

Scaling

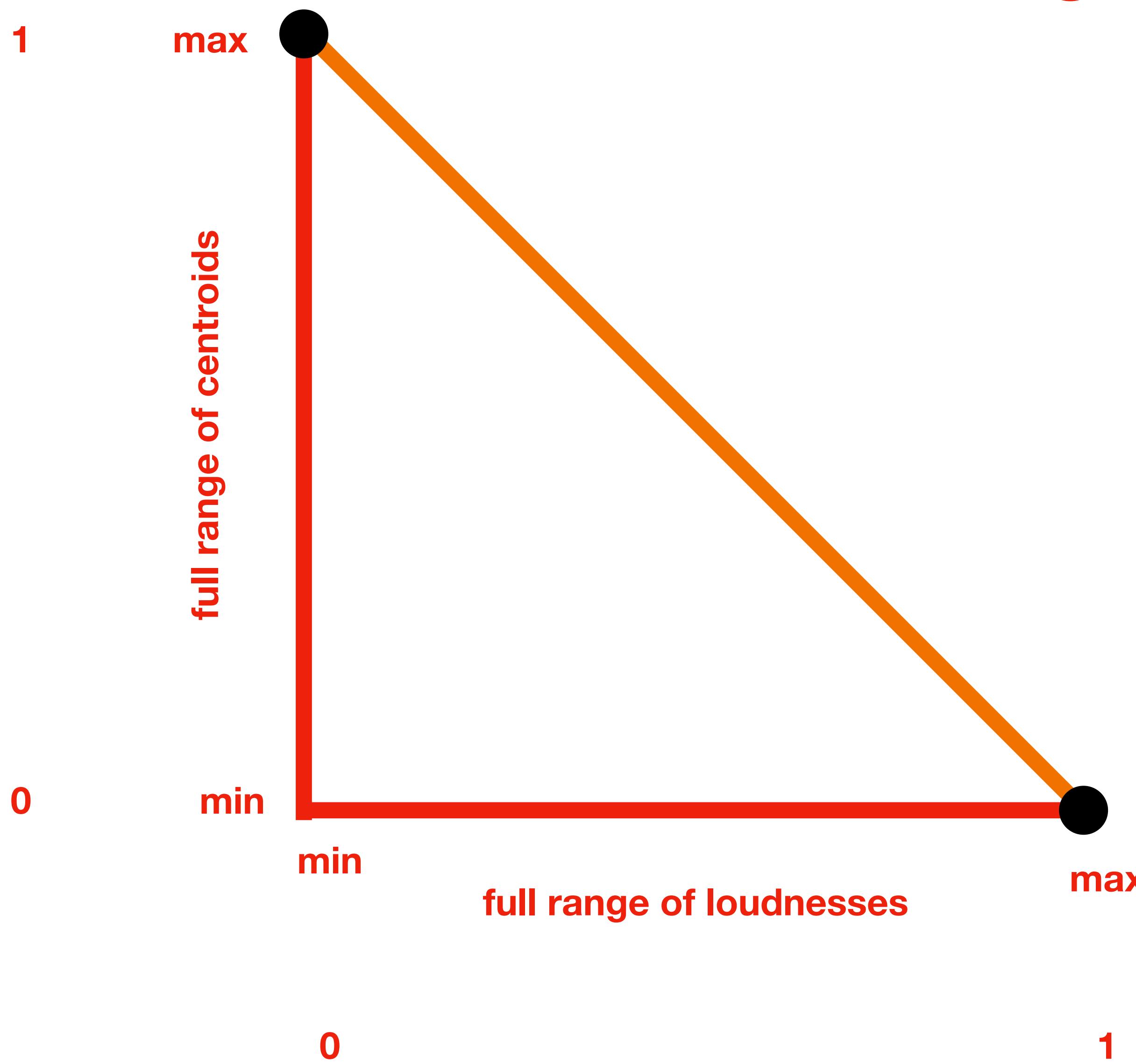
“Proximity” as “Similarity”



