(a) Gradient Space (True Labels)
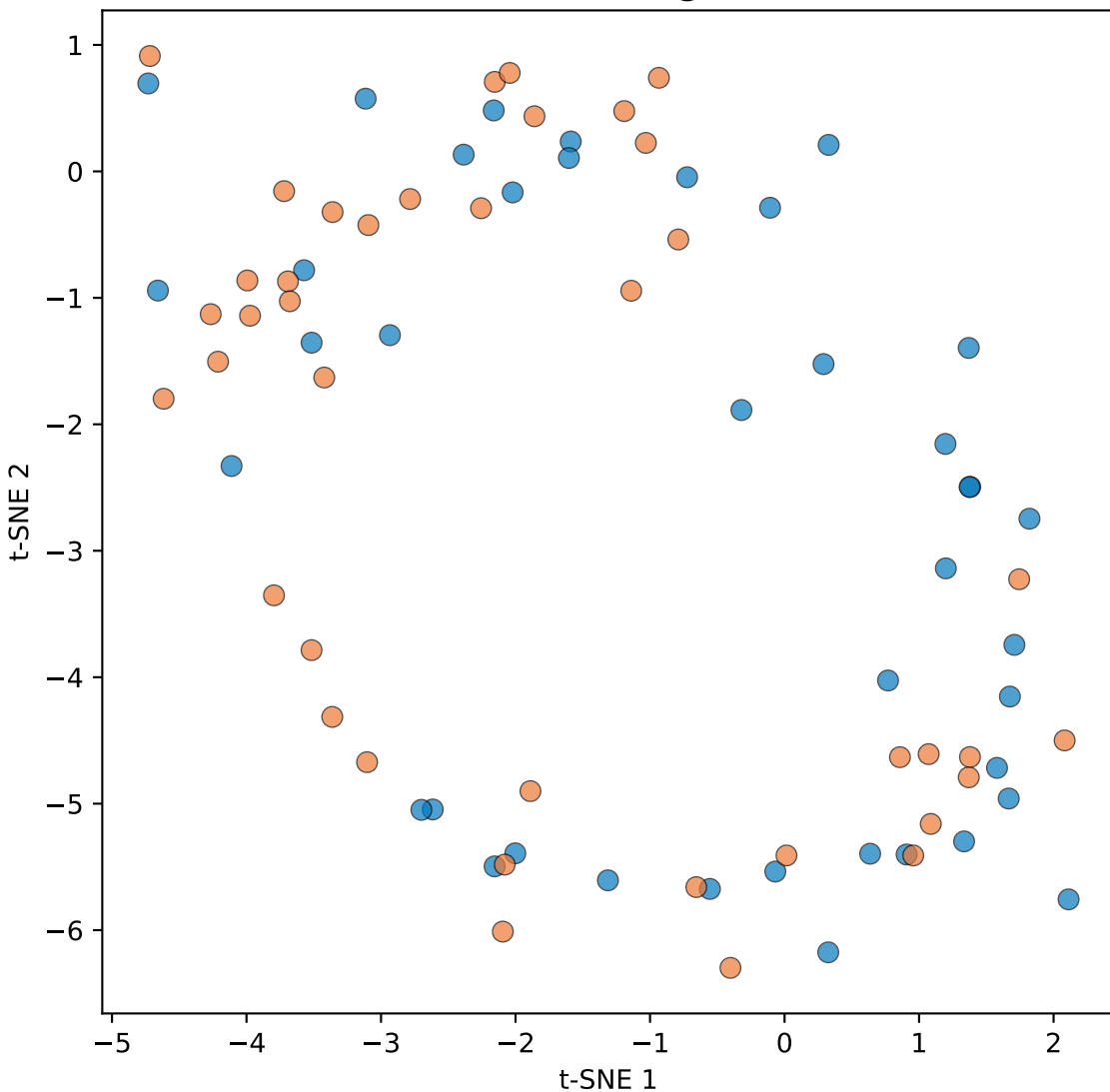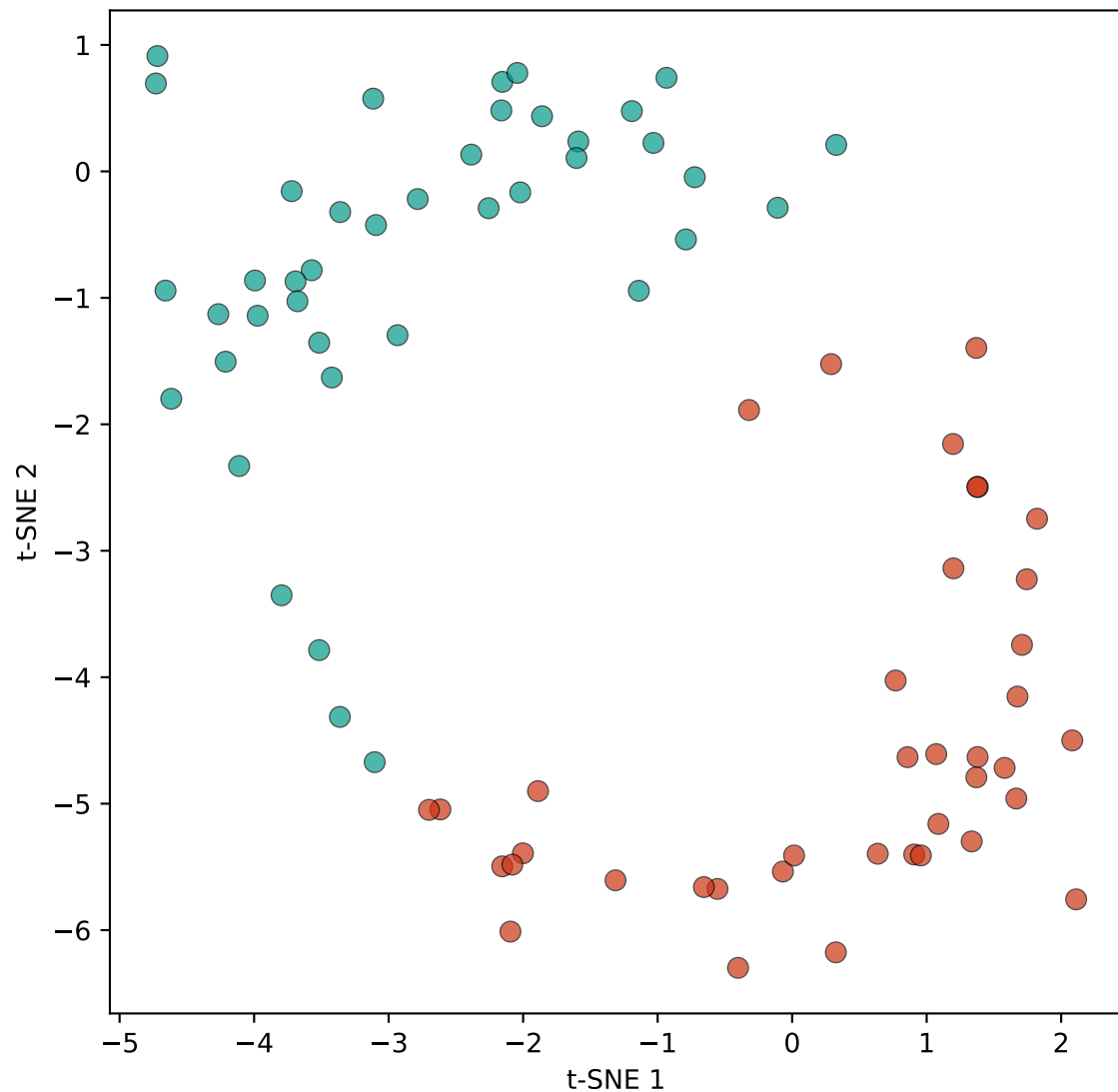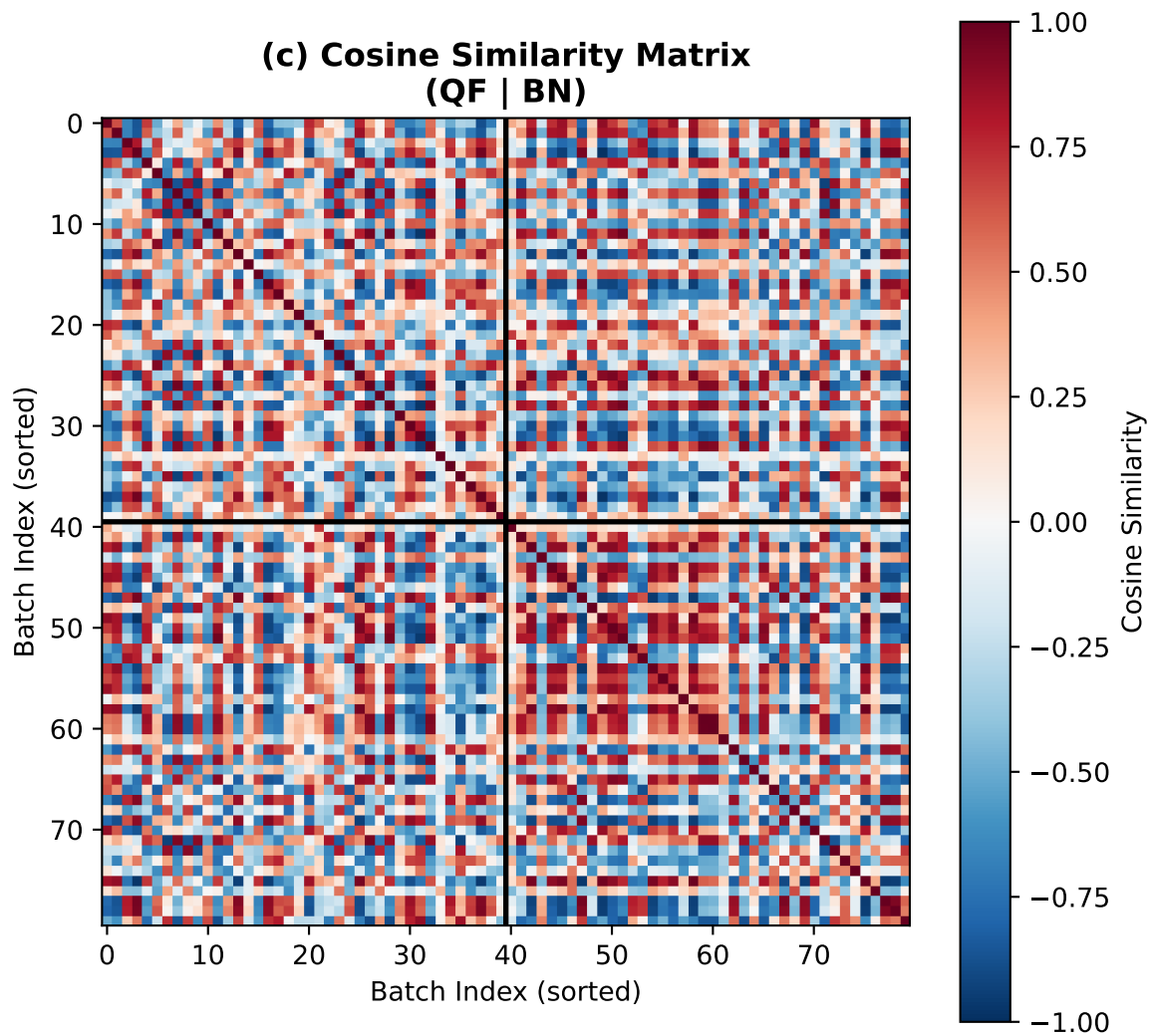Blue=QF, Orange=BN

(b) Discovered Clusters (K-Means)
Cluster 0=QF, Cluster 1=BN

(c) Cosine Similarity Matrix
(QF | BN)

```
GRADIENT CLUSTERING (TRAINED MODEL)
_____

Training:
 • 20,000 steps on mixed QF+BN data
 • PPO with your exact architecture

Gradient Collection:
 • 40 QF batches
 • 40 BN batches
 • 50 steps per batch

Clustering (K-Means):
 • Silhouette: 0.369
 • Adjusted Rand Index: 0.064
 • Average Purity: 63.8%

Confusion Matrix:
                 True QF     True BN
 Cluster 0         25          14
 Cluster 1         15          26

CONCLUSION:
 ○ Partial separation
```