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Three Waves of Substance-Induced Mental Disorders over the Past 30 Years: Results from a Retrospective Observational Cohort Analysis

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Table 1. All cases per year from dataset, and cases of SID, AID, substance dependence and substance abuse per year.

Year	All cases	Substance induced disorders		Alcohol induced disorders		Substance dependence		Substance abuse	
		Absolute	Percent from all cases	Absolute	Percent from all cases	Absolute	Percent from all cases	Absolute	Percent from all cases
1992	1560311	1744	0,1%	2661	0,2%	96781	6,2%	32616	2,1%
1993	1618597	1000	0,1%	1918	0,1%	117772	7,3%	23939	1,5%
1994	1671039	1062	0,1%	1933	0,1%	131986	7,9%	26412	1,6%
1995	1680697	1095	0,1%	1054	0,1%	136899	8,1%	29632	1,8%
1996	1643731	1286	0,1%	1293	0,1%	149750	9,1%	27637	1,7%
1997	1607957	1535	0,1%	1918	0,1%	137312	8,5%	25769	1,6%
1998	1712268	3948	0,2%	5052	0,3%	180428	10,5%	35233	2,1%
1999	1725885	4687	0,3%	5161	0,3%	167385	9,7%	30961	1,8%
2000	1748957	5901	0,3%	5771	0,3%	176860	10,1%	34338	2,0%
2001	1769941	7171	0,4%	6324	0,4%	194589	11,0%	38290	2,2%
2002	1889848	9343	0,5%	6217	0,3%	242234	12,8%	44941	2,4%
2003	1862834	10653	0,6%	5741	0,3%	267948	14,4%	51689	2,8%
2004	1807301	10058	0,6%	6408	0,4%	255006	14,1%	62858	3,5%
2005	1923753	14088	0,7%	7433	0,4%	301221	15,7%	75040	3,9%
2006	1956713	14730	0,8%	8042	0,4%	318624	16,3%	76092	3,9%
2007	1966450	15089	0,8%	9427	0,5%	307139	15,6%	75905	3,9%
2008	2064820	14822	0,7%	10830	0,5%	338720	16,4%	92796	4,5%
2009	2046070	16114	0,8%	11050	0,5%	347848	17,0%	95815	4,7%
2010	1924055	15261	0,8%	9617	0,5%	347349	18,1%	100825	5,2%
2011	1919466	17252	0,9%	7717	0,4%	372628	19,4%	97064	5,1%

Year	All cases	Substance induced disorders		Alcohol induced disorders		Substance dependence		Substance abuse	
		Absolute	Percent from all cases	Absolute	Percent from all cases	Absolute	Percent from all cases	Absolute	Percent from all cases
2012	1826816	19203	1,1%	6649	0,4%	357370	19,6%	82646	4,5%
2013	1761003	20056	1,1%	6593	0,4%	360591	20,5%	75123	4,3%
2014	1648325	16692	1,0%	5031	0,3%	346986	21,1%	69666	4,2%
2015	1694055	28453	1,7%	7084	0,4%	419191	24,7%	72966	4,3%
2016	1818421	39798	2,2%	8354	0,5%	482867	26,6%	76121	4,2%
2017	1981862	44970	2,3%	10883	0,5%	658955	33,2%	94515	4,8%
2018	2031116	48797	2,4%	13012	0,6%	775221	38,2%	114474	5,6%
2019	1889755	42288	2,2%	12043	0,6%	692781	36,7%	103703	5,5%
2020	1545201	37491	2,4%	10299	0,7%	549379	35,6%	87471	5,7%
2021	1482543	40867	2,8%	11248	0,8%	526560	35,5%	83601	5,6%
2022	1498034	38243	2,6%	11741	0,8%	527805	35,2%	82408	5,5%

