

Supplementary Material

STATA code

**** Descriptive statistics ****

- sum x (details)
- tab x
- table_1_mc (see link: <https://www.stata.com/new-in-stata/create-export-descriptive-statistic-tables/>)

Modeling

- Unadjusted

1. logistic depression_diagnoses moderate_binary vigorous_binary

```
. logistic depression_diagnoses moderate_binary vigorous_binary
```

```
Logistic regression                                Number of obs = 2,288
                                                    LR chi2(2)      = 21.02
                                                    Prob > chi2     = 0.0000
Log likelihood = -755.44206                        Pseudo R2      = 0.0137
```

depression_diagnoses	Odds ratio	Std. err.	z	P> z	[95% conf. interval]	
moderate_binary	.5956156	.0960779	-3.21	0.001	.4341701	.8170944
vigorous_binary	.6851537	.1447244	-1.79	0.073	.4528865	1.036541
_cons	.1477713	.0121392	-23.28	0.000	.1257955	.1735862

Note: _cons estimates baseline odds.

2. Association between moderate_binary and vigorous_binary

```
. tabulate moderate_binary vigorous_binary, chi2
```

moderate_b inary	vigorous_binary		Total
	No	Yes	
No	1,336	129	1,465
Yes	576	357	933
Total	1,912	486	2,398

Pearson chi2(1) = 306.0954 Pr = 0.000

- Adjusted:

1. Adjusted using both moderate and vigorous PA

2. **logistic depression_diagnoses vigorous_binary moderate_binary ib2.age
ib3.RaceHispanicorigin i. Maritalstatus i.income_category thyroid_recode
bronchitis_recode arthritis_recode**

```
. logistic depression_diagnoses vigorous_binary moderate_binary ib2.age ib3.RaceHispanicorigin i.Maritalstatus i.income_category
> thyroid_recode bronchitis_recode arthritis_recode
note: 77.Maritalstatus != 0 predicts failure perfectly;
      77.Maritalstatus omitted and 3 obs not used.
```

Logistic regression

Number of obs = 2,285
LR chi2(20) = 98.83
Prob > chi2 = 0.0000
Pseudo R2 = 0.0645

Log likelihood = -716.2046

depression_diagnoses	Odds ratio	Std. err.	z	P> z	[95% conf. interval]	
vigorous_binary	.7213738	.1609115	-1.46	0.143	.4658962	1.116944
moderate_binary	.6479853	.1081148	-2.60	0.009	.4672445	.8986406
age						
Young Adults	.9322214	.2056799	-0.32	0.750	.6049437	1.436558
Older Adults	.7586708	.1503183	-1.39	0.163	.5145192	1.118678
Senior Adults	.4546082	.1094599	-3.27	0.001	.2835868	.7287665
RaceHispanicorigin						
Mexican American	1.0856	.2418653	0.37	0.712	.7014996	1.680013
Other Hispanic	1.056229	.2642985	0.22	0.827	.6467898	1.724856
Black	.8890426	.1698665	-0.62	0.538	.6113448	1.292882
Other	.7937863	.1806445	-1.01	0.310	.5081511	1.239979
Maritalstatus						
Widowed	1.814427	.4552961	2.37	0.018	1.109549	2.967101
Divorced	2.173378	.4695563	3.59	0.000	1.423095	3.319224
Separated	2.145447	.6476661	2.53	0.011	1.187292	3.876841
Never Married	1.546334	.3499867	1.93	0.054	.992312	2.409675
Living with a partner	1.735986	.4382848	2.18	0.029	1.058384	2.847406
77	1	(empty)				
income_category						
Middle income	.965477	.227838	-0.15	0.882	.6079547	1.533249
Near poor	1.182387	.2166858	0.91	0.361	.8255957	1.693371
Poor	1.4279	.2814734	1.81	0.071	.9702986	2.10131
thyroid_recode	1.456733	.2596321	2.11	0.035	1.027238	2.065802
bronchitis_recode	2.176351	.4471491	3.78	0.000	1.454932	3.255481
arthritis_recode	1.711094	.2847144	3.23	0.001	1.234922	2.370871
_cons	.0841013	.0192273	-10.83	0.000	.053728	.1316452

Note: _cons estimates baseline odds.

