

Supplementary Material 1

Model fit improved considerably from 1 to 4 profiles based on the Bayesian Information Criterion (BIC), with diminishing returns beyond four profiles. Although the 5-profile model had a slightly lower BIC, the improvement was minimal, and the 6-profile model showed a worse BIC (Figure S1, Table S1). Therefore, the 4-profile solution was selected as the optimal model, balancing fit and parsimony.

Figure S1. Bayesian Information Criterion (BIC) values for latent profile models with 1 to 6 profiles. Lower BIC values indicate better model fit.

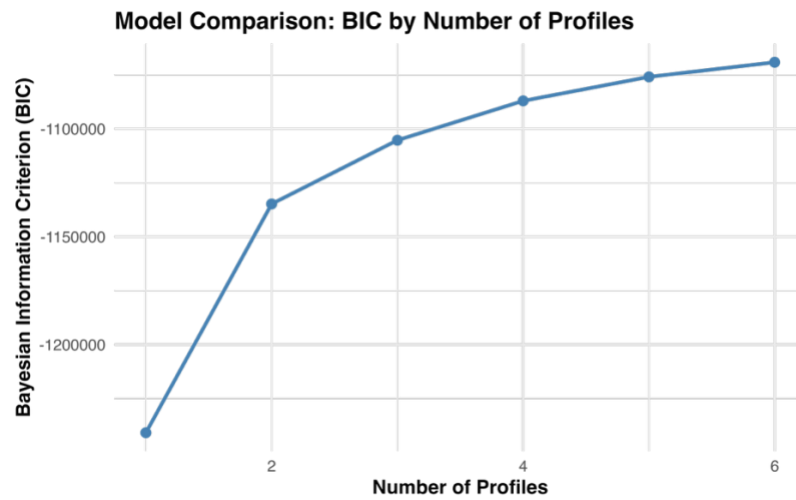


Table S1. Model comparison: BIC by number of profiles

n_profiles	BIC
1	-1240777
2	1134830.8
3	1105320.3
4	1087094.2
5	1086976.8
6	1085223.6

Supplementary Material 2

Figure S2. Employment status distribution by country

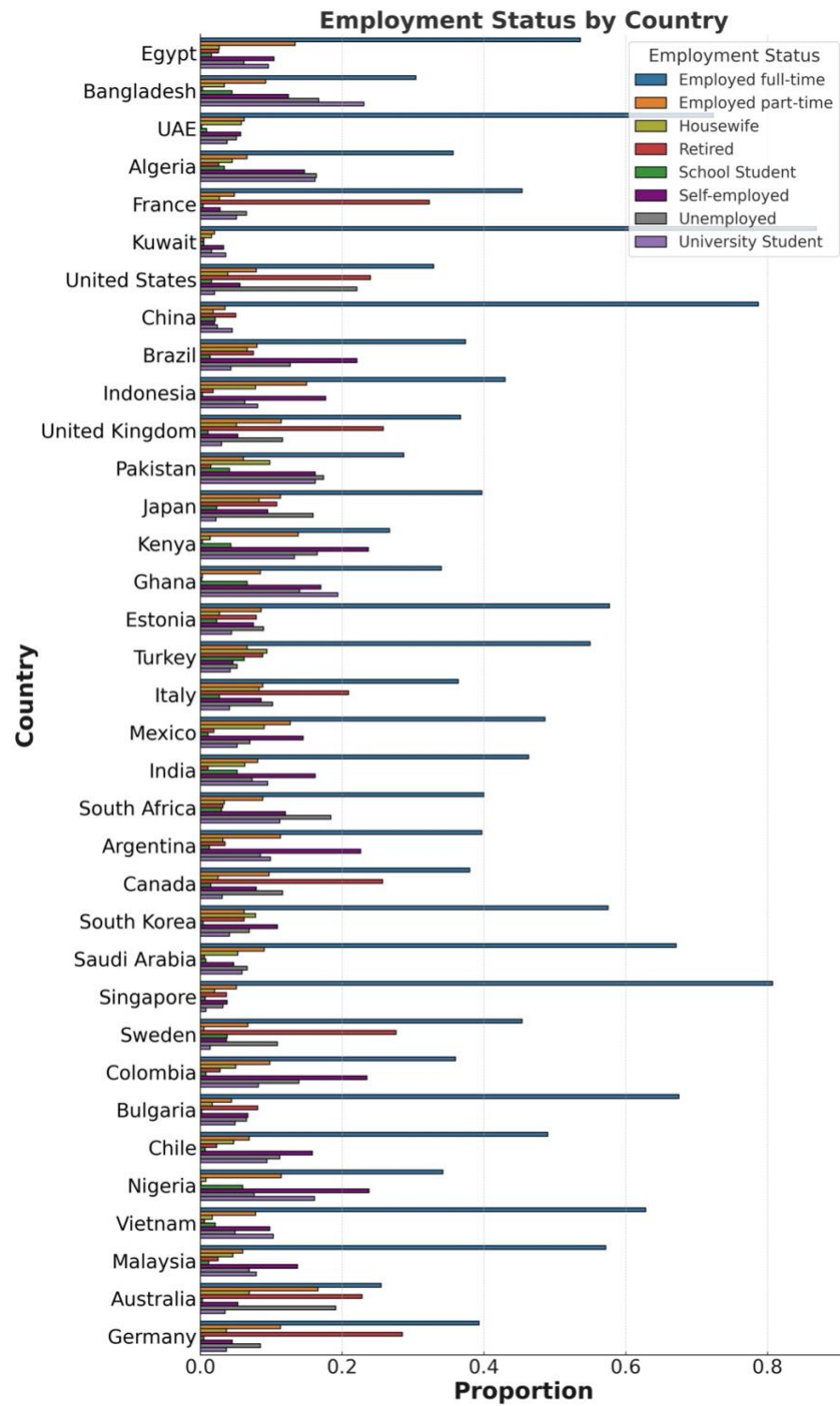
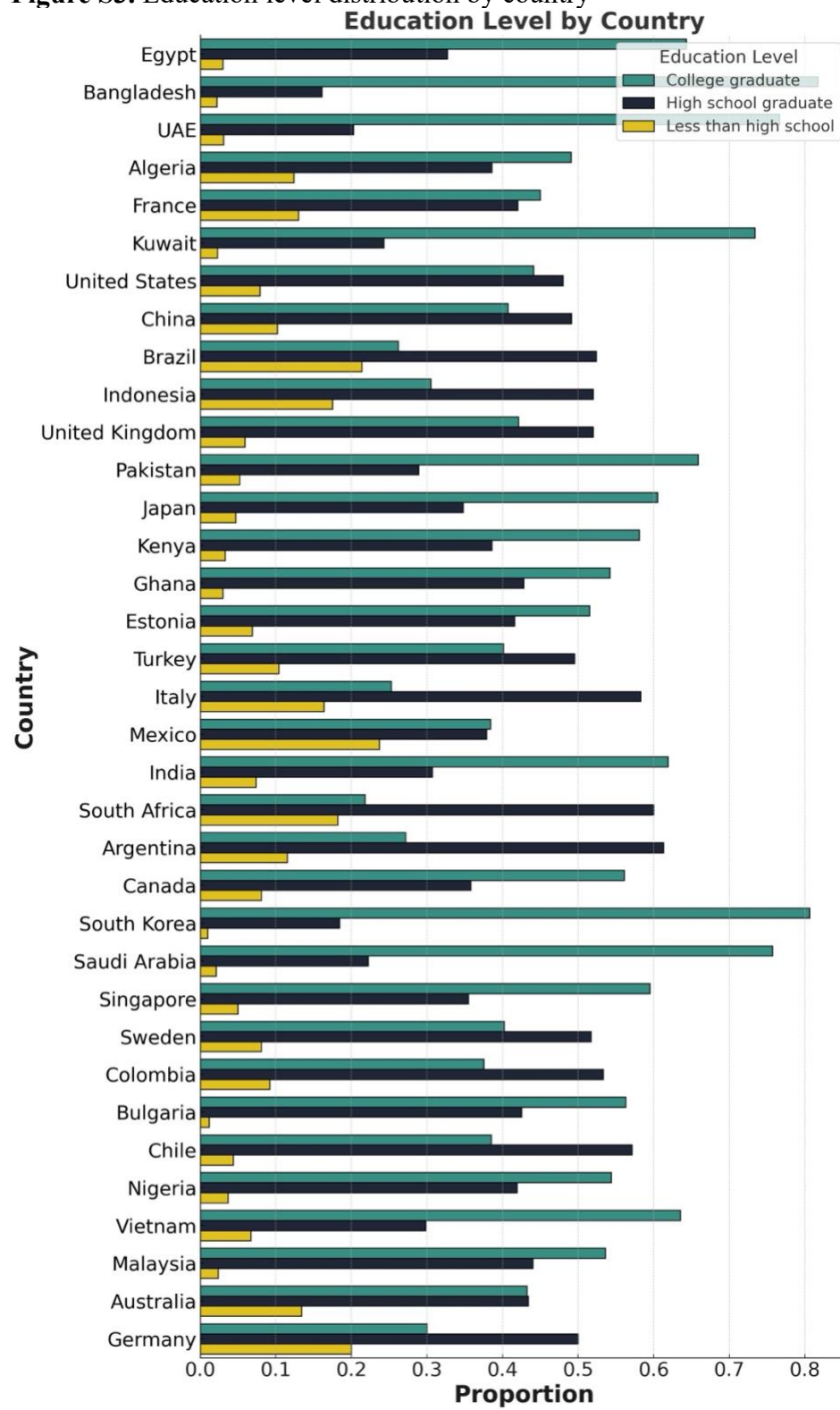