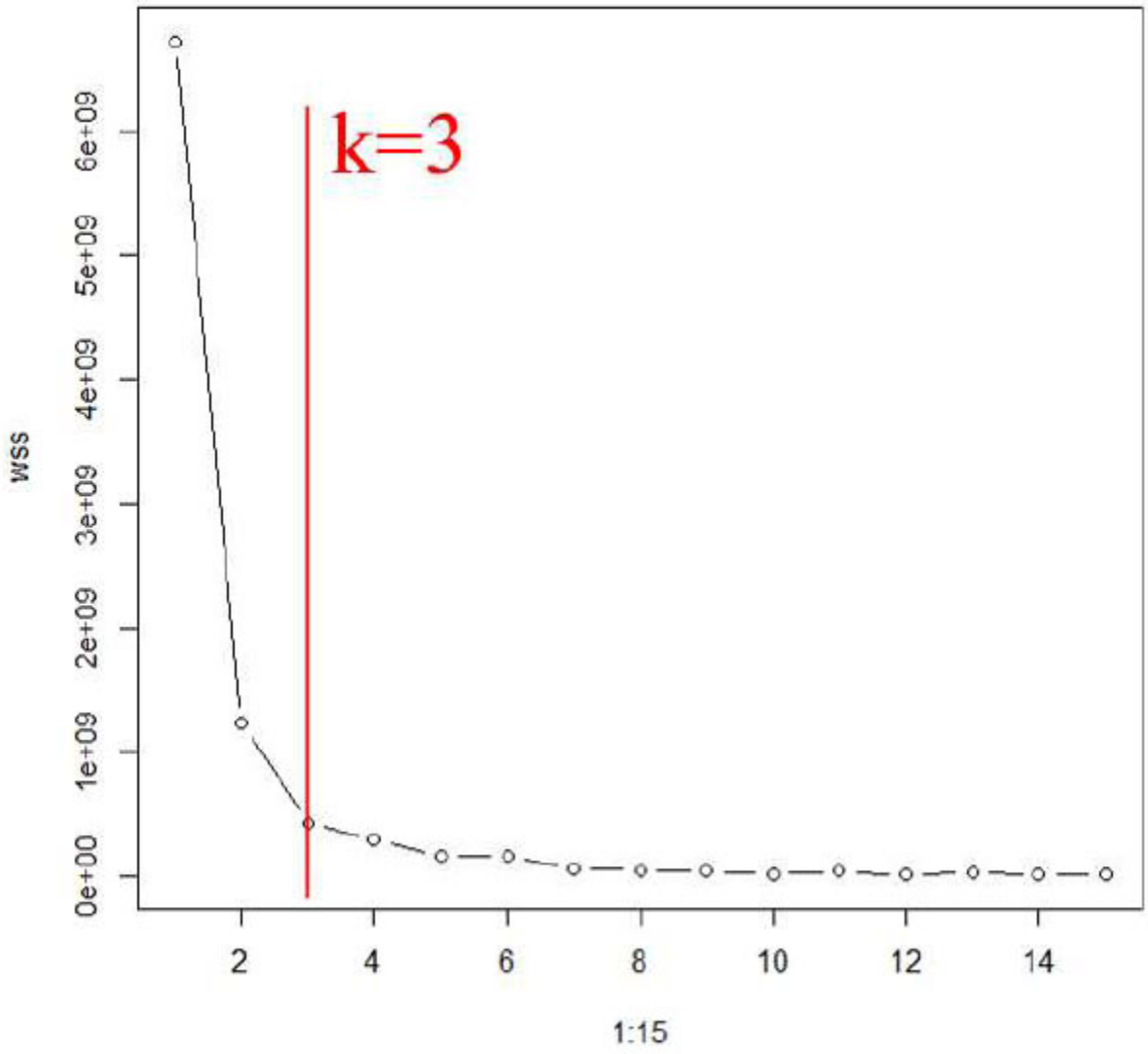

Fig. S1. WSS-plot.