3. **logistic depression_diagnoses vigorous_binary moderate_binary ib2.age
ib3.RaceHispanicorigin i. Maritalstatus i.income_category thyroid_recode
bronchitis_recode arthritis_recode i. BMI_category i.sugar_intake_category
Sedentarism_Level**

Logistic regression

Number of obs = 2,285

LR chi2(27) = 116.83

Prob > chi2 = 0.0000

Pseudo R2 = 0.0763

Log likelihood = -707.2055

depression_diagnoses	Odds ratio	Std. err.	z	P> z	[95% conf. interval]	
vigorous_binary	.7690596	.1730159	-1.17	0.243	.4948398	1.195241
moderate_binary	.6572581	.1105351	-2.50	0.013	.4726985	.9138768
age						
Young Adults	.9464894	.211174	-0.25	0.805	.6112258	1.465648
Older Adults	.7874388	.1578253	-1.19	0.233	.5316327	1.166331
Senior Adults	.4952631	.1209552	-2.88	0.004	.3068683	.7993185
RaceHispanicorigin						
Mexican American	1.028384	.2344358	0.12	0.902	.6578258	1.60768
Other Hispanic	1.028696	.2624154	0.11	0.912	.6239496	1.695995
Black	.8240465	.1599723	-1.00	0.319	.5632586	1.205579
Other	.8512239	.196453	-0.70	0.485	.5414969	1.33811
Maritalstatus						
Widowed	1.825105	.4599606	2.39	0.017	1.113703	2.990932
Divorced	2.210163	.4834289	3.63	0.000	1.439597	3.393186
Separated	2.28182	.6943671	2.71	0.007	1.256775	4.14291
Never Married	1.522581	.3476235	1.84	0.066	.9732871	2.38188
Living with a partner	1.736571	.4430865	2.16	0.031	1.053193	2.863365
77	1	(empty)				
income_category						
Middle income	.9284763	.2219584	-0.31	0.756	.5811463	1.483393
Near poor	1.156981	.2135918	0.79	0.430	.8057216	1.661376
Poor	1.353955	.2717483	1.51	0.131	.9136131	2.006534
thyroid_recode	1.468881	.2636648	2.14	0.032	1.033227	2.088227
bronchitis_recode	2.081477	.4324808	3.53	0.000	1.3852	3.127741
arthritis_recode	1.635791	.275468	2.92	0.003	1.17594	2.275467
BMI_category						
Normal weight	.5455761	.2910959	-1.14	0.256	.1917304	1.552458
Pre-obesity	.6559471	.3467031	-0.80	0.425	.2327894	1.848308
Obesity class I	1.041906	.5482072	0.08	0.938	.3715028	2.9221
Obesity class II	.7472522	.4058764	-0.54	0.592	.2577091	2.166729
Obesity class III	.8227631	.4445807	-0.36	0.718	.2853168	2.372588
sugar_intake_category						
Above recommended	1.975657	.4660254	2.89	0.004	1.244305	3.136867
Sedentarism_Level	.9048914	.1476657	-0.61	0.540	.6571919	1.24595
_cons	.1099347	.0615123	-3.95	0.000	.0367162	.3291636

Note: _cons estimates baseline odds.

4. Adjusted excluding moderate_binary

- a. **logistic depression_diagnoses vigorous_binary ib2.age ib3.RaceHispanicorigin i. Maritalstatus i.income_category thyroid_recode bronchitis_recode arthritis_recode**

