49.619427  3866.911865  4073.589844
8  OP01-001          9  4031.301249  194.390656  3703.313965  4635.237305
9  OP01-001         10  3613.168075   21.720693  3566.940186  3661.458252

   synergy_mean  synergy_std  metaover_mean  metaover_std
0      2.051742     0.006401          1.024      0.973249
1      2.837817     0.012070          4.032      0.993440
2      3.320491     0.019230          4.784      0.892485
3      3.105585     0.015952          3.504      0.622522
4      2.852581     0.011073          6.544      0.728138
5      0.914784     0.000073          0.964      0.911057
6      2.918307     0.014209          3.556      0.785706
7      2.981331     0.022396          4.032      1.017407
8      2.995182     0.148637          4.100      1.098557
9      2.681732     0.011330          3.868      0.924117
```



In [ ]:
```
def count_cards(deck_series):
    c_all = Counter()
    for deck_dict in deck_series.dropna():
        if isinstance(deck_dict, dict):
            for cid, cnt in deck_dict.items():
```

```
                c_all[cid] += cnt
    return c_all

print("\n=== Häufigste Karten pro Leader (über alle Trials und Decks) ===")
for ld in leaders_evaluated:
    df_ld = df_analysis[df_analysis["leader"]==ld]
    ccount = count_cards(df_ld["deck"])
    if len(ccount)==0:
        print(f" -> Leader {ld}: Keine Deck-Daten?")
        continue

    top10 = ccount.most_common(10)
    print(f"\nLeader {ld}: Top 10 Karten [CardID -> Anzahl Kopien]")
    for cardid, amount in top10:
        print(f"  {cardid}: {amount}")
```

=== Häufigste Karten pro Leader (über alle Trials und Decks) ===

Leader OP01-001: Top 10 Karten [CardID -> Anzahl Kopien]
  OP01-030: 12275
  OP01-016: 11918
  OP03-008: 11819
  OP02-018: 11678
  P-014: 10810
  OP03-003: 10656
  OP03-013: 10618
  OP05-004: 10556
  OP05-017: 10535
  OP05-018: 10513

Leader ST02-001: Top 10 Karten [CardID -> Anzahl Kopien]
  OP01-044: 12295
  OP01-049: 12286
  OP01-050: 12256
  OP01-051: 12145
  ST02-005: 11377
  ST02-017: 11342
  OP02-035: 10556
  OP02-036: 10303
  OP02-030: 9003
  OP03-029: 8938

Leader ST13-003: Top 10 Karten [CardID -> Anzahl Kopien]
  OP03-108: 13316
  OP04-104: 13262
  OP05-101: 13226
  ST07-007: 13212
  OP05-105: 13136
  OP03-116: 13079
  OP06-086: 12514
  ST13-010: 12469
  ST13-007: 12431
  OP06-104: 12427

Leader OP07-079: Top 10 Karten [CardID -> Anzahl Kopien]
  OP06-086: 13103
  OP05-091: 13081
  OP03-089: 12955
  OP03-086: 12933
  OP03-090: 12877
  OP02-113: 12793
  OP02-099: 12034
  OP03-094: 11997
  OP04-081: 8623
  OP05-093: 8512

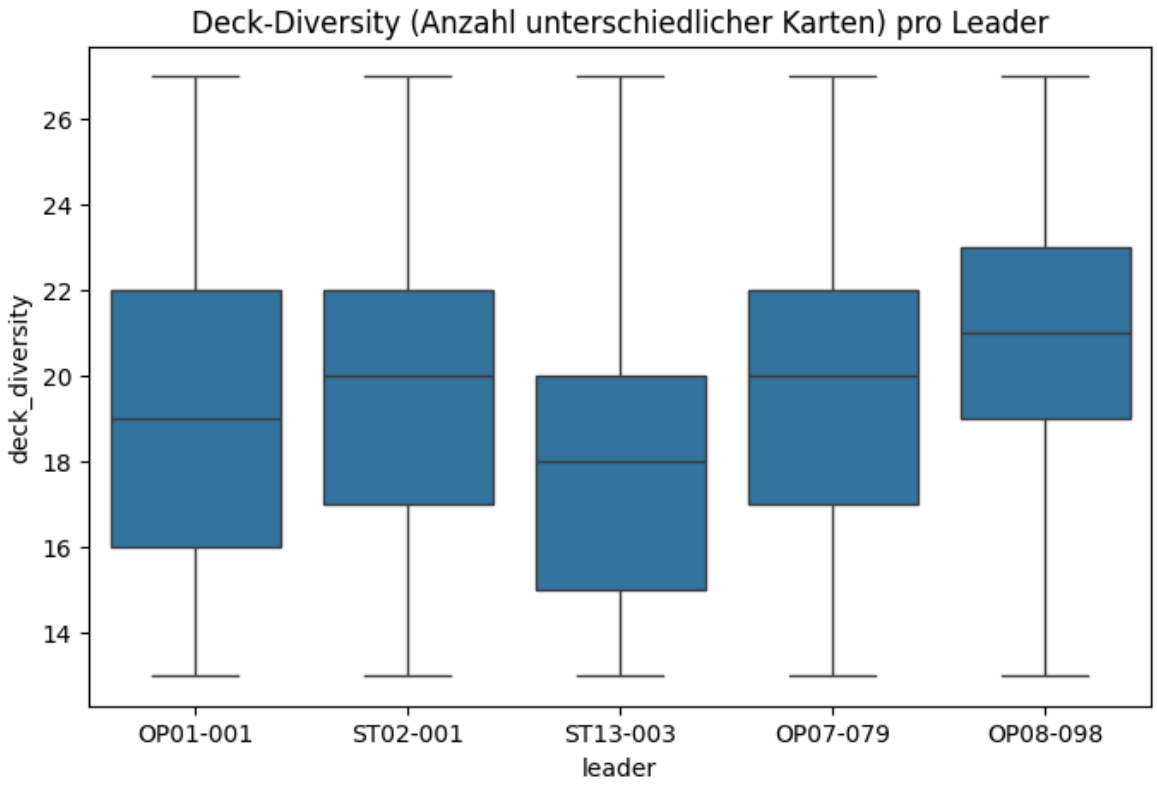
Leader OP08-098: Top 10 Karten [CardID -> Anzahl Kopien]
  OP03-112: 11920
  OP03-113: 11897
  ST07-007: 11863
  OP03-110: 11812
  OP03-108: 11767
  OP04-104: 11663
  OP03-121: 11634
  ST07-010: 5924

