

Supplementary Information

Table S1. Workload self-ratings of female and male drivers from both age groups related to manual and automated driving in the rested and fatigued conditions.

Condition	Driving Mode	Age Group 20-49 Years				Age Group 50-85 Years			
		Male		Female		Male		Female	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mental Demand									
Rested	Automated	0.873	0.127	0.735	0.144	1.025	0.133	0.956	0.117
	Manual	1.531	0.130	1.107	0.147	1.414	0.136	1.221	0.120
Fatigued	Automated	1.112	0.151	1.064	0.170	0.821	0.158	1.012	0.139
	Manual	1.483	0.138	1.413	0.156	1.405	0.144	1.410	0.127
Physical Demand									
Rested	Automated	0.721	0.122	0.530	0.138	0.613	0.128	0.696	0.113
	Manual	1.209	0.126	0.898	0.142	1.008	0.132	1.186	0.116
Fatigued	Automated	0.828	0.142	0.661	0.160	0.610	0.149	0.704	0.131
	Manual	1.308	0.132	1.131	0.149	1.121	0.138	1.180	0.122
Temporal Demand									
Rested	Automated	0.610	0.124	0.629	0.140	0.883	0.129	0.821	0.114
	Manual	0.741	0.124	0.783	0.140	0.987	0.130	1.172	0.114
Fatigued	Automated	0.613	0.140	0.639	0.158	0.731	0.147	0.748	0.129
	Manual	1.037	0.141	0.977	0.159	1.465	0.147	1.143	0.130
Performance									
Rested	Automated	1.365	0.163	1.651	0.184	1.220	0.170	1.245	0.150
	Manual	1.829	0.107	1.914	0.121	1.681	0.112	1.738	0.099
Fatigued	Automated	1.265	0.171	1.386	0.193	1.328	0.179	1.287	0.158
	Manual	1.567	0.111	1.879	0.125	1.596	0.116	1.770	0.102
Effort									
Rested	Automated	1.052	0.150	0.761	0.169	1.013	0.156	1.101	0.138
	Manual	1.481	0.127	1.192	0.143	1.303	0.133	1.373	0.117
Fatigued	Automated	1.052	0.169	1.183	0.192	1.228	0.177	0.990	0.156
	Manual	1.783	0.129	1.620	0.146	1.745	0.135	1.452	0.119
Frustration									
Rested	Automated	1.155	0.166	1.194	0.188	1.241	0.174	1.289	0.154
	Manual	1.206	0.146	1.095	0.165	1.017	0.153	0.997	0.135
Fatigued	Automated	1.252	0.165	1.460	0.186	1.068	0.172	1.108	0.152
	Manual	1.421	0.156	1.372	0.176	1.392	0.163	1.259	0.144

Note: Data transformation by $\ln(x+1)$ was used before calculating ANOVA. SD - Standard Deviation

Table S2. PERCLOS of female and male drivers from both age groups related to manual and automated driving in the rested and fatigued conditions.

Condition	Driving Mode	Age Group 20-49 Years				Age Group 50-85 Years			
		Male		Female		Male		Female	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Minimal PERCLOS									
Rested	Automated	0.007	0.004	0.004	0.004	0.004	0.004	0.011	0.004
	Manual	0.001	0.002	0.005	0.002	0.006	0.002	0.005	0.002
Fatigued	Automated	0.006	0.004	0.010	0.004	0.008	0.004	0.010	0.004
	Manual	0.006	0.002	0.004	0.002	0.003	0.002	0.006	0.002
Maximal PERCLOS									
Rested	Automated	0.161	0.028	0.147	0.029	0.142	0.028	0.179	0.026
	Manual	0.082	0.026	0.102	0.026	0.165	0.026	0.143	0.023
Fatigued	Automated	0.275	0.041	0.268	0.042	0.220	0.041	0.197	0.037
	Manual	0.118	0.032	0.167	0.033	0.156	0.032	0.131	0.029
Median PERCLOS									
Rested	Automated	0.032	0.016	0.027	0.016	0.026	0.016	0.068	0.014
	Manual	0.011	0.010	0.026	0.010	0.024	0.010	0.032	0.009
Fatigued	Automated	0.053	0.018	0.064	0.018	0.069	0.018	0.060	0.016
	Manual	0.024	0.010	0.031	0.010	0.020	0.010	0.034	0.009
Mean PERCLOS									
Rested	Automated	0.042	0.015	0.035	0.016	0.039	0.015	0.072	0.014
	Manual	0.015	0.010	0.031	0.010	0.035	0.010	0.040	0.009
Fatigued	Automated	0.075	0.019	0.086	0.020	0.075	0.019	0.072	0.017
	Manual	0.031	0.012	0.039	0.012	0.038	0.012	0.041	0.011
Variance PERCLOS									
Rested	Automated	0.002	0.001	0.002	0.001	0.002	0.001	0.004	0.001
	Manual	0.000	0.001	0.001	0.001	0.003	0.001	0.002	0.001
Fatigued	Automated	0.010	0.003	0.010	0.003	0.006	0.003	0.007	0.003
	Manual	0.001	0.003	0.002	0.003	0.008	0.003	0.003	0.003

Note: Data transformation by $\ln(x+1)$ was used before calculating ANOVA. SD - Standard Deviation

Table S3. KSS self-ratings of female and male drivers from both age groups related to the baseline before-test, manual and automated driving in the rested and fatigued conditions.