Table 2. Gender and age percentage among SID cases

YEAR	ALL SID	GENDER		AGE											CLUSTER
		MALE	FEMALE	12-14	15-17	18-20	21-24	25-29	30-34	35-39	40-44	45-49	50-54	55 and more	
1992	1744	63,9%	36,1%	0,3%	0,7%	7,6%	13,2%	23,8%	25,9%	13,5%	6,9%	3,0%	1,1%	3,4%	I
1993	1000	69,8%	30,2%	0,2%	0,5%	5,1%	12,1%	22,0%	23,7%	18,8%	8,0%	3,9%	1,4%	3,7%	
1994	1062	63,9%	36,0%	0,3%	1,5%	6,4%	11,7%	20,9%	25,3%	17,3%	9,5%	2,9%	1,1%	2,5%	
1995	1095	64,6%	35,4%	1,2%	3,5%	7,5%	12,1%	19,5%	21,6%	16,6%	8,5%	5,3%	1,6%	2,0%	
1996	1286	63,4%	36,6%	1,3%	4,0%	7,5%	9,7%	17,4%	19,9%	18,5%	12,8%	4,7%	1,6%	1,9%	
1997	1535	66,4%	33,6%	1,8%	2,9%	7,4%	9,3%	16,0%	21,1%	17,0%	13,5%	5,4%	2,3%	2,2%	
1998	3948	68,2%	31,8%	1,5%	3,5%	5,7%	9,7%	15,9%	19,9%	17,9%	14,9%	6,4%	2,5%	1,5%	
1999	4687	71,6%	28,4%	1,5%	3,8%	6,8%	10,7%	15,3%	18,4%	16,9%	13,6%	8,1%	2,9%	1,5%	
2000	5901	68,8%	31,1%	1,4%	3,9%	6,7%	10,4%	14,8%	18,0%	18,3%	13,6%	8,3%	3,1%	1,6%	
2001	7171	65,8%	34,2%	1,7%	4,5%	6,6%	11,2%	12,9%	17,2%	18,0%	14,0%	9,0%	3,2%	1,6%	
2002	9343	67,0%	32,9%	1,1%	4,0%	6,4%	11,5%	13,4%	15,7%	17,6%	14,4%	9,9%	4,0%	2,0%	II
2003	10653	68,1%	31,9%	1,3%	3,9%	6,5%	11,4%	14,2%	15,8%	15,6%	15,2%	10,1%	4,0%	2,1%	
2004	10058	66,4%	33,6%	1,6%	4,5%	7,5%	12,3%	15,0%	15,2%	14,7%	14,3%	9,1%	3,8%	2,0%	
2005	14088	68,7%	31,3%	1,2%	3,5%	6,8%	12,1%	15,8%	14,4%	14,0%	14,7%	10,3%	4,9%	2,3%	
2006	14730	68,9%	31,1%	1,0%	3,2%	6,3%	12,7%	16,2%	14,2%	14,5%	13,9%	10,3%	5,2%	2,3%	
2007	15089	66,5%	33,5%	1,2%	4,2%	6,6%	12,2%	16,2%	13,8%	14,2%	13,2%	10,7%	5,3%	2,3%	
2008	14822	65,9%	34,1%	1,2%	4,0%	7,3%	12,9%	16,7%	13,5%	13,2%	12,3%	9,8%	5,9%	3,2%	
2009	16114	66,2%	33,8%	1,2%	4,5%	7,2%	14,2%	16,9%	13,7%	11,7%	11,0%	9,7%	6,3%	3,5%	
2010	15261	63,5%	36,5%	1,3%	4,6%	7,6%	15,1%	18,7%	13,8%	10,9%	10,0%	8,6%	5,7%	3,7%	
2011	17252	63,3%	36,7%	1,2%	4,1%	7,9%	15,3%	19,1%	14,6%	10,3%	9,6%	8,4%	5,7%	3,9%	
2012	19203	63,9%	36,0%	1,2%	3,6%	7,5%	15,0%	18,7%	15,2%	10,4%	9,2%	8,4%	6,2%	4,6%	
2013	20056	62,6%	37,4%	1,0%	3,5%	6,6%	15,3%	19,7%	16,8%	10,2%	8,9%	7,3%	6,2%	4,6%	
2014	16692	63,2%	36,8%	0,6%	2,3%	6,8%	15,8%	20,6%	16,6%	10,3%	8,1%	7,3%	6,1%	5,5%	
2015	28453	63,2%	36,7%	0,6%	2,9%	5,3%	13,2%	20,8%	16,4%	11,1%	8,5%	7,8%	6,5%	6,8%	III
2016	39798	62,4%	37,6%	0,4%	2,4%	4,5%	12,2%	21,4%	17,1%	12,8%	8,6%	7,8%	6,6%	6,4%	
2017	44970	62,6%	37,3%	0,6%	2,3%	3,9%	10,7%	20,9%	18,4%	13,6%	9,0%	7,6%	6,3%	6,8%	
2018	48797	61,7%	38,3%	0,8%	2,4%	3,9%	10,0%	19,6%	18,2%	14,2%	9,2%	7,4%	6,5%	7,7%	
2019	42288	63,9%	36,0%	1,7%	4,0%	4,1%	9,1%	17,8%	17,6%	14,1%	9,9%	7,5%	6,2%	8,2%	
2020	37491	65,1%	34,8%	1,1%	2,7%	4,1%	8,7%	17,3%	18,5%	14,9%	10,9%	7,6%	6,0%	8,2%	
2021	40867	66,0%	33,8%	0,8%	2,1%	3,7%	8,8%	16,7%	18,3%	15,0%	11,6%	7,8%	6,4%	8,6%	
2022	38243	65,8%	34,1%	0,9%	2,6%	3,5%	8,0%	15,0%	17,9%	15,3%	12,5%	8,0%	6,8%	9,5%	
Chi-square p		*1.1e-56*	*3.1e-54*	*7.6e-29*	*8.7e-117*	*0*	*0*	*4.1e-50*	*3.5e-197*	*3.0e-139*	*1.9e-92*	*1.1e-80*	*3.4e-169*	*0*	
Adjusted p		*1.1e-56*	*3.1e-54*	*7.6e-29*	*8.7e-117*	*0*	*0*	*4.1e-50*	*3.5e-197*	*3.0e-139*	*1.9e-92*	*1.1e-80*	*3.4e-169*	*0*	

