Automated Data Analysis Report

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1. Clustering Results

Best Parameters: {'epsilon': 2.393369097964607, 'min_samples': 6, 'silhouette': 0.33287232534725236}, Best Silhouette Score: 0.333

2. ANOVA Results

Results for wife_religion: F-value = 20296.886, P-value = 0.000
Tukey-HSD Test Results: Multiple Comparison of Means - Tukey HSD, FWER=0.05
== group1 group2 meandiff p-adj lower upper reject ---------- -1 1 1.8704 0.0 1.7661 1.9746 True -1 3 1.8704 0.0 1.7712 1.9696 True -1 4 1.8704 0.0 1.7697 1.971 True -1 5 -0.9352 0.0 -1.0377 -0.8327 True -1 6 -0.9352 0.0 -1.0422 -0.8282 True 1 3 -0.0 1.0 -0.0359 0.0359 False 1 4 -0.0 1.0 -0.0398 0.0398 False 1 5 -2.8055 0.0 -2.8498 -2.7613 True 1 6 -2.8055 0.0 -2.8593 -2.7518 True 3 4 0.0 1.0 -0.0237 0.0237 False 3 5 -2.8055 0.0 -2.8361 -2.7749 True 3 6 -2.8055 0.0 -2.8488 -2.7623 True 4 5 -2.8055 0.0 -2.8406 -2.7704 True 4 6 -2.8055 0.0 -2.8521 -2.759 True 5 6 -0.0 1.0 -0.0504 0.0504 False ----------

Results for wife_working: F-value = 3630.540, P-value = 0.000
Tukey-HSD Test Results: Multiple Comparison of Means - Tukey HSD, FWER=0.05
== group1 group2 meandiff p-adj lower upper reject ---------- -1 1 0.8207 0.0 0.582 1.0594 True -1 3 1.3462 0.0 1.119 1.5735 True -1 4 -0.9616 0.0 -1.1922 -0.731 True -1 5 1.3462 0.0 1.1114 1.5811 True -1 6 -0.9616 0.0 -1.2067 -0.7165 True 1 3 0.5255 0.0 0.4434 0.6077 True 1 4 -1.7823 0.0 -1.8734 -1.6912 True 1 5 0.5255 0.0 0.4242 0.6269 True 1 6 -1.7823 0.0 -1.9055 -1.6591 True 3 4 -2.3078 0.0 -2.3621 -2.2536 True 3 5 -0.0 1.0 -0.0701 0.0701 False 3 6 -2.3078 0.0 -2.4069 -2.2087 True 4 5 2.3078 0.0 2.2274 2.3882 True 4 6 0.0 1.0 -0.1066 0.1066 False 5 6 -2.3078 0.0 -2.4233 -2.1923 True ----------

Results for media_exposure: F-value = 10811.880, P-value = 0.000
Tukey-HSD Test Results: Multiple Comparison of Means - Tukey HSD, FWER=0.05
== group1 group2 meandiff p-adj lower upper reject ---------- -1 1 1.2734 0.0 1.1315 1.4153 True -1 3 -2.5468 0.0 -2.6819 -2.4117 True -1 4 -2.5468 0.0 -2.6839 -2.4097 True -1 5 -2.5468 0.0 -2.6864 -2.4072 True -1 6 -2.5468 0.0 -2.6925 -2.4011 True 1 3 -3.8202 0.0 -3.869 -3.7713 True 1 4 -3.8202 0.0 -3.8743 -3.766 True 1 5 -3.8202 0.0 -3.8804 -3.7599 True 1 6 -3.8202 0.0 -3.8934 -3.7469 True 3 4 -0.0 1.0 -0.0323 0.0323 False 3 5 -0.0 1.0 -0.0417 0.0417 False 3 6 -0.0 1.0 -0.0589 0.0589 False 4 5 0.0 1.0 -0.0478 0.0478 False 4 6 0.0 1.0 -0.0634 0.0634 False 5 6 0.0 1.0 -0.0687 0.0687 False ----------