Figure S3. Education level distribution by country



Supplementary Material 3

Figure S4. Country-specific reliability of SMD scale

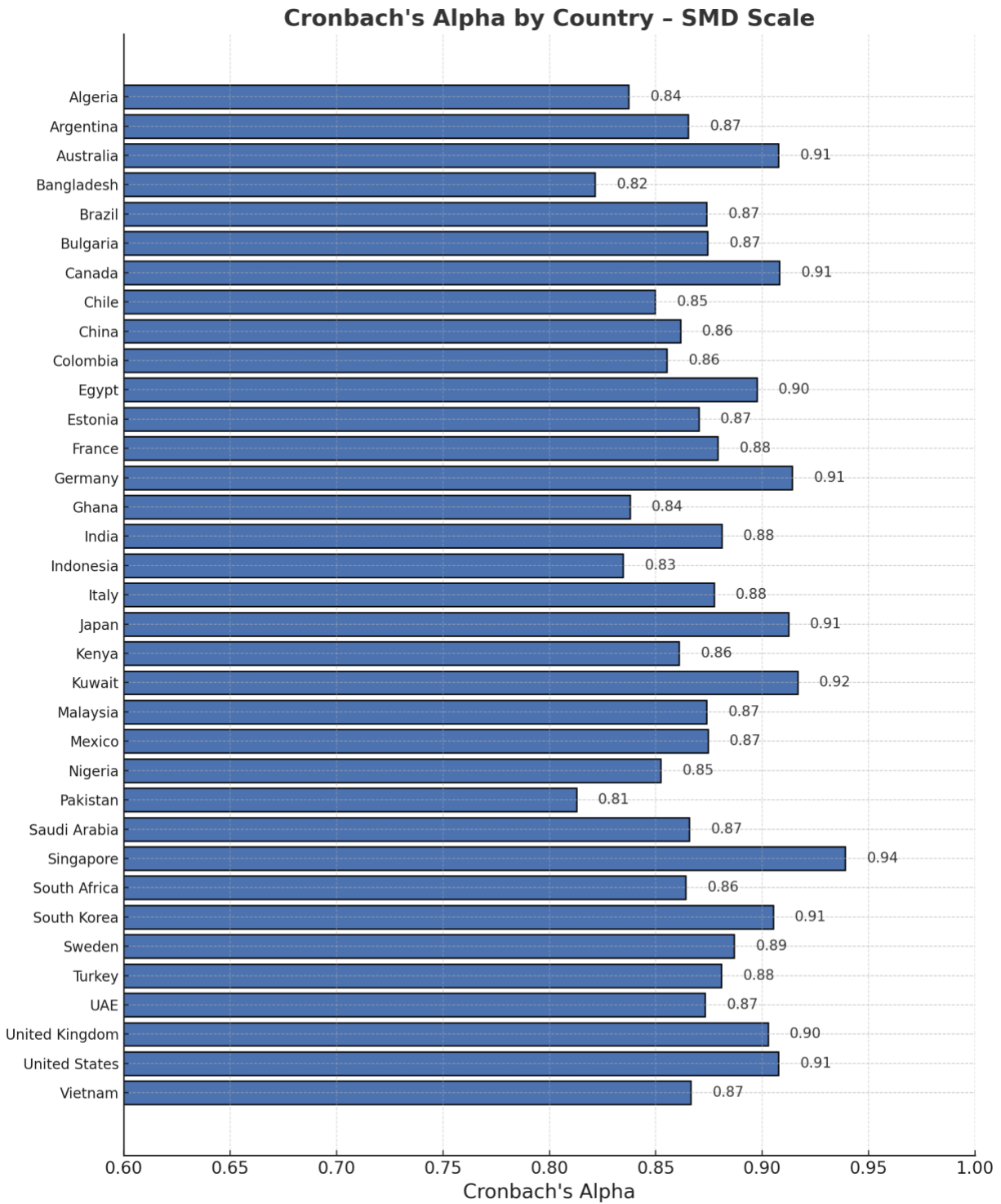
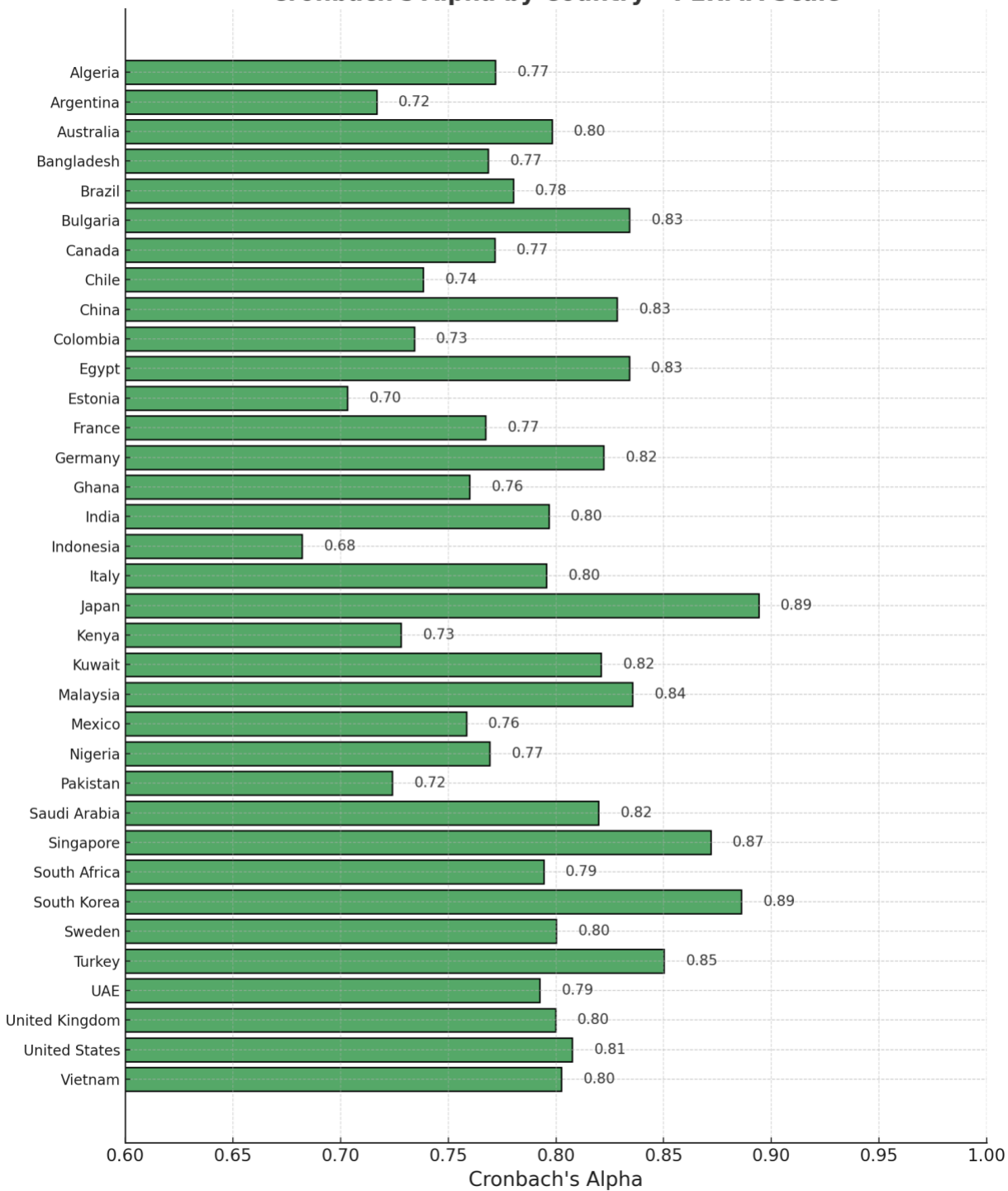