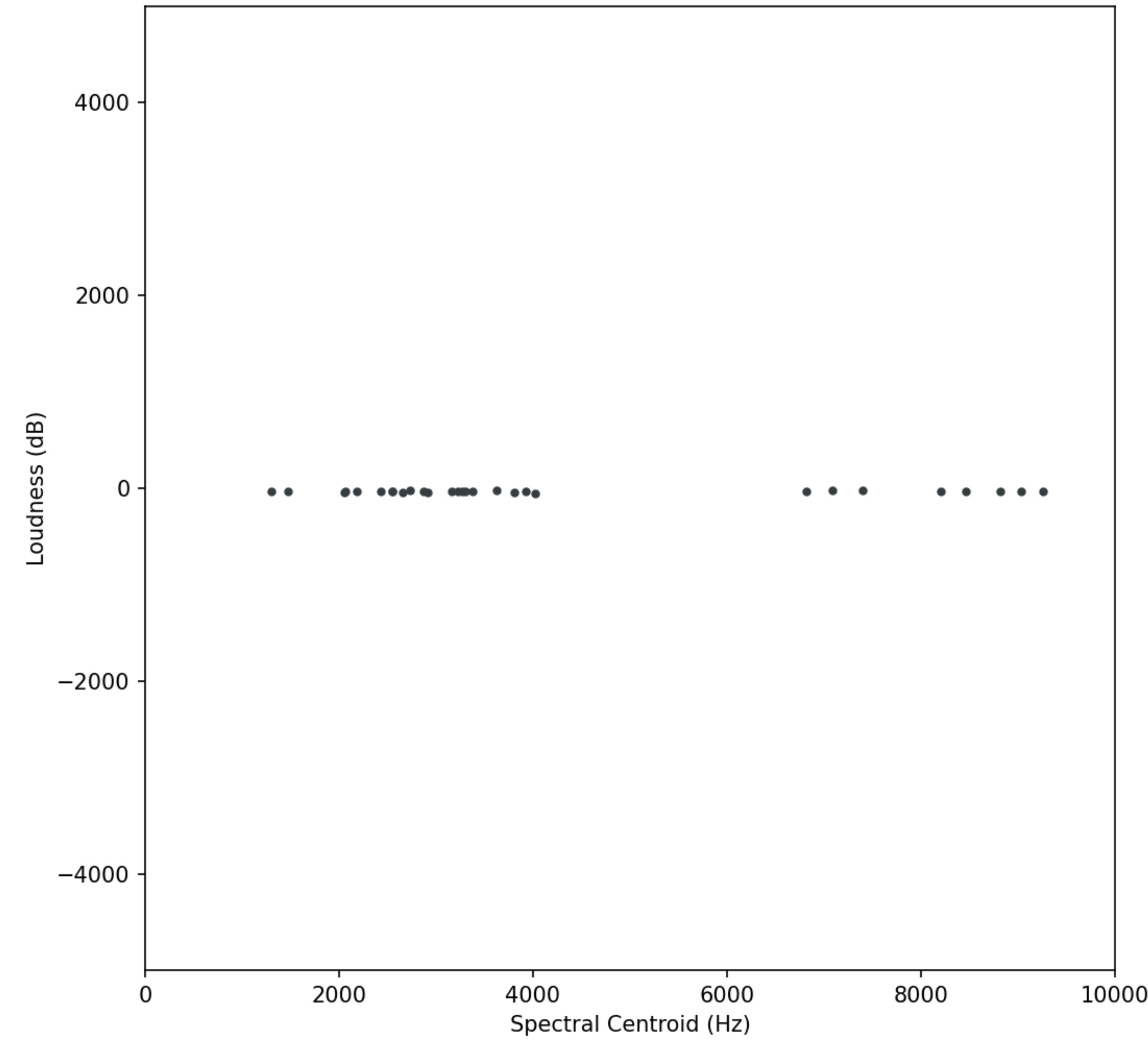
If 1 Hz = 1dB



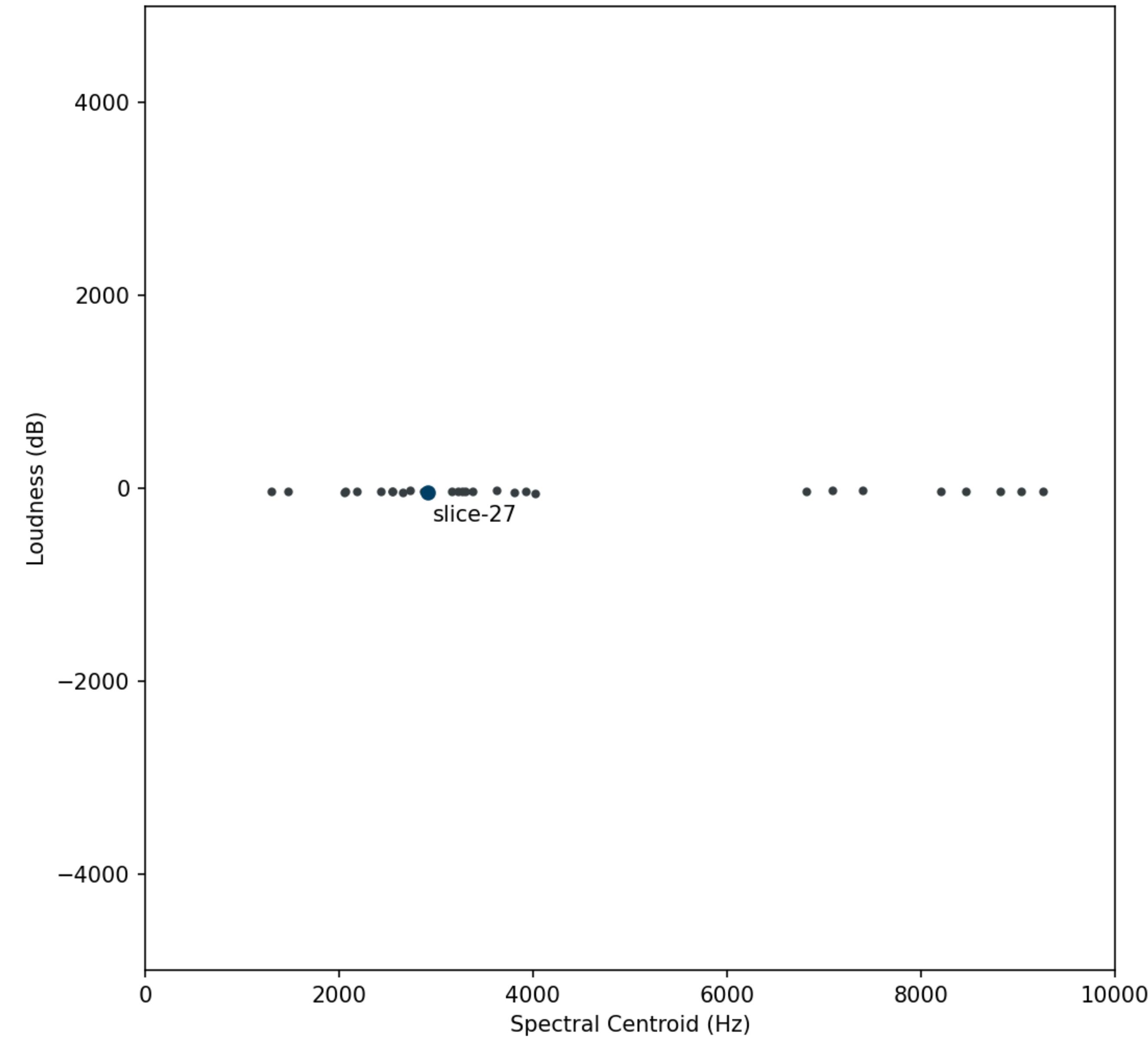
Normalization



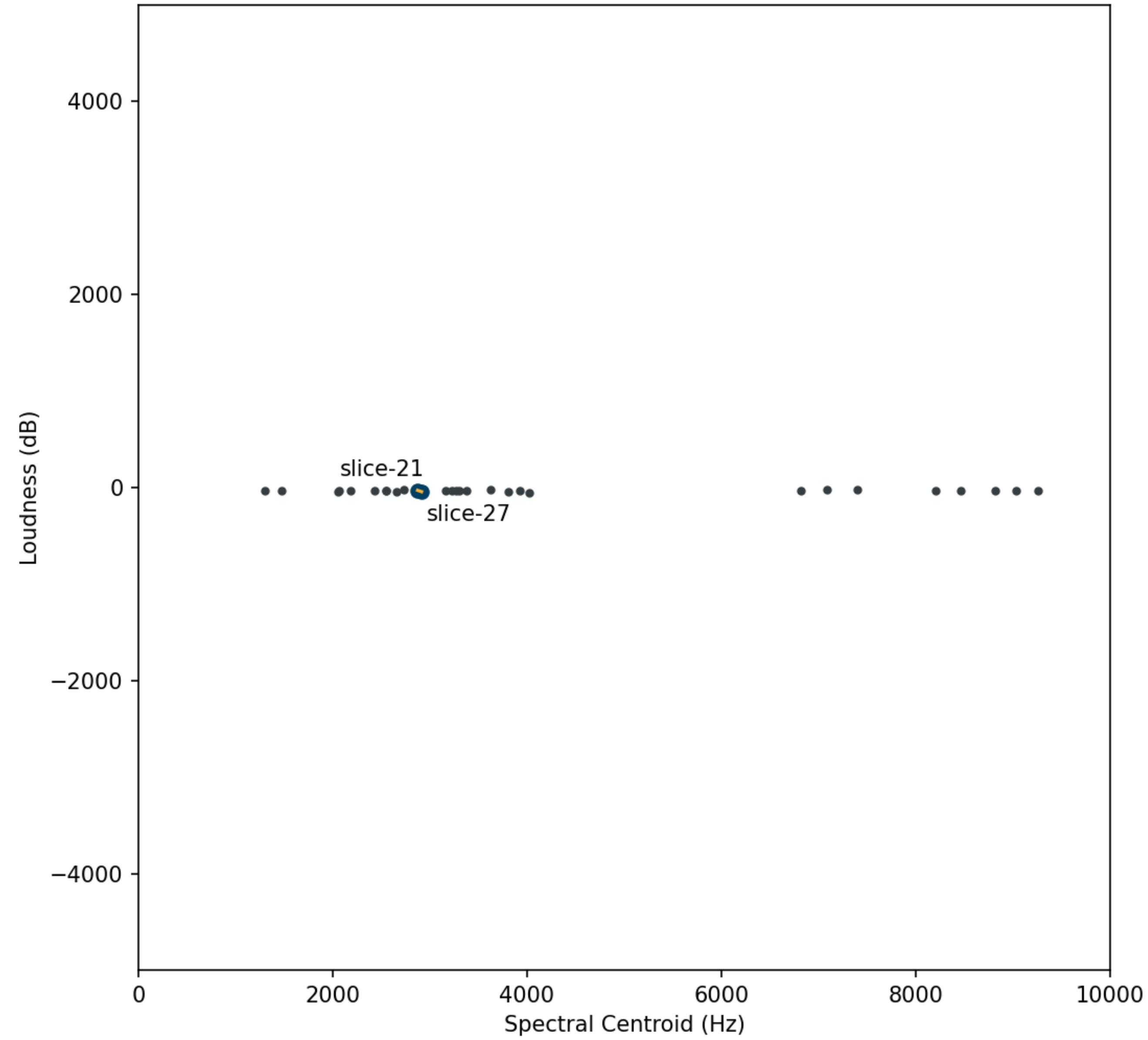
Raw scaling: 1 Hz = 1 dB



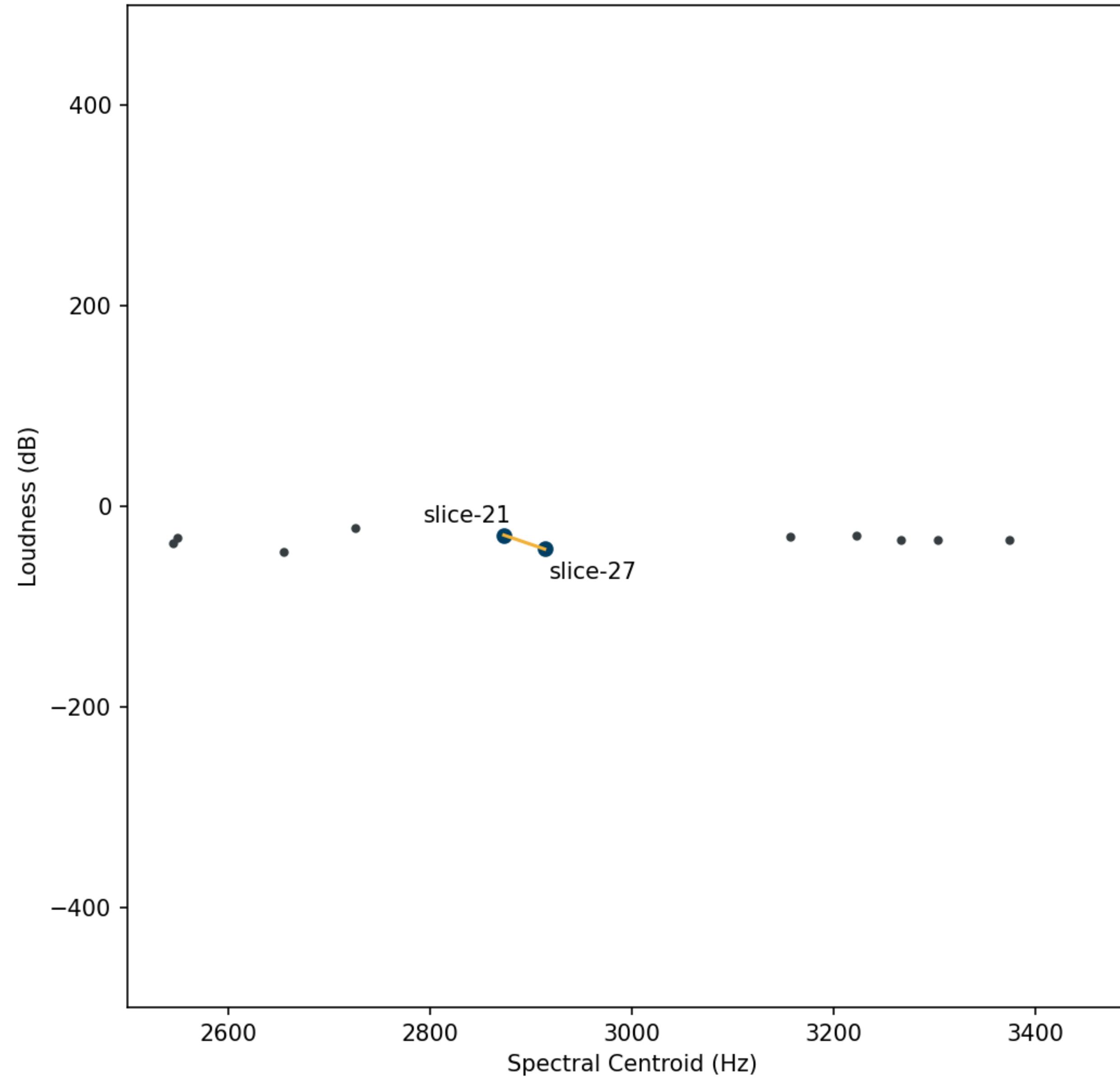
Raw scaling: 1 Hz = 1 dB



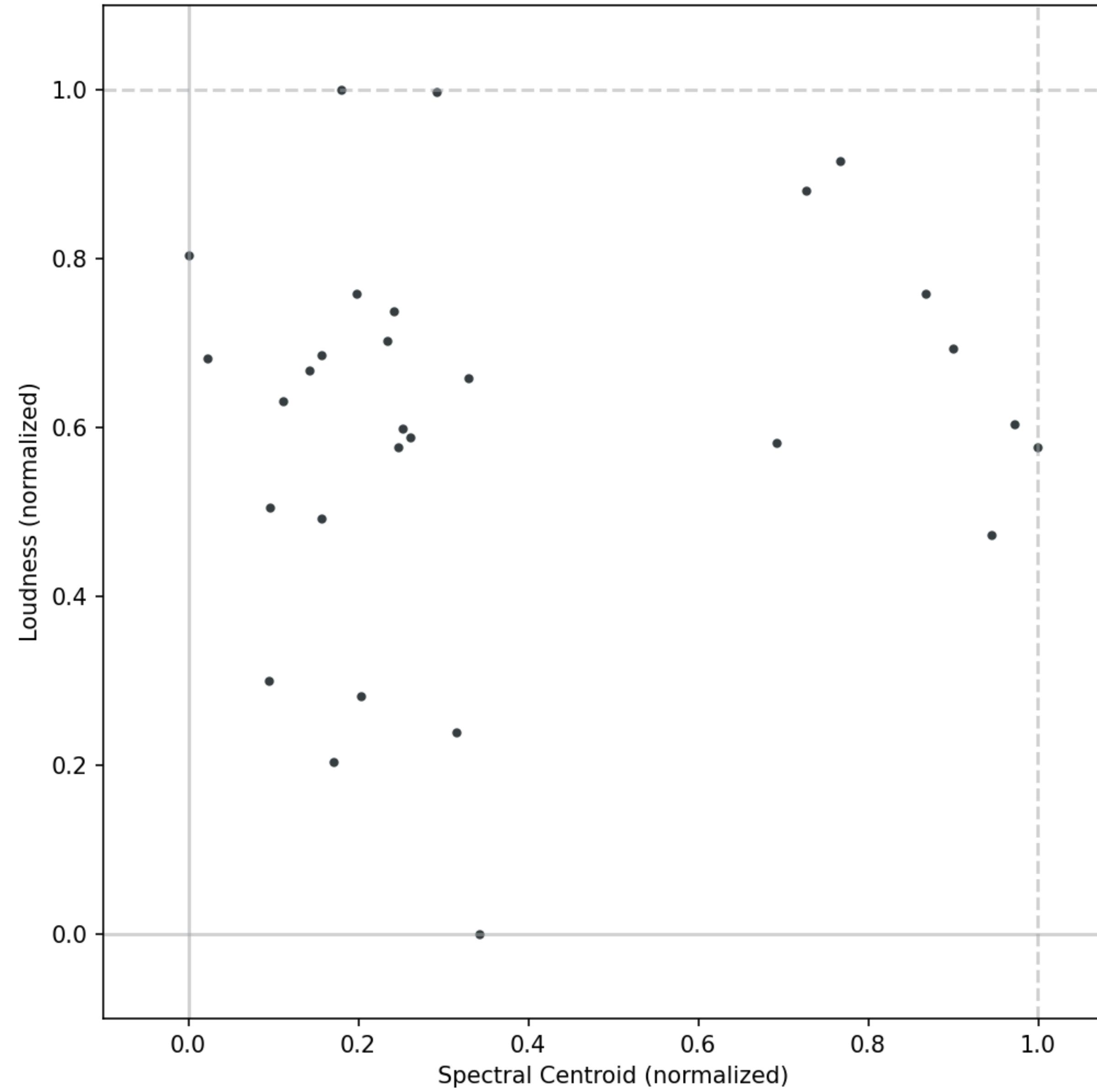