Table 3. Educational and married status of all SID cases.

		EDUCATION						MARRIED STATUS				
		NA	< 8 grade	9-11 grade	grade 12	1-3 years of college or university	4 years of college, university, postgraduate study or more	NA	Never married	Now married	Separated	Divorsed, widowed
CLUSTER I	Absolute	1160	2460	8718	11575	4841	675	1799	14311	4796	2467	6056
	Percentage	3.9%	8.4%	29.6%	39.3%	16.4%	2.3%	6.1%	48.6%	16.3%	8.4%	20.6%
CLUSTER II	Absolute	4930	12492	49655	82210	36130	7944	10164	112862	26851	12217	31267
	Percentage	2.5%	6.5%	25.7%	42.5%	18.7%	4.1%	5.3%	58.4%	13.9%	6.3%	16.2%
CLUSTER III	Absolute	107663	13591	48638	106039	34821	10155	67495	180975	26921	12836	32680

		EDUCATION						MARRIED STATUS				
		NA	**< 8 grade**	**9-11 grade**	**grade 12**	**1-3 years of college or university**	**4 years of college, university, postgraduate study or more**	**NA**	**Never married**	**Now married**	**Separated**	**Divorsed, widowed**
	Percentage	33.5%	4.2%	15.2%	33.0%	10.9%	3.2%	21.0%	56.4%	8.4%	4.0%	10.2%
	p Chi square	*< 2.2e-16*	*< 2.2e-16*	*< 2.2e-16*	*< 2.2e-16*	*< 2.2e-16*	*1.41e-97*	*1.73e-220*	*< 2.2e-16*	*< 2.2e-16*	*< 2.2e-16*	*< 2.2e-16*
	p adjusted	*0*	*0*	*0*	*0*	*0*	*1.41e-97*	*1.73e-220*	*0*	*0*	*0*	*0*