Results for age_children_interaction: F-value = 15.977, P-value = 0.000
Tukey-HSD Test Results: Multiple Comparison of Means - Tukey HSD, FWER=0.05
== group1 group2 meandiff p-adj lower upper reject ---------- -1 1 -1.2763 0.0003 -2.1265 -0.4261 True -1 3 -1.7529 0.0 -2.5622 -0.9436 True -1 4 -1.9621 0.0 -2.7835 -1.1407 True -1 5 -1.8269 0.0 -2.6633 -0.9905 True -1 6 -1.9877 0.0 -2.8605 -1.1148 True 1 3 -0.4766 0.0001 -0.7692 -0.184 True 1 4 -0.6858 0.0 -1.0103 -0.3614 True 1 5 -0.5506 0.0002 -0.9115 -0.1897 True 1 6 -0.7114 0.0001 -1.1501 -0.2727 True 3 4 -0.2092 0.025 -0.4025 -0.016 True 3 5 -0.074 0.9587 -0.3237 0.1756 False 3 6 -0.2348 0.4035 -0.5878 0.1181 False 4 5 0.1352 0.7583 -0.1511 0.4215 False 4 6 -0.0256 1.0 -0.4054 0.3542 False 5 6 -0.1608 0.8751 -0.5721 0.2505 False ----------

Results for edu_interaction: F-value = 55.231, P-value = 0.000

Tukey-HSD Test Results: Multiple Comparison of Means - Tukey HSD, FWER=0.05 == group1 group2 meandiff p-adj lower upper reject -- -1 1 -1.1287 0.0009 -1.9296 -0.3278 True -1 3 0.0767 0.9997 -0.6857 0.8391 False -1 4 0.1563 0.9926 -0.6174 0.9301 False -1 5 0.6846 0.1309 -0.1033 1.4725 False -1 6 0.7676 0.0832 -0.0546 1.5899 False 1 3 1.2054 0.0 0.9298 1.4811 True 1 4 1.285 0.0 0.9794 1.5907 True 1 5 1.8133 0.0 1.4733 2.1533 True 1 6 1.8964 0.0 1.4831 2.3097 True 3 4 0.0796 0.8133 -0.1025 0.2617 False 3 5 0.6079 0.0 0.3727 0.843 True 3 6 0.6909 0.0 0.3584 1.0234 True 4 5 0.5283 0.0 0.2586 0.798 True 4 6 0.6113 0.0 0.2536 0.9691 True 5 6 0.0831 0.9902 -0.3044 0.4705 False --

3. Cluster Variability

		antecedent support	consequent support	support	confidence	\
	count	42.000000	42.000000	42.000000	42.000000	
	mean	0.168162	0.379675	0.080507	0.489911	
	std	0.104944	0.053132	0.051028	0.094273	
	min	0.062785	0.230594	0.036530	0.320856	
	25%	0.090468	0.333333	0.045662	0.444724	
	50%	0.130708	0.390411	0.059361	0.496713	
	75%	0.226313	0.425799	0.088756	0.510443	
	max	0.428082	0.428082	0.213470	0.769231	

		lift	leverage	conviction	zhangs_metric	total_items	coverage
	count	42.000000	42.000000	42.000000	42.000000	42.000000	42.000000
	mean	1.291581	0.017107	1.257707	0.260709	2.690476	0.168162
	std	0.167568	0.014045	0.272600	0.107497	0.467901	0.104944
	min	1.134799	0.004746	1.086022	0.130561	2.000000	0.062785
	25%	1.175932	0.008405	1.119062	0.177983	2.000000	0.090468
	50%	1.208708	0.013528	1.152477	0.232774	3.000000	0.130708
	75%	1.378380	0.019793	1.237219	0.311055	3.000000	0.226313
3	max	1.796923	0.070776	2.478311	0.579718	3.000000	0.428082

