Supplemental Online Content

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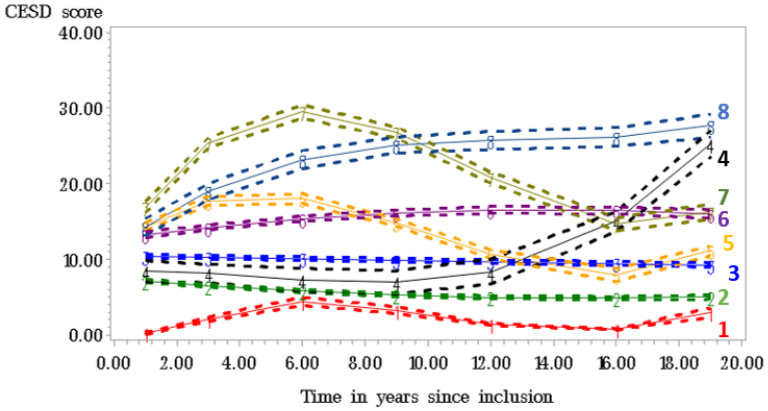
This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods. Calculation of Trajectories of Depressive Symptoms

To calculate trajectories of depressive symptoms, we used a group-based trajectory modeling approach, which is based on a non-parametric mixed model.[1] We estimated the best-fitting number of trajectories based on a minimum Bayesian Information Criterion while maintaining at least 50 participants in each trajectory. Of the initially 8 trajectories obtained, we grouped them into 5 groups for clinical interpretation. The original 8 trajectories are given in eFigure 1 below. The figure shows trajectories of mean CES-D (Center for Epidemiologic Studies Depression Scale) scores over 19 years from the study population of 6,980 individuals, and with up to 7 measures of depressive symptoms. For clinical interpretation, we grouped together trajectories 1 and 2 which have both a CES-D score <10 at each follow-up examination round (new combined low trajectory in the main analysis). We also grouped together the trajectories 3 and 6 that had a CES-D score between 10 and 17 at each follow-up examination (new combined mild trajectory in the main analysis). Finally, we grouped together the trajectories 5 and 7 because these trajectories had the same pattern of moderately high starting CES-D scores, increasing, then remitting (new remitting trajectory in the main analysis). Trajectory 4 corresponds to the low-increasing trajectory and trajectory 8 to the high-increasing trajectory in the main analysis.



TRAJECTORY NUMBER	NUMBER OF PARTICIPANTS (%)	NUMBER OF OBSERVATIONS IN EACH TRAJECTORY DURING FU
1	296 (4,2%)	3851
2	2572 (36,9%)	21532
3	2687 (38,5%)	18072
4	57 (0,8%)	6770
5	424 (6,1%)	1543
6	692 (9,9%)	2343
7	161 (2,3%)	2612
8	91 (1,3%)	985

eFigure 1. The initially obtained eight trajectories of depressive symptoms
The figure shows trajectories of mean CES-D (Center for Epidemiologic Studies Depression Scale) scores over 19 years from 6,980 individuals, with up to 7 measures of depressive symptoms

eTable 1. Definition of Cardiovascular Health Metrics

Metric	Intermediate/ideal level	Poor level
Smoking	Never or quit smoking	Current smokers
Body mass index	<30 kg/m^2	≥30 kg/m^2
Physical activity	≥1h of sports per week	<1h of sports per week
Healthy diet	≥2 portions of fish/week and/or vegetables and fruits everyday	<2 portions of fish/week and <1 portion of fruits and vegetables per day
Blood pressure	No diagnosis of hypertension and no use of antihypertensive medication	Diagnosis of hypertension or use of antihypertensive medication
Hyperglycemia	No diagnosis of diabetes and no use of glucose-lowering medication	Diagnosis of diabetes or use of glucose-lowering medication
Dyslipidemia	No diagnosis of dyslipidemia and no use of lipid-modifying medication	Diagnosis of dyslipidemia or use of lipid-modifying medication

eTable 2. Characteristics Measured in 1997 of Included and Excluded Individuals

	Included	Excluded due to prior coronary heart disease or depressive symptoms in 1997	Excluded due to missing data
	n=6980	**n=3408**	**n=10239**
Age, mean (standard deviation), y	53.3 (3.5)	53.2 (3.4)	53.1 (3.5)
Women, %	1671 (23.9)	720 (21.1)	3223 (31.5)
Education level, %		**n=3340**	**n=9350**
High	1968 (28.2)	799 (23.9)	1935 (20.7)
Intermediate	4711 (67.5)	2344 (70.2)	6607 (70.7)
Low	301 (4.3)	197 (5.9)	808 (8.6)
Occupation level, %		**n=3340**	**n=9350**
High	2098 (30.1)	754 (22.6)	1769 (18.9)
Intermediate	4509 (64.6)	2291 (68.6)	6773 (72.4)
Low	373 (5.3)	295 (8.8)	808 (8.6)

Values are reported as No. (%) unless otherwise indicated.