Raw scaling: 1 Hz = 1 dB



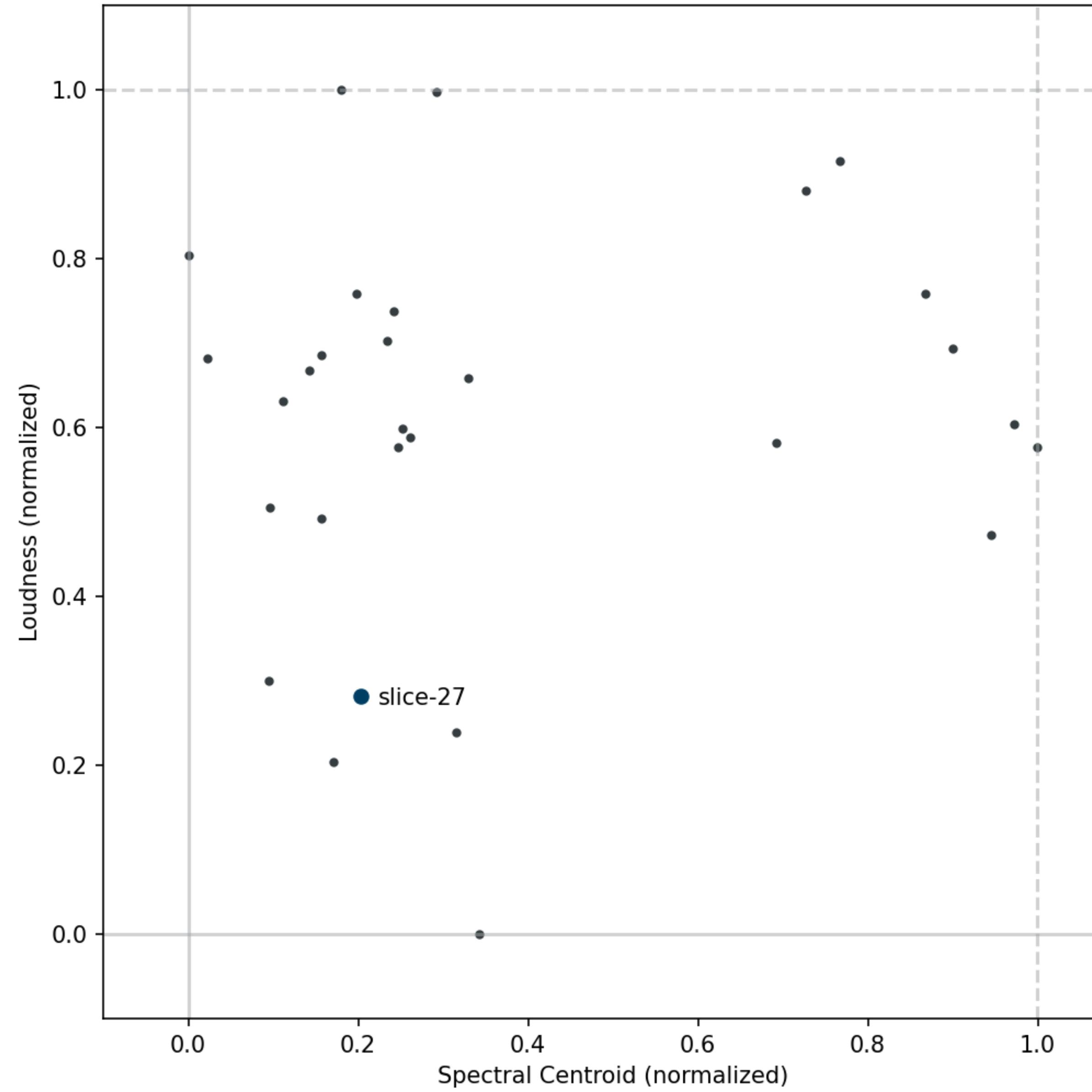
Raw scaling: 1 Hz = 1 dB



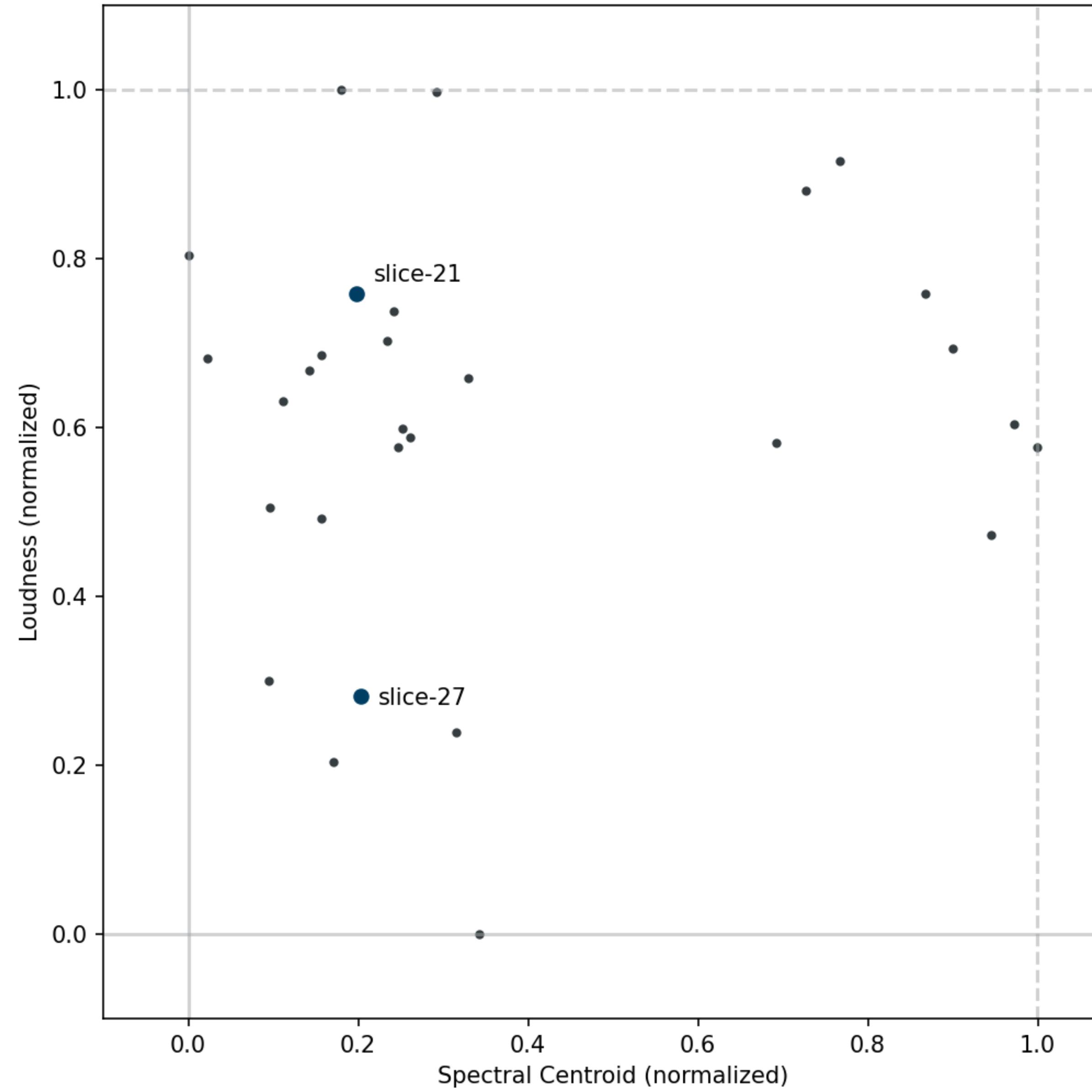
Normalized (min = 0, max = 1)



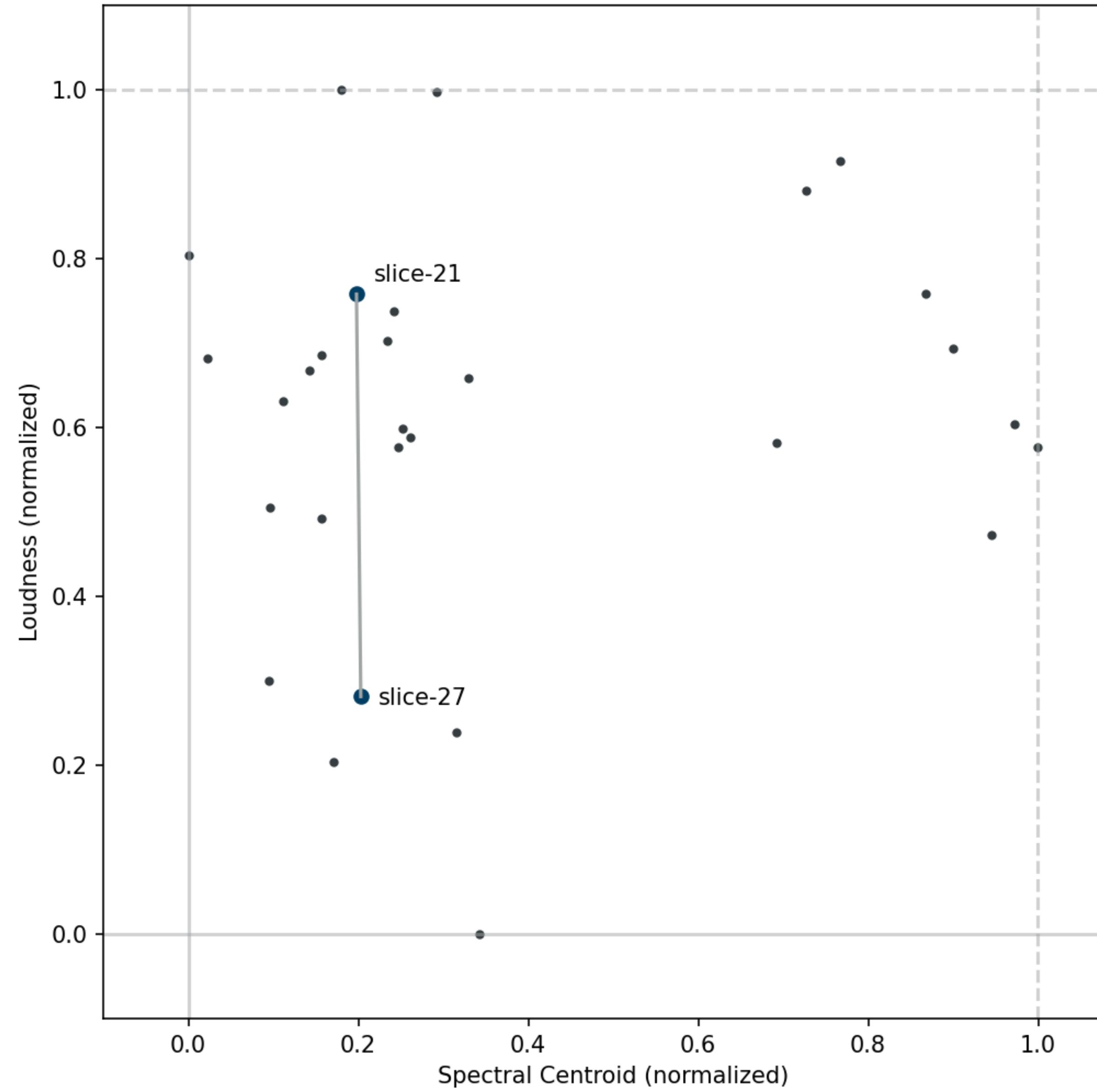
Normalized (min = 0, max = 1)



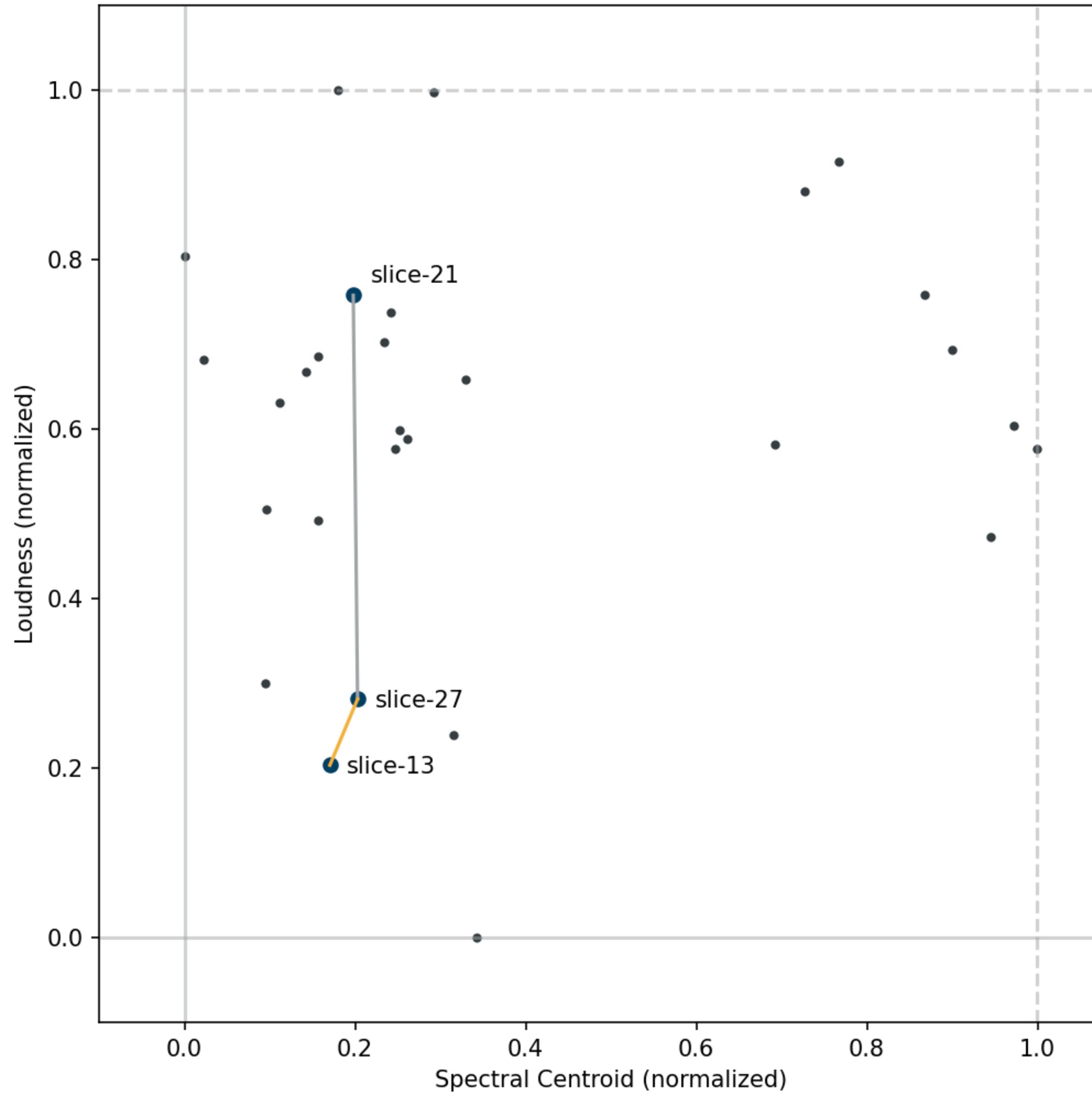
Normalized (min = 0, max = 1)