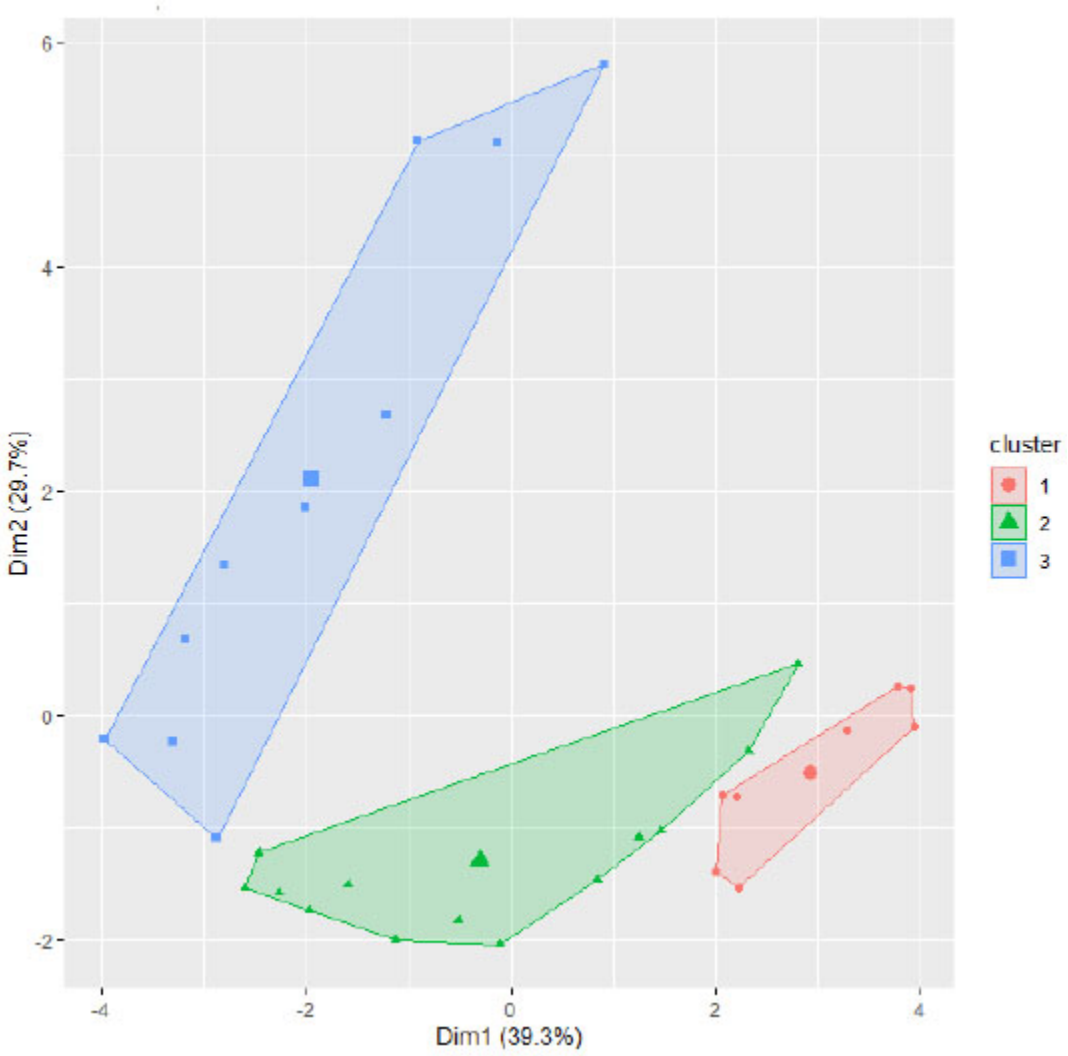

Fig. S2. Cluster plot (package “Factoextra”).

