

Supplementary Material

Supplementary Table 1. All 529 behavioural traits used in the analysis, as described by the UK Biobank for completeness.

Ever thought that life not worth living

Self harmed

Self harmed in past year

Number of times self harmed

Attempted suicide

Attempted suicide in past year

Ever contemplated self harm

Contemplated self harm in past year

Felt hated by family member as a child

Physically abused by family as a child

Sexually molested as a child

Belittlement by partner or ex partner as an adult

Physical violence by partner or ex partner as an adult

Sexual interference by partner or ex partner without consent as an adult

Carer support indicators

Detention categories

Legal statuses

Mental categories

History of psychiatric care on admission

Number of correct matches in round 0 1

Number of correct matches in round 0 2

Number of correct matches in round 0 3

Number of incorrect matches in round 0 1

Number of incorrect matches in round 0 2

Number of incorrect matches in round 0 3

Time to complete round 0 1

Time to complete round 0 2

Time to complete round 0 3

Own or rent accommodation lived in

Length of time at current address

Number in household

Number of vehicles in household

Average total household income before tax

Time employed in main current job

Length of working week for main job

Frequency of travelling from home to job workplace

Distance between home and job workplace

Job involves mainly walking or standing

Job involves heavy manual or physical work

Job involves shift work

Age completed full time education

Number of days week walked 10 minutes

Duration of walks

Number of days week of moderate physical activity 10 minutes

Duration of moderate activity

Number of days week of vigorous physical activity 10 minutes

Duration of vigorous activity

Usual walking pace

Frequency of stair climbing in last 4 weeks

Frequency of walking for pleasure in last 4 weeks

Duration walking for pleasure

Frequency of strenuous sports in last 4 weeks

Duration of strenuous sports

Frequency of light DIY in last 4 weeks

Duration of light DIY

Frequency of friend family visits

Time spend outdoors in summer

Time spent outdoors in winter

Time spent watching television TV

Time spent using computer

Time spent driving

Drive faster than motorway speed limit

Length of mobile phone use

Weekly usage of mobile phone in last 3 months

Hands free device speakerphone use with mobile phone in last 3 month

Difference in mobile phone use compared to two years previously

Usual side of head for mobile phone use

Sleep duration

Getting up in morning

Morning evening person chronotype

Nap during day

Sleeplessness insomnia

Snoring

Daytime dozing sleeping narcolepsy

Current tobacco smoking

Past tobacco smoking

Smoking smokers in household

Exposure to tobacco smoke at home

Exposure to tobacco smoke outside home

Cooked vegetable intake

Salad raw vegetable intake

Fresh fruit intake

Dried fruit intake

Oily fish intake

Non oily fish intake

Processed meat intake

Poultry intake

Beef intake

Lamb mutton intake

Pork intake

Cheese intake

Milk type used

Salt added to food

Tea intake

Coffee intake

Water intake

Major dietary changes in the last 5 years

Variation in diet

Alcohol intake frequency

Average weekly red wine intake

Average weekly beer plus cider intake

Average weekly spirits intake

Average weekly fortified wine intake

Alcohol intake versus 10 years previously

Country of birth UK elsewhere

Breastfed as a baby

Skin colour

Adopted as a child

Maternal smoking around birth

Father still alive

Mother still alive

Mood swings

Miserableness

Irritability

Sensitivity hurt feelings

Fed up feelings

Nervous feelings

Worrier anxious feelings

Tense 'highly strung'

Worry too long after embarrassment
Suffer from 'nerves'
Loneliness isolation
Guilty feelings
Risk taking
Frequency of depressed mood in last 2 weeks
Frequency of unenthusiasm disinterest in last 2 weeks
Frequency of tenseness restlessness in last 2 weeks
Frequency of tiredness lethargy in last 2 weeks
Seen doctor GP for nerves anxiety tension or depression
Seen a psychiatrist for nerves anxiety tension or depression
Able to confide
Answered sexual history questions
Age first had sexual intercourse
Lifetime number of sexual partners
Ever had same sex intercourse
Overall health rating
Plays computer games
Use of sun uv protection
Frequency of solarium sunlamp use
Falls in the last year
Number of children fathered
Frequency of heavy DIY in last 4 weeks
Duration of heavy DIY
Light smokers at least 100 smokes in lifetime
Reason for reducing amount of alcohol drunk
Number of live births
Ever had stillbirth spontaneous miscarriage or termination
Ever taken oral contraceptive pill
Age started oral contraceptive pill
Ever used hormone replacement therapy HRT
Age started smoking in former smokers
Type of tobacco previously smoked
Number of cigarettes previously smoked daily
Age stopped smoking
Ever stopped smoking for 6 months
Number of unsuccessful stop smoking attempts
Likelihood of resuming smoking
Caffeine drink within last hour
Pregnant
Smoked cigarette or pipe within last hour
Job involve night shift work
Age started smoking in current smokers
Type of tobacco currently smoked
Number of cigarettes currently smoked daily current cigarette smokers
Time from waking to first cigarette
Difficulty not smoking for 1 day
Ever tried to stop smoking
Wants to stop smoking
Smoking compared to 10 years previous
Frequency of other exercises in last 4 weeks
Duration of other exercises
Year immigrated to UK United Kingdom
Lifetime number of same sex sexual partners
Age when last ate meat
Former alcohol drinker
Number of pregnancy terminations
Reason former drinker stopped drinking alcohol
Completion status of numeric memory test
Maximum digits remembered correctly
Number of rounds of numeric memory test performed
Average monthly red wine intake
Average monthly champagne plus white wine intake

Average monthly beer plus cider intake

Average monthly spirits intake

Average monthly fortified wine intake

Average monthly intake of other alcoholic drinks

Happiness

Work job satisfaction

Health satisfaction

Family relationship satisfaction

Friendships satisfaction

Financial situation satisfaction

Ever depressed for a whole week

Longest period of depression

Number of depression episodes

Ever unenthusiastic disinterested for a whole week

Ever manic hyper for 2 days

Ever highly irritable argumentative for 2 days

Private healthcare

Noisy workplace

Loud music exposure frequency

Attempted fluid intelligence FI test

F11 numeric addition test

F12 identify largest number

F13 word interpolation

F14 positional arithmetic

F15 family relationship calculation

F16 conditional arithmetic

F17 synonym

F18 chained arithmetic

Average weekly intake of other alcoholic drinks

Longest period of unenthusiasm disinterest

Number of unenthusiastic disinterested episodes

Length of longest manic irritable episode

Severity of manic irritable episodes

F110 arithmetic sequence recognition

F111 antonym

F112 square sequence recognition

F113 subset inclusion logic

Previously smoked cigarettes on most all days

Able to walk or cycle unaided for 10 minutes

Number of cigarettes previously smoked daily current cigar pipe smokers

Age stopped smoking cigarettes current cigar pipe or previous cigarette smoker

Email access

Fluid intelligence score

Prospective memory result

Mean time to correctly identify matches

Job code deduced

Smoking status

Alcohol drinker status

Home area population density urban or rural

Current employment status corrected

Cascot confidence score

Bipolar disorder status

Single episode of probable major depression

Probable recurrent major depression moderate

Probable recurrent major depression severe

Bipolar and major depression status

Neuroticism score

Number of fluid intelligence questions attempted within time limit

Number of correct matches in round

Number of correct matches in round 0 1

Number of correct matches in round 0 2

Number of incorrect matches in round

Number of incorrect matches in round 0 1

Number of incorrect matches in round 0 2
Time to complete round
Time to complete round 0 1
Time to complete round 0 2
When pairs test completed
When fluid intelligence test completed
When trail making test completed
When symbol digit substitution test completed
When numeric memory test completed
When initial questions completed
Ever smoked
F11 numeric addition test
F12 identify largest number
F13 word interpolation
F14 positional arithmetic
F15 family relationship calculation
F16 conditional arithmetic
F17 synonym
F18 chained arithmetic
F19 concept interpolation
F110 arithmetic sequence recognition
F111 antonym
F112 square sequence recognition
F113 subset inclusion logic
Fluid intelligence score
Number of fluid intelligence questions attempted within time limit
F114 alphanumeric substitution
Number of symbol digit matches attempted
Maximum digits remembered correctly
Tobacco smoking
Age of stopping smoking
Amount of tobacco currently smoked
Number of jobs held
Nitrogen dioxide air pollution 2010
Nitrogen oxides air pollution 2010
Particulate matter air pollution pm10 2010
Particulate matter air pollution pm2 5 2010
Particulate matter air pollution pm2 5 absorbance 2010
Particulate matter air pollution 2 5 10um 2010
Traffic intensity on the nearest road
Inverse distance to the nearest road
Traffic intensity on the nearest major road
Inverse distance to the nearest major road
Total traffic load on major roads
Close to major road
Sum of road length of major roads within 100m
Nitrogen dioxide air pollution 2005
Nitrogen dioxide air pollution 2006
Nitrogen dioxide air pollution 2007
Particulate matter air pollution pm10 2007
Average daytime sound level of noise pollution
Average evening sound level of noise pollution
Average night time sound level of noise pollution
Average 16 hour sound level of noise pollution
Average 24 hour sound level of noise pollution
Drinking water intake
Alcohol consumed
Time spent doing vigorous physical activity
Time spent doing moderate physical activity
Time spent doing light physical activity
Ever addicted to any substance or behaviour
Amount of alcohol drunk on a typical drinking day
Ever physically dependent on alcohol

Ever had known person concerned about or recommend reduction of alcohol consumption

Ever addicted to alcohol

Frequency of failure to fulfil normal expectations due to drinking alcohol in last year