		antecedent support	consequent support	support	confidence	\
	count	33.000000	33.000000	33.000000	33.000000	
	mean	0.212121	0.359626	0.113302	0.536347	
	std	0.139517	0.075309	0.081804	0.111667	
	min	0.073529	0.264706	0.044118	0.378947	
	25%	0.099265	0.283088	0.051471	0.466667	
	50%	0.136029	0.349265	0.084559	0.548148	
	75%	0.349265	0.397059	0.132353	0.590909	
	max	0.496324	0.496324	0.272059	0.851852	

		lift	leverage	conviction	zhangs_metric	total_items	coverage
	count	33.000000	33.000000	33.000000	33.000000	33.000000	33.000000
	mean	1.505561	0.034331	1.457631	0.417759	2.848485	0.212121
	std	0.225781	0.021253	0.408258	0.089219	0.364110	0.139517
	min	1.283951	0.010570	1.166189	0.245526	2.000000	0.073529
	25%	1.374316	0.018666	1.251414	0.357143	3.000000	0.099265
	50%	1.392888	0.031831	1.334378	0.418550	3.000000	0.136029
	75%	1.574074	0.036048	1.527778	0.457152	3.000000	0.349265
4	max	2.365217	0.074989	3.399816	0.630522	3.000000	0.496324

	antecedent support	consequent support	support	confidence	\
count	16.000000	16.000000	16.000000	16.000000	
mean	0.230198	0.257426	0.094678	0.430119	
std	0.101197	0.100256	0.049170	0.166763	
min	0.069307	0.148515	0.039604	0.266667	
25%	0.165842	0.193069	0.056931	0.298529	
50%	0.198020	0.198020	0.089109	0.320856	
75%	0.336634	0.341584	0.111386	0.591176	
max	0.435644	0.435644	0.198020	0.714286	

		lift	leverage	conviction	zhangs_metric	total_items	coverage
	count	16.000000	16.000000	16.000000	16.000000	16.000000	16.000000
	mean	1.687226	0.037607	1.383560	0.519623	2.500000	0.230198
	std	0.265425	0.020920	0.315130	0.129621	0.516398	0.101197
	min	1.377273	0.014214	1.102723	0.341564	2.000000	0.069307
	25%	1.507574	0.019974	1.143299	0.422688	2.000000	0.165842
	50%	1.644969	0.034751	1.246463	0.496250	2.500000	0.198020
	75%	1.796449	0.047936	1.510166	0.615792	3.000000	0.336634
1	max	2.142424	0.078032	2.122772	0.769335	3.000000	0.435644

	antecedent support	consequent support	support	confidence	\
count	18.000000	18.000000	18.000000	18.000000	
mean	0.219157	0.336015	0.108046	0.508400	
std	0.076342	0.037537	0.028875	0.058202	
min	0.096552	0.275862	0.062069	0.408163	
25%	0.175862	0.337931	0.089655	0.500000	
50%	0.213793	0.337931	0.113793	0.516129	
75%	0.275862	0.370690	0.137931	0.542869	
max	0.337931	0.379310	0.137931	0.642857	

		lift	leverage	conviction	zhangs_metric	total_items	coverage
	count	18.000000	18.000000	18.000000	18.000000	18.000000	18.000000
	mean	1.516875	0.036047	1.363338	0.434456	2.777778	0.219157
	std	0.120650	0.008902	0.135964	0.057102	0.427793	0.076342
	min	1.387560	0.019263	1.223543	0.321429	2.000000	0.096552
	25%	1.457398	0.032580	1.313793	0.392157	3.000000	0.175862
	50%	1.479592	0.038098	1.368276	0.439145	3.000000	0.213793
	75%	1.527321	0.044709	1.374384	0.479092	3.000000	0.275862
5	max	1.902332	0.044709	1.853793	0.525021	3.000000	0.337931