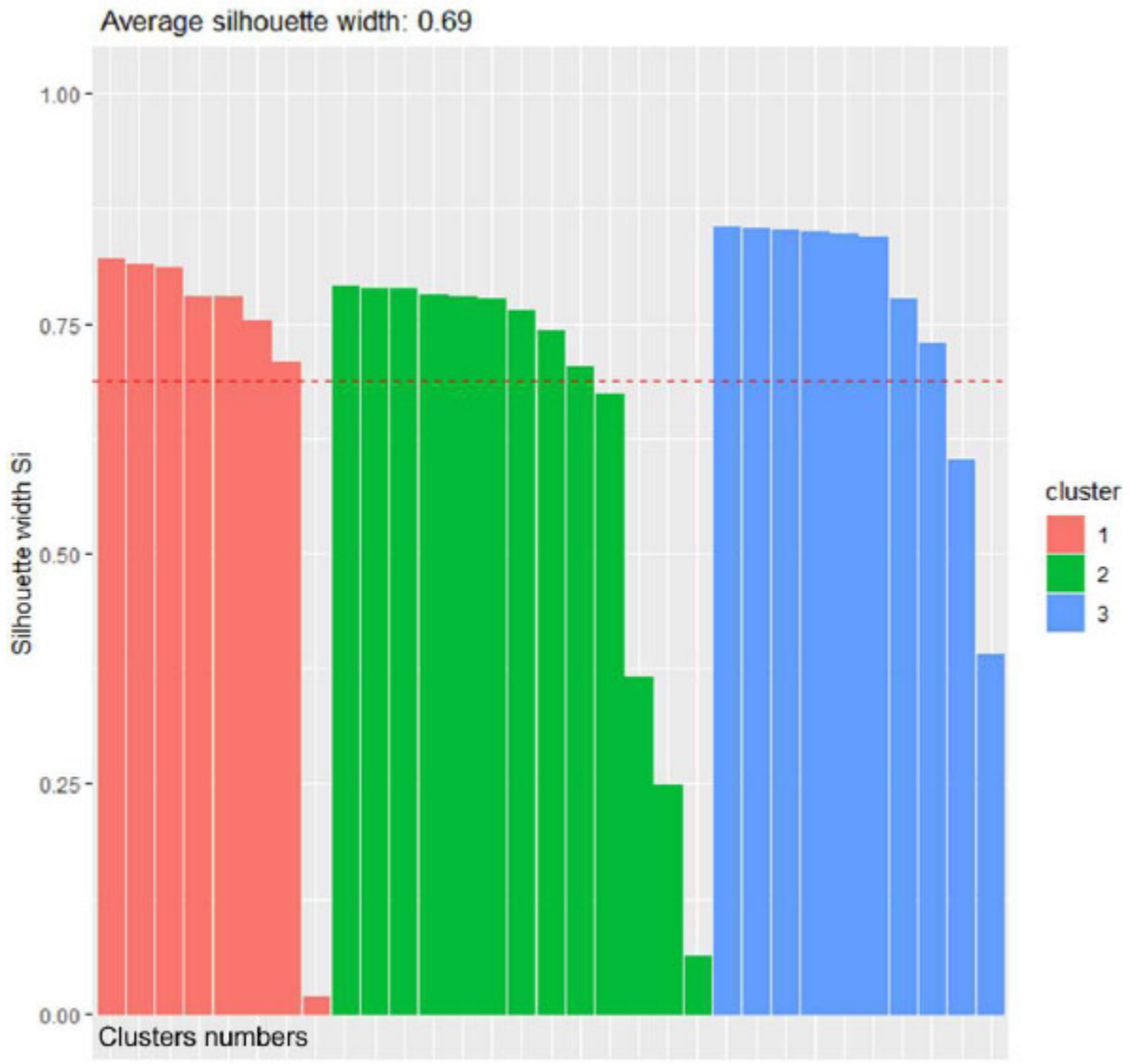

Fig. S3. Cluster silhouette plot.

Table 4. Summary for models of logistic regression analysis.

	CLUSTER I					CLUSTER II					CLUSTER III				
	Estimate	Std.Error	z-value	Pr(>|z|)	Signif. codes	Estimate	Std.Error	z-value	Pr(>|z|)	Signif. codes	Estimate	Std.Error	z-value	Pr(>|z|)	Signif. codes
Model1															
(Intercept)	-0.98909	0.02401	-41.201	<2e-16	***	-0.63842	0.006941	-9.20E+01	<2e-16	***	-0.57316	0.00686	-8.36E+01	<2e-16	***
COKEFLG1	1.02334	0.02692	38.007	<2e-16	***	0.713866	0.00833	8.57E+01	<2e-16	***	0.014656	0.008914	1.644	0.100131	
MARFLG1	-0.22622	0.02723	-8.307	<2e-16	***	-0.2401	0.007869	-3.05E+01	<2e-16	***	-0.04244	0.007727	-5.492	3.97E-08	***
HERFLG1	2.15528	0.03998	53.904	<2e-16	***	0.779388	0.010138	7.69E+01	<2e-16	***	0.199059	0.007877	25.271	<2e-16	***
METHFLG1	0.89341	0.23416	3.815	1.36E-04	***	0.765518	0.035565	2.15E+01	<2e-16	***	0.358454	0.049483	7.244	4.36E-13	***
OPSYNFLG1	1.09057	0.06219	17.537	<2e-16	***	0.878422	0.010201	8.61E+01	<2e-16	***	0.369898	0.009582	3.86E+01	<2e-16	***
PCPFLG1	0.89864	0.25177	3.569	3.58E-04	***	-0.37559	0.073743	-5.09E+00	3.5E-07	***	0.007297	0.046699	0.156	0.875834	
HALLFLG1	0.33936	0.11415	2.973	2.95E-03	**	0.125809	0.047025	2.68E+00	0.00746	**	0.504566	0.040514	1.25E+01	<2e-16	***
MTHAMFLG1	2.23179	0.06255	35.682	<2e-16	***	1.15287	0.01217	9.47E+01	<2e-16	***	1.392911	0.008348	166.861	<2e-16	***
AMPHFLG1	1.40111	0.10549	13.282	<2e-16	***	0.284199	0.031436	9.04E+00	<2e-16	***	0.493902	0.025423	19.427	<2e-16	***