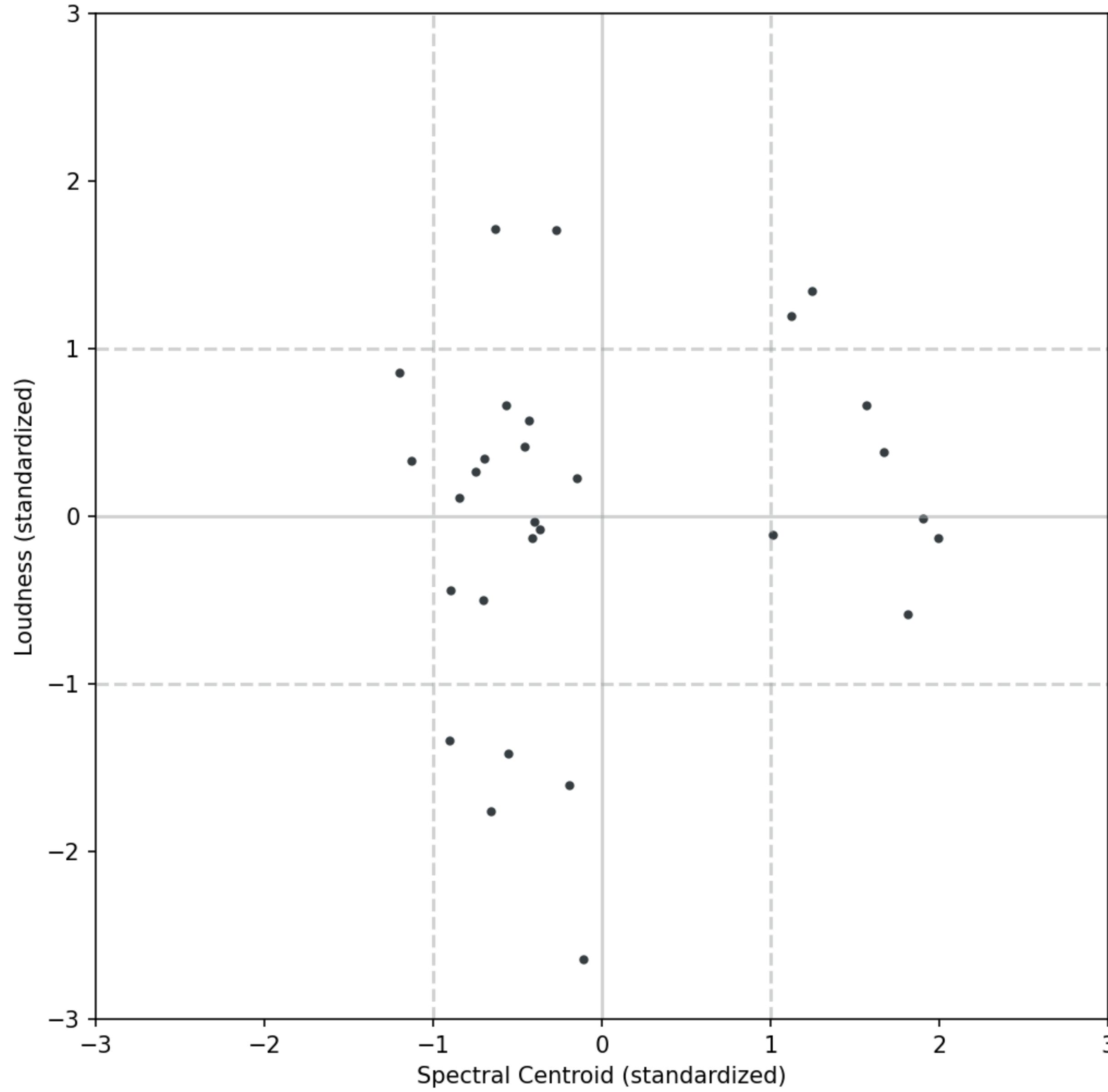
Normalized (min = 0, max = 1)



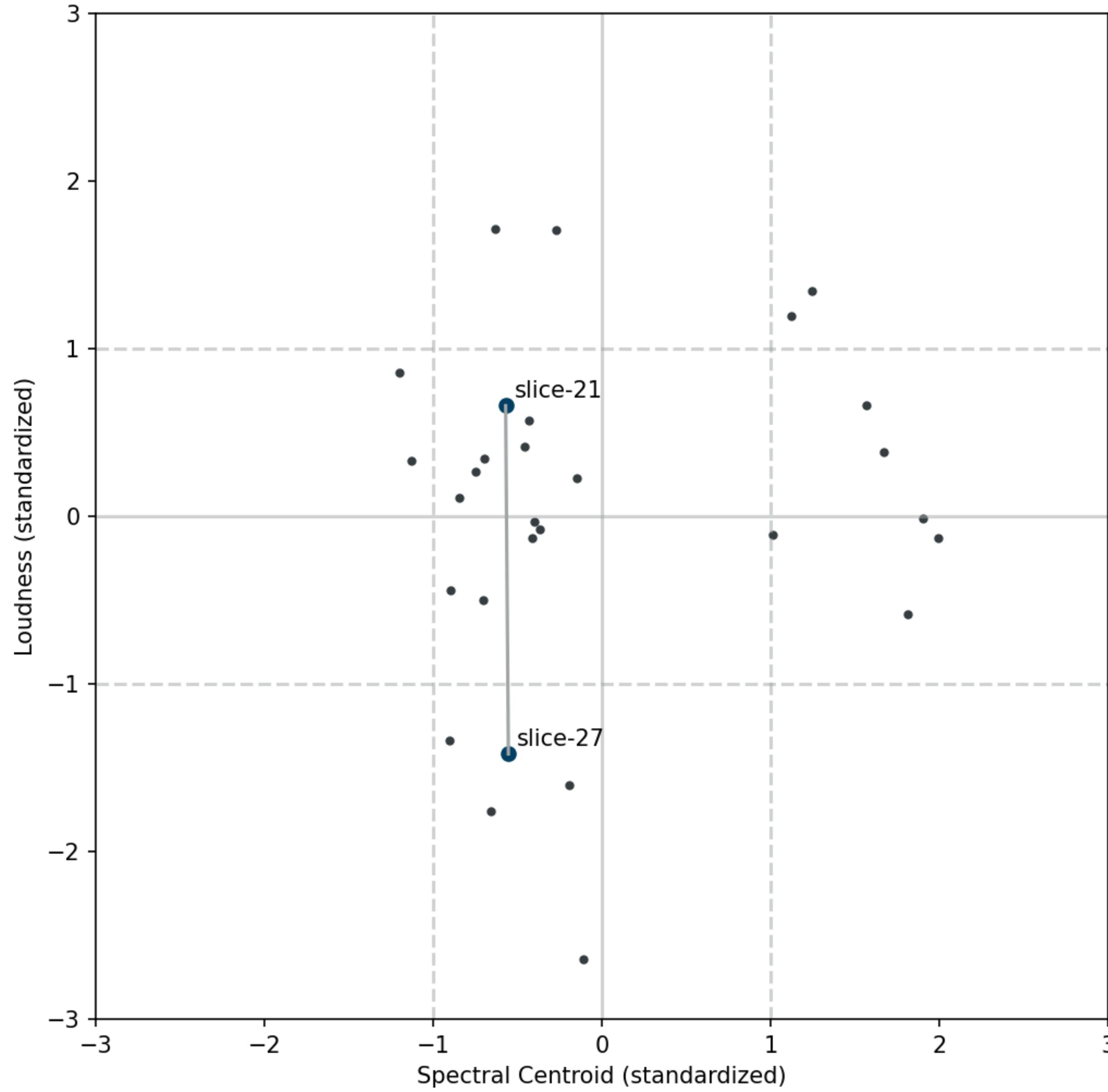
Normalized (min = 0, max = 1)



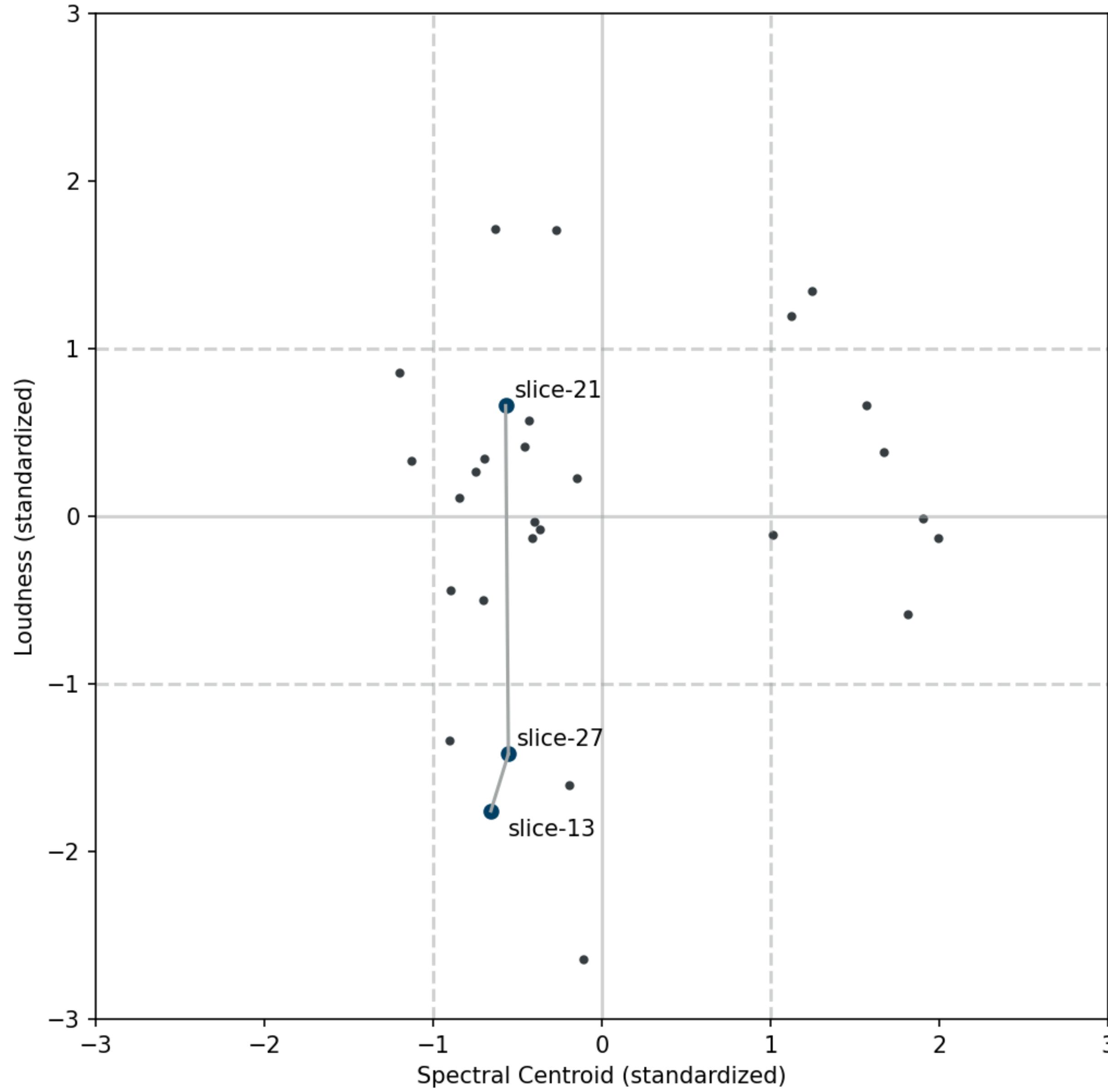
Standardized (mean = 0, standard deviation = 1)



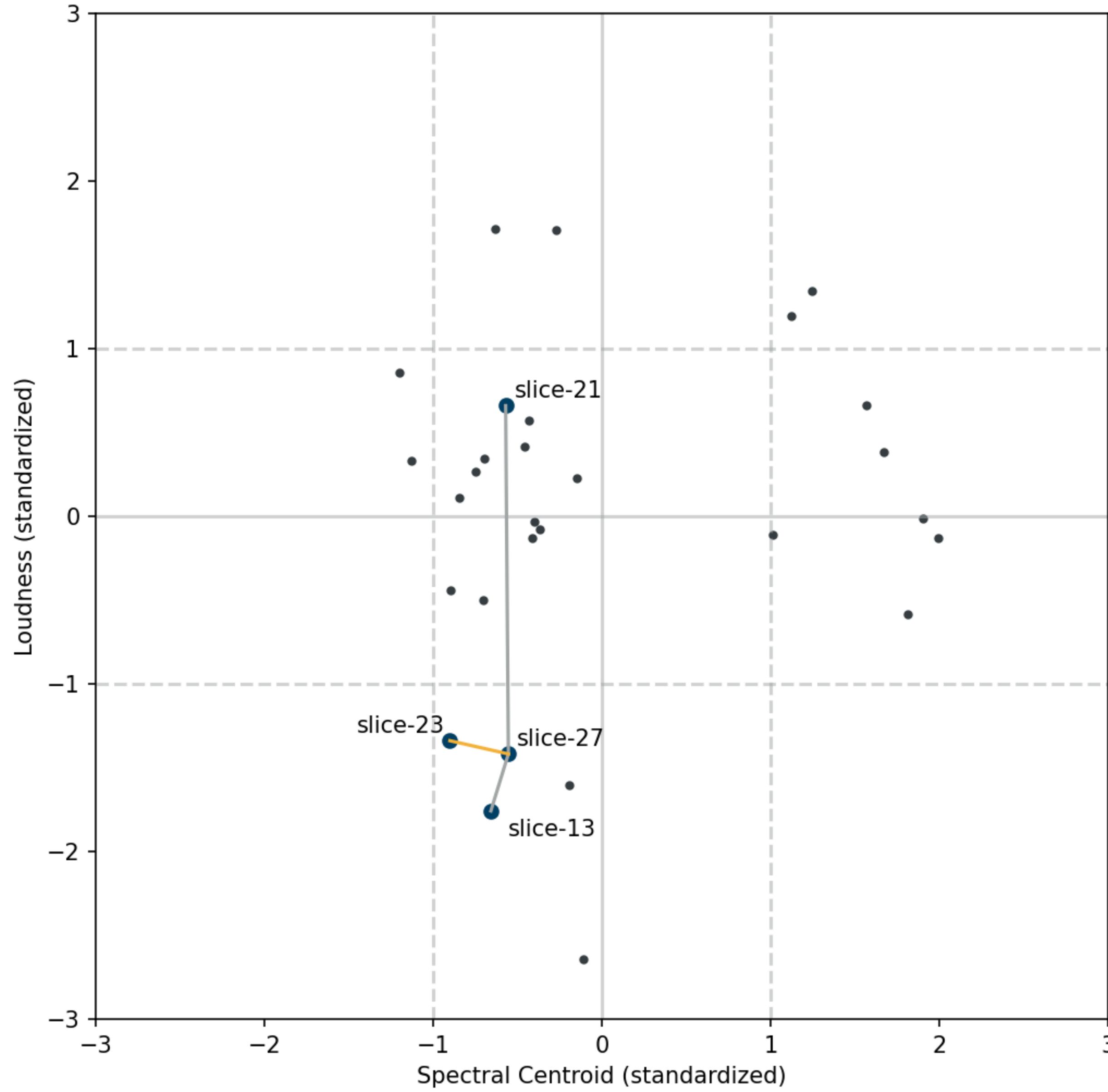
Standardized (mean = 0, standard deviation = 1)