Figure S5. Country-specific reliability of PERMA

Cronbach's Alpha by Country - PERMA Scale



Supplementary Material 4

Country	Item	Total Correlation	if Item Deleted
Algeria	Conflict	0.549443	0.820238
Algeria	Deception	0.559319	0.819332
Algeria	Displacement	0.550364	0.820137
Algeria	Escape	0.516553	0.824229
Algeria	Persistence	0.561719	0.818879
Algeria	Preoccupation	0.630727	0.811714
Algeria	Problem	0.457434	0.83032
Algeria	Tolerance	0.548991	0.820269
Algeria	Withdrawal	0.555298	0.819574
Argentina	Conflict	0.535087	0.856334
Argentina	Deception	0.624029	0.848727
Argentina	Displacement	0.65618	0.84493
Argentina	Escape	0.573957	0.854372
Argentina	Persistence	0.548123	0.855583
Argentina	Preoccupation	0.635027	0.847265
Argentina	Problem	0.545908	0.855456
Argentina	Tolerance	0.645267	0.846889
Argentina	Withdrawal	0.623856	0.848334
Australia	Conflict	0.677234	0.898537
Australia	Deception	0.698709	0.896892
Australia	Displacement	0.712157	0.895338
Australia	Escape	0.580296	0.907489
Australia	Persistence	0.642341	0.900987
Australia	Preoccupation	0.744599	0.892924
Australia	Problem	0.705663	0.895981
Australia	Tolerance	0.748365	0.892815
Australia	Withdrawal	0.719641	0.89506
Bangladesh	Conflict	0.565928	0.798147
Bangladesh	Deception	0.57349	0.797156
Bangladesh	Displacement	0.545092	0.800654
Bangladesh	Escape	0.444735	0.812615
Bangladesh	Persistence	0.500878	0.805931
Bangladesh	Preoccupation	0.393759	0.817723
Bangladesh	Problem	0.587943	0.795765
Bangladesh	Tolerance	0.546642	0.800459
Bangladesh	Withdrawal	0.536781	0.801747
Brazil	Conflict	0.575385	0.863495
Brazil	Deception	0.612775	0.860655
Brazil	Displacement	0.664553	0.855374
Brazil	Escape	0.520032	0.869969
Brazil	Persistence	0.58683	0.862635
Brazil	Preoccupation	0.646045	0.857165
Brazil	Problem	0.560983	0.86468
Brazil	Tolerance	0.68339	0.854049
Brazil	Withdrawal	0.679414	0.854063

Bulgaria	Conflict	0.626134	0.860331
Bulgaria	Deception	0.653442	0.858237
Bulgaria	Displacement	0.671672	0.855276
Bulgaria	Escape	0.498861	0.872565
Bulgaria	Persistence	0.547616	0.86754
Bulgaria	Preoccupation	0.669612	0.85583
Bulgaria	Problem	0.577559	0.863849
Bulgaria	Tolerance	0.676115	0.855225
Bulgaria	Withdrawal	0.644687	0.857863
Canada	Conflict	0.669389	0.899235
Canada	Deception	0.662385	0.899679
Canada	Displacement	0.699889	0.896856
Canada	Escape	0.613808	0.905233
Canada	Persistence	0.662021	0.900095
Canada	Preoccupation	0.734312	0.894461
Canada	Problem	0.700781	0.896911
Canada	Tolerance	0.761484	0.892739
Canada	Withdrawal	0.726418	0.894902
Chile	Conflict	0.57454	0.833598
Chile	Deception	0.596054	0.831575
Chile	Displacement	0.578982	0.83298
Chile	Escape	0.499157	0.842077
Chile	Persistence	0.508728	0.840706
Chile	Preoccupation	0.620392	0.828579
Chile	Problem	0.518091	0.839056
Chile	Tolerance	0.660545	0.825374
Chile	Withdrawal	0.586836	0.832109
China	Conflict	0.663401	0.839679
China	Deception	0.665192	0.839169
China	Displacement	0.587688	0.846938
China	Escape	0.577103	0.848026
China	Persistence	0.625062	0.843246
China	Preoccupation	0.499415	0.855564
China	Problem	0.600684	0.845806
China	Tolerance	0.608655	0.845312
China	Withdrawal	0.481586	0.85707
Colombia	Conflict	0.598926	0.838283
Colombia	Deception	0.604406	0.837553
Colombia	Displacement	0.549123	0.843002
Colombia	Escape	0.52692	0.846282
Colombia	Persistence	0.513433	0.846796
Colombia	Preoccupation	0.627886	0.83507
Colombia	Problem	0.551026	0.842485
Colombia	Tolerance	0.635398	0.834328
Colombia	Withdrawal	0.620188	0.835763
Egypt	Conflict	0.689914	0.883879
Egypt	Deception	0.661969	0.886077