Frequency of memory loss due to drinking alcohol in last year

Frequency of feeling guilt or remorse after drinking alcohol in last year

Age when known person last commented about drinking habits

Ever been injured or injured someone else through drinking alcohol

Frequency of needing morning drink of alcohol after heavy drinking session in last year

Frequency of inability to cease drinking in last year

Frequency of drinking alcohol

Ongoing addiction to alcohol

Frequency of consuming six or more units of alcohol

Tense sore or aching muscles during worst period of anxiety

Impact on normal roles during worst period of anxiety

Difficulty concentrating during worst period of anxiety

Longest period spent worried or anxious

Ever felt worried tense or anxious for most of a month or longer

More irritable than usual during worst period of anxiety

Keyed up or on edge during worst period of anxiety

Ever worried more than most people would in similar situation

Restless during period of worst anxiety

Frequent trouble falling or staying asleep during worst period of anxiety

Professional informed about anxiety

Easily tired during worst period of anxiety

Ever addicted to a behaviour or miscellaneous

Ongoing behavioural or miscellaneous addiction

Age at first episode of depression

Age at last episode of depression

Difficulty concentrating during worst depression

Fraction of day affected during worst episode of depression

Thoughts of death during worst depression

Duration of worst depression

Frequency of depressed days during worst episode of depression

Impact on normal roles during worst period of depression

Ever had prolonged loss of interest in normal activities

Lifetime number of depressed periods

Depression possibly related to childbirth

Ever had prolonged feelings of sadness or depression

Depression possibly related to stressful or traumatic event

Professional informed about depression

Feelings of tiredness during worst episode of depression

Feelings of worthlessness during worst period of depression

Ever taken cannabis

Maximum frequency of taking cannabis

Age when last took cannabis

Ever addicted to illicit or recreational drugs

Illicit or recreational drugs addiction or dependence ongoing

General happiness

General happiness with own health

Belief that own life is meaningful

Age when first had unusual or psychotic experience

Distress caused by unusual or psychotic experiences

Ever heard an unreal voice

Number of times heard an unreal voice

Ever prescribed a medication for unusual or psychotic experiences

Frequency of unusual or psychotic experiences in past year

Ever believed in an unreal conspiracy against self

Number of times believed in an unreal conspiracy against self

Ever seen an unreal vision

Number of times seen an unreal vision

Ever believed in unreal communications or signs

Number of times believed in unreal communications or signs

Ever talked to a health professional about unusual or psychotic experiences

Felt loved as a child

Someone to take to doctor when needed as a child

Longest period of mania or irritability

Severity of problems due to mania or irritability

Felt irritable or had angry outbursts in past month

Avoided activities or situations because of previous stressful experience in past month

Felt distant from other people in past month

Repeated disturbing thoughts of stressful experience in past month

Felt very upset when reminded of stressful experience in past month

Ever sought or received professional help for mental distress

Ever suffered mental distress preventing usual activities

Ever had period of mania excitability

Ever had period extreme irritability

Ever addicted to prescription or over the counter medication

Prescription or over the counter medication addiction or dependence ongoing

Recent easy annoyance or irritability

Recent feelings of nervousness or anxiety

Recent feelings of inadequacy

Recent trouble concentrating on things

Recent inability to stop or control worrying

Recent feelings of depression

Recent poor appetite or overeating

Recent feelings of foreboding

Recent thoughts of suicide or self harm

Recent lack of interest or pleasure in doing things

Recent trouble relaxing

Recent restlessness

Trouble falling or staying asleep or sleeping too much

Recent changes in speed amount of moving or speaking

Recent feelings of tiredness or low energy

Recent worrying too much about different things

Been in a confiding relationship as an adult

Able to pay rent mortgage as an adult

Been in serious accident believed to be life threatening

Been involved in combat or exposed to war zone

Diagnosed with life threatening illness

Victim of physically violent crime

Witnessed sudden violent death

Did your sleep change

Trouble falling asleep

Sleeping too much

Waking too early

Weight change during worst episode of depression

Frequency of difficulty controlling worry during worst period of anxiety

Worried most days during period of worst anxiety

Frequency of inability to stop worrying during worst period of anxiety

Multiple worries during worst period of anxiety

Difficulty stopping worrying during worst period of anxiety

Stronger worrying than other people during period of worst anxiety

Number of things worried about during worst period of anxiety

Current employment status employed

Current employment status retired

Current employment status family

Current employment status disabled

Current employment status unemployed

Current employment status voluntary

Current employment status student

Heating types in home gas

Heating types in home electricity

Heating types in home oil

Heating types in home paraffin

Heating types in home solid fuel

Heating types in home open fire

How are people in household related to participant partner
How are people in household related to participant children
How are people in household related to participant siblings
How are people in household related to participant parents
How are people in household related to participant grandparents
How are people in household related to participant grandchildren
How are people in household related to participant other related
How are people in household related to participant other unrelated
Illness injury bereavement stress in last 2 years illness self
Illness injury bereavement stress in last 2 years illness relative
Illness injury bereavement stress in last 2 years death relative
Illness injury bereavement stress in last 2 years death spouse
Illness injury bereavement stress in last 2 years divorce
Illness injury bereavement stress in last 2 years financial difficulties
Leisure social activities sports
Leisure social activities pub
Leisure social activities religion
Leisure social activities adult class
Leisure social activities other
Manic hyper symptoms more active
Manic hyper symptoms more talkative
Manic hyper symptoms less sleep
Manic hyper symptoms more creative
Manic hyper symptoms all
Mineral and other dietary supplements fish oil
Mineral and other dietary supplements glucosamine
Mineral and other dietary supplements calcium
Mineral and other dietary supplements zinc
Mineral and other dietary supplements iron
Mineral and other dietary supplements selenium
Never eat eggs dairy wheat sugar eggs
Never eat eggs dairy wheat sugar dairy
Never eat eggs dairy wheat sugar wheat
Never eat eggs dairy wheat sugar sugar
Never eat eggs dairy wheat sugar none
Qualifications university
Qualifications A levels
Qualifications GCSEs
Qualifications CSEs
Qualifications NVQ
Qualifications other
Transport type for commuting to job workplace car
Transport type for commuting to job workplace walk
Transport type for commuting to job workplace public transport
Transport type for commuting to job workplace cycle
Type of special diet followed gluten free
Type of special diet followed lactose free
Type of special diet followed low calorie
Type of special diet followed vegetarian
Type of special diet followed vegan
Type of special diet followed other
Types of physical activity in last 4 weeks walking
Types of physical activity in last 4 weeks other
Types of physical activity in last 4 weeks light DIY
Types of physical activity in last 4 weeks heavy DIY
Types of transport used excluding work car
Types of transport used excluding work walk
Types of transport used excluding work public transport
Types of transport used excluding work cycle
Vitamin and mineral supplements A
Vitamin and mineral supplements B
Vitamin and mineral supplements C
Vitamin and mineral supplements D

Vitamin and mineral supplements E

Vitamin and mineral supplements folic acid

Vitamin and mineral supplements multi

Vitamin and or mineral supplement use_dichotomised multi

Vitamin and or mineral supplement use_dichotomised multi iron

Vitamin and or mineral supplement use_dichotomised multi calcium

Vitamin and or mineral supplement use_dichotomised multi minerals

Vitamin and or mineral supplement use_dichotomised fish oil

Vitamin and or mineral supplement use_dichotomised glucosamine

Vitamin and or mineral supplement use_dichotomised evening primrose

Vitamin and or mineral supplement use_dichotomised A

Vitamin and or mineral supplement use_dichotomised B6

Vitamin and or mineral supplement use_dichotomised B12

Vitamin and or mineral supplement use_dichotomised C

Vitamin and or mineral supplement use_dichotomised D

Vitamin and or mineral supplement use_dichotomised E

Vitamin and or mineral supplement use_dichotomised folic acid

Vitamin and or mineral supplement use_dichotomised chromium

Vitamin and or mineral supplement use_dichotomised magnesium

Vitamin and or mineral supplement use_dichotomised selenium

Vitamin and or mineral supplement use_dichotomised calcium

Vitamin and or mineral supplement use_dichotomised iron

Vitamin and or mineral supplement use_dichotomised zinc

Vitamin and or mineral supplement use_dichotomised other

Why reduced smoking illness

Why reduced smoking doctor

Why reduced smoking health

Why reduced smoking financial

Why stopped smoking illness

Why stopped smoking doctor

Why stopped smoking health

Why stopped smoking financial

Supplementary Table 2: The 104 target traits associated with schizophrenia polygenic risk scores (PRSs) at $P < 1 \times 10^{-7}$ in the unaffected sub-cohort of the UK Biobank.