	CLUSTER I					CLUSTER II					CLUSTER III				
	Estimate	**Std.Error**	**z-value**	**Pr(>|z|)**	**Signif. codes**	**Estimate**	**Std.Error**	**z-value**	**Pr(>|z|)**	**Signif. codes**	**Estimate**	**Std.Error**	**z-value**	**Pr(>|z|)**	**Signif. codes**
STIMFLG1	1.07433	0.15254	7.043	1.88E-12	***	1.210012	0.050885	2.38E+01	<2e-16	***	0.504098	0.037193	13.554	<2e-16	***
BENZFLG1	1.12249	0.08647	12.982	<2e-16	***	0.583516	0.015956	3.66E+01	<2e-16	***	0.247846	0.014633	16.938	<2e-16	***
TRNQFLG1	0.55088	0.18542	2.971	2.97E-03	**	0.172808	0.093067	1.86E+00	6.3E-02	.	0.374781	0.167965	2.231	0.02566	*
BARBFLG1	0.11579	0.19824	0.584	0.559152		1.341427	0.070359	1.91E+01	<2e-16	***	0.567579	0.091525	6.201	5.60E-10	***
SEDHPFLG1	1.15449	0.12676	9.108	<2e-16	***	-0.06895	0.041056	-1.68E+00	9.3E-02	.	0.263158	0.048985	5.37E+00	7.78E-08	***
INHFLG1	1.23057	0.15046	8.179	2.87E-16	***	1.00025	0.065212	1.53E+01	<2e-16	***	0.668115	0.086704	7.71E+00	1.30E-14	***
OTCFLG1	1.75821	0.2565	6.855	7.15E-12	***	0.794421	0.070835	1.12E+01	<2e-16	***	0.313652	0.081814	3.83E+00	0.000126	***
OTHERFLG1	1.30849	0.09011	14.522	<2e-16	***	0.768821	0.016743	4.59E+01	<2e-16	***	0.878789	0.015343	5.73E+01	<2e-16	***
Model2															
(Intercept)	-1.26911	0.15696	-8.086	6.18E-16	***	0.003221	0.032765	0.098	0.922		-0.55286	0.03777	-14.636	<2e-16	***
SERV11	0.82941	0.19211	4.317	1.58E-05	***	0.219098	0.044741	4.90E+00	9.7E-07	***	1.24143	0.04907	25.298	<2e-16	***
SERV21	3.11558	0.1592	19.57	<2e-16	***	1.361387	0.033382	4.08E+01	<2e-16	***	1.89989	0.03845	49.411	<2e-16	***
SERV31	3.06758	0.19081	16.076	<2e-16	***	0.735928	0.056403	1.30E+01	<2e-16	***	1.26648	0.06408	19.763	<2e-16	***
SERV41	0.13255	0.16818	0.788	0.4306		-0.99581	0.036911	-2.70E+01	<2e-16	***	-0.72946	0.04034	-18.084	<2e-16	***
SERV51	-0.3373	0.17078	-1.975	0.0483	*	-1.83325	0.042312	-4.33E+01	<2e-16	***	-0.68802	0.04273	-16.1	<2e-16	***
SERV61	-0.02264	0.16512	-0.137	8.91E-01		-2.19093	0.039722	-5.52E+01	<2e-16	***	-0.61879	0.03999	-15.475	<2e-16	***
SERV71	0.3275	0.15815	2.071	0.0384	*	-1.00332	0.033388	-3.01E+01	<2e-16	***	0.19921	0.0381	5.229	1.70E-07	***
Model3															
(Intercept)	-0.16639	0.01706	-9.754	<2e-16	***	0.074978	0.00507	1.48E+01	<2e-16	***	0.180833	0.005233	34.56	<2e-16	***
NOPRI11	-0.19224	0.02974	-6.465	1.01E-10	***	-0.30303	0.008896	-3.41E+01	<2e-16	***	-0.34554	0.008835	-39.11	<2e-16	***
NOPRI21	0.14863	0.03743	3.971	7.16E-05	***	-0.11058	0.011408	-9.69E+00	<2e-16	***	-0.37782	0.010736	-35.19	<2e-16	***
NOPRI31	0.26642	0.04899	5.438	5.39E-08	***	-0.12197	0.014857	-8.21E+00	2.2E-16	***	-0.43712	0.013193	-33.13	<2e-16	***
