Supplement to

"Data-driven identification of subtypes of intimate partner violence"

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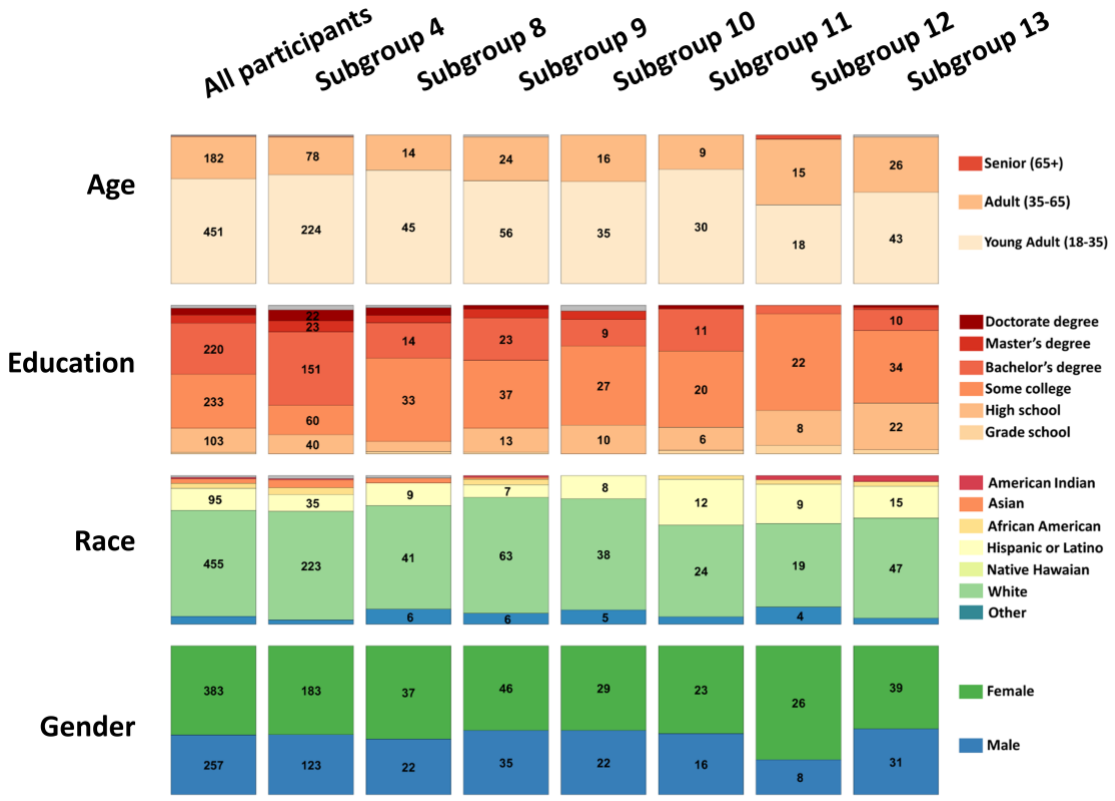
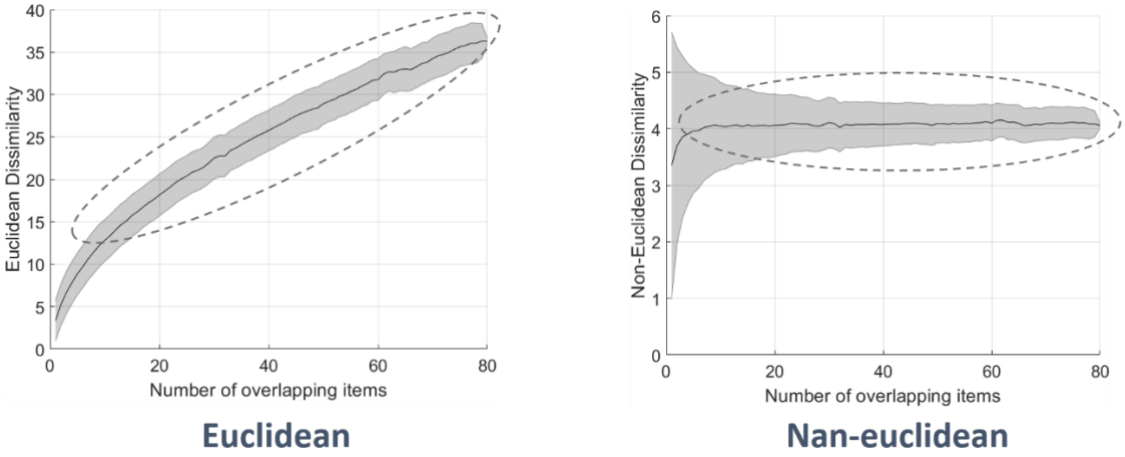


Supplementary Figure 1. Demographics of the identified subgroups of CTS. Rows indicate different demographic characteristics, namely age, education level, race, and gender. Columns indicate different subgroups which are identified based on CTS responses. The left-most column represents all 640 participants. The numbers in each colored block indicate the number of participants in the subgroup having the specified demographic characteristic.