```
OP03-115: 5609
OP03-102: 5403
```

In [ ]:

```python
def deck_size_and_diversity(row):
    d = row["deck"]
    if not isinstance(d, dict):
        return pd.Series([np.nan, np.nan])
    total_copies = sum(d.values())
    diff_cards = len(d.keys())
    return pd.Series([total_copies, diff_cards])

df_analysis[["deck_size","deck_diversity"]] = df_analysis.apply(deck_size_and_di

print("\nEinige Zeilen mit deck_size, deck_diversity:")
print(df_analysis[["leader","gnn_trial","deck_trial","deck_size","deck_diversity

# Boxplot deck_diversity pro Leader
plt.figure(figsize=(8,5))
sns.boxplot(data=df_analysis, x="leader", y="deck_diversity")
plt.title("Deck-Diversity (Anzahl unterschiedlicher Karten) pro Leader")
plt.show()
```

```
Einige Zeilen mit deck_size, deck_diversity:
     leader  gnn_trial  deck_trial  deck_size  deck_diversity
0  OP01-001          1           1         50              25
1  OP01-001          1           2         50              24
2  OP01-001          1           3         50              24
3  OP01-001          1           4         50              27
4  OP01-001          1           5         50              24
5  OP01-001          1           6         50              22
6  OP01-001          1           7         50              23
7  OP01-001          1           8         50              24
8  OP01-001          1           9         50              25
9  OP01-001          1          10         50              24
```



In [ ]:

```python
def best_deck_per_leader(df):
    idx = df.groupby("leader")["score"].transform(max) == df["score"]
    return df[idx]


df_best_decks = best_deck_per_leader(df_analysis)

print("\n=== Bestes Deck pro Leader ===")
# the deck is a dict containing the card_id as key and the amount of copies as v
for idx, row in df_best_decks.iterrows():
    leader = row["leader"]
    gnn_trial = row["gnn_trial"]
    deck_trial = row["deck_trial"]
    deck = row["deck"]
    score = row["score"]
    print(f"Leader '{leader}' (GNN-Trial {gnn_trial}, Deck-Trial {deck_trial}):
    print(deck)
    for card_id, count in deck.items():
        print(f"  {count}x {card_id}")
    print()
```

```
=== Bestes Deck pro Leader ===
Leader 'OP01-001' (GNN-Trial 16, Deck-Trial 21): Score 4829.10546875
{'OP01-006': 4, 'OP01-029': 3, 'OP01-022': 3, 'OP01-017': 3, 'OP01-013': 2, 'OP01
-120': 2, 'OP01-025': 4, 'ST01-012': 3, 'ST01-011': 3, 'ST01-015': 3, 'OP02-011':
3, 'OP02-008': 1, 'OP02-015': 3, 'P-013': 3, 'P-019': 1, 'OP03-018': 3, 'OP03-02
0': 3, 'OP04-016': 3}
  4x OP01-006
  3x OP01-029
  3x OP01-022
  3x OP01-017
  2x OP01-013
  2x OP01-120
  4x OP01-025
  3x ST01-012
  3x ST01-011
  3x ST01-015
  3x OP02-011
  1x OP02-008
  3x OP02-015
  3x P-013
  1x P-019
  3x OP03-018
  3x OP03-020
  3x OP04-016