Log likelihood = -719.72255

Prob > chi2 = 0.0000
Pseudo R2 = 0.0599

depression_diagnoses	Odds ratio	Std. err.	z	P> z	[95% conf. interval]	
vigorous_binary	.6046465	.1282975	-2.37	0.018	.3989225	.9164624
age						
Young Adults	.9165515	.2021339	-0.40	0.693	.5948877	1.412143
Older Adults	.7526024	.1488446	-1.44	0.151	.5107646	1.108946
Senior Adults	.4571777	.1099567	-3.25	0.001	.2853388	.7325026
RaceHispanicorigin						
Mexican American	1.141646	.2528636	0.60	0.550	.7396023	1.762237
Other Hispanic	1.108688	.2758073	0.41	0.678	.6808586	1.805353
Black	.9084419	.1731087	-0.50	0.614	.6253109	1.31977
Other	.7970404	.1811833	-1.00	0.318	.5104874	1.244445
Maritalstatus						
Widowed	1.84739	.4631588	2.45	0.014	1.130197	3.019696
Divorced	2.167677	.4674682	3.59	0.000	1.420461	3.307955
Separated	2.077619	.6251164	2.43	0.015	1.152008	3.746937
Never Married	1.529941	.3458995	1.88	0.060	.9822662	2.382979
Living with a partner	1.72086	.4342399	2.15	0.031	1.049432	2.821869
77	1	(empty)				
income_category						
Middle income	.9708162	.2289587	-0.13	0.900	.6114887	1.541294
Near poor	1.203029	.2201132	1.01	0.312	.8404954	1.721935
Poor	1.494207	.2929263	2.05	0.041	1.017513	2.194226

Sensitivity analysis:
regress y x if k==1
regress y x if k==2

. vif, uncentered

Variable	VIF	1/VIF
vigorous_b~y	1.54	0.647544
moderate_b~y	1.80	0.555650
age		
1	1.98	0.504486
3	1.96	0.509502
4	2.16	0.463833
RaceHispan~n		
1	1.29	0.772761
2	1.20	0.831357
4	1.60	0.626373
5	1.31	0.761531
Maritalsta~s		
2	1.43	0.699915
3	1.37	0.731780
4	1.13	0.882675
5	1.67	0.598859
6	1.28	0.781779
income_cat~y		
2	1.28	0.783919
3	1.56	0.640131
4	1.45	0.689481
thyroid_re~e	1.31	0.766254
bronchitis~e	1.16	0.864053
arthritis_~e	1.98	0.505715
Mean VIF	1.52	

. estat gof

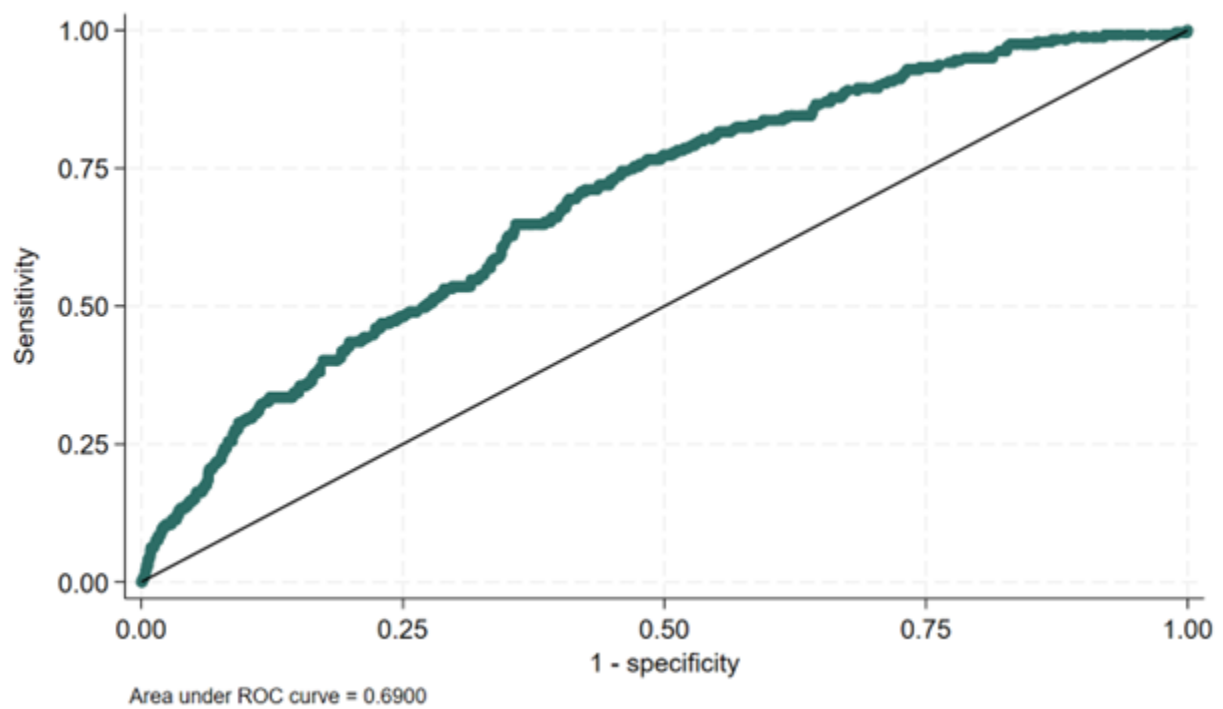
Goodness-of-fit test after logistic model
Variable: depression_diagnoses