eTable 3. Characteristics of the Total Study Population in 1997 According to the Trajectories of Depressive Symptoms[a]

	Low trajectory (n=2868 (41.1%))	Mild trajectory (n=3379 (48.4%))	Low-increasing trajectory (n=57 (0.8%))	Remitting trajectory (n=585 (8.4%))	High-increasing trajectory (n=91 (1.3%))
Characteristics					
Age, mean (SD), years	53.5 (10.3)	53.5 (12.9)	54.4 (12.0)	51.6 (3.8)	52.1 (15.9)
Women	412 (14.4%)	865 (25.6%)	14 (24.6%)	324 (55.4%)	56 (61.5%)
Education level					
High	840 (29.3%)	912 (27.0%)	11 (19.3%)	180 (30.8%)	25 (27.5%)
Intermediate	1920 (67%)	2315 (68.5%)	41 (71.9%)	375 (64.1%)	60 (65.9%)
Low	108 (3.8%)	152 (4.5%)	5 (8.8%)	30 (5.1%)	6 (6.6%)
Occupation level					
High	975 (34.0%)	976 (28.9%)	13 (22.87%)	116 (19.8%)	18 (19.8%)
Intermediate	1747 (60.9%)	2210 (65.4%)	40 (70.2%)	444 (75.9%)	68 (74.7%)
Low	146 (5.1%)	193 (5.7%)	4 (7.0%)	25 (4.3%)	5 (5.5%)
Cardiovascular health[b]					
Number of metrics at intermediate/ideal level in 1997, mean (SD)	4.9 (1.3)	4.8 (1.4)	4.5 (1.5)	5.0 (1.3)	4.7 (1.5)

Values are reported as No. (%) unless otherwise indicated.

[a] Depressive symptoms trajectories were calculated from 1997 up to 2015

[b] The cardiovascular health metrics included nonsmoking and intermediate or ideal levels of body weight, physical activity, diet, blood pressure, glucose and cholesterol.

eTable 4. Associations of Cardiovascular Health (in 1997) and 7-Year Change in Cardiovascular Health (Between 1990 and 1997) With Incident Depressive Symptoms—Results of Additional Analysis

	Adjusted odds ratio [95%CI][a,b]
Main analysis	
Cardiovascular health per one additional intermediate/ideal metric	0.87 [0.84 - 0.91]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.91 [0.86 - 0.96]
After excluding individuals with incident coronary heart disease (n=378 excluded)	
Cardiovascular health per one additional intermediate/ideal metric	0.88 [0.84 - 0.92]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.91 [0.86 - 0.97]
Only individuals included with complete follow-up data (total included in analysis n=4832, with 1269 individuals with depressive symptoms at one or more follow-up examinations)	
Cardiovascular health per one additional intermediate/ideal metric	0.86 [0.82 - 0.91]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.88 [0.82 - 0.94]
After multiple imputation (total number included in analysis 8,904)[c]	
Cardiovascular health per one additional intermediate/ideal metric	0.90 [0.86 - 0.93]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.93 [0.89 - 0.98]
Incident depressive symptoms defined as CES-D ≥17 (total included in analysis n=6622, with 1957 individuals with depressive symptoms at one or more follow-up examinations)	
Cardiovascular health per one additional intermediate/ideal metric	0.89 [0.86 - 0.93]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.87 [0.82 - 0.92]
Incident depressive symptoms defined as CES-D ≥23 (total included in analysis n=7895, with 1243 individuals with depressive symptoms at one or more follow-up examinations)	
Cardiovascular health per one additional intermediate/ideal metric	0.84 [0.80 - 0.89]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.81 [0.76 - 0.86]
Incident depressive symptoms defined as CES-D ≥17 in men and CES-D ≥ 23 in women and/or use of antidepressant medication[d] (total included in analysis n=7354, with 1728 individuals with incident depressive symptoms)	
Cardiovascular health per one additional intermediate/ideal metric	0.87 [0.82 – 0.92]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.92 [0.86 - 0.98]
Excluding individuals with depressive symptoms within 3 years of follow-up (total included in analysis n=5808, with 976 individuals with depressive symptoms at one or more follow-up examinations)	
Cardiovascular health per one additional intermediate/ideal metric	0.87 [0.82 - 0.92]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.91 [0.84 - 0.98]
Additional adjustment for childhood life events[e] (total included in analysis n=6622)	
Cardiovascular health per one additional intermediate/ideal metric	0.90 [0.85 - 0.94]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.94 [0.88 - 1.00]
Additional adjustment for psychosocial work environment[f] (total included in analysis n=6219)	
Cardiovascular health per one additional intermediate/ideal metric	0.88 [0.84 - 0.92]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.91 [0.86 - 0.97]
Additional adjustment for psychosocial factors at work[g] (total included in analysis n=5125)	
Cardiovascular health per one additional intermediate/ideal metric	0.85 [0.81 - 0.90]
7-year change in cardiovascular health per one higher intermediate/ideal metric	0.88 [0.82 - 0.94]

Abbreviations: CI=confidence interval, CES-D=Center for Epidemiologic Studies Depression Scale

[a] Odds ratios were adjusted for age, sex, education and occupation.[b] Analyses on 7-year change in cardiovascular health (between 1990 and 1997) were additionally adjusted for number of metrics at intermediate/ideal level in 1990

[c] Imputation of missing covariates (imputed in 887 individuals) and cardiovascular health metrics (imputed in 1037 individuals) with multiple imputation using fully conditional specification method under SAS MI procedure (n=10 imputations). Metrics were not imputed if participants had missing data on all individual cardiovascular health metrics (n=2658).