Leader 'ST02-001' (GNN-Trial 8, Deck-Trial 36): Score 3817.15380859375
{'OP01-037': 2, 'OP01-050': 2, 'OP01-044': 2, 'OP01-040': 2, 'OP01-049': 2, 'OP01
-051': 2, 'ST02-005': 3, 'ST02-017': 3, 'ST02-007': 2, 'OP02-037': 2, 'OP02-035':
4, 'OP02-041': 3, 'OP02-036': 2, 'OP02-030': 1, 'OP02-044': 2, 'OP03-030': 2, 'OP
03-027': 1, 'OP03-029': 2, 'OP04-119': 2, 'OP05-033': 1, 'ST12-003': 3, 'OP06-03
1': 2, 'OP06-041': 2, 'EB01-013': 1}
  2x OP01-037
  2x OP01-050
  2x OP01-044
  2x OP01-040
  2x OP01-049
  2x OP01-051
  3x ST02-005
  3x ST02-017
  2x ST02-007
  2x OP02-037
  4x OP02-035
  3x OP02-041
  2x OP02-036
  1x OP02-030
  2x OP02-044
  2x OP03-030
  1x OP03-027
  2x OP03-029
  2x OP04-119
  1x OP05-033
  3x ST12-003
  2x OP06-031
  2x OP06-041
  1x EB01-013

Leader 'ST13-003' (GNN-Trial 1, Deck-Trial 232): Score 3994.91064453125
{'OP02-113': 2, 'ST07-007': 2, 'OP03-113': 1, 'OP03-090': 2, 'OP03-100': 2, 'OP03
-108': 2, 'OP03-116': 2, 'ST09-008': 3, 'OP04-103': 1, 'OP04-104': 3, 'OP05-091':
1, 'OP05-101': 2, 'OP05-105': 3, 'OP05-106': 2, 'OP05-111': 1, 'OP06-086': 2, 'OP
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06-102': 2, 'OP06-104': 2, 'OP06-109': 2, 'OP06-110': 2, 'ST13-007': 2, 'ST13-01
0': 1, 'ST13-014': 2, 'OP08-096': 2, 'OP08-113': 2, 'OP08-114': 2}
  2x OP02-113
  2x ST07-007
  1x OP03-113
  2x OP03-090
  2x OP03-100
  2x OP03-108
  2x OP03-116
  3x ST09-008
  1x OP04-103
  3x OP04-104
  1x OP05-091
  2x OP05-101
  3x OP05-105
  2x OP05-106
  1x OP05-111
  2x OP06-086
  2x OP06-102
  2x OP06-104
  2x OP06-109
  2x OP06-110
  2x ST13-007
  1x ST13-010
  2x ST13-014
  2x OP08-096
  2x OP08-113
  2x OP08-114

Leader 'OP07-079' (GNN-Trial 12, Deck-Trial 169): Score 5197.02099609375
{'OP02-099': 2, 'OP02-104': 2, 'OP02-113': 3, 'OP03-090': 4, 'OP03-089': 4, 'OP03
-086': 3, 'OP03-094': 3, 'ST08-007': 3, 'OP04-084': 3, 'OP05-091': 3, 'OP05-093':
1, 'OP06-086': 3, 'OP06-098': 3, 'EB01-042': 3, 'EB01-043': 2, 'OP08-090': 2, 'OP
08-092': 3, 'OP08-096': 3}
  2x OP02-099
  2x OP02-104
  3x OP02-113
  4x OP03-090
  4x OP03-089
  3x OP03-086
  3x OP03-094
  3x ST08-007
  3x OP04-084
  3x OP05-091
  1x OP05-093
  3x OP06-086
  3x OP06-098
  3x EB01-042
  2x EB01-043
  2x OP08-090
  3x OP08-092
  3x OP08-096

Leader 'OP08-098' (GNN-Trial 19, Deck-Trial 133): Score 3310.7685546875
{'ST07-007': 3, 'ST07-017': 1, 'OP03-113': 2, 'OP03-119': 2, 'OP03-112': 3, 'OP03
-108': 3, 'OP03-110': 3, 'OP03-117': 2, 'OP03-121': 2, 'ST09-008': 1, 'OP04-106':
3, 'OP04-104': 2, 'OP04-108': 2, 'OP04-111': 1, 'OP05-101': 2, 'OP05-112': 2, 'OP
06-104': 2, 'OP07-100': 2, 'OP07-101': 2, 'OP07-111': 2, 'OP07-115': 1, 'ST13-00
6': 1, 'OP08-104': 2, 'OP08-113': 2, 'OP08-114': 2}
  3x ST07-007

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  1x ST07-017
  2x OP03-113
  2x OP03-119
  3x OP03-112
  3x OP03-108
  3x OP03-110
  2x OP03-117
  2x OP03-121
  1x ST09-008
  3x OP04-106
  2x OP04-104
  2x OP04-108
  1x OP04-111
  2x OP05-101
  2x OP05-112
  2x OP06-104
  2x OP07-100
  2x OP07-101
  2x OP07-111
  1x OP07-115
  1x ST13-006
  2x OP08-104
  2x OP08-113
  2x OP08-114
```

```
C:\Users\sandr\AppData\Local\Temp\ipykernel_1336\3948551135.py:6: FutureWarning:
The provided callable <built-in function max> is currently using SeriesGroupBy.ma
x. In a future version of pandas, the provided callable will be used directly. To
keep current behavior pass the string "max" instead.
  idx = df.groupby("leader")["score"].transform(max) == df["score"]
```