Condition	Baseline/Driving Mode	Age Group 20-49 Years				Age Group 50-85 Years			
		Male		Female		Male		Female	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Rested	Baseline	1.299	0.071	1.277	0.080	1.141	0.074	1.242	0.065
	Automated	1.717	0.089	1.645	0.101	1.675	0.094	1.730	0.083
	Manual	1.704	0.085	1.771	0.096	1.578	0.088	1.615	0.078
Fatigued	Baseline	1.997	0.075	2.017	0.084	1.834	0.078	1.677	0.069
	Automated	2.155	0.066	2.18	0.074	2.093	0.069	1.963	0.061
	Manual	2.130	0.071	2.125	0.080	2.005	0.074	1.871	0.065

Note: Data transformation by $\ln(x+1)$ was used before calculating ANOVA. SD - Standard Deviation

Table S4. Reaction time (RT) of female and male drivers from both age groups related to manual and automated driving in the rested and fatigued conditions.

Condition	Driving Mode	Age Group 20-49 Years				Age Group 50-85 Years			
		Male		Female		Male		Female	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Minimal RT									
Rested	Automated	0.934	0.137	0.874	0.158	1.047	0.127	0.955	0.132
	Manual	0.902	0.133	0.708	0.154	0.793	0.123	0.848	0.128
Fatigued	Automated	0.964	0.089	0.989	0.103	0.845	0.083	0.912	0.086
	Manual	0.889	0.059	0.829	0.068	0.714	0.054	0.824	0.056
Maximal RT									
Rested	Automated	1.325	0.244	1.397	0.281	1.529	0.226	1.280	0.234
	Manual	1.103	0.188	1.035	0.217	1.054	0.174	1.248	0.180
Fatigued	Automated	1.269	0.161	1.243	0.186	1.228	0.149	1.307	0.154
	Manual	1.099	0.122	1.175	0.140	1.058	0.113	1.035	0.117
Median RT									
Rested	Automated	1.167	0.174	0.976	0.201	1.254	0.161	1.014	0.167
	Manual	0.986	0.133	0.894	0.153	0.922	0.123	0.965	0.128
Fatigued	Automated	1.099	0.103	1.074	0.119	1.018	0.096	1.062	0.099
	Manual	0.971	0.064	0.923	0.074	0.870	0.060	0.922	0.062
Mean RT									
Rested	Automated	1.180	0.196	1.151	0.227	1.338	0.182	1.127	0.189
	Manual	1.007	0.154	0.897	0.178	0.934	0.143	1.076	0.148
Fatigued	Automated	1.123	0.121	1.115	0.140	1.065	0.112	1.135	0.117
	Manual	0.992	0.087	1.025	0.101	0.897	0.081	0.934	0.084
Variance RT									
Rested	Automated	0.774	0.495	0.836	0.571	1.023	0.458	0.495	0.475
	Manual	0.495	0.349	0.188	0.403	0.399	0.323	0.569	0.335
Fatigued	Automated	0.469	0.304	0.358	0.351	0.514	0.281	0.539	0.292
	Manual	0.152	0.208	0.584	0.240	0.283	0.192	0.144	0.200

Note: Data transformation by $\ln(x+1)$ was used before calculating ANOVA. SD - Standard Deviation

Table S5. Non-parametric Spearman's coefficients of correlation between subjective fatigue, age, and PERCLOS (* Indicates significant correlations at $p < 0.05$)

Variable	Correlation	Subjective Fatigue	Age	Minimum PERCLOS	Maximum PERCLOS	Median PERCLOS	Mean PERCLOS	PERCLOS Variance
Automated driving in a rested condition								
Effort	Rho	.428*	.089	.211*	-.002	.077	.013	-.027
	p	.0001	.202	.03	.493	.247	.455	.406
	N	89	89	80	80	80	80	80
Subjective Fatigue	Rho		-.061	.244*	.149	.18	.178	.154
	p		.284	.015	.094	.055	.057	.087
	N		89	80	80	80	80	80
Age	Rho			-.123	.048	-.113	-.072	.028
	p			.139	.337	.158	.264	.402
	N			80	80	80	80	80
Automated driving in a fatigued condition								
Effort	Rho	.288*	.029	.023	.0	.008	.007	.011
	p	.003	.394	.42	.5	.472	.474	.462
	N	89	89	81	81	81	81	81
Subjective Fatigue	Rho		-.193*	.102	.356*	.367*	.376*	.404*
	p		.035	.183	.001	.0001	.0001	.0001
	N		89	81	81	81	81	81
Age	Rho			-.144	-.256*	-.221*	-.257*	-.251*
	p			.1	.01	.024	.01	.012
	N			81	81	81	81	81
Manual driving in a rested condition								
Effort	Rho	.439*	-.049	.047	.073	.034	.111	.091
	p	.0001	.325	.338	.26	.382	.165	.211
	N	89	89	80	80	80	80	80
Subjective Fatigue	Rho		-.123	.082	-.077	.094	.063	-.063
	p		.125	.236	.248	.203	.288	.29
	N		89	80	80	80	80	80
Age	Rho			.031	.192*	-.002	.103	.179
	p			.394	.044	.493	.182	.056
	N			80	80	80	80	80
Manual driving in a fatigued condition								
Effort	Rho	.432*	-.139	.134	.148	.175	.184	.162
	p	.0001	.098	.117	.095	.061	.051	.076
	N	89	89	80	80	80	80	80
Subjective Fatigue	Rho		-.308*	.128	.308*	.258*	.291*	.317*
	p		.002	.129	.003	.01	.004	.002
	N		89	80	80	80	80	80
Age	Rho			-.083	-.225*	-.17	-.165	-.199*
	p			.232	.023	.065	.071	.038
	N			80	80	80	80	80