Trait	Direction of effect	$P_{t < 0.05}$ PRS R2	$P_{t < 0.05}$ PRS P -value	GW-sig P -value	N	Unaffected vs. cases different P -value	Trait type
Number of incorrect matches in round 2 (Pair matching errors)	+	0.001	2.94×10^{-82}	3.14×10^{-13}	307395	7.20×10^{-01}	Cognitive
Number of fluid intelligence questions attempted within time limit	-	0.003	2.32×10^{-76}	1.11×10^{-27}	99466	9.37×10^{-02}	Cognitive
Seen doctor GP for nerves anxiety tension or depression	+	0.002	9.99×10^{-75}	1.57×10^{-15}	305607	2.07×10^{-176}	Affective
Plays computer games	-	0.001	2.71×10^{-59}	2.56×10^{-08}	307479	4.60×10^{-06}	Behavioural
Seen a psychiatrist for nerves anxiety tension or depression	+	0.002	1.59×10^{-58}	1.24×10^{-16}	306579	1.15×10^{-255}	Affective
Time to complete round 2	+	0.001	2.39×10^{-57}	1.15×10^{-16}	307395	2.46×10^{-02}	Cognitive
Mean time to correctly identify matches	+	0.001	2.36×10^{-54}	1.70×10^{-07}	305797	1.98×10^{-25}	Cognitive
Oily fish intake	+	0.001	7.22×10^{-54}	3.62×10^{-20}	306254	5.01×10^{-04}	Behavioural
Fluid intelligence score⁺	-	0.002	2.18×10^{-53}	3.43×10^{-15}	99466	1.56×10^{-17}	Cognitive
Nervous feelings	+	0.001	1.25×10^{-46}	2.09×10^{-17}	300070	1.87×10^{-67}	Affective
Getting up in morning	-	0.001	5.05×10^{-45}	2.26×10^{-05}	307056	3.12×10^{-37}	Disorganisation
Ever depressed for a whole week	+	0.003	2.58×10^{-44}	8.41×10^{-11}	99725	3.90×10^{-30}	Affective
Time to complete round 1	+	0.001	3.36×10^{-44}	8.79×10^{-11}	307395	2.66×10^{-07}	Cognitive
Ever unenthusiastic disinterested for a whole week	+	0.003	1.07×10^{-43}	8.00×10^{-10}	97754	7.98×10^{-28}	Affective
Frequency of tenseness restlessness in last 2 weeks	+	0.001	1.67×10^{-43}	2.02×10^{-09}	296554	2.51×10^{-38}	Affective
BMI	-	0.001	1.05×10^{-41}	2.82×10^{-13}	306919	4.93×10^{-18}	Disorganisation/behaviour
Number of incorrect matches in round 1	+	0.001	6.88×10^{-40}	1.16×10^{-07}	307395	2.28×10^{-06}	Cognitive
Neuroticism score (Neuroticism)	+	0.001	7.82×10^{-40}	2.16×10^{-12}	250454	5.05×10^{-64}	Affective
Number of days week of moderate physical activity 10 minutes (Moderate physical activity)	+	0.001	2.03×10^{-38}	3.85×10^{-14}	293844	2.15×10^{-09}	Behavioural
Self-reported risk taking (Risk taking)	+	0.001	3.00×10^{-38}	5.78×10^{-07}	297101	1×10^{-308}	Behavioural

Reason for reducing amount of alcohol drunk	-	0.001	2.46x10 ⁻³⁵	4.28x10 ⁻⁰³	112644	5.60x10 ⁻²³	Behavioural
Family relationship satisfaction	+	0.001	6.65x10⁻³⁵	1.92x10⁻⁰⁶	100952	1.26x10⁻²²	Affective
Current smoking status (Smoking)	+	0.000	5.45x10⁻³⁴	6.04x10⁻⁰³	306505	5.02x10⁻³⁰	Behavioural
Why stopped smoking health	+	0.001	9.60x10 ⁻³⁴	9.55x10 ⁻¹³	59132	3.28x10 ⁻⁰³	Behavioural
Worrier anxious feelings	+	0.001	1.70x10 ⁻³³	2.53x10 ⁻¹³	299507	2.68x10 ⁻¹¹	Affective
Time to answer	+	0.001	3.79x10 ⁻³¹	6.69x10 ⁻⁰⁹	101682	7.45x10 ⁻⁰²	Cognitive
Guilty feelings	+	0.001	5.47x10⁻³⁰	2.22x10⁻⁰⁹	299852	5.33x10⁻²⁵	Affective
Frequency of depressed mood in last 2 weeks	+	0.000	1.27x10 ⁻²⁹	7.21x10 ⁻¹⁰	295142	1.68x10 ⁻⁴⁰	Affective
Frequency of unenthusiasm disinterest in last 2 weeks	+	0.000	1.06x10 ⁻²⁸	3.10x10 ⁻⁰⁷	298216	2.94x10 ⁻³⁸	Affective
Tea intake	+	0.000	1.69x10⁻²⁸	4.23x10⁻⁰¹	297475	1.44x10⁻⁰³	Behavioural
Felt loved as a child	-	0.001	3.29x10⁻²⁸	1.39x10⁻⁰¹	83605	5.37x10⁻⁰⁴	Affective
Past tobacco smoking	-	0.000	1.01x10 ⁻²⁶	1.72x10 ⁻⁰⁴	288806	2.35x10 ⁻⁰²	Behavioural
Non-oily fish intake	+	0.000	9.22x10 ⁻²⁶	2.60x10 ⁻¹²	306525	5.62x10 ⁻⁰⁷	Behavioural
Frequency of tiredness lethargy in last 2 weeks	+	0.000	1.19x10 ⁻²⁴	3.78x10 ⁻⁰⁶	298429	2.65x10 ⁻³⁶	Motor
Friendship satisfaction	+	0.001	2.17x10⁻²⁴	5.67x10⁻⁰⁴	100886	6.72x10⁻¹²	Affective
Length of time at current address	-	0.000	7.52x10⁻²⁴	2.61x10⁻⁰⁶	300865	5.44x10⁻⁰⁴	Behavioural
Number of correct matches in round 2	-	0.000	1.26x10 ⁻²²	1.29x10 ⁻⁰³	307395	7.97x10 ⁻¹⁸	Cognitive
Cooked vegetable intake	+	0.000	6.35x10⁻²²	5.21x10⁻⁰⁴	298869	7.70x10⁻⁰²	Behavioural
Sensitivity hurt feelings	+	0.000	1.74x10⁻²¹	8.72x10⁻¹⁰	298692	5.05x10⁻¹²	Affective
Avoided activities or situations because of previous stressful experience in past month	+	0.001	5.06x10 ⁻²¹	7.16x10 ⁻⁰²	83805	2.47x10 ⁻⁰⁵	Affective
PM initial answer	-	0.001	1.04x10 ⁻²⁰	2.99x10 ⁻⁰⁶	101664	3.83x10 ⁻⁰⁸	Cognitive
Number of correct matches in round 1	-	0.000	2.38x10 ⁻²⁰	9.99x10 ⁻⁰³	307396	5.21x10 ⁻¹⁷	Cognitive
Bipolar and major depression status	+	0.001	2.65x10 ⁻²⁰	2.33x10 ⁻⁰⁷	73573	2.71x10 ⁻¹⁸	Affective
Duration screen displayed	+	0.001	3.47x10 ⁻²⁰	1.76x10 ⁻⁰⁶	101682	8.13x10 ⁻⁰⁷	Cognitive
Happiness	+	0.001	5.45x10 ⁻²⁰	7.57x10 ⁻⁰⁶	101565	4.16x10 ⁻¹³	Affective
Ever felt worried tense or anxious for most of a month or longer	+	0.002	5.68x10 ⁻¹⁹	2.72x10 ⁻⁰³	80410	2.96x10 ⁻⁰⁶	Affective
Vitamin and mineral supplements C	+	0.001	6.41x10 ⁻¹⁹	3.84x10 ⁻⁰⁷	307812	6.25x10 ⁻⁰¹	Behavioural
Nap during day	+	0.000	6.79x10⁻¹⁹	6.98x10⁻⁰⁶	307469	4.75x10⁻³⁴	Motor/disorganisation
How are people in household related	-	0.000	1.06x10 ⁻¹⁸	2.21x10 ⁻⁰²	307812	1.60x10 ⁻¹⁰⁶	Behavioural

to participant partner								
Repeated disturbing thoughts of stressful experience in past month	+	0.001	1.08x10 ⁻¹⁸	2.97x10 ⁻⁰²	83808	4.51x10 ⁻⁰⁴	Delusions	
Time spent watching television TV	-	0.000	1.62x10 ⁻¹⁸	6.04x10 ⁻⁰¹	290951	2.90x10 ⁻⁰⁹	Behavioural	
Number of days week of vigorous physical activity 1 minutes	+	0.000	3.94x10 ⁻¹⁸	1.02x10 ⁻⁰⁵	293799	3.81x10 ⁻⁰⁸	Behavioural/motor	
Ever suffered mental distress preventing usual activities	+	0.002	3.92x10 ⁻¹⁷	7.80x10 ⁻⁰²	82792	1.53x10 ⁻²⁵	Affective	
Number of vehicles in household	-	0.000	5.19x10 ⁻¹⁷	2.11x10 ⁻⁰²	305805	2.81x10 ⁻¹³⁸	Behavioural	
Pork intake	-	0.000	8.12x10 ⁻¹⁷	3.52x10 ⁻⁰³	306068	9.79x10 ⁻⁰¹	Behavioural	
Types of transport used excluding work car	-	0.000	1.23x10 ⁻¹⁶	5.11x10 ⁻⁰²	307812	2.79x10 ⁻⁹⁰	Behavioural	
Felt very upset when reminded of stressful experience in past month	+	0.001	1.30x10 ⁻¹⁶	4.59x10 ⁻⁰¹	83794	6.14x10 ⁻⁰⁵	Affective	
Age first had sexual intercourse	-	0.000	5.03x10 ⁻¹⁶	4.67x10 ⁻⁰⁴	269875	7.74x10 ⁻⁰¹	Behavioural	
Sleep duration	+	0.000	6.99x10 ⁻¹⁶	3.13x10 ⁻⁰⁴	306190	1.06x10 ⁻⁰⁸	Motor	
Mineral and other dietary supplements zinc	+	0.001	1.45x10 ⁻¹⁵	5.55x10 ⁻⁰⁵	307812	6.85x10 ⁻⁰³	Behavioural	
Qualifications GCSx10s	-	0.000	3.69x10 ⁻¹⁵	2.58x10 ⁻⁰¹	307812	1.72x10 ⁻⁰³	Behavioural	
Vitamin and mineral supplements x10	+	0.001	7.28x10 ⁻¹⁵	1.46x10 ⁻⁰⁴	307812	2.61x10 ⁻⁰¹	Behavioural	
Vitamin and mineral supplements A	+	0.001	4.74x10 ⁻¹⁴	1.08x10 ⁻⁰⁶	307812	1.69x10 ⁻⁰²	Behavioural	
Leisure social activities adult class	+	0.000	9.18x10 ⁻¹⁴	1.77x10 ⁻⁰³	307812	1.51x10 ⁻⁰²	Behavioural	
Overall health rating	+	0.000	1.15x10 ⁻¹³	2.97x10 ⁻⁰¹	306588	5.15x10 ⁻⁶⁸	Behavioural	
Loneliness isolation	+	0.000	4.98x10 ⁻¹³	1.81x10 ⁻⁰²	303135	2.40x10 ⁻⁴⁸	Affective	
Worry too long after embarrassment	+	0.000	1.11x10 ⁻¹²	3.46x10 ⁻⁰²	295015	1.12x10 ⁻¹⁵	Affective	
Number of pregnancy terminations	+	0.001	1.76x10 ⁻¹²	2.11x10 ⁻⁰³	48343	7.68x10 ⁻⁰³	Behavioural	
Ever had prolonged loss of interest in normal activities	+	0.001	2.75x10 ⁻¹²	1.22x10 ⁻⁰⁴	83678	2.25x10 ⁻¹⁶	Negative	
Number of attempts	+	0.000	3.19x10 ⁻¹²	1.10x10 ⁻⁰²	101682	9.65x10 ⁻⁰³	Affective	
Ever sought or received professional help for mental distress	+	0.001	3.37x10 ⁻¹²	1.00x10 ⁻⁰²	83656	1x10 ⁻³⁰⁸	Affective	