NOPRI41	0.64815	0.06494	9.981	<2e-16	***	0.051207	0.018961	2.701	0.00692	**	-0.27519	0.016245	-1.69E+01	<2e-16	***
NOPRI51	1.25081	0.03866	32.358	<2e-16	***	0.105513	0.012095	8.72E+00	<2e-16	***	-0.11393	0.009986	-11.41	<2e-16	***
Model4															
(Intercept)	1.52786	0.213	7.173	7.34E-13	***	1.13716	0.048032	2.37E+01	<2e-16	***	0.5531	0.032067	17.248	<2e-16	***
ROUT11	-1.58962	0.21296	-7.464	8.37E-14	***	-1.31365	0.048105	-2.73E+01	<2e-16	***	-1.22026	0.032449	-3.76E+01	<2e-16	***
ROUT21	-0.76234	0.21293	-3.58	3.43E-04	***	-0.31445	0.048066	-6.54E+00	6.1E-11	***	0.162471	0.032356	5.021	5.13E-07	***
ROUT31	-0.27274	0.21734	-1.255	2.10E-01		-0.37703	0.049211	-7.66E+00	1.8E-14	***	-0.45156	0.033044	-13.665	<2e-16	***
ROUT41	0.58244	0.21623	2.694	7.07E-03	**	-0.10022	0.048747	-2.06E+00	3.9E-02	*	-0.16757	0.032571	-5.145	2.68E-07	***
FR11	-1.65498	0.03635	-45.527	<2e-16	***	-1.45816	0.010582	-1.38E+02	<2e-16	***	-0.71282	0.009008	-7.91E+01	<2e-16	***
FR21	-0.98829	0.02846	-34.726	<2e-16	***	-0.53835	0.008306	-6.48E+01	<2e-16	***	0.045796	0.008015	5.71E+00	1.10E-08	***
Model5															
(Intercept)	0.89554	0.03659	24.476	<2e-16	***	0.70335	0.01082	65.017	<2e-16	***	0.360023	0.008747	41.158	<2e-16	***
FU11	-1.26609	0.05378	-23.542	<2e-16	***	-1.2915	0.01838	-70.279	<2e-16	***	-0.62331	0.01769	-35.235	<2e-16	***
FU21	-1.34592	0.04541	-29.64	<2e-16	***	-1.15554	0.01362	-84.845	<2e-16	***	-0.70266	0.012331	-56.982	<2e-16	***
FU31	-1.24718	0.04295	-29.036	<2e-16	***	-0.95926	0.01279	-75.003	<2e-16	***	-0.5501	0.011094	-49.588	<2e-16	***
FU41	-0.84473	0.04599	-18.368	<2e-16	***	-0.61938	0.01354	-45.745	<2e-16	***	-0.30237	0.011471	-26.359	<2e-16	***
FU51	-0.43884	0.05071	-8.654	<2e-16	***	-0.37052	0.01495	-24.782	<2e-16	***	-0.22397	0.012575	-17.811	<2e-16	***
FU61	-0.27999	0.05313	-5.27	1.36E-07	***	-0.12954	0.01621	-7.993	1.3E-15	***	-0.12849	0.013498	-9.519	<2e-16	***
*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*															

Table 5. Wald test results.

Model	Cluster I – Cluster II	Cluster I – Cluster III	Cluster II – Cluster III
Model 1	X2 = 94144.8, df = 17, P(> X2) = 0.0	X2 = 94144.8, df = 17, P(> X2) = 0.0	X2 = 43427.2, df = 17, P(> X2) = 0.0
Model 2	X2 = 98139.0, df = 7, P(> X2) = 0.0	X2 = 91294.9, df = 7, P(> X2) = 0.0	X2 = 77515.0, df = 7, P(> X2) = 0.0
Model 3	X2 = 4233.6, df = 5, P(> X2) = 0.0	X2 = 4602.1, df = 5, P(> X2) = 0.0	X2 = 1328.4, df = 5, P(> X2) = 0.0
Model 4	X2 = 71570.0, df = 6, P(> X2) = 0.0	X2 = 1e+05, df = 6, P(> X2) = 0.0	X2 = 46982.3, df = 6, P(> X2) = 0.0
Model 5	X2 = 15091.8, df = 6, P(> X2) = 0.0	X2 = 19006.0, df = 6, P(> X2) = 0.0	X2 = 13527.4, df = 6, P(> X2) = 0.0
X2 – Chi-square			