Standardized (mean = 0, standard deviation = 1)



Standardized (mean = 0, standard deviation = 1)



quartet



Using FluCoMa

a workflow

Artistic Hypothesis:
reorganize a corpus of sounds
according to their similarity

Using FluCoMa a workflow

1. corpus curation

2. decomposition

3. analysis

4. pattern finding

5. creating

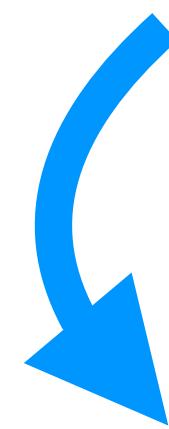
The image shows a musical score with three staves:

- Perc.** (Percussion): This staff contains rhythmic patterns for shell chimes, maraca swirl, free rebound, and floor tom. It includes dynamic markings like *f*, *mp*, *ff*, *fp*, *s*, and *mf*.
- Pno.** (Piano): This staff features melodic lines with various dynamics such as *mf*, *ff*, *fff*, and *f*. It also includes performance instructions like *aggressive*, *8va*, and *pedal on bass notes*.
- Vc.** (Cello/Bass): This staff shows rhythmic patterns with dynamics like *ff*, *mf*, *f*, *sffz*, *mf*, *m.s.p.*, *sfz*, *mp*, *f*, and *sfp*.

The score uses standard musical notation with stems, beams, and rests, along with specific performance instructions and dynamics.

Using FluCoMa *a workflow*

1. corpus curation



2. decomposition

3. analysis

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Using FluCoMa a workflow

1. corpus curation



2. decomposition

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Using FluCoMa a workflow

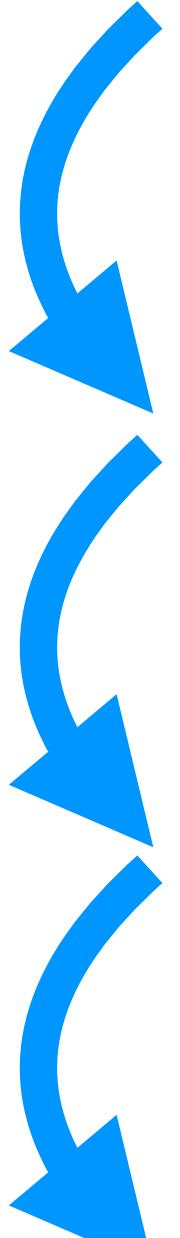
1. corpus curation

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	spec cent	spec spread	spec skewness	spec kurtosis	spec rolloff	spec flatness	spec crest	loudness	true peak	pitch	pitch conf	mfcc 0	mfcc 1	mfcc 2	mfcc 3	mfcc 4	mfcc 5	mfcc 6
	0.276	0.362	0.891	0.135	0.772	0.843	0.869	0.372	0.523	0.041	0.053	0.270	0.103	0.759	0.370	0.901	0.689	0.698
	0.854	0.266	0.789	0.708	0.889	0.041	0.445	0.236	0.661	0.819	0.704	0.307	0.753	0.177	0.399	0.295	0.789	0.696
	0.566	0.366	0.772	0.133	0.581	0.904	0.203	0.553	0.838	0.697	0.659	0.981	0.072	0.503	0.588	0.964	0.764	0.982
	0.448	0.466	0.153	0.581	0.679	0.332	0.450	0.579	0.479	0.833	0.781	0.077	0.702	0.376	0.749	0.608	0.863	0.348
	0.854	0.520	0.015	0.768	0.278	0.359	0.350	0.221	0.629	0.387	0.047	0.703	0.631	0.438	0.170	0.019	0.097	0.973
	0.858	0.220	0.727	0.604	0.854	0.978	0.976	0.252	0.394	0.858	0.223	0.148	0.729	0.308	0.341	0.265	0.026	0.737
	0.661	0.076	0.065	0.848	0.990	0.976	0.249	0.899	0.557	0.276	0.458	0.186	0.995	0.699	0.421	0.621	0.120	0.635
	0.159	0.331	0.874	0.059	0.834	0.650	0.889	0.635	0.714	0.752	0.182	0.820	0.477	0.559	0.305	0.700	0.744	0.859
	0.057	0.032	0.334	0.208	0.842	0.438	0.010	0.789	0.148	0.471	0.791	0.308	0.381	0.332	0.026	0.379	0.370	0.282
	0.427	0.304	0.637	0.269	0.560	0.810	0.455	0.869	0.828	0.397	0.149	0.055	0.259	0.758	0.203	0.584	0.401	0.770
	0.355	0.180	0.043	0.989	0.167	0.263	0.600	0.114	0.332	0.839	0.121	0.611	0.303	0.180	0.142	0.976	0.117	0.163
	0.400	0.348	0.094	0.837	0.286	0.872	0.850	0.817	0.231	0.567	0.965	0.603	0.669	0.941	0.242	0.859	0.593	0.838
	0.941	0.817	0.018	0.783	0.094	0.661	0.744	0.473	0.449	0.311	0.647	0.861	0.496	0.328	0.340	0.395	0.107	0.439
	0.075	0.817	0.177	0.187	0.096	0.990	0.179	0.605	0.403	0.359	0.828	0.394	0.723	0.456	0.701	0.356	0.496	0.779
	0.669	0.216	0.782	0.567	0.032	0.263	0.951	0.412	0.293	0.415	0.546	0.175	0.094	0.641	0.432	0.166	0.119	0.897

Using FluCoMa *a workflow*

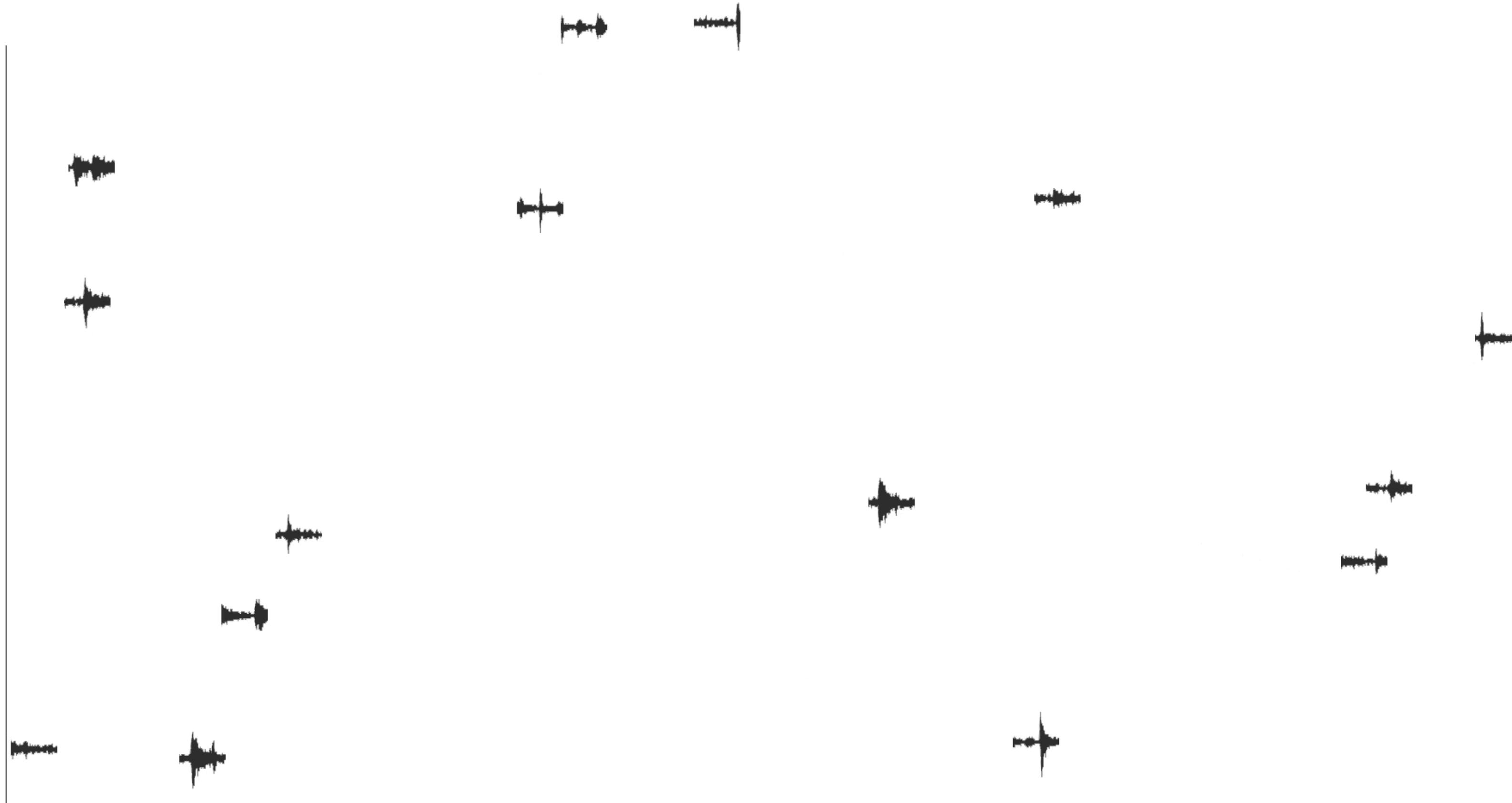
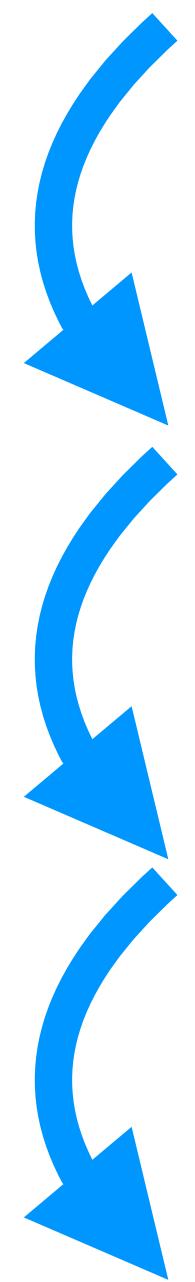
1. corpus curation