Egypt	Displacement	0.689328	0.883911
Egypt	Escape	0.64196	0.887744
Egypt	Persistence	0.65415	0.886682
Egypt	Preoccupation	0.688227	0.884209
Egypt	Problem	0.582647	0.892079
Egypt	Tolerance	0.707432	0.882588
Egypt	Withdrawal	0.63848	0.887892
Estonia	Conflict	0.536167	0.862438
Estonia	Deception	0.57801	0.858986
Estonia	Displacement	0.622899	0.854858
Estonia	Escape	0.577995	0.861072
Estonia	Persistence	0.584298	0.859371
Estonia	Preoccupation	0.657493	0.852236
Estonia	Problem	0.590811	0.858264
Estonia	Tolerance	0.687354	0.848463
Estonia	Withdrawal	0.669983	0.850431
France	Conflict	0.596768	0.868987
France	Deception	0.659116	0.864235
France	Displacement	0.614016	0.867094
France	Escape	0.607816	0.868802
France	Persistence	0.522536	0.877264
France	Preoccupation	0.669889	0.861876
France	Problem	0.640331	0.865165
France	Tolerance	0.696122	0.860145
France	Withdrawal	0.675701	0.861661
Germany	Conflict	0.72065	0.903368
Germany	Deception	0.757931	0.901168
Germany	Displacement	0.679259	0.906042
Germany	Escape	0.634127	0.910155
Germany	Persistence	0.713189	0.903629
Germany	Preoccupation	0.757887	0.90042
Germany	Problem	0.700962	0.904595
Germany	Tolerance	0.695815	0.90472
Germany	Withdrawal	0.680696	0.905743
Ghana	Conflict	0.529667	0.823067
Ghana	Deception	0.583809	0.817171
Ghana	Displacement	0.596414	0.815596
Ghana	Escape	0.456806	0.830618
Ghana	Persistence	0.495598	0.826873
Ghana	Preoccupation	0.569239	0.818757
Ghana	Problem	0.569733	0.818702
Ghana	Tolerance	0.601189	0.815312
Ghana	Withdrawal	0.525588	0.823675
India	Conflict	0.710632	0.860451
India	Deception	0.712046	0.860196
India	Displacement	0.605605	0.869727
India	Escape	0.401729	0.885455

India	Persistence	0.563508	0.873187
India	Preoccupa	0.592003	0.870899
India	Problem	0.737838	0.857846
India	Tolerance	0.672619	0.863865
India	Withdrawa	0.630817	0.867653
Indonesia	Conflict	0.456268	0.826471
Indonesia	Deception	0.57159	0.814464
Indonesia	Displacem	0.579526	0.813354
Indonesia	Escape	0.428362	0.829845
Indonesia	Persistence	0.582789	0.812965
Indonesia	Preoccupa	0.558731	0.815828
Indonesia	Problem	0.482723	0.824069
Indonesia	Tolerance	0.629888	0.807662
Indonesia	Withdrawa	0.586707	0.812497
Italy	Conflict	0.629458	0.863269
Italy	Deception	0.667035	0.860638
Italy	Displacem	0.621773	0.864043
Italy	Escape	0.569898	0.870618
Italy	Persistence	0.553486	0.871777
Italy	Preoccupa	0.678382	0.859155
Italy	Problem	0.600115	0.866066
Italy	Tolerance	0.655759	0.861396
Italy	Withdrawa	0.66917	0.860443
Japan	Conflict	0.644314	0.906301
Japan	Deception	0.706512	0.901968
Japan	Displacem	0.736794	0.899429
Japan	Escape	0.64917	0.908001
Japan	Persistence	0.710193	0.901734
Japan	Preoccupa	0.771423	0.896942
Japan	Problem	0.642744	0.906372
Japan	Tolerance	0.714591	0.901019
Japan	Withdrawa	0.741794	0.899056
Kenya	Conflict	0.608136	0.844317
Kenya	Deception	0.610604	0.844053
Kenya	Displacem	0.622048	0.842905
Kenya	Escape	0.472474	0.857158
Kenya	Persistence	0.574152	0.847578
Kenya	Preoccupa	0.588604	0.846204
Kenya	Problem	0.575087	0.847494
Kenya	Tolerance	0.659444	0.839156
Kenya	Withdrawa	0.578435	0.847175
Kuwait	Conflict	0.743052	0.904571
Kuwait	Deception	0.727264	0.905694
Kuwait	Displacem	0.735802	0.905134
Kuwait	Escape	0.650084	0.910864
Kuwait	Persistence	0.690595	0.908199
Kuwait	Preoccupa	0.686104	0.908512

Kuwait	Problem	0.722736	0.906024
Kuwait	Tolerance	0.73496	0.905173
Kuwait	Withdrawal	0.666089	0.909833
Malaysia	Conflict	0.631553	0.859032
Malaysia	Deception	0.638161	0.858114
Malaysia	Displacement	0.644962	0.857304
Malaysia	Escape	0.506988	0.870333
Malaysia	Persistence	0.556314	0.865496
Malaysia	Preoccupation	0.616767	0.859907
Malaysia	Problem	0.63514	0.858441
Malaysia	Tolerance	0.66179	0.855828
Malaysia	Withdrawal	0.634172	0.858314
Mexico	Conflict	0.645292	0.858594
Mexico	Deception	0.666763	0.856312
Mexico	Displacement	0.615987	0.860802
Mexico	Escape	0.56343	0.866068
Mexico	Persistence	0.546843	0.866945
Mexico	Preoccupation	0.648582	0.857783
Mexico	Problem	0.572051	0.864522
Mexico	Tolerance	0.642496	0.85847
Mexico	Withdrawal	0.633124	0.859155
Nigeria	Conflict	0.623181	0.831455
Nigeria	Deception	0.591536	0.83477
Nigeria	Displacement	0.590184	0.83493
Nigeria	Escape	0.461499	0.84722
Nigeria	Persistence	0.520428	0.841948
Nigeria	Preoccupation	0.57888	0.836081
Nigeria	Problem	0.599096	0.833994
Nigeria	Tolerance	0.616831	0.832231
Nigeria	Withdrawal	0.562354	0.837781
Pakistan	Conflict	0.570482	0.786014
Pakistan	Deception	0.559978	0.787431
Pakistan	Displacement	0.545417	0.789402
Pakistan	Escape	0.292549	0.818141
Pakistan	Persistence	0.484497	0.797046
Pakistan	Preoccupation	0.489147	0.796553
Pakistan	Problem	0.549893	0.788944
Pakistan	Tolerance	0.565488	0.786797
Pakistan	Withdrawal	0.512135	0.793685
Saudi Arab	Conflict	0.652598	0.846001
Saudi Arab	Deception	0.651601	0.846023
Saudi Arab	Displacement	0.632195	0.848036
Saudi Arab	Escape	0.477442	0.862361
Saudi Arab	Persistence	0.582806	0.852708
Saudi Arab	Preoccupation	0.603885	0.850861
Saudi Arab	Problem	0.550752	0.85565
Saudi Arab	Tolerance	0.630305	0.848235