	antecedent support	consequent support	support	confidence	\
count	18.000000	18.000000	18.000000	18.000000	
mean	0.197347	0.644279	0.140962	0.838605	
std	0.140811	0.171269	0.076828	0.207872	
min	0.044776	0.373134	0.044776	0.518519	
25%	0.067164	0.432836	0.067164	0.579091	
50%	0.119403	0.776119	0.119403	1.000000	
75%	0.361940	0.776119	0.208955	1.000000	
max	0.402985	0.776119	0.283582	1.000000	

	lift	leverage	conviction	zhangs_metric	total_items	coverage
count	18.000000	18.000000	18.000000	18.000000	18.000000	18.000000
mean	1.309973	0.033526	inf	0.305400	2.888889	0.197347
std	0.055343	0.019359	NaN	0.085126	0.323381	0.140811
min	1.224038	0.010025	1.289009	0.234375	2.000000	0.044776
25%	1.288462	0.015037	1.407564	0.247986	3.000000	0.067164
50%	1.288462	0.026732	NaN	0.257578	3.000000	0.119403
75%	1.293793	0.047449	NaN	0.362245	3.000000	0.361940
6 max	1.470219	0.066830	inf	0.476190	3.000000	0.402985

	antecedent support	consequent support	support	confidence	\
count	29.000000	29.000000	29.000000	29.0	
mean	0.097701	0.442529	0.097701	1.0	
std	0.032035	0.099860	0.032035	0.0	
min	0.083333	0.250000	0.083333	1.0	
25%	0.083333	0.416667	0.083333	1.0	
50%	0.083333	0.500000	0.083333	1.0	
75%	0.083333	0.500000	0.083333	1.0	
max	0.166667	0.500000	0.166667	1.0	

	lift	leverage	conviction	zhangs_metric	total_items	coverage
count	29.000000	29.000000	29.0	29.000000	29.0	29.000000
mean	2.427586	0.054837	inf	0.619122	3.0	0.097701
std	0.775931	0.022298	NaN	0.116632	0.0	0.032035
min	2.000000	0.041667	inf	0.545455	3.0	0.083333
25%	2.000000	0.041667	NaN	0.545455	3.0	0.083333
50%	2.000000	0.041667	NaN	0.545455	3.0	0.083333
75%	2.400000	0.062500	NaN	0.636364	3.0	0.083333
-1 max	4.000000	0.125000	inf	0.900000	3.0	0.166667

4. Rule Metrics Comparison

mean	std	min	25%	50%	75%
91100884440497	0.09427321097816364	0.32085561497326204	0.44472389585981975	0.49671319417765825	0.5104427736
53467925967239	0.11166707123207359	0.37894736842105264	0.4666666666666667	0.548148148148148	0.5909090909
01194057168322	0.1667626043350457	0.26666666666666666	0.2985294117647059	0.32085561497326204	0.5911764705
33995887126361	0.05820159786792578	0.40816326530612246	0.5	0.5161290322580645	0.5428692699
36045641601197	0.2078719998105836	0.5185185185185185	0.5790909090909091	1.0	1.0

1.0	0.0	1.0	1.0	1.0	1.0
9802563448316	0.1380484715492421	0.3770491803278688	0.6289384502656165	0.7142857142857142	0.7824620041

5. Top Unique Rules per Cluster

Cluster 3:

Rule: frozenset({'age_children_interaction_(42.0, 87.0]', 'edu_interaction_(12.0, 16.0]'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.048, Confidence: 0.600, Lift: 1.402)
Rule: frozenset({'standard_of_living_index_3', 'age_children_interaction_(42.0, 87.0]'}) -> frozenset({'edu_interaction_(6.0, 12.0]'}) (Support: 0.054, Confidence: 0.580, Lift: 1.486)
Rule: frozenset({'edu_interaction_(6.0, 12.0]', 'age_children_interaction_(87.0, 164.0]'}) -> frozenset({'husband_occupation_3'}) (Support: 0.045, Confidence: 0.520, Lift: 1.221)
Rule: frozenset({'standard_of_living_index_3', 'age_children_interaction_(87.0, 164.0]'}) -> frozenset({'husband_occupation_3'}) (Support: 0.037, Confidence: 0.508, Lift: 1.193)
Rule: frozenset({'age_children_interaction_(87.0, 164.0]'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.116, Confidence: 0.505, Lift: 1.180)

Cluster 4:

Rule: frozenset({'Cluster_(3.0, 4.0]', 'edu_interaction_(12.0, 16.0]'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.272, Confidence: 0.685, Lift: 1.381)
Rule: frozenset({'edu_interaction_(12.0, 16.0]'}) -> frozenset({'Cluster_(3.0, 4.0]', 'standard_of_living_index_4'}) (Support: 0.272, Confidence: 0.685, Lift: 1.381)
Rule: frozenset({'edu_interaction_(6.0, 12.0]', 'age_children_interaction_(42.0, 87.0]'}) -> frozenset({'husband_occupation_2'}) (Support: 0.055, Confidence: 0.652, Lift: 2.365)
Rule: frozenset({'husband_occupation_2', 'age_children_interaction_(42.0, 87.0]'}) -> frozenset({'edu_interaction_(6.0, 12.0]'}) (Support: 0.055, Confidence: 0.652, Lift: 1.867)
Rule: frozenset({'Cluster_(3.0, 4.0]', 'standard_of_living_index_2'}) -> frozenset({'husband_occupation_3'}) (Support: 0.096, Confidence: 0.591, Lift: 1.576)

Cluster 1:

Rule: frozenset({'standard_of_living_index_3', 'husband_occupation_2'}) -> frozenset({'age_children_interaction_(164.0, 768.0]'}) (Support: 0.050, Confidence: 0.714, Lift: 1.640)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'standard_of_living_index_2'}) -> frozenset({'husband_occupation_2'}) (Support: 0.109, Confidence: 0.688, Lift: 2.042)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'husband_occupation_2'}) -> frozenset({'standard_of_living_index_2'}) (Support: 0.109, Confidence: 0.611, Lift: 1.715)
Rule: frozenset({'standard_of_living_index_3'}) -> frozenset({'age_children_interaction_(164.0, 768.0]'}) (Support: 0.119, Confidence: 0.600, Lift: 1.377)
Rule: frozenset({'husband_occupation_2'}) -> frozenset({'standard_of_living_index_2'}) (Support: 0.198, Confidence: 0.588, Lift: 1.650)

Cluster 5:

Rule: frozenset({'age_children_interaction_(164.0, 768.0]'}) -> frozenset({'husband_occupation_2'}) (Support: 0.117, Confidence: 0.548, Lift: 1.446)

Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'Cluster_(4.0, 6.0]'}) -> frozenset({'husband_occupation_2'}) (Support: 0.117, Confidence: 0.548, Lift: 1.446)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]'}) -> frozenset({'Cluster_(4.0, 6.0]', 'husband_occupation_2'}) (Support: 0.117, Confidence: 0.548, Lift: 1.446)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'standard_of_living_index_4'}) -> frozenset({'husband_occupation_2'}) (Support: 0.069, Confidence: 0.526, Lift: 1.388)
Rule: frozenset({'standard_of_living_index_3', 'Cluster_(4.0, 6.0]'}) -> frozenset({'edu_interaction_(6.0, 12.0]'}) (Support: 0.110, Confidence: 0.516, Lift: 1.527)

Cluster 6:

Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'Cluster_(4.0, 6.0]'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.119, Confidence: 1.000, Lift: 1.288)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]'}) -> frozenset({'Cluster_(4.0, 6.0]', 'standard_of_living_index_4'}) (Support: 0.119, Confidence: 1.000, Lift: 1.288)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'husband_occupation_2'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.045, Confidence: 1.000, Lift: 1.288)
Rule: frozenset({'husband_occupation_2', 'age_children_interaction_(87.0, 164.0]'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.209, Confidence: 1.000, Lift: 1.288)
Rule: frozenset({'edu_interaction_(6.0, 12.0]', 'husband_occupation_2'}) -> frozenset({'standard_of_living_index_4'}) (Support: 0.060, Confidence: 1.000, Lift: 1.288)

Cluster -1:

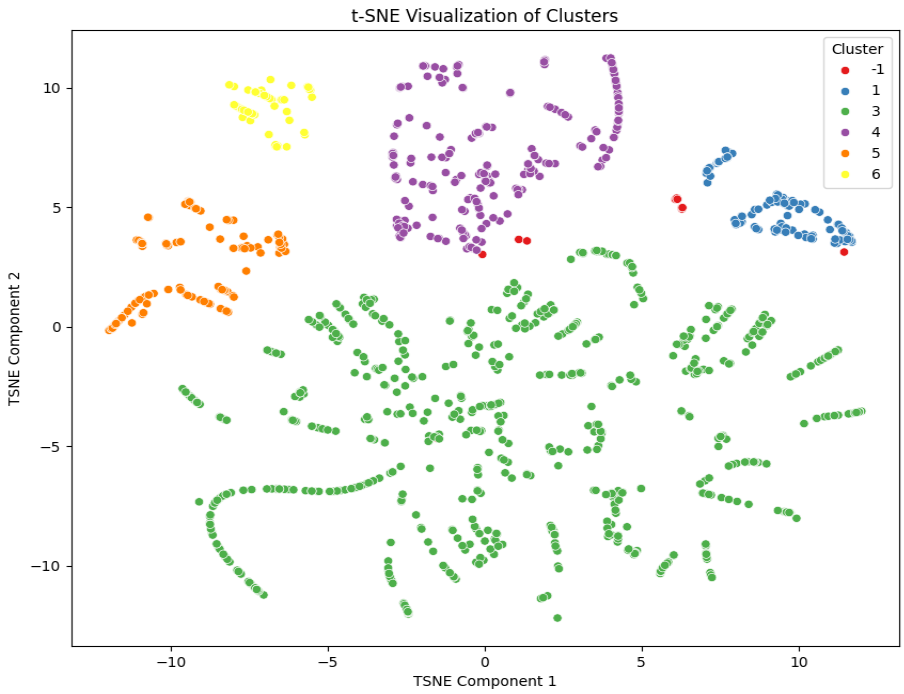
Rule: frozenset({'husband_occupation_3', 'age_children_interaction_(164.0, 768.0]'}) -> frozenset({'edu_interaction_(6.0, 12.0]'}) (Support: 0.083, Confidence: 1.000, Lift: 2.000)
Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'standard_of_living_index_3'}) -> frozenset({'edu_interaction_(6.0, 12.0]'}) (Support: 0.083, Confidence: 1.000, Lift: 2.000)
Rule: frozenset({'husband_occupation_3', 'standard_of_living_index_3'}) -> frozenset({'edu_interaction_(12.0, 16.0]'}) (Support: 0.083, Confidence: 1.000, Lift: 4.000)
Rule: frozenset({'age_children_interaction_(87.0, 164.0]', 'edu_interaction_(12.0, 16.0]'}) -> frozenset({'husband_occupation_3'}) (Support: 0.083, Confidence: 1.000, Lift: 2.000)
Rule: frozenset({'age_children_interaction_(87.0, 164.0]', 'edu_interaction_(12.0, 16.0]'}) -> frozenset({'standard_of_living_index_3'}) (Support: 0.083, Confidence: 1.000, Lift: 4.000)