2. decomposition

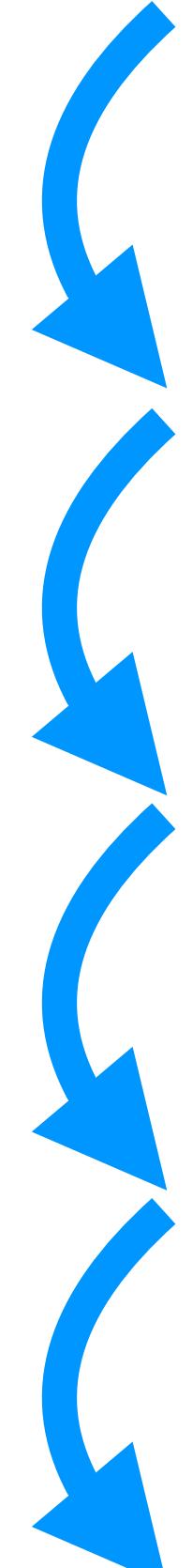
3. analysis

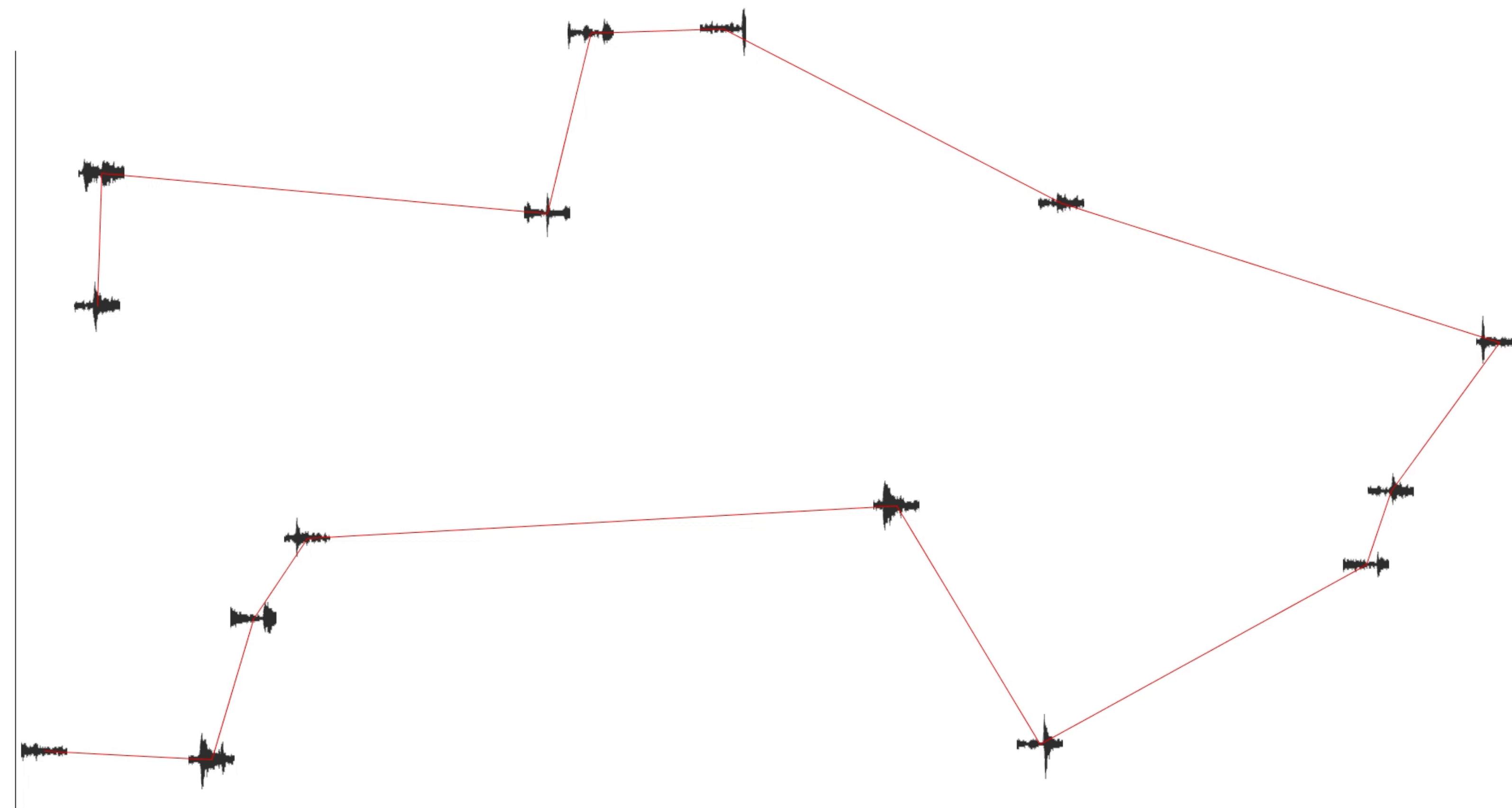
4. pattern finding

5. creating

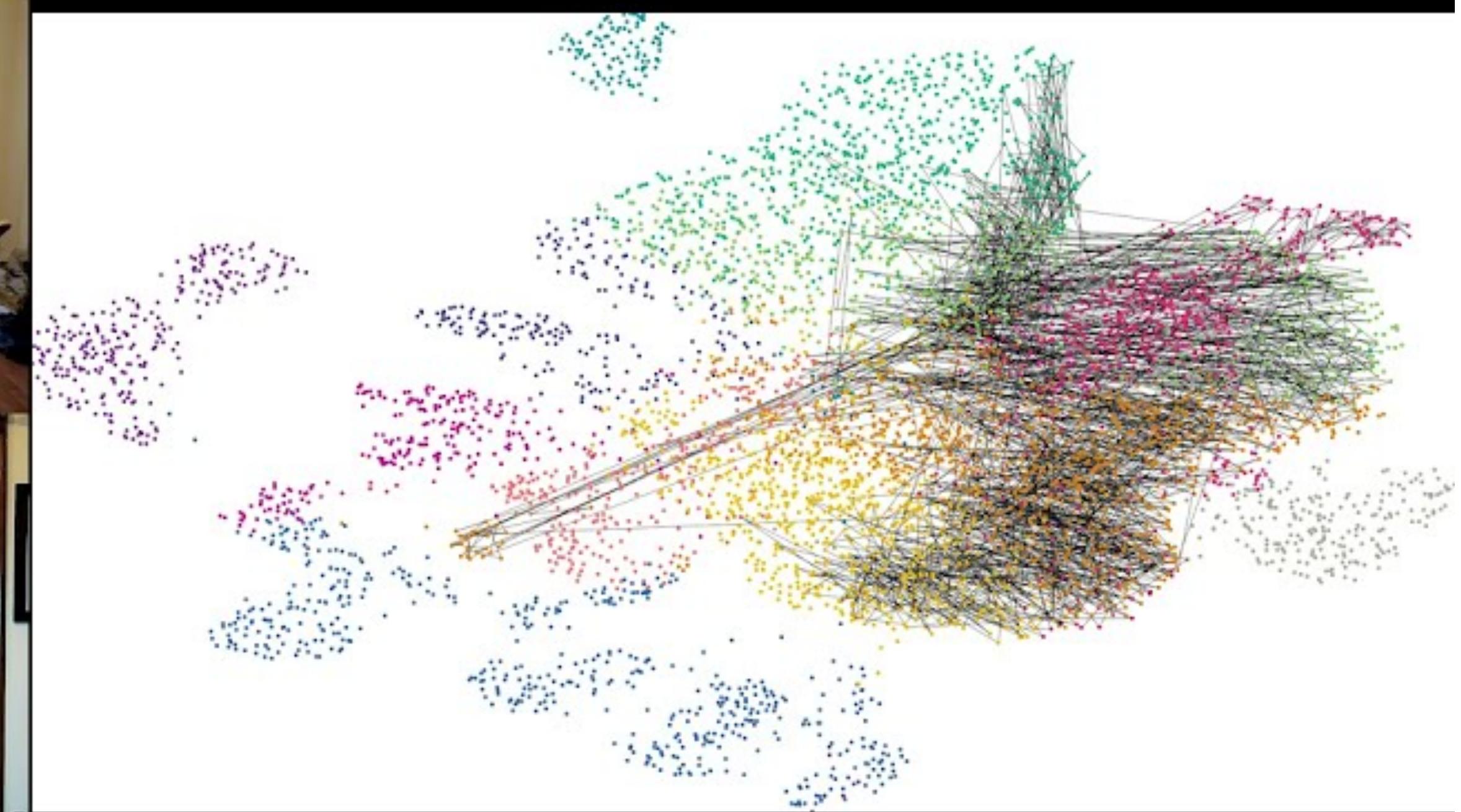


Using FluCoMa *a workflow*

1. corpus curation
 2. decomposition
 3. analysis
 4. pattern finding
 5. creating
- 