[d] Antidepressant medication use was available since 2007 via linkage with the French National claims data

[e] Presence of adverse childhood life events (before age 17) was evaluated in 2004 by the ACLE questionnaire (subscales material deprivation, history of early separation and history of conflicts or violence).[2]

[f] Psychosocial work environment was evaluated in 1997 by the short version of the effort–reward imbalance questionnaire (subscales: effort, reward and over-commitment).[3]

[g] Psychosocial factors at work was evaluated in 1997 by the Karasek Job Content Questionnaire (scales: decision latitude, psychological demands, social support and physical demands).[4]

eTable 5. Associations of Individual Cardiovascular Health Metrics (Measured in 1997) With Incident Clinically Relevant Depressive Symptoms

Intermediate/ideal vs poor level of each cardiovascular health metric in 1997	Number of individuals with intermediate/ideal cardiovascular health of the individual metric	Adjusted odds ratio [95% confidence interval][a]
Smoking	5875	0.73 [0.64 - 0.83]
Body mass index	6398	0.86 [0.72 - 1.03]
Physical activity	2653	0.83 [0.75 - 0.93]
Healthy diet	1985	1.03 [0.91 - 1.15]
High blood pressure	5649	0.82 [0.72 - 0.93]
Hyperglycemia	6681	0.68 [0.54 - 0.86]
Dyslipidemia	4807	0.86 [0.77 - 0.97]

[a] Odds ratios were adjusted for age, sex, education and occupation. For each metric, the poor level is used as the reference category.

eTable 6. Associations of 7-Year Change in Each Cardiovascular Health Metric (Between 1990 and 1997) With Incident Clinically Relevant Depressive Symptoms

Change in cardiovascular health between 1990 and 1997	n	Adjusted odds ratio [95% confidence interval][a]
Smoking		
Consistently poor	939	1 [reference]
Poor to intermediate/ideal	565	0.79 [0.63 - 0.99]
Intermediate/ideal to poor	166	1.33 [0.98 - 1.80]
Consistently intermediate/ideal	5310	0.76 [0.66 - 0.88]
Body mass index		
Consistently poor	258	1 [reference]
Poor to intermediate/ideal	39	1.55 [0.86 - 2.79]
Intermediate/ideal to poor	324	0.69 [0.49 - 0.97]
Consistently intermediate/ideal	6359	0.70 [0.55 - 0.90]
Physical activity		
Consistently poor	3651	1 [reference]
Poor to intermediate/ideal	673	0.97 [0.81 - 1.16]
Intermediate/ideal to poor	676	0.84 [0.70 - 1.02]
Consistently intermediate/ideal	1980	0.76 [0.67 - 0.86]
Healthy diet		
Consistently poor	4144	1 [reference]
Poor to intermediate/ideal	1139	0.99 [0.85 - 1.14]
Intermediate/ideal to poor	851	0.94 [0.79 - 1.11]
Consistently intermediate/ideal	846	0.89 [0.82 - 1.24]
High blood pressure		
Consistently poor	637	1 [reference]
Poor to intermediate/ideal	0[b]	-
Intermediate/ideal to poor	694	0.97 [0.78 - 1.22]
Consistently intermediate/ideal	5649	0.80 [0.68 - 0.96]
Hyperglycemia		
Consistently poor	122	1 [reference]
Poor to intermediate/ideal	0[b]	-
Intermediate/ideal to poor	177	1.28 [0.81 – 2.02]
Consistently intermediate/ideal	6681	0.79 [0.55 - 1.15]
Dyslipidemia		
Consistently poor	903	1 [reference]
Poor to intermediate/ideal	0[b]	-
Intermediate/ideal to poor	1270	0.93 [0.77 - 1.11]
Consistently intermediate/ideal	4807	0.83 [0.71 - 0.97]

[a] Odds ratios were adjusted for age, sex, education and occupation. The consistently poor category is used as the reference category

[b] For the metrics high blood pressure, hyperglycemia and dyslipidemia, no individuals changed from a poor level (i.e. diagnosis of hypertension, diabetes or dyslipidemia or use of antihypertensive, glucose-lowering or lipid-modifying medication, respectively) to an intermediate/ideal level. For definition of individual metrics, see eTable 1.

eReferences.

1. Jones BL, Nagin DS. Advances in Group-Based Trajectory Modeling and an SAS Procedure for Estimating Them. Sociol Methods Res. 2007;35(4):542-571.
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