Qualifications university	+	0.000	4.44x10 ⁻¹²	3.36x10 ⁻⁰¹	307812	1.20x10 ⁻²²	Behavioural
Loud music exposure frequency	+	0.000	7.09x10 ⁻¹²	1.92x10 ⁻⁰²	100541	8.46x10 ⁻⁰⁵	Behavioural
Felt hated by family member as a child	+	0.001	8.49x10 ⁻¹²	2.72x10 ⁻⁰¹	83737	8.98x10 ⁻⁰⁴	Affective
Length of mobile phone use	-	0.000	3.45x10 ⁻¹¹	3.82x10 ⁻⁰¹	303951	1.85x10 ⁻³³	Behavioural
Belittlement by partner or ex-partner as an adult	+	0.001	4.13x10 ⁻¹¹	3.68x10 ⁻⁰¹	83687	4.03x10 ⁻⁰³	Behavioural
Current tobacco smoking	+	0.000	6.06x10 ⁻¹¹	1.67x10 ⁻⁰¹	307490	9.50x10 ⁻²⁷	Behavioural
Coffee intake	-	0.000	6.88x10 ⁻¹¹	1.32x10 ⁻⁰⁵	285407	1.71x10 ⁻⁰⁷	Behavioural
Vitamin and mineral supplements B	+	0.000	1.20x10 ⁻¹⁰	4.85x10 ⁻⁰³	307812	1.10x10 ⁻⁰³	Behavioural
Recent feelings of nervousness or anxiety	+	0.000	1.43x10 ⁻¹⁰	3.90x10 ⁻⁰⁵	83610	2.30x10 ⁻⁰³	Affective
Ever thought that life not worth living	+	0.000	1.99x10 ⁻¹⁰	1.80x10 ⁻⁰¹	83477	4.46x10 ⁻¹⁰	Affective
Types of physical activity in last 4 weeks heavy DIY	-	0.000	2.50x10 ⁻¹⁰	1.20x10 ⁻⁰¹	307812	9.40x10 ⁻⁵⁷	Motor
Ever worried more than most people would in similar situation	+	0.001	2.50x10 ⁻¹⁰	1.07x10 ⁻⁰²	72425	2.19x10 ⁻¹¹	Affective
Ever highly irritable argumentative for 2 days	+	0.001	2.74x10 ⁻¹⁰	1.33x10 ⁻⁰¹	99716	5.39x10 ⁻⁰⁹	Affective
Beef intake	-	0.000	2.88x10 ⁻¹⁰	1.22x10 ⁻⁰¹	306645	2.50x10 ⁻⁰⁴	Behavioural
F13 word interpolation	-	0.000	3.76x10 ⁻¹⁰	4.36x10 ⁻⁰³	98680	3.72x10 ⁻⁰⁴	Cognitive
Average weekly beer plus cider intake	+	0.000	5.16x10 ⁻¹⁰	1.42x10 ⁻⁰¹	224335	3.94x10 ⁻⁰⁸	Behavioural
Mood swings	+	0.000	8.63x10 ⁻¹⁰	3.55x10 ⁻⁰⁴	300051	4.78x10 ⁻²⁹	Affective
Types of transport used excluding work walk	-	0.000	1.22x10 ⁻⁰⁹	1.69x10 ⁻⁰³	307812	1.58x10 ⁻⁰³	Behavioural
Transport type for commuting to job workplace car	-	0.000	3.37x10 ⁻⁰⁹	2.15x10 ⁻⁰¹	307812	3.01x10 ⁻¹⁹⁴	Behavioural/motor
Victim of physically violent crime	+	0.000	4.67x10 ⁻⁰⁹	7.91x10 ⁻⁰²	83793	5.37x10 ⁻⁰³	Behavioural
Ever contemplated self-harm	+	0.000	8.59x10 ⁻⁰⁹	1.15x10 ⁻⁰¹	83704	1.76x10 ⁻⁰⁷	Affective
Snoring	+	0.000	1.21x10 ⁻⁰⁸	9.21x10 ⁻⁰¹	287640	3.65x10 ⁻⁰³	Behavioural/motor
Felt distant from other people in past month	+	0.001	1.85x10 ⁻⁰⁸	1.71x10 ⁻⁰¹	31346	1.58x10 ⁻⁰⁴	Affective
Number of unsuccessful stop smoking attempts	+	0.000	2.70x10 ⁻⁰⁸	3.50x10 ⁻⁰²	68272	1.39x10 ⁻⁰¹	Behavioural
Someone to take to doctor when needed as a child	-	0.000	3.18x10 ⁻⁰⁸	3.04x10 ⁻⁰²	83422	1.30x10 ⁻⁰¹	Behavioural

Average total household income before tax	-	0.000	3.33x10 ⁻⁰⁸	3.34x10 ⁻⁰³	264483	6.66x10 ⁻¹³⁴	Behavioural
Physical violence by partner or ex-partner as an adult	+	0.000	3.48x10 ⁻⁰⁸	5.85x10 ⁻⁰¹	83707	6.27x10 ⁻⁰¹	Behavioural
Morning evening person chronotype	+	0.000	3.76x10 ⁻⁰⁸	3.91x10 ⁻⁰¹	274298	3.71x10 ⁻¹⁰	Motor/disorganisation
Health satisfaction	+	0.000	3.99x10 ⁻⁰⁸	2.59x10 ⁻⁰¹	101574	3.65x10 ⁻⁰³	Disorganisation
Age at first episode of depression	-	0.001	6.43x10 ⁻⁰⁸	2.84x10 ⁻⁰¹	32234	4.91x10 ⁻⁰⁶	Affective
Ever manic hyper for 2 days	+	0.001	7.13x10 ⁻⁰⁸	5.45x10 ⁻⁰²	99666	1.31x10 ⁻²⁵	Delusions
Recent worrying too much about different things	+	0.000	8.48x10 ⁻⁰⁸	1.78x10 ⁻⁰³	83578	7.52x10 ⁻⁰⁴	Affective
Frequency of walking for pleasure in last 4 weeks	+	0.000	9.98x10 ⁻⁰⁸	2.80x10 ⁻⁰³	222295	4.40x10 ⁻⁰⁴	Behavioural

GW-Sig PRS = PRS comprising only genome-wide significant ($P_T < 5 \times 10^{-8}$). Top non-overlapping and distinct traits in bold selected for Fig. 1 of the Main Text (*names given in Fig. 1 provided in parentheses if different*). The two last columns show the result (P -value) of a difference-in-means t-test between the target trait value among individuals diagnosed with schizophrenia and with unaffected individuals; and the traits categorised by schizophrenia symptom type respectively. + Fluid intelligence assessed by a simple 13 question verbal-numerical reasoning test.