Traveling Salesperson Route: UMAP



UMAP in 1 dimension

FluidBufMFCC writes the analysis to a buffer

FFT frames (time): →

Dimensionality Reduction

PCA & UMAP

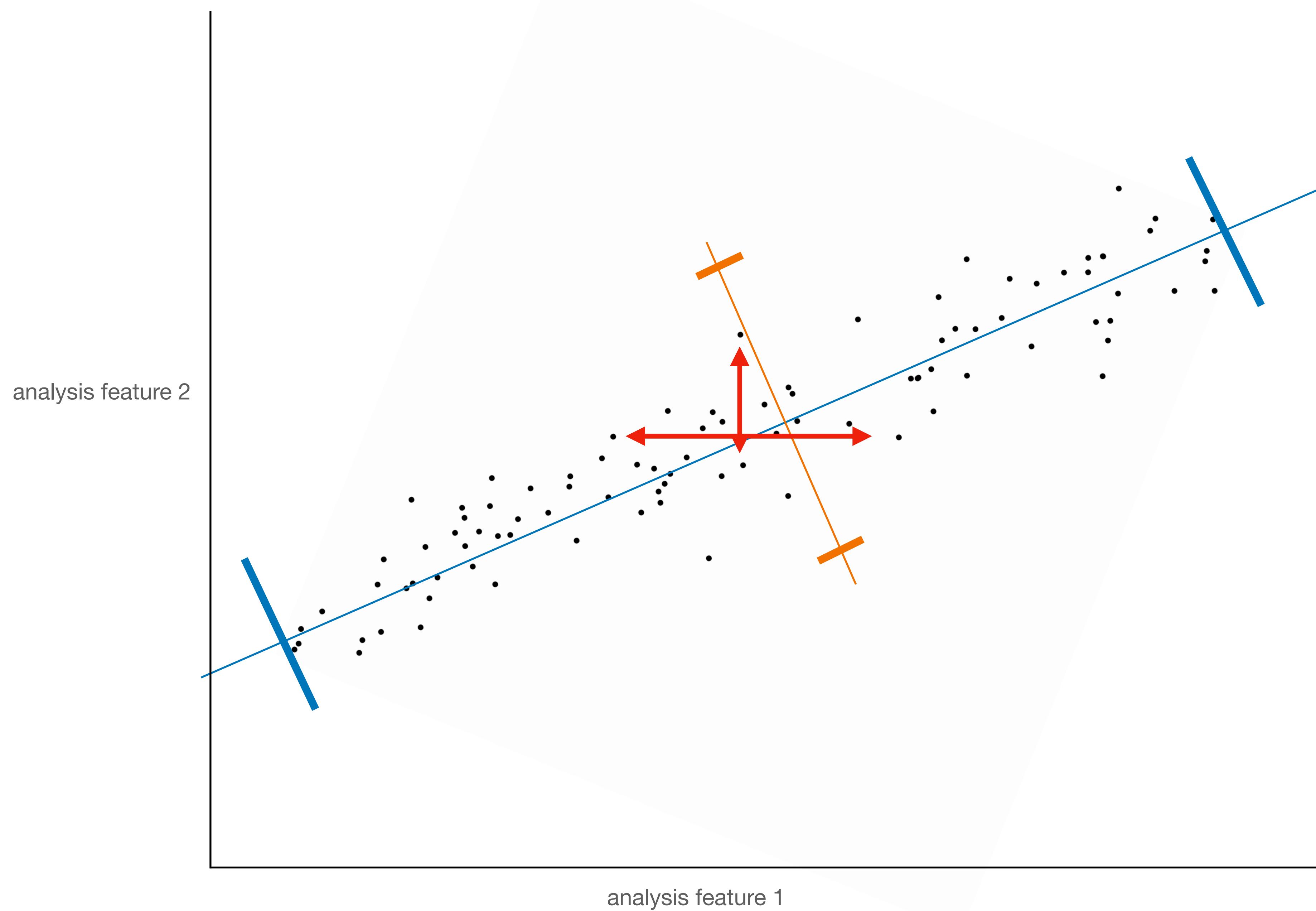


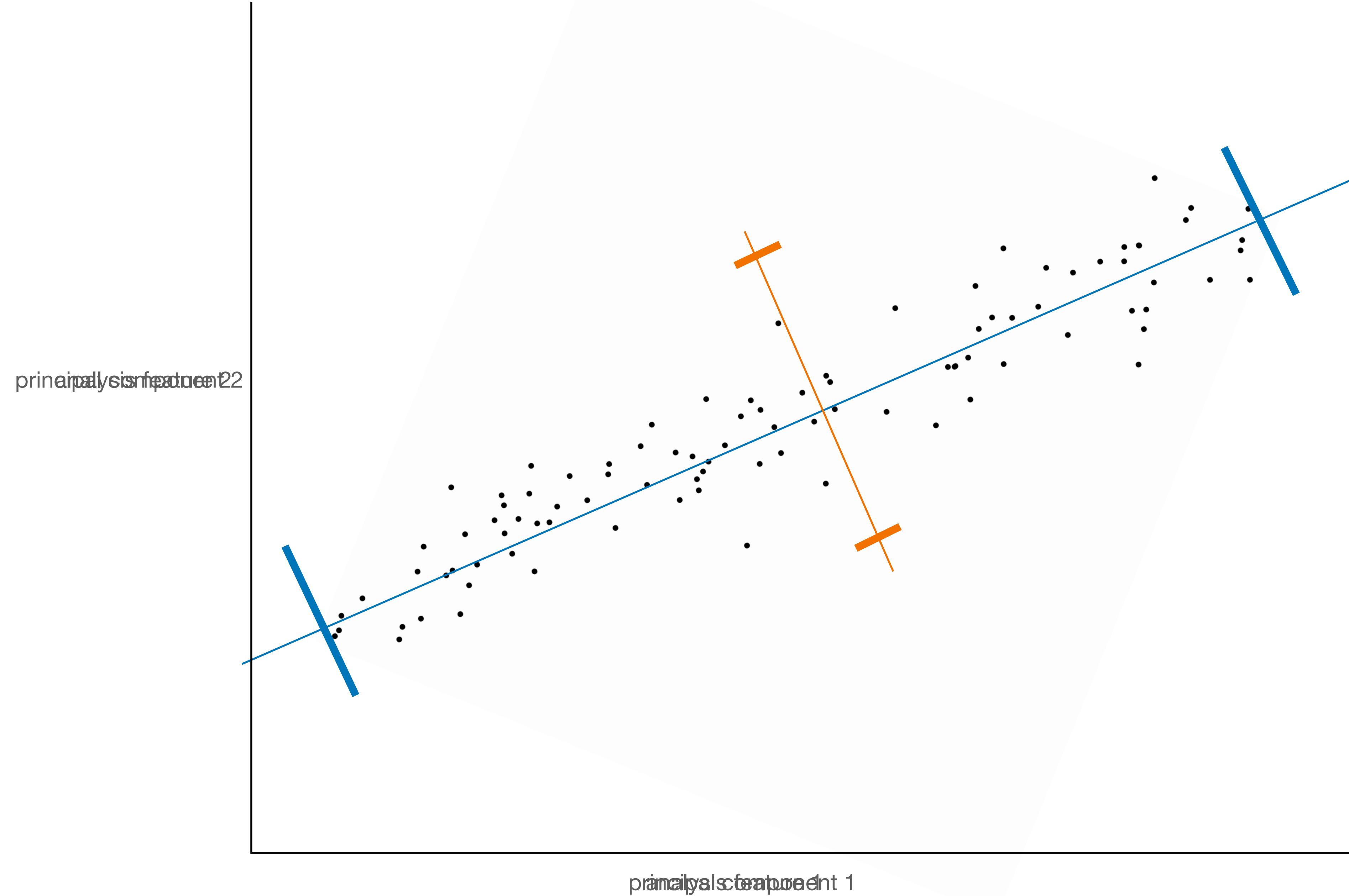
PCA



Principal Component Analysis (PCA)

1. analyze (or “fit to”) a dataset
2. use that analysis to transform the data to show more of the “variance” (or “differences”) between data points
 - can help remove redundancy
 - can help remove noise
 - can offer dimensionality reduction