Number of observations = 2,285
Number of covariate patterns = 1,232
Pearson chi2(1211) = 1318.57
Prob > chi2 = 0.0163

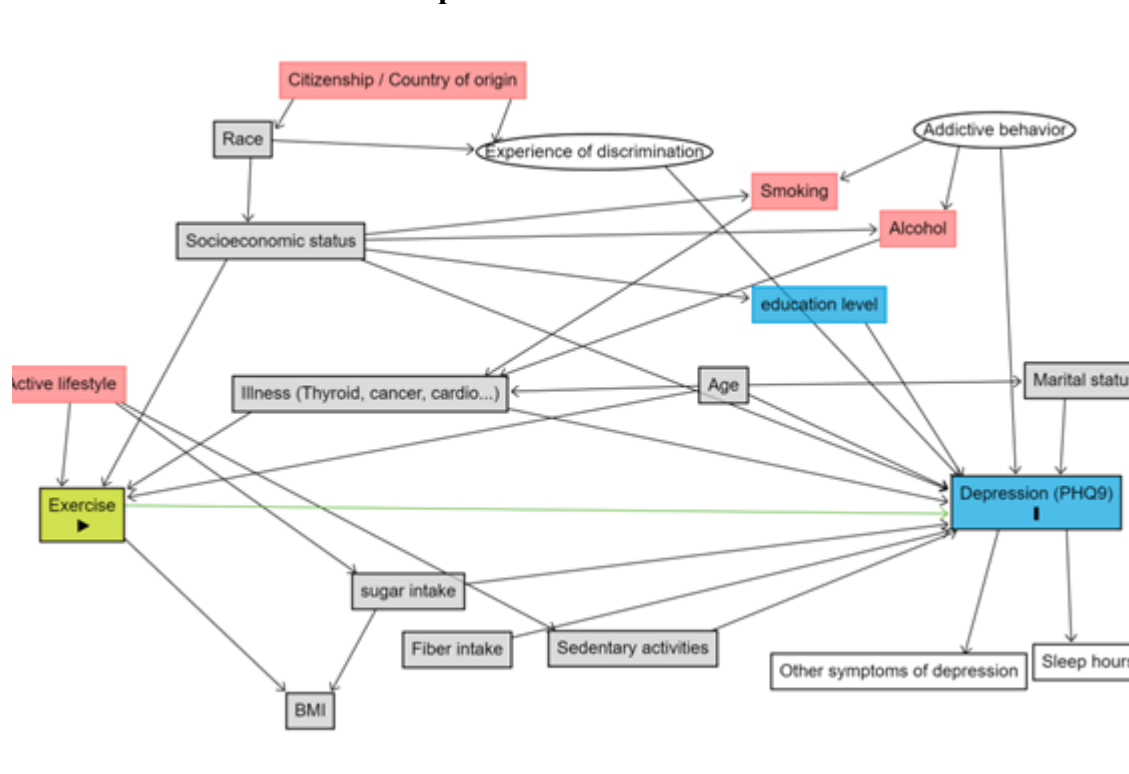
. lroc

Logistic model for depression_diagnoses

Number of observations = 2285
Area under ROC curve = 0.6900



DAG 1. The main model assumptions



DAG 2. Sensitivity analysis of assumed assumptions