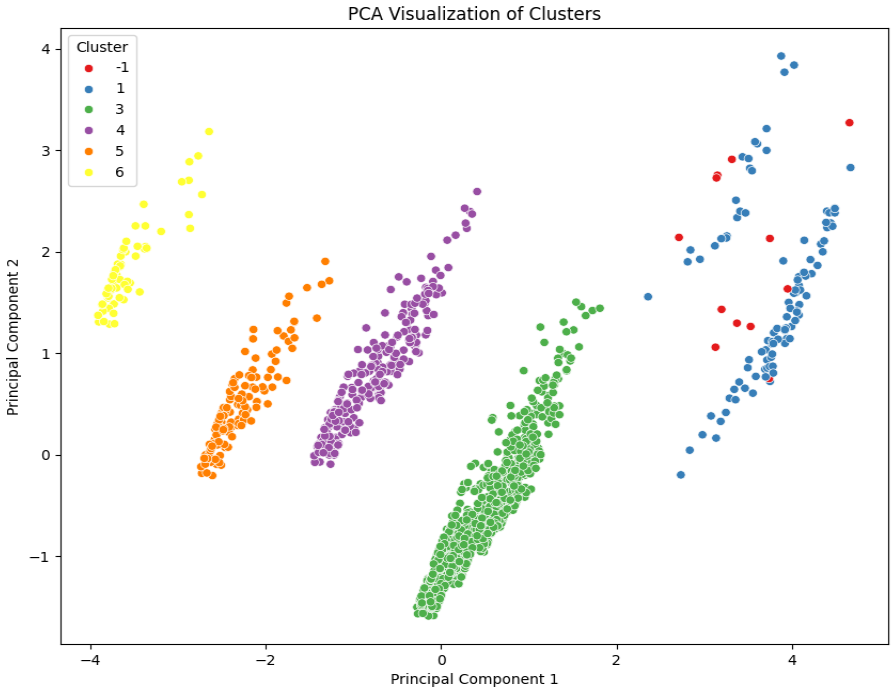
6. Top 10 Common Rules Sorted by Absolute Coverage Difference

Rule: frozenset({'standard_of_living_index_4', 'husband_occupation_2', 'edu_interaction_(12.0, 16.0]'}) (Abs Coverage Difference: 0.236)
Rule: frozenset({'standard_of_living_index_4', 'husband_occupation_2', 'edu_interaction_(12.0, 16.0]'}) (Abs Coverage Difference: 0.225)
Rule: frozenset({'standard_of_living_index_4', 'husband_occupation_2', 'edu_interaction_(12.0, 16.0]'}) (Abs Coverage Difference: 0.200)
Rule: frozenset({'standard_of_living_index_3', 'edu_interaction_(6.0, 12.0]'}) (Abs Coverage Difference: 0.177)
Rule: frozenset({'standard_of_living_index_4', 'edu_interaction_(12.0, 16.0]'}) (Abs Coverage Difference: 0.163)
Rule: frozenset({'husband_occupation_3', 'edu_interaction_(6.0, 12.0]'}) (Abs Coverage Difference: 0.150)

Rule: frozenset({'age_children_interaction_(164.0, 768.0]', 'standard_of_living_index_4'}) (Abs Coverage Difference: 0.140)
Rule: frozenset({'edu_interaction_(6.0, 12.0]', 'standard_of_living_index_3'}) (Abs Coverage Difference: 0.115)
Rule: frozenset({'husband_occupation_3', 'edu_interaction_(6.0, 12.0]'}) (Abs Coverage Difference: 0.115)
Rule: frozenset({'standard_of_living_index_4', 'age_children_interaction_(87.0, 164.0]', 'edu_interaction_(12.0, 16.0]'}) (Abs Coverage Difference: 0.114)

7. Cluster Visualizations




PCA Visualization of Clusters
Cluster
-1
1
3
4
5
6
Principal Component 2
Principal Component 1
4
3
2
1
0
−1
−4
−2
0
2
4