Saudi Arab Withdrawal	0.587245	0.852327
Singapore Conflict	0.801033	0.930024
Singapore Deception	0.778488	0.931296
Singapore Displacement	0.749406	0.932941
Singapore Escape	0.70115	0.935989
Singapore Persistence	0.717337	0.934824
Singapore Preoccupation	0.775261	0.931469
Singapore Problem	0.801648	0.92993
Singapore Tolerance	0.815093	0.929272
Singapore Withdrawal	0.772306	0.931637
South Africa Conflict	0.561715	0.852728
South Africa Deception	0.618901	0.847203
South Africa Displacement	0.623273	0.846658
South Africa Escape	0.499456	0.85904
South Africa Persistence	0.573653	0.851565
South Africa Preoccupation	0.606057	0.848355
South Africa Problem	0.613331	0.847894
South Africa Tolerance	0.623506	0.846912
South Africa Withdrawal	0.633371	0.845648
South Korea Conflict	0.648493	0.897141
South Korea Deception	0.721868	0.892586
South Korea Displacement	0.711798	0.892051
South Korea Escape	0.607279	0.901032
South Korea Persistence	0.710586	0.892579
South Korea Preoccupation	0.677272	0.894807
South Korea Problem	0.616362	0.899223
South Korea Tolerance	0.741548	0.889891
South Korea Withdrawal	0.729393	0.890758
Sweden Conflict	0.624685	0.876426
Sweden Deception	0.636806	0.875695
Sweden Displacement	0.663988	0.872338
Sweden Escape	0.596015	0.881973
Sweden Persistence	0.645901	0.875184
Sweden Preoccupation	0.711187	0.868974
Sweden Problem	0.602557	0.877815
Sweden Tolerance	0.673958	0.87155
Sweden Withdrawal	0.696504	0.869871
Turkey Conflict	0.670982	0.864122
Turkey Deception	0.648564	0.866355
Turkey Displacement	0.639767	0.866751
Turkey Escape	0.504781	0.878008
Turkey Persistence	0.659142	0.865017
Turkey Preoccupation	0.621892	0.868374
Turkey Problem	0.679831	0.863359
Turkey Tolerance	0.603461	0.869965
Turkey Withdrawal	0.611481	0.869179
UAE Conflict	0.638841	0.856834

UAE	Deception	0.637811	0.856945
UAE	Displacement	0.625337	0.858094
UAE	Escape	0.500143	0.868902
UAE	Persistence	0.541485	0.865379
UAE	Preoccupation	0.632858	0.857558
UAE	Problem	0.642393	0.856498
UAE	Tolerance	0.659445	0.855111
UAE	Withdrawal	0.614458	0.859094
United Kingdom	Conflict	0.644384	0.894801
United Kingdom	Deception	0.673388	0.892028
United Kingdom	Displacement	0.700469	0.889992
United Kingdom	Escape	0.64596	0.897419
United Kingdom	Persistence	0.664817	0.893822
United Kingdom	Preoccupation	0.719972	0.889031
United Kingdom	Problem	0.677263	0.892395
United Kingdom	Tolerance	0.734174	0.888021
United Kingdom	Withdrawal	0.710956	0.889292
United States	Conflict	0.645218	0.900277
United States	Deception	0.701231	0.896575
United States	Displacement	0.737409	0.893231
United States	Escape	0.633535	0.902997
United States	Persistence	0.634395	0.901766
United States	Preoccupation	0.72293	0.894581
United States	Problem	0.655423	0.899437
United States	Tolerance	0.738955	0.893389
United States	Withdrawal	0.748379	0.892595
Vietnam	Conflict	0.598113	0.852219
Vietnam	Deception	0.650702	0.847104
Vietnam	Displacement	0.627651	0.84929
Vietnam	Escape	0.531726	0.858544
Vietnam	Persistence	0.578712	0.853943
Vietnam	Preoccupation	0.532504	0.858459
Vietnam	Problem	0.616595	0.850572
Vietnam	Tolerance	0.625659	0.84948
Vietnam	Withdrawal	0.625473	0.849551

Supplementary Material 4 (continuing)

Country	Item	Item-Total Co Alpha if Item Deleted	
Algeria	Accomplishme	0.566238	0.722061
Algeria	Engagement	0.594036	0.712649
Algeria	Meaning	0.409139	0.778014
Algeria	Positive_Emoi	0.624669	0.705626
Algeria	Relationships	0.543955	0.729882
Argentina	Accomplishme	0.491006	0.66243
Argentina	Engagement	0.40442	0.695246
Argentina	Meaning	0.346981	0.720755
Argentina	Positive_Emoi	0.583275	0.629323
Argentina	Relationships	0.569273	0.627343
Australia	Accomplishme	0.615145	0.748069
Australia	Engagement	0.513779	0.779967
Australia	Meaning	0.513885	0.781242
Australia	Positive_Emoi	0.648616	0.742933
Australia	Relationships	0.62469	0.744856
Bangladesh	Accomplishme	0.551629	0.722617
Bangladesh	Engagement	0.430789	0.763566
Bangladesh	Meaning	0.525152	0.732069
Bangladesh	Positive_Emoi	0.605336	0.703521
Bangladesh	Relationships	0.591994	0.708087
Brazil	Accomplishme	0.579955	0.730624
Brazil	Engagement	0.573919	0.733192
Brazil	Meaning	0.411527	0.786974
Brazil	Positive_Emoi	0.658497	0.70748
Brazil	Relationships	0.567876	0.734993
Bulgaria	Accomplishme	0.618389	0.805347
Bulgaria	Engagement	0.673668	0.789642
Bulgaria	Meaning	0.59063	0.813869
Bulgaria	Positive_Emoi	0.692038	0.787285
Bulgaria	Relationships	0.607677	0.808283
Canada	Accomplishme	0.600731	0.708853
Canada	Engagement	0.548767	0.727838
Canada	Meaning	0.374769	0.787534
Canada	Positive_Emoi	0.650187	0.697996
Canada	Relationships	0.568359	0.720739
Chile	Accomplishme	0.542136	0.676446
Chile	Engagement	0.397714	0.727821
Chile	Meaning	0.377017	0.742101
Chile	Positive_Emoi	0.648421	0.639967
Chile	Relationships	0.563776	0.667441
China	Accomplishme	0.65212	0.786372
China	Engagement	0.587649	0.804825
China	Meaning	0.593791	0.802934
China	Positive_Emoi	0.662391	0.784644
China	Relationships	0.632906	0.792097