Supplementary Table 3: Associations between self-reported risk-taking and measures of migration, substance use and control traits

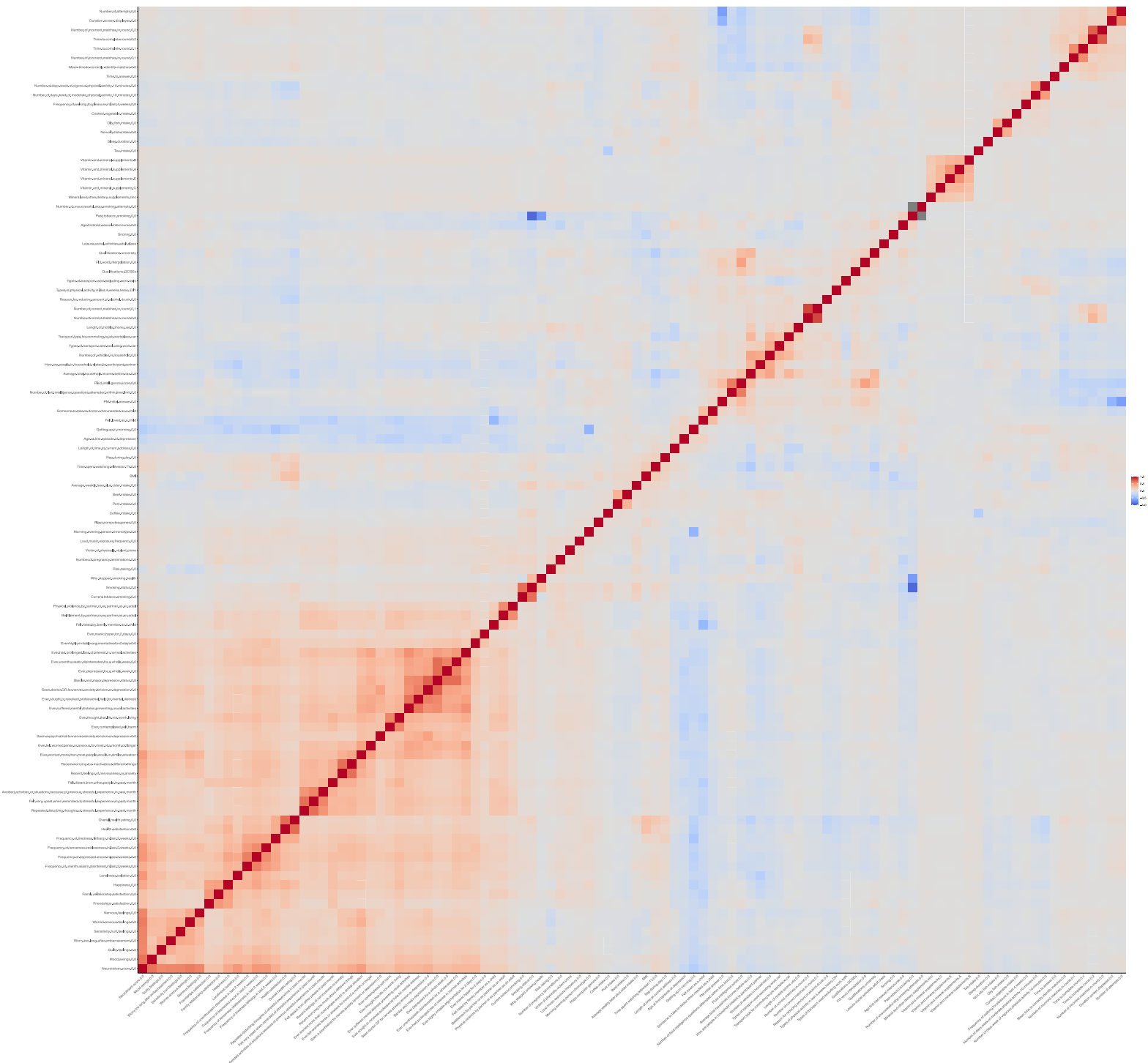
	Effect (β): adjusted for age and sex	R ² : adjusted for age and sex	P-value: adjusted for age and sex	P-value: adjusted for age, sex and TDEP	P-value: adjusted for age, sex, TDEP and EDU
Ever smoked cannabis	0.23	0.11	< 10 ⁻³⁰⁸	< 10 ⁻³⁰⁸	< 10 ⁻³⁰⁸
Time at current residence	-2.23	0.00664	< 10 ⁻³⁰⁸	< 10 ⁻³⁰⁸	< 10 ⁻³⁰⁸
Left hand grip strength	0.651	0.000627	1.32x10 ⁻¹⁴³	1.23x10 ⁻²⁰⁰	9.95x10 ⁻¹⁸¹
Population density: current residence	204	0.00149	3.19x10 ⁻¹³⁶	4.94x10 ⁻⁵⁰	7.28x10 ⁻²⁴
Distance travelled: birth to current	10800	0.00131	2.61x10 ⁻¹²³	1.14x10 ⁻¹³³	2.38x10 ⁻⁶⁷
Self-reported substance abuse	1.85 ⁺	0.00771 ^{α}	7.94x10 ⁻⁷⁴	5.52x10 ⁻⁵⁵	3.93x10 ⁻⁶²
Breast fed	1.16 ⁺	0.00115 ^{α}	4.67x10 ⁻⁶⁷	2.39x10 ⁻⁶⁸	5.95x10 ⁻⁵¹
Leg pain on walking	1.23 ⁺	0.00229 ^{α}	2.55x10 ⁻⁵⁶	3.85x10 ⁻³⁸	1.52x10 ⁻⁵²
Population density difference: birth to current	127	0.000389	7.13x10 ⁻³⁷	2.31x10 ⁻⁰⁹	0.0252
Population density: birth place	76.8	0.000198	1.50x10 ⁻¹⁹	1.67x10 ⁻¹⁰	2.44x10 ⁻¹⁰
Birth weight	0.0254	0.000271	1.39x 10 ⁻¹⁷	4.53x10 ⁻²⁰	1.45x10 ⁻¹⁶
Birth weight known	0.96 ⁺	9.45x10 ^{-05α}	2.80x10 ⁻⁰⁹	0.000935	4.39x10 ⁻⁰⁵
Blood pressure device ID	156000	2.50x10 ⁻⁰⁶	0.277	0.267	0.331
Month attended baseline assessment	-0.00327	1.87x10 ⁻⁰⁷	0.766	0.778	0.86

+ Odds ratio for binary outcome variables; α Pseudo R² for binary outcome variables; TDEP = Townsend deprivation index; EDU = Educational attainment

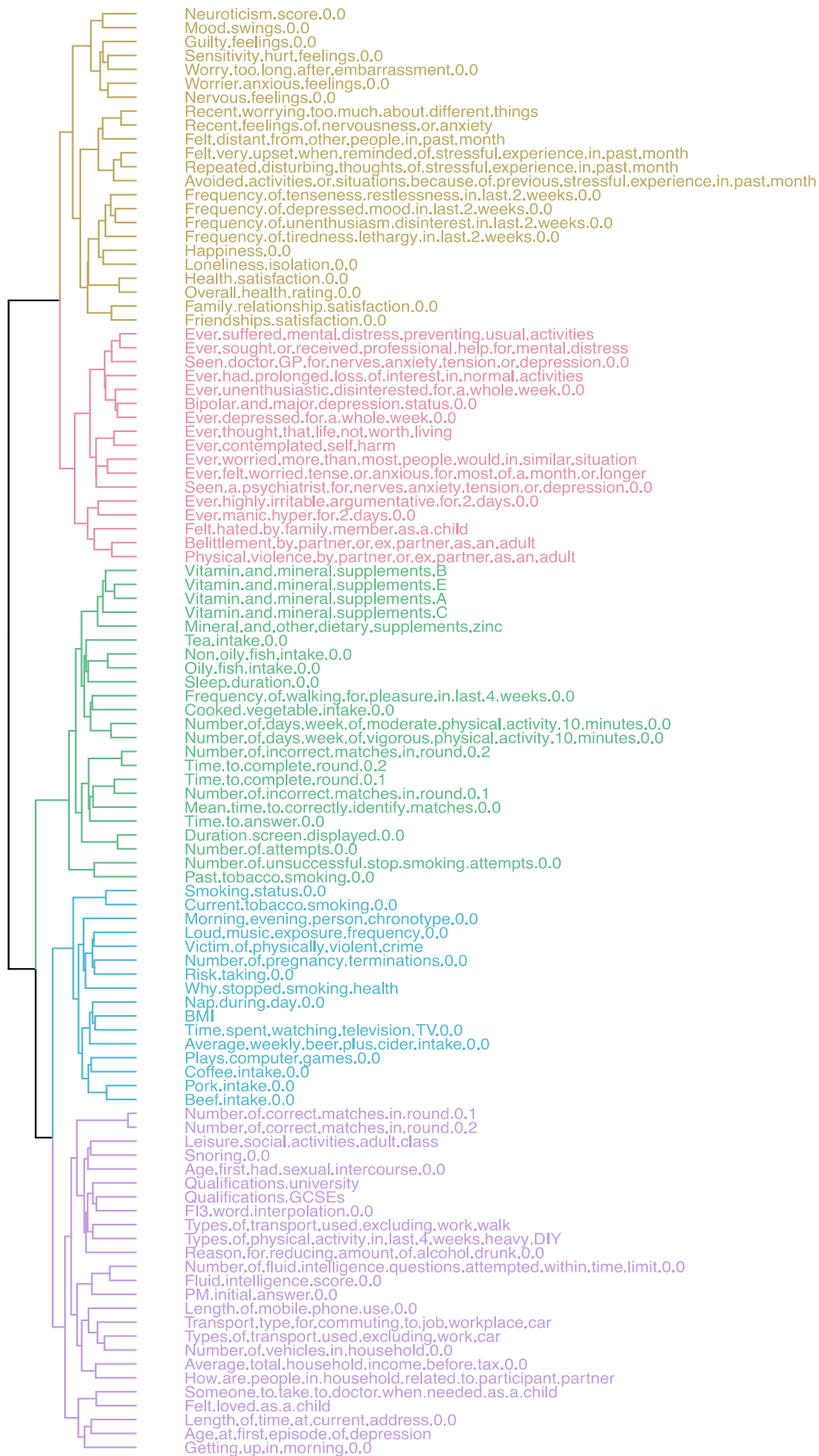
Supplementary Table 4: Summary of PRS results corresponding to the most predictive PRS for schizophrenia tested against the target behavioural and control traits