Supplementary Figure 2. NaN-Euclidian measure of dissimilarity removes bias caused by varying number of common dimensions between samples. In our simulation study, we generated a 640x78 data matrix in which rows represent samples (participants) and columns represent dimensions (items). The entries in the matrix were taken from a uniform distribution. Then, we randomly selected and removed 38.8% of the entries in the matrix, to create missing (NaN) data in the same amount as in the original data. We then computed the dissimilarity between all pairs of using Euclidean distance (without normalization) and NaN-Euclidean distance that we use to take into account missing values and the number items that are used to assess the distance between each pair of samples (Equation 1). In each panel, the x-axis shows the number of common (overlapping) dimensions between the pair of samples and the y-axis shows the dissimilarity computed using Euclidian distance (left) and NaN-Euclidian distance (right). The black lines show the mean value across all sample pairs with the respective number of overlapping dimensions, and the shaded areas indicate the range for two standard deviations. As it can be seen, unlike the Euclidean distance, we do not observe considerable bias or variance in NaN-Euclidian dissimilarity with varying number of overlapping items between samples. The mean dissimilarity is lower and there is high variance when the number of overlapping dimensions is very small (e.g., smaller than 5), which is not common in our study since the participants included in the analysis have answers for at least 7 of the 78 items.

Supplementary Table 1. Enrichment analysis on CTS subscales for the annotation of subgroups. The enrichment scores (abbreviated E.S.) and significance figures (p-values) for each CTS subscale are listed for each split in the context of hierarchical clustering.

Scale	Subscale	Split 2-3		Split 4-5		Split 6-7		Split 8-9		Split 10-11		Split 12-13	
		E.S.	P-value	E.S.	P-value	E.S.	P-value	E.S.	P-value	E.S.	P-value	E.S.	P-value
CTS	Injury	0.403	.965	0.337	.984	0.436	.993	0.734	.081	0.712	.587	0.771	.026*
CTS	Negotiation	0.654	.408	1	.001***	1	.001***	-	-	-	-	-	-
CTS	Physical Assault	0.575	.666	0.313	1	0.583	.941	0.511	.811	0.929	.001***	0.662	.208
CTS	Sexual Coercion	0.249	.997	0.355	.97	0.5	.959	0.704	.145	0.667	.781	0.562	.63
CTS	Verbal Abuse	0.834	.005**	-	-	-	-	-	-	-	-	-	-

Supplementary Table 2. Enrichment analysis on the subscales of non-CTS scales for the projection of CTS subgroups to other factors. The enrichment scores (abbreviated E.S.) and significance figures (p-values) for each subscale of non-CTS scales are listed for each split in the context of hierarchical clustering.

Scale	Subscale	Split 2-3		Split 4-5		Split 6-7		Split 8-9		Split 10-11		Split 12-13	
		E.S.	P-value	E.S.	P-value	E.S.	P-value	E.S.	P-value	E.S.	P-value	E.S.	P-value
ASI	Benevolent	-	-	0.724	.028*	-	-	-	-	-	-	-	-
ASI	Hostile	-	-	0.633	.125	-	-	-	-	-	-	-	-
BFI	Agreeableness	0.502	.836	0.696	.072	-	-	0.471	.936	-	-	-	-
BFI	Conscientiousness	0.493	.853	0.716	.064	-	-	0.641	.371	-	-	-	-
BFI	Emotional Stability	0.509	.829	0.651	.169	-	-	0.598	.543	-	-	-	-
BFI	Extraversion	0.428	.962	0.687	.107	-	-	0.623	.438	-	-	-	-
BFI	Openness	0.609	.498	0.253	.984	-	-	0.661	.255	-	-	-	-
BSI	Anxiety	0.69	.328	0.51	.521	0.929	.234	0.524	.809	0.885	.469	0.894	.394
BSI	Depression	0.898	.019*	-	-	-	-	-	-	-	-	-	-
BSI	Hostility	0.919	.022*	-	-	-	-	-	-	-	-	-	-
BSI	Interpersonal Sensitivity	0.71	.359	0.502	.57	0.918	.223	0.787	.187	0.87	.42	0.953	.13
BSI	Obsession Compulsion	0.704	.325	0.346	.875	0.9	.361	0.51	.829	0.896	.426	0.893	.406
BSI	Paranoid Ideation	0.904	.034*	-	-	-	-	-	-	-	-	-	-
BSI	Phobic Anxiety	0.673	.393	0.241	.964	0.874	.446	0.792	.125	0.904	.384	0.904	.326
BSI	Psychoticism	0.755	.247	0.485	.612	0.879	.419	0.593	.632	0.943	.184	0.869	.487