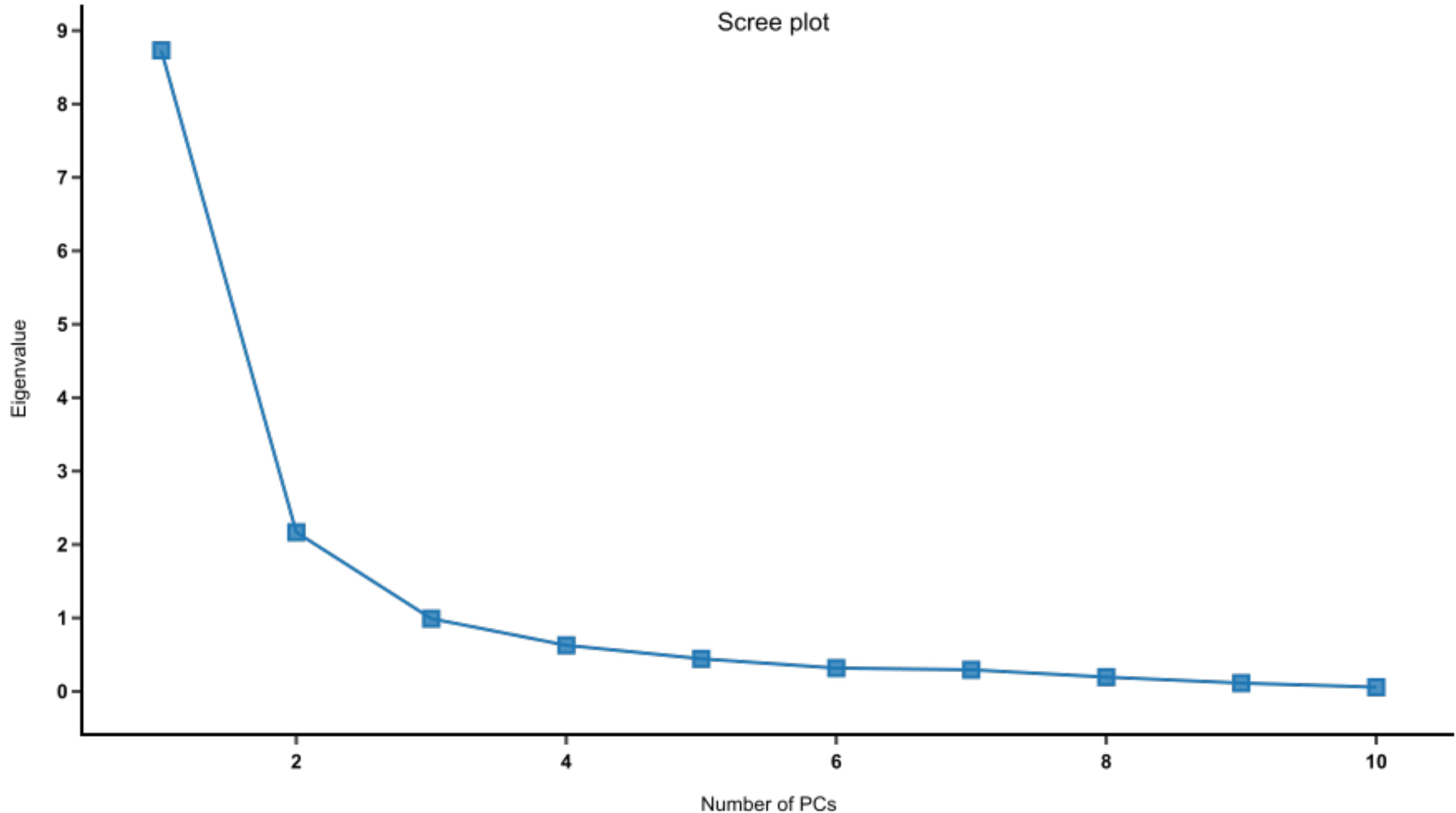
13 dimensions in → 13 PCs out

dimensions

13 dimensions in → 13 PCs out

principal components

Scree plot



13 dimensions in → 13 PCs out

principal components

13 dimensions in → 13 PCs out

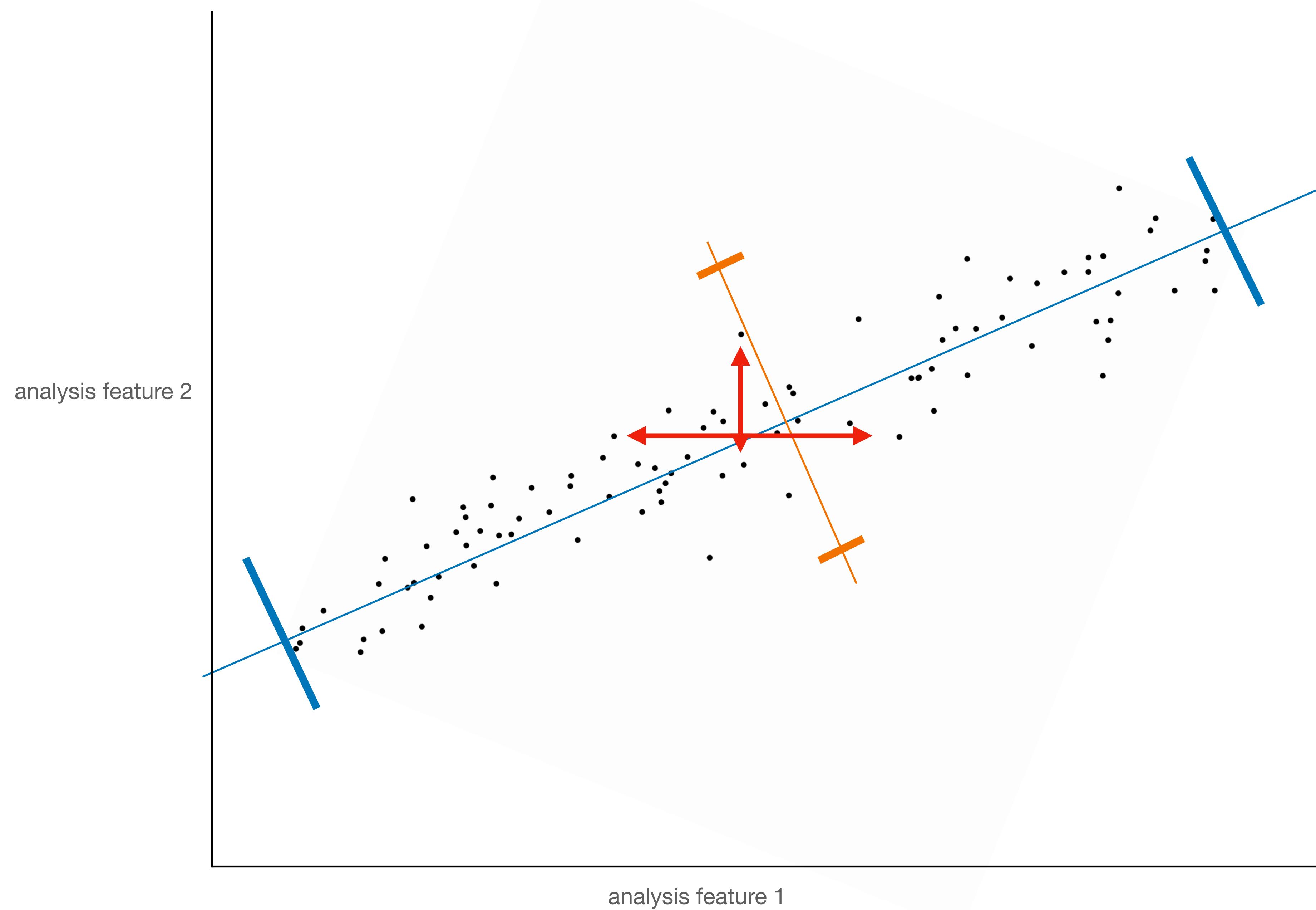
principal components

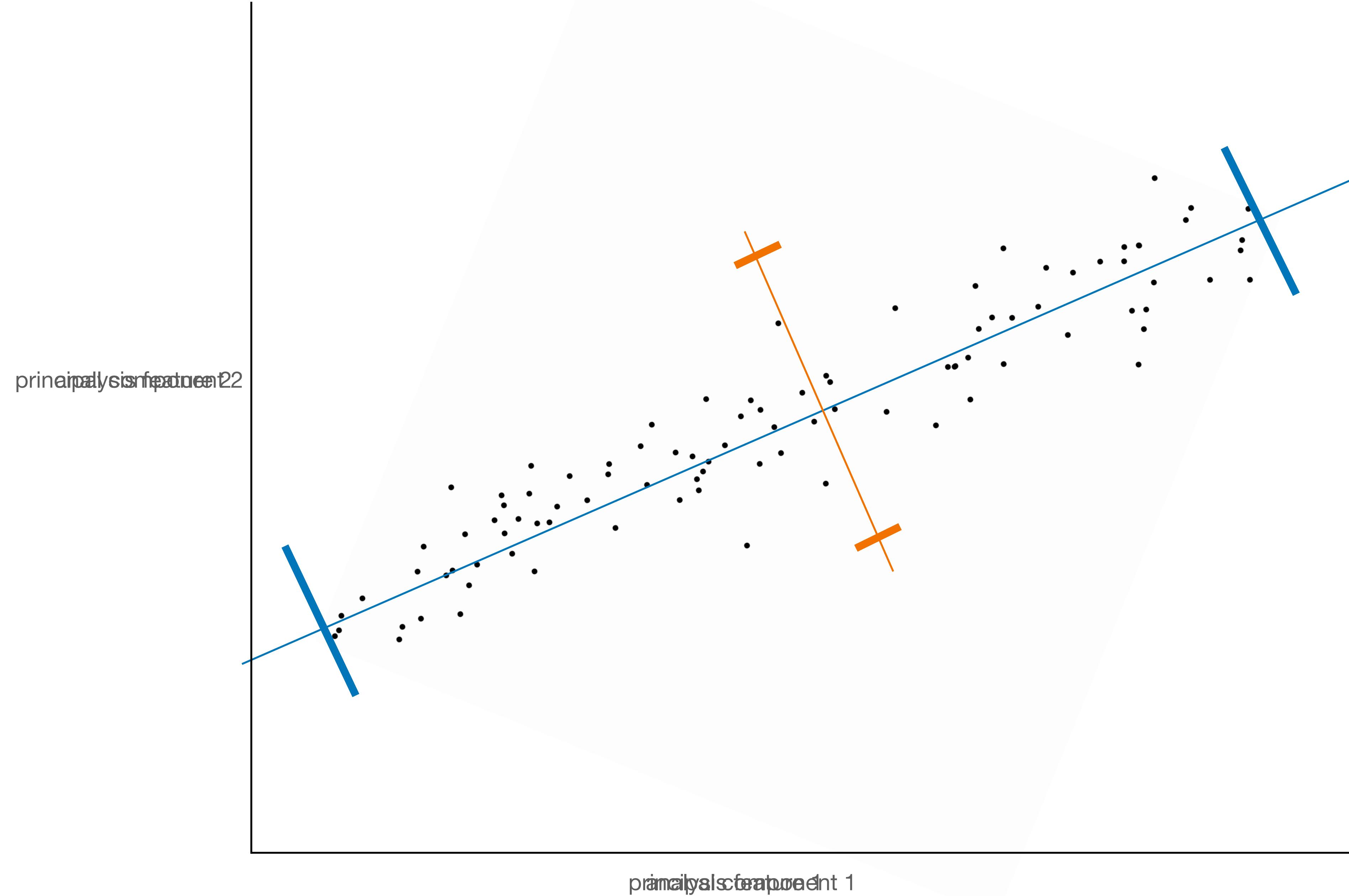
UMAP



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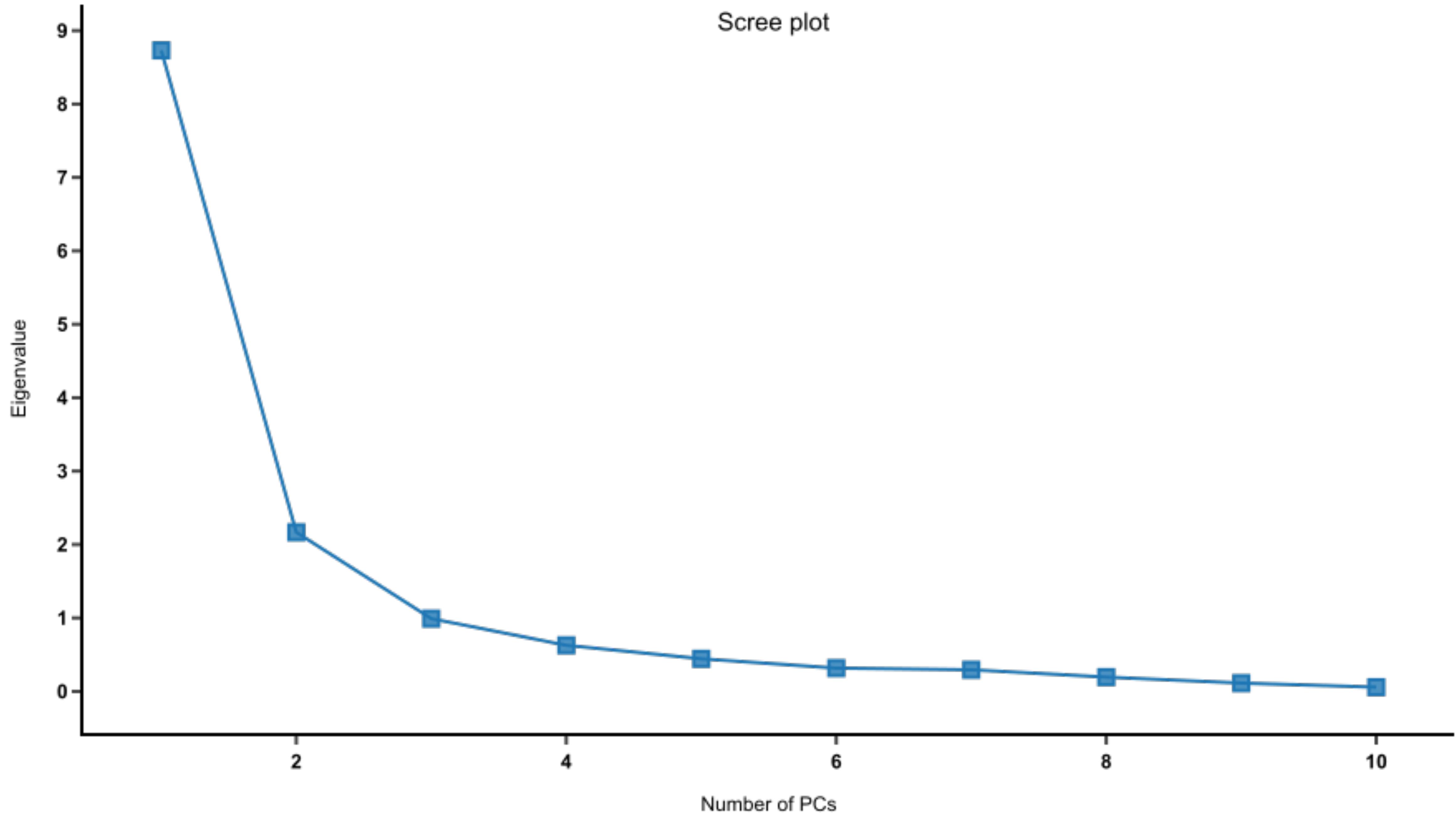
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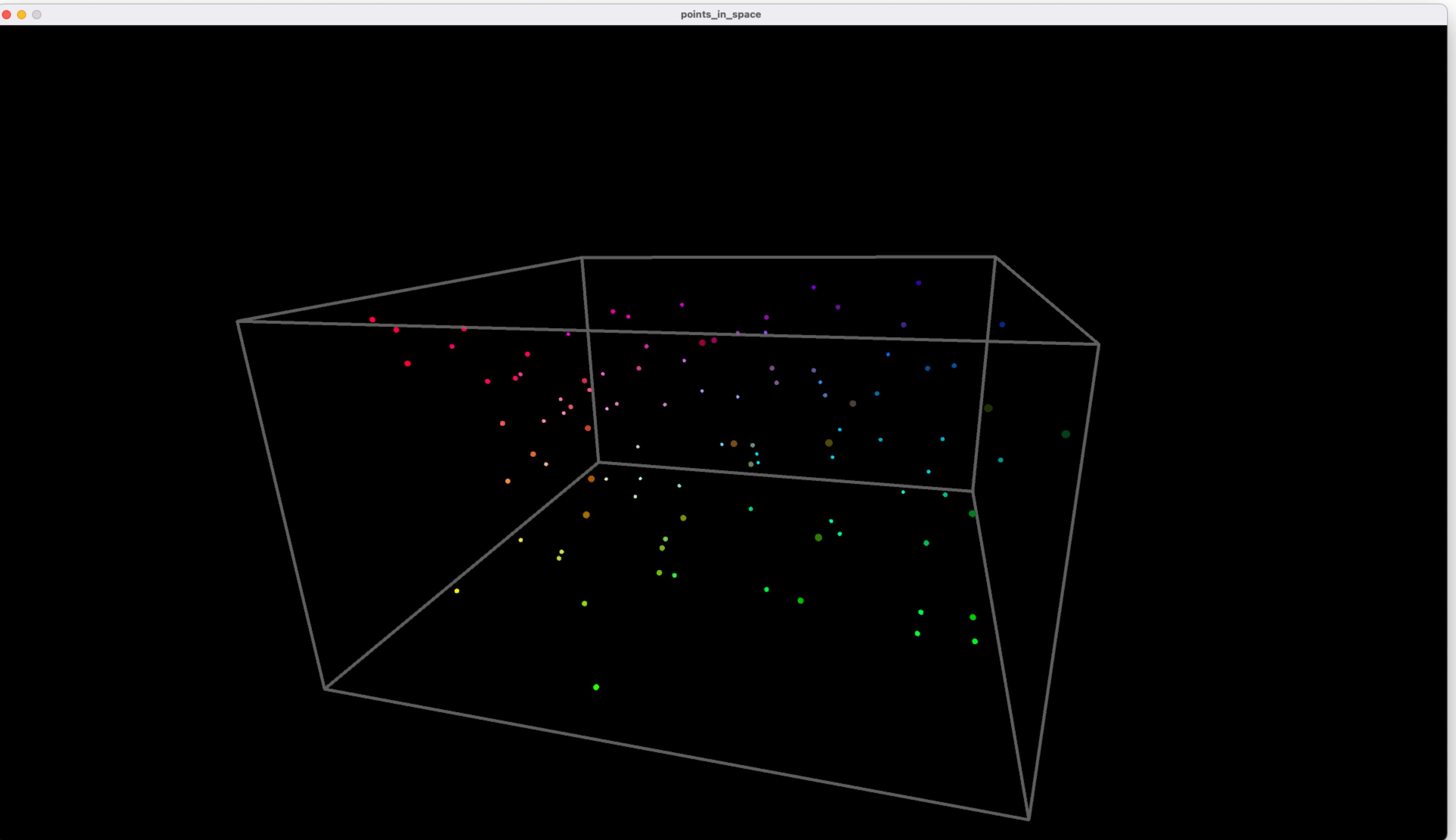
principal components

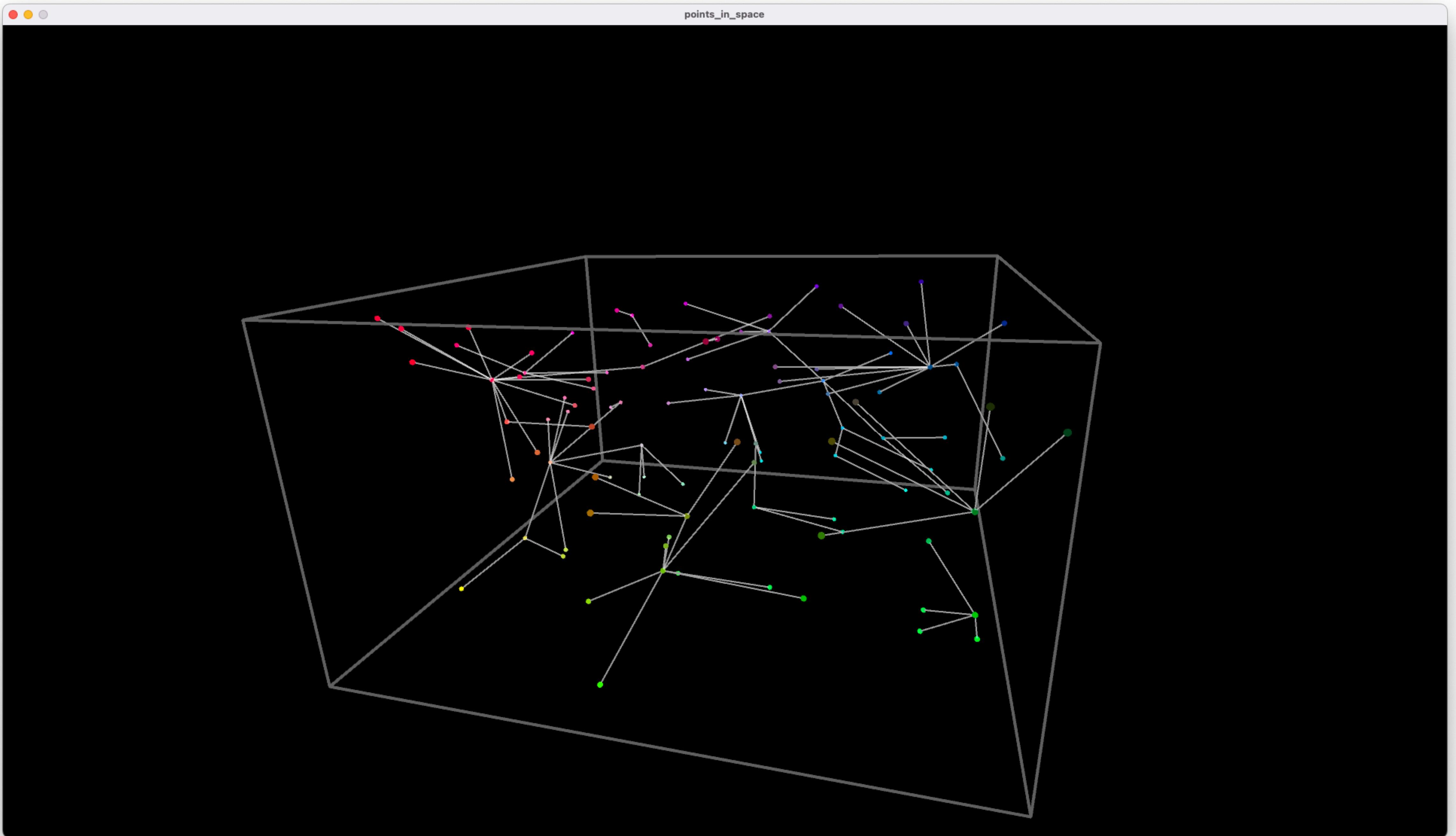
13 dimensions in → 13 PCs out

principal components

Uniform Manifold Approximation and Projection (UMAP)

1. in the high dimensional space, create a tree-like structure of neighbor relations (which points are close, which points are far)
2. randomly toss the points into the lower dimensional space (tree relations will be...poor)
3. iterate on the points, shifting them around in the lower dimensional space until the tree relations are more similar to how they were in higher dimensions





Uniform Manifold Approximation and Projection (UMAP)