	Effect (β): adjusted for age and sex	R ² : adjusted for age and sex	P-value: adjusted for age and sex	P-value: adjusted for age, sex and TDEP	P-value: adjusted for age, sex, TDEP and EDU
Time at current residence	-738.61	0.00027	1.13x10 ⁻²¹	2.32x10 ⁻²¹	9.07x10 ⁻²⁰
Population density: current residence	104222	5.74x10 ⁻⁰⁵	3.28x10 ⁻¹¹	8.84x10 ⁻⁰⁷	8.65x10 ⁻⁰⁶
Self-reported substance abuse	633.75 ⁺	0.00168 ^{α}	3.78x10 ⁻⁰⁹	8.75x10 ⁻⁰⁹	1.34x10 ⁻⁰⁸
Ever smoked cannabis	13.04	0.00033	7.01x10 ⁻⁰⁸	3.02x10 ⁻⁰⁷	1.17x10 ⁻⁰⁶
Distance travelled: birth to current	-9246200	9.32x10 ⁻⁰⁶	0.0005	0.0008	0.0002
Blood pressure device ID	-670154	0.00014	0.0029	0.0029	0.0029
Left hand grip strength	-888.61	1.15x10 ⁻⁰⁵	0.0054	0.0421	0.0233
Population density difference: birth to current	43655.70	2.11x10 ⁻⁰⁵	0.0061	0.0500	0.1656
Breast fed	10.41 ⁺	2.08x10 ^{-05α}	0.0585	0.0432	0.0784
Population density: birth place	91061.90	1.03x10 ⁻⁰⁵	0.0673	0.1019	0.0609
Month attended baseline assessment	33.70	8.32x10 ⁻⁰⁶	0.0989	0.0885	0.0987
Leg pain on walking	113.19 ⁺	2.40x10 ^{-05α}	0.2134	0.3905	0.2845
Birth weight known	59.44 ⁺	2.88x10 ^{-06α}	0.3291	0.4623	0.3974
Birth weight	-4.56	3.74x10 ⁻⁰⁶	0.4134	0.4639	0.4058

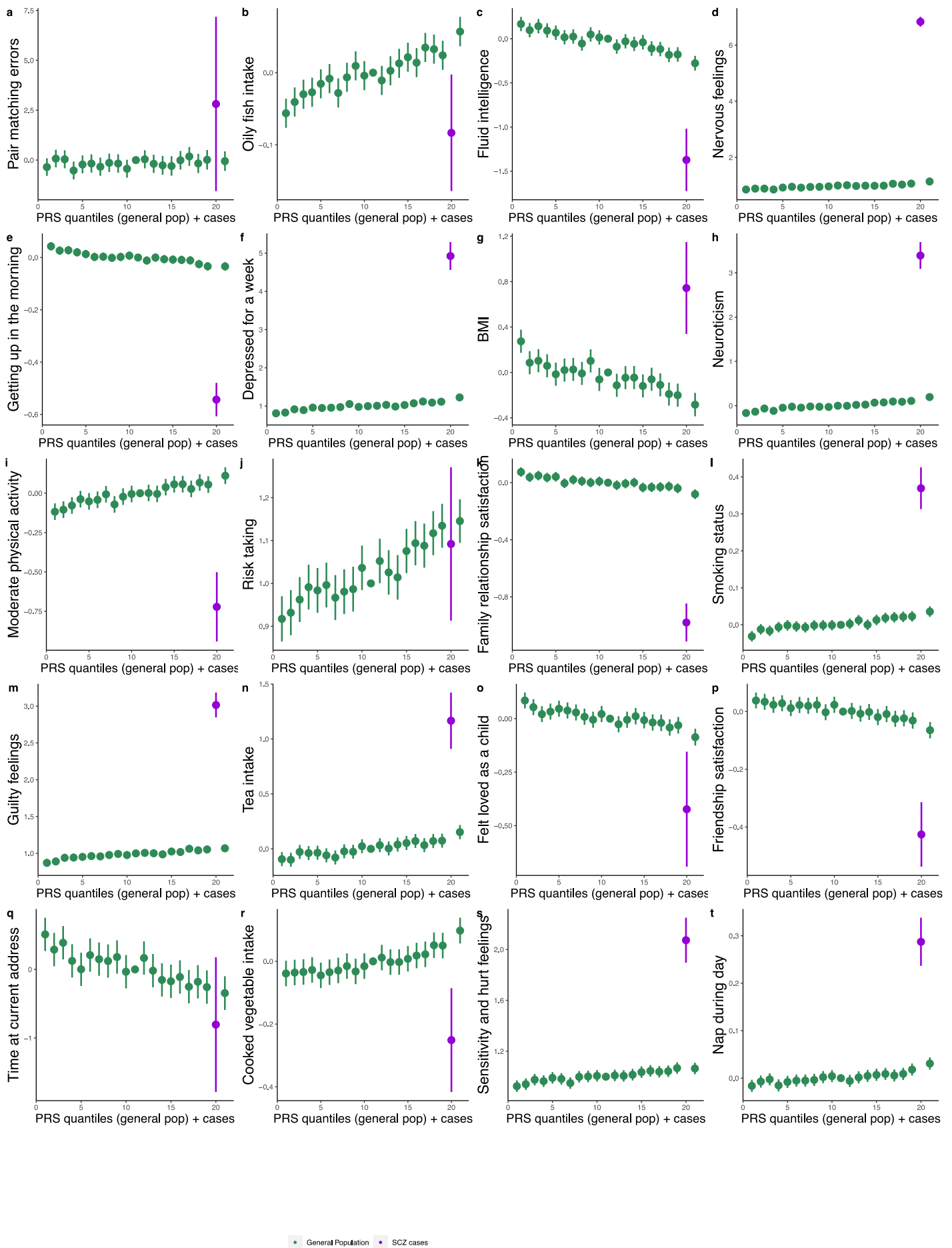
+ Odds ratio for binary outcome variables; α Pseudo R² for binary outcome variables; TDEP = Townsend deprivation index; EDU = Educational attainment



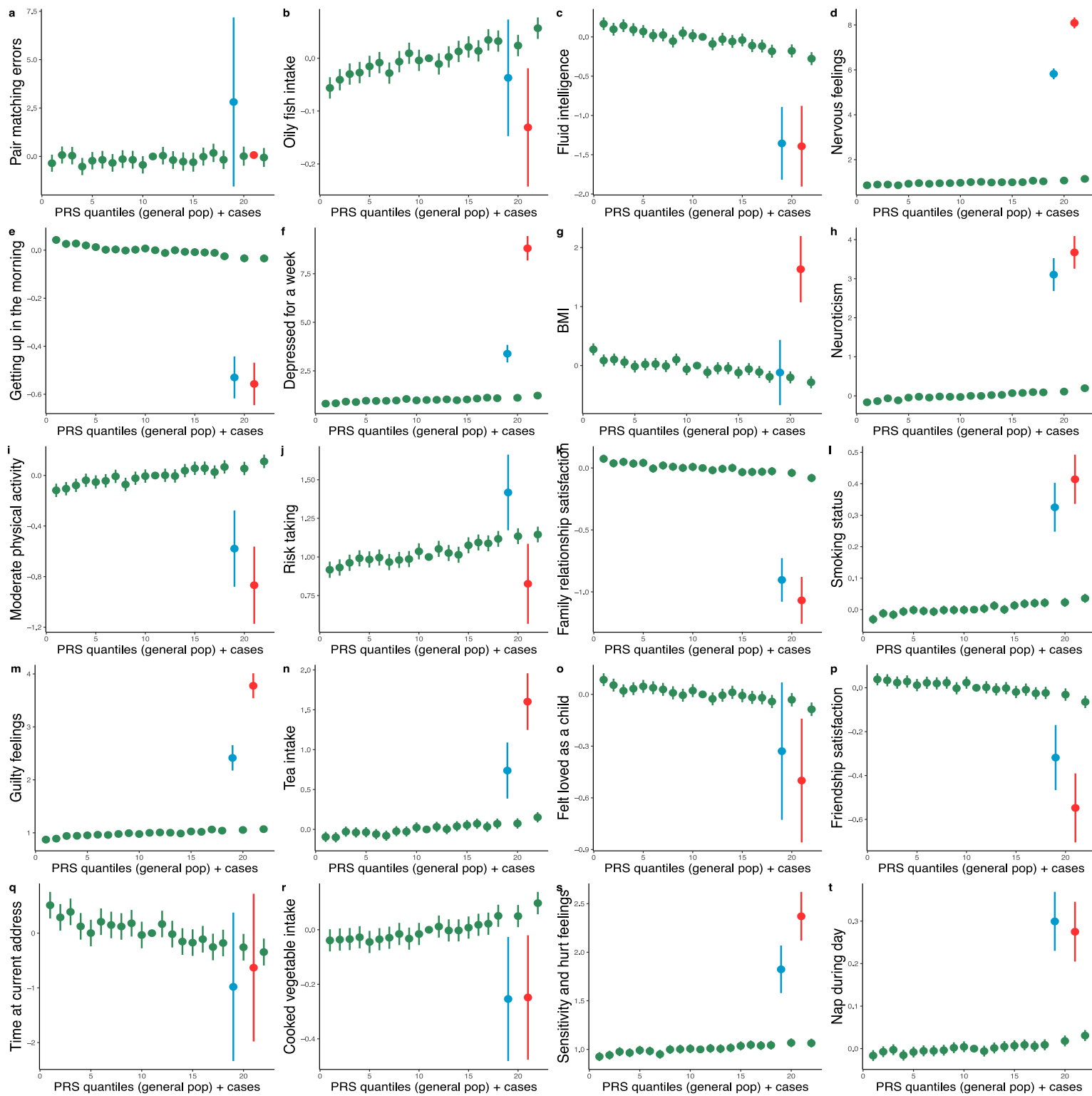
Supplementary Figure 1. Correlation matrix showing phenotypic correlations between the 104 target traits associated with schizophrenia PRS at $P < 1 \times 10^{-7}$. Not including same variable correlations, there are 10712 correlations in total, with a median r^2 of 0.01. 20% of the correlations are $r^2 > 0.01$; 6.8% are $r^2 > 0.05$; and 2.7% are $r^2 > 0.1$. This demonstrates overall weak intercorrelation between the behavioural traits included in the analysis.