BSI	Somatization	0.649	.448	0.291	.929	0.869	.578	0.546	.768	0.9	.459	0.865	.626
CISS	Avoidance	0.426	.876	0.855	.059	-	-	0.479	.827	-	-	-	-
CISS	Distraction	0.44	.937	0.578	.303	-	-	0.494	.884	-	-	-	-
CISS	Emotion	0.466	.93	0.375	.799	-	-	0.515	.791	-	-	-	-
CISS	Social	0.532	.766	0.573	.392	-	-	0.553	.719	-	-	-	-
CISS	Task	0.548	.654	0.421	.652	-	-	0.656	.145	-	-	-	-
DAS	Affectional Expression	0.867	.087	0.989	.001***	0.986	.04*	-	-	-	-	-	-
DAS	Consensus	0.774	.033*	-	-	-	-	-	-	-	-	-	-
DAS	Dyadic Cohesion	0.935	.015*	-	-	-	-	-	-	-	-	-	-
DAS	Dyadic Satisfaction	0.683	.274	0.895	.001***	0.889	.514	-	-	0.98	.07	-	-
DCI	Negative Dyadic Coping By Oneself	0.859	.091	0.223	.971	-	-	0.636	.533	-	-	-	-
DCI	Negative Dyadic Coping By Partner	0.496	.814	0.71	.158	-	-	0.455	.896	-	-	-	-
DCI	Supportive Dyadic Coping By Oneself	0.57	.671	0.392	.777	-	-	0.72	.276	-	-	-	-
DCI	Supportive Dyadic Coping By Partner	0.571	.671	0.355	.853	-	-	0.453	.943	-	-	-	-
DS	Authority	-	-	0.226	.993	-	-	-	-	-	-	-	-
DS	Disparagement	-	-	0.399	.759	-	-	-	-	-	-	-	-
DS	Restrictiveness	-	-	0.173	.999	-	-	-	-	-	-	-	-
EAQ	Degradation	0.49	.87	0.352	.86	-	-	0.628	.095	-	-	-	-
EAQ	Isolation	0.424	.988	0.339	.907	-	-	0.444	.986	-	-	-	-
EAQ	Property Damage	-	-	0.188	.998	-	-	-	-	-	-	-	-
EAQ	Sexual Abuse	0.449	.93	0.481	.575	-	-	0.754	.104	-	-	-	-

ECR	Anxiety	0.985	.001***	-	-	-	-	-	-	-	-	-	-
ECR	Avoid	0.926	.001***	-	-	-	-	-	-	-	-	-	-
ERC	Emotional Regulation	-	-	0.404	.744	-	-	-	-	-	-	-	-
ERC	Lability Negativity	-	-	0.503	.41	-	-	-	-	-	-	-	-
FDHI	Negative Involvement	0.505	.826	0.418	.658	-	-	0.621	.188	-	-	-	-
FDHI	Positive Involvement	0.49	.885	0.551	.206	-	-	0.582	.386	-	-	-	-
FDHI	Time Energy Involvement	0.618	.32	0.434	.554	-	-	0.535	.66	-	-	-	-
MB	Marital Burnout	0.385	.999	0.212	.995	-	-	0.596	.446	-	-	-	-
MDJS	Behavioral Jealousy	0.405	.989	0.562	.32	-	-	0.635	.378	-	-	-	-
MDJS	Cognitive Jealousy	0.426	.959	0.342	.87	-	-	0.647	.342	-	-	-	-
MDJS	Emotional Jealousy	0.469	.899	0.466	.619	-	-	0.6	.541	-	-	-	-
OQ	Interpersonal Relations	0.767	.061	0.55	.301	0.911	.339	0.587	.502	0.887	.625	0.92	.326
OQ	Risk	0.577	.67	0.224	.979	0.855	.543	0.713	.285	0.877	.483	0.878	.444
OQ	Social Role	0.576	.604	0.389	.778	0.87	.626	0.489	.885	0.884	.634	0.876	.63
OQ	Symptom Distress	0.691	.057	0.388	.734	0.885	.477	0.645	.1	0.904	.441	0.895	.431
POWER	Partner Power	-	-	0.437	.695	-	-	-	-	-	-	-	-
POWER	Self-Power	-	-	0.353	.833	-	-	-	-	-	-	-	-
RQ	Relationship Questionnaire	-	-	0.589	.353	-	-	-	-	-	-	-	-
SBNR	Secure Based Narrative Representational	-	-	0.272	.925	-	-	-	-	-	-	-	-

SF	General Health	0.528	.801	0.523	.505	-	-	0.816	.099	-	-	-	-
SF	Mental Health	0.674	.401	0.379	.81	-	-	0.51	.827	-	-	-	-
SRES	Egalitarian	-	-	0.462	.462	-	-	-	-	-	-	-	-
TCS	Anxiety	0.481	.876	0.707	.068	-	-	0.629	.362	-	-	-	-
TCS	Depression	0.528	.769	0.376	.807	-	-	0.606	.514	-	-	-	-
TCS	Dissociation	0.482	.886	0.649	.198	-	-	0.579	.675	-	-	-	-
TCS	Sati	0.402	.976	0.561	.383	-	-	0.52	.82	-	-	-	-
TCS	Sexual Problems	0.462	.903	0.475	.563	-	-	0.5	.875	-	-	-	-
TCS	Sleep Dis	0.388	.989	0.465	.644	-	-	0.585	.616	-	-	-	-