Colombia	Accomplishme	0.570873	0.65826
Colombia	Engagement	0.373947	0.729813
Colombia	Meaning	0.399308	0.727007
Colombia	Positive_Emoi	0.595434	0.652702
Colombia	Relationships	0.55517	0.663995
Egypt	Accomplishme	0.649583	0.796204
Egypt	Engagement	0.664157	0.791971
Egypt	Meaning	0.551365	0.823292
Egypt	Positive_Emoi	0.691465	0.784949
Egypt	Relationships	0.615532	0.80574
Estonia	Accomplishme	0.47024	0.649827
Estonia	Engagement	0.529862	0.62449
Estonia	Meaning	0.336991	0.704054
Estonia	Positive_Emoi	0.521059	0.631457
Estonia	Relationships	0.450653	0.658594
France	Accomplishme	0.592764	0.705324
France	Engagement	0.487338	0.743343
France	Meaning	0.318502	0.798562
France	Positive_Emoi	0.690322	0.678537
France	Relationships	0.642582	0.686164
Germany	Accomplishme	0.64166	0.779288
Germany	Engagement	0.681642	0.767675
Germany	Meaning	0.484395	0.82449
Germany	Positive_Emoi	0.673733	0.771461
Germany	Relationships	0.60747	0.789875
Ghana	Accomplishme	0.593633	0.692897
Ghana	Engagement	0.48904	0.730137
Ghana	Meaning	0.430283	0.75192
Ghana	Positive_Emoi	0.575222	0.702403
Ghana	Relationships	0.562407	0.703916
India	Accomplishme	0.578799	0.757788
India	Engagement	0.537552	0.770413
India	Meaning	0.562394	0.76281
India	Positive_Emoi	0.611875	0.748261
India	Relationships	0.599878	0.750929
Indonesia	Accomplishme	0.60795	0.552771
Indonesia	Engagement	0.064599	0.796399
Indonesia	Meaning	0.465674	0.619179
Indonesia	Positive_Emoi	0.604814	0.56896
Indonesia	Relationships	0.566687	0.569585
Italy	Accomplishme	0.614078	0.744395
Italy	Engagement	0.586339	0.75393
Italy	Meaning	0.393465	0.818014
Italy	Positive_Emoi	0.69476	0.724009
Italy	Relationships	0.631293	0.738224
Japan	Accomplishme	0.754183	0.867716
Japan	Engagement	0.769403	0.864224

Japan	Meaning	0.721738	0.875283
Japan	Positive_Emoi	0.766134	0.865926
Japan	Relationships	0.699249	0.88189
Kenya	Accomplishme	0.527553	0.666009
Kenya	Engagement	0.405669	0.712743
Kenya	Meaning	0.417784	0.709219
Kenya	Positive_Emoi	0.560783	0.657798
Kenya	Relationships	0.543591	0.658675
Kuwait	Accomplishme	0.664506	0.77001
Kuwait	Engagement	0.588942	0.792656
Kuwait	Meaning	0.549811	0.804024
Kuwait	Positive_Emoi	0.638673	0.778865
Kuwait	Relationships	0.62716	0.781534
Malaysia	Accomplishme	0.664389	0.794501
Malaysia	Engagement	0.62222	0.806996
Malaysia	Meaning	0.601972	0.81196
Malaysia	Positive_Emoi	0.691221	0.790042
Malaysia	Relationships	0.61291	0.809294
Mexico	Accomplishme	0.562919	0.701239
Mexico	Engagement	0.441038	0.743953
Mexico	Meaning	0.405712	0.756501
Mexico	Positive_Emoi	0.638444	0.67894
Mexico	Relationships	0.598156	0.687386
Nigeria	Accomplishme	0.597259	0.706725
Nigeria	Engagement	0.471929	0.749532
Nigeria	Meaning	0.451954	0.757099
Nigeria	Positive_Emoi	0.604986	0.707178
Nigeria	Relationships	0.583844	0.711511
Pakistan	Accomplishme	0.522122	0.66136
Pakistan	Engagement	0.480542	0.678179
Pakistan	Meaning	0.418745	0.70259
Pakistan	Positive_Emoi	0.48077	0.678892
Pakistan	Relationships	0.516651	0.663502
Saudi Arabia	Accomplishme	0.622184	0.781084
Saudi Arabia	Engagement	0.609085	0.784982
Saudi Arabia	Meaning	0.520606	0.810961
Saudi Arabia	Positive_Emoi	0.675972	0.767224
Saudi Arabia	Relationships	0.638276	0.776194
Singapore	Accomplishme	0.735149	0.835358
Singapore	Engagement	0.703692	0.843316
Singapore	Meaning	0.601408	0.866934
Singapore	Positive_Emoi	0.719418	0.840218
Singapore	Relationships	0.735429	0.835494
South Africa	Accomplishme	0.598019	0.747599
South Africa	Engagement	0.520042	0.771775
South Africa	Meaning	0.477556	0.785577
South Africa	Positive_Emoi	0.674544	0.72664

South Africa	Relationships	0.616233	0.741444
South Korea	Accomplishme	0.69995	0.867229
South Korea	Engagement	0.738216	0.85842
South Korea	Meaning	0.744718	0.856891
South Korea	Positive_Emoi	0.687372	0.870264
South Korea	Relationships	0.755694	0.854262
Sweden	Accomplishme	0.579748	0.762753
Sweden	Engagement	0.56403	0.767789
Sweden	Meaning	0.428865	0.80833
Sweden	Positive_Emoi	0.721074	0.721507
Sweden	Relationships	0.638928	0.743302
Turkey	Accomplishme	0.65667	0.820904
Turkey	Engagement	0.678319	0.815411
Turkey	Meaning	0.622108	0.829821
Turkey	Positive_Emoi	0.67529	0.816597
Turkey	Relationships	0.678905	0.814412
UAE	Accomplishme	0.596851	0.745028
UAE	Engagement	0.565167	0.755489
UAE	Meaning	0.496226	0.777759
UAE	Positive_Emoi	0.616191	0.741197
UAE	Relationships	0.591481	0.74688
United Kingdc	Accomplishme	0.626087	0.747116
United Kingdc	Engagement	0.573972	0.764036
United Kingdc	Meaning	0.441974	0.805098
United Kingdc	Positive_Emoi	0.675921	0.737097
United Kingdc	Relationships	0.614468	0.751025
United States	Accomplishme	0.633384	0.757793
United States	Engagement	0.56408	0.779291
United States	Meaning	0.466072	0.809134
United States	Positive_Emoi	0.683966	0.747167
United States	Relationships	0.639432	0.755807
Vietnam	Accomplishme	0.653687	0.743297
Vietnam	Engagement	0.510706	0.790124
Vietnam	Meaning	0.576543	0.767601
Vietnam	Positive_Emoi	0.602311	0.762804
Vietnam	Relationships	0.604271	0.759057

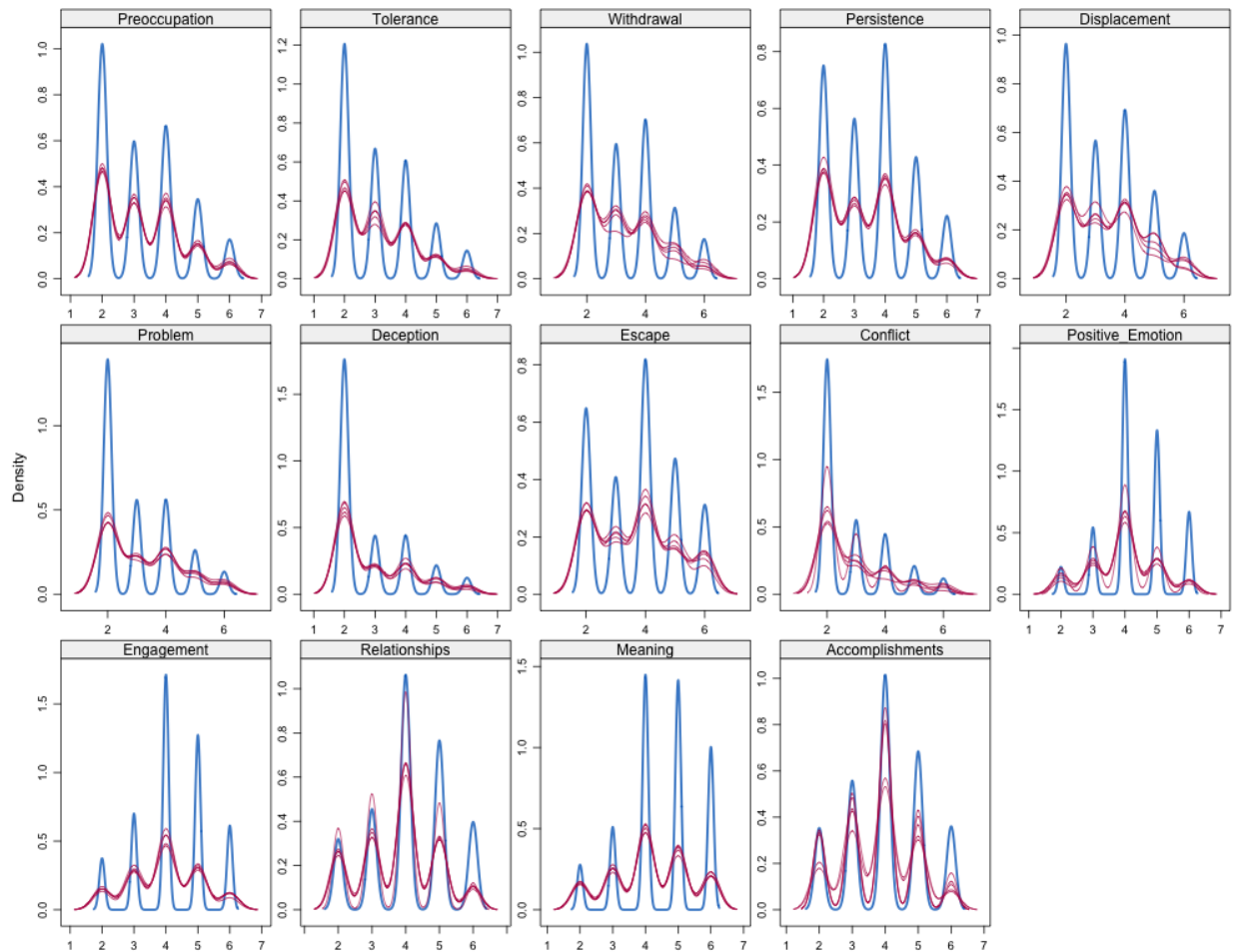
Supplementary Material 5

Items	Number of missing	Proportion of missing
Q2023SM4_SM_Addictive	620	2.953224731
METRIC_A5_Q2023SMD1_Preoccupation	728	3.467657426
METRIC_A5_Q2023SMD2_Tolerance	338	1.609983805
METRIC_A5_Q2023SMD3_Withdrawal	250	1.190816424
METRIC_A5_Q2023SMD4_Persistence	418	1.99104506
METRIC_A5_Q2023SMD5_Displacement	238	1.133657235
METRIC_A5_Q2023SMD6_Problem	276	1.314661332
METRIC_A5_Q2023SMD7_Deception	428	2.038677717
METRIC_A5_Q2023SMD8_Escape	396	1.886253215
METRIC_A5_Q2023SMD9_Conflict	233	1.109840907
METRIC_A6_QPERMADSM1_Positive_Emotion	409	1.948175669
METRIC_A6_QPERMADSM2_Engagement	472	2.248261408
METRIC_A6_QPERMADSM3_Relationships	1287	6.130322949
METRIC_A6_QPERMADSM4_Meaning	1077	5.130037153
METRIC_A6_QPERMADSM5_Accomplishments	656	3.124702296

Supplementary Material 6

Missing data were handled using multiple imputation via chained equations (MICE) with five imputed datasets and predictive mean matching. Diagnostic plots showed that the distributions of imputed values closely matched the observed data and that the algorithm converged appropriately across iterations. All imputed variables were included as predictors for one another (Figure S6).

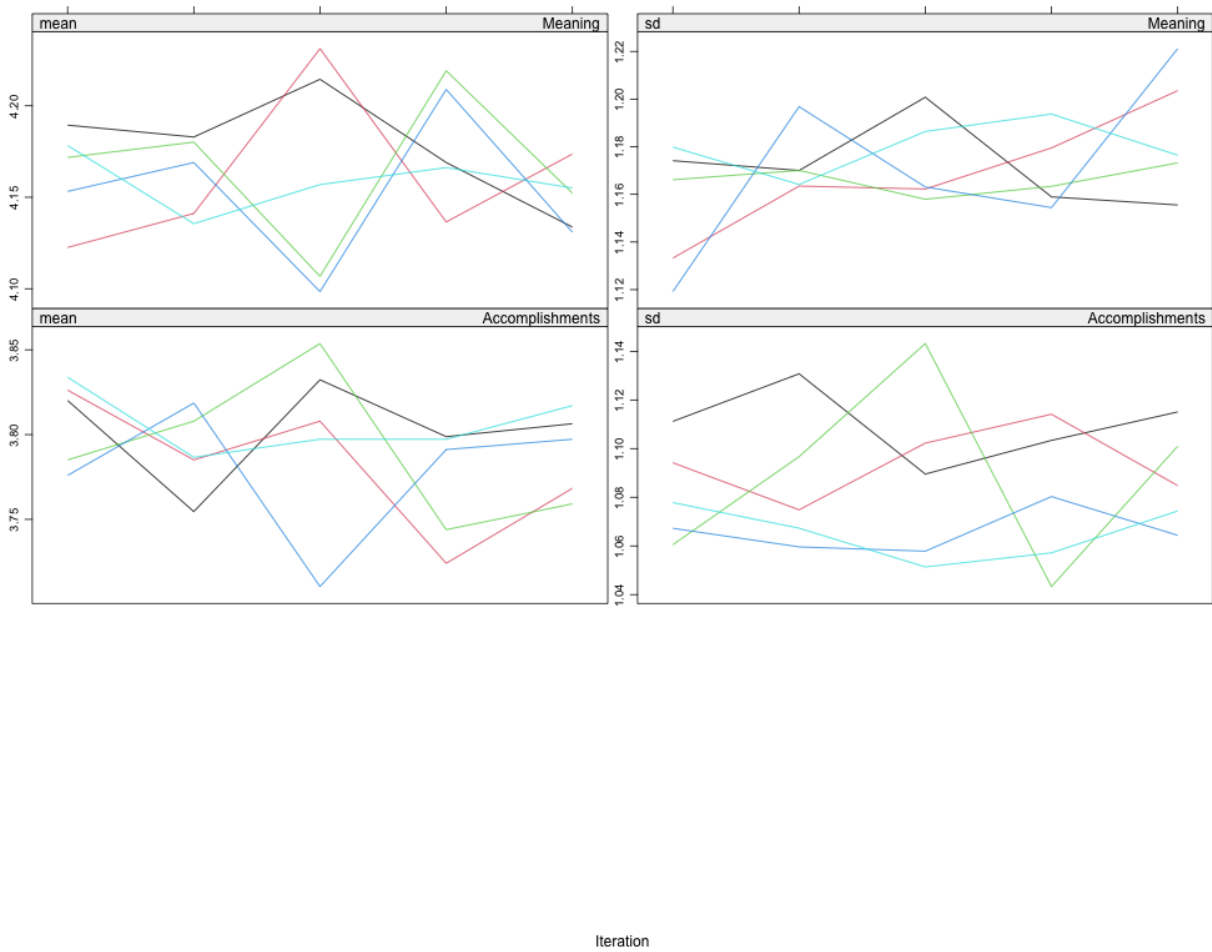
Figure S6. Density plots for data imputation (five datasets are depicted in magenta).