Supplementary Figure 2. Dendrogram showing phenotypic clustering based on the correlation matrix in Supplementary Fig. 2 for the 104 target traits associated with schizophrenia PRS at $P < 1 \times 10^{-7}$



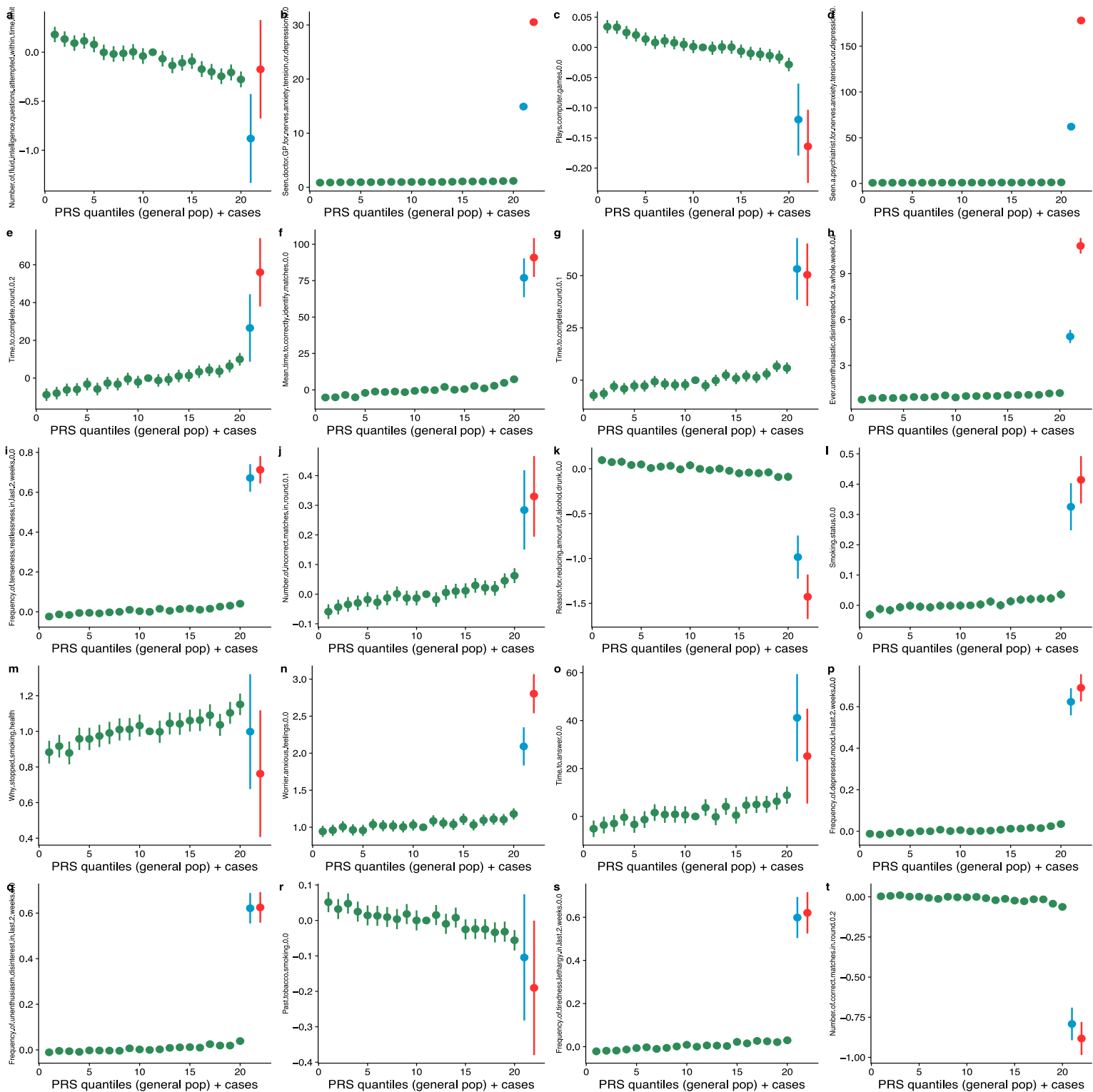
Supplementary Figure 3. PRS-by-trait quantile plots (in green) indicating the trends of association between the best-fit schizophrenia PRS and the target behavioural traits among 20 of the most significant associations, matching those of Fig. 1. The quantile plot is ordered from low to high genetic risk for schizophrenia, according to PRS in the target (UK Biobank) data, with each green point representing the average target trait value of a 5% quantile of the sample. Schizophrenia cases (purple) show the average PRS quantile of cases compared to the quantiles of the general population.



Supplementary

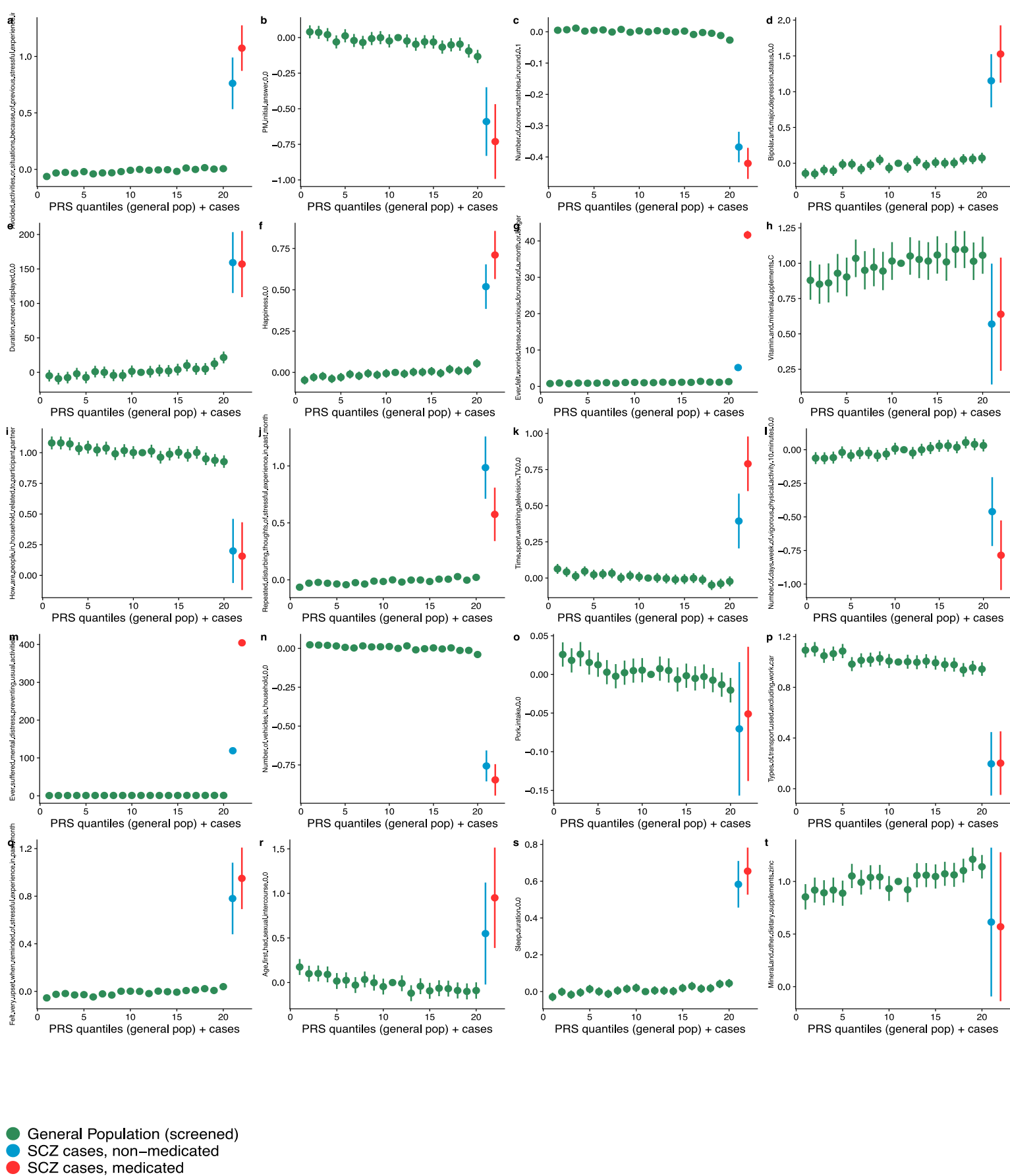
- General Population (screened)
- SCZ cases, non-medicated
- SCZ cases, medicated

Figure 4. PRS-by-trait quantile plots (in green) indicating the trends of association between the best-fit schizophrenia PRS and the target behavioural traits among 20 of the most significant associations, matching those of **Fig. 1**. The quantile plot is ordered from low to high genetic risk for schizophrenia, according to PRS in the target (UK Biobank) data, with each green point representing the average target trait value of a 5% quantile of the sample. Medicated (red) and non-medicated (blue) schizophrenia cases show the average PRS quantile of medicated and non-medicated cases compared to the quantiles of the general population.

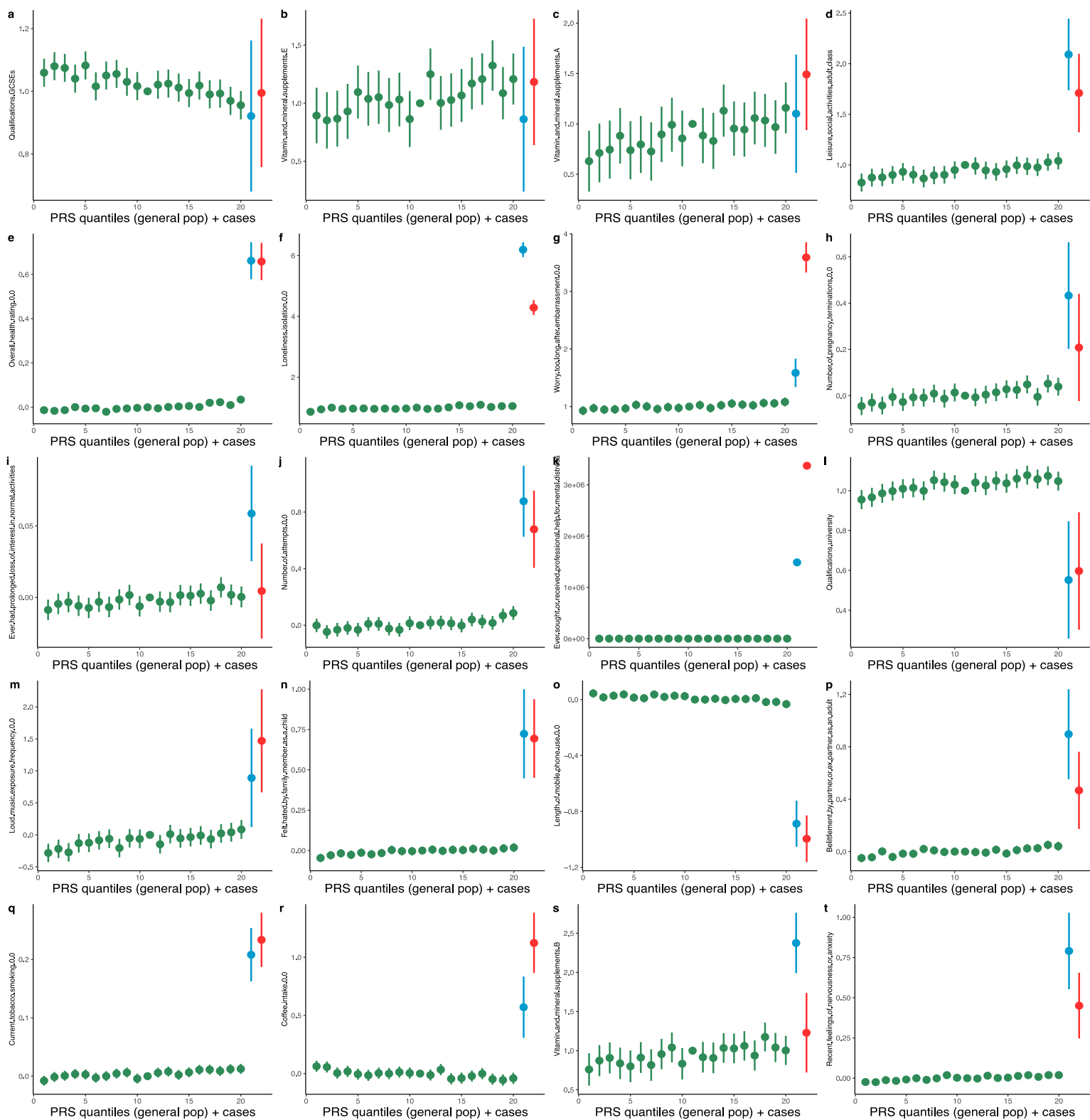


● General Population (screened)
 ● SCZ cases, non-medicated
 ● SCZ cases, medicated

Supplementary Figure 5. PRS-by-trait quantile plots (in green) indicating the trends of association between the best-fit schizophrenia PRS and the target behavioural traits among all significant associations ($P < 1 \times 10^{-7}$), ordered by significance, excluding those of Fig. 1 (see Supplementary Table 2 for details). Each quantile plot is ordered from low to high genetic risk for schizophrenia, according to PRS in the target (UK Biobank) data, with each green point representing the average target trait value of a 5% quantile of the sample. Non-medicated (blue) and medicated (red), at baseline, diagnosed individuals are appended to the right end of each plot, reflecting the expected higher genetic burden of diagnosed individuals compared to unaffected individuals (see Main Text). Vertical lines represent 95% confidence intervals; these appear absent for some traits with a large range and are larger in the two categories of cases due to their smaller sample sizes.

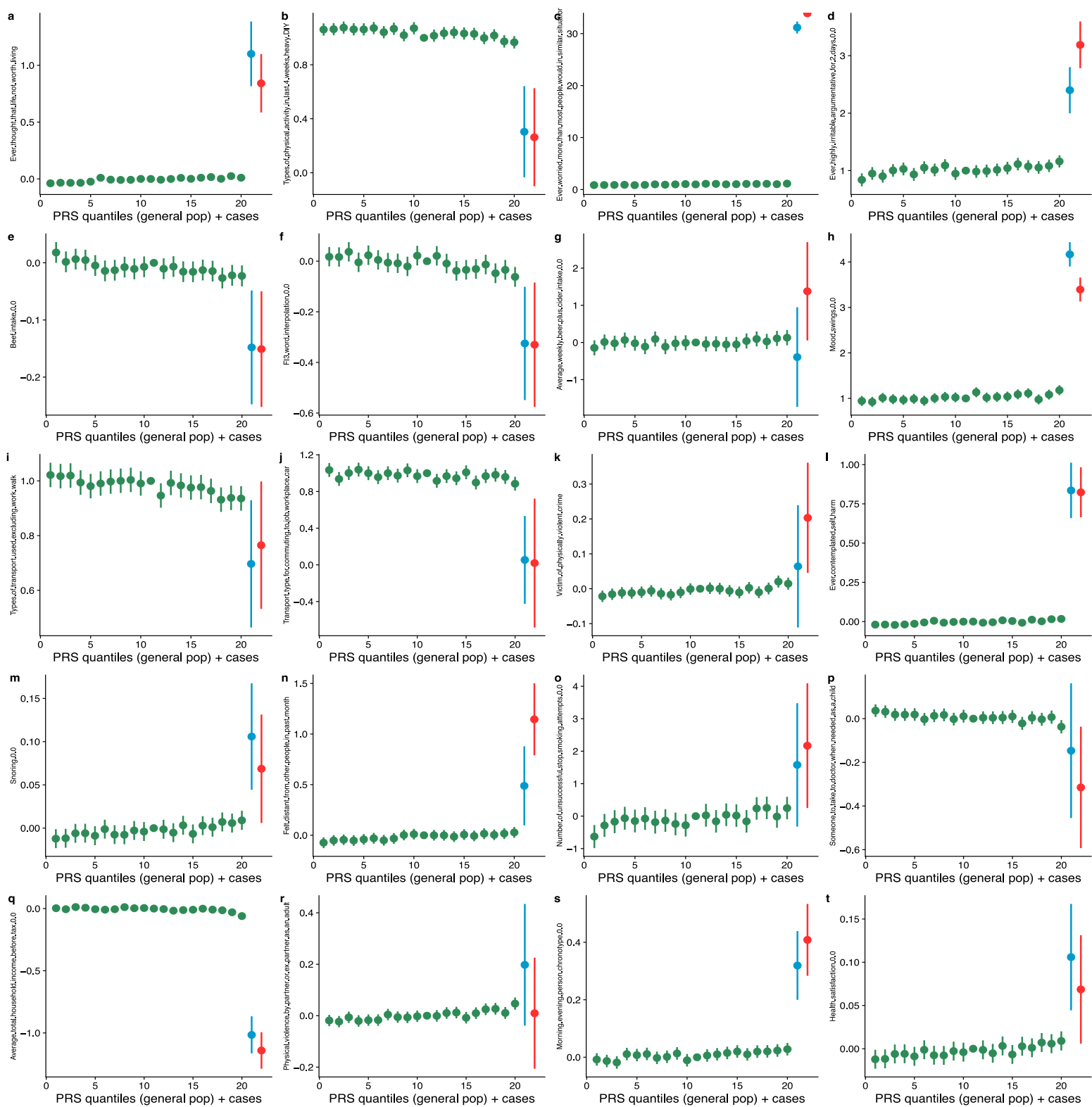


Supplementary Figure 6. PRS-by-trait quantile plots (in green) indicating the trends of association between the best-fit schizophrenia PRS and the target behavioural traits among all significant associations ($P < 1 \times 10^{-7}$), ordered by significance, excluding those of Fig. 1 (see Supplementary Table 2 for details). Each quantile plot is ordered from low to high genetic risk for schizophrenia, according to PRS in the target (UK Biobank) data, with each green point representing the average target trait value of a 5% quantile of the sample. Non-medicated (blue) and medicated (red), at baseline, diagnosed individuals are appended to the right end of each plot, reflecting the expected higher genetic burden of diagnosed individuals compared to unaffected individuals (see Main Text). Vertical lines represent 95% confidence intervals; these appear absent for some traits with a large range and are larger in the two categories of cases due to their smaller sample sizes.