Convergence of the multiple imputation algorithm was evaluated using trace plots (see example below for “Meaning” and “Accomplishments”) (Figure S7). The plots showed stable trends in means and standard deviations across the five imputations and iterations, suggesting that the chained equations procedure achieved adequate convergence.

Figure S7. Trace plots showing the mean and standard deviation of imputed values across iterations for the variables “Meaning” and “Accomplishments” in the multiple imputation

process. Each line represents one of the five imputed datasets, demonstrating stability and convergence across iterations



Supplementary Material 7

To assess the relative contribution of each indicator to latent profile classification, we conducted a variable importance analysis using a supervised machine learning approach. Specifically, a random forest classifier was trained on the full set of SMD and SMWB indicators to predict profile membership as determined by latent profile analysis. The model was implemented using the `randomForest` package in R (version 4.7-1.1), and variable importance was computed using the *Mean Decrease in Gini* index, which quantifies the total reduction in node impurity attributable to each variable across the ensemble.

The importance scores were extracted using the `importance()` function with `type = 2`. The full ranked table is Table S2.

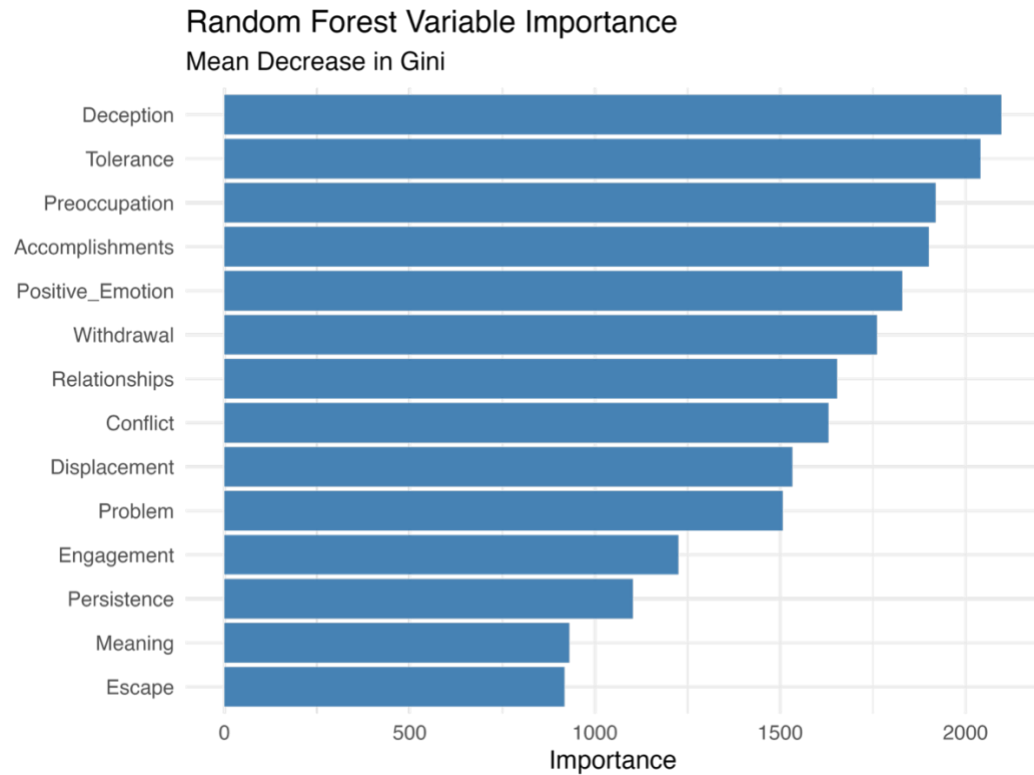
Table S2. Ranked importance of SMD and SMWB indicators in predicting latent profile membership

Variable importance scores from a random forest classifier trained to predict latent profile membership using SMD and SMWB indicators. Importance is based on the mean decrease in Gini index, with higher values indicating greater contribution to classification accuracy. Indicators are sorted in descending order of importance

Variable	Importance
Deception	2096.41027
Tolerance	2040.21104
Preoccupation	1919.40514
Accomplishments	1900.64082
Positive_Emotion	1829.40022
Withdrawal	1760.77546
Relationships	1653.27475
Conflict	1630.34215
Displacement	1532.74012
Problem	1506.42425
Engagement	1225.08838
Persistence	1101.9847
Meaning	930.762917
Escape	917.924453

Results showed that both SMD and SMWB indicators played substantial roles in profile differentiation. The five most important indicators were *Deception*, *Tolerance*, and *Preoccupation* (SMD), followed by *Accomplishments* and *Positive Emotion* (SMWB) (Figure 7). *Deception* emerged as the most influential predictor, suggesting that concealment or dishonest behaviour around social media use was central in distinguishing higher-risk user profiles.

Figure S7. Relative importance of SMD and SMWB indicators in predicting latent profile membership (Random Forest Classifier)



In contrast, indicators such as *Escape*, *Meaning*, and *Persistence* received the lowest importance scores, indicating a weaker role in separating profiles. These items may vary more within profiles or capture experiences less central to the underlying classification structure.

The inclusion of SMWB indicators among the top predictors highlights that the latent profiles reflect not only levels of problematic use, but also meaningful differences in social media–related well-being. These findings support the interpretation of the profiles as qualitatively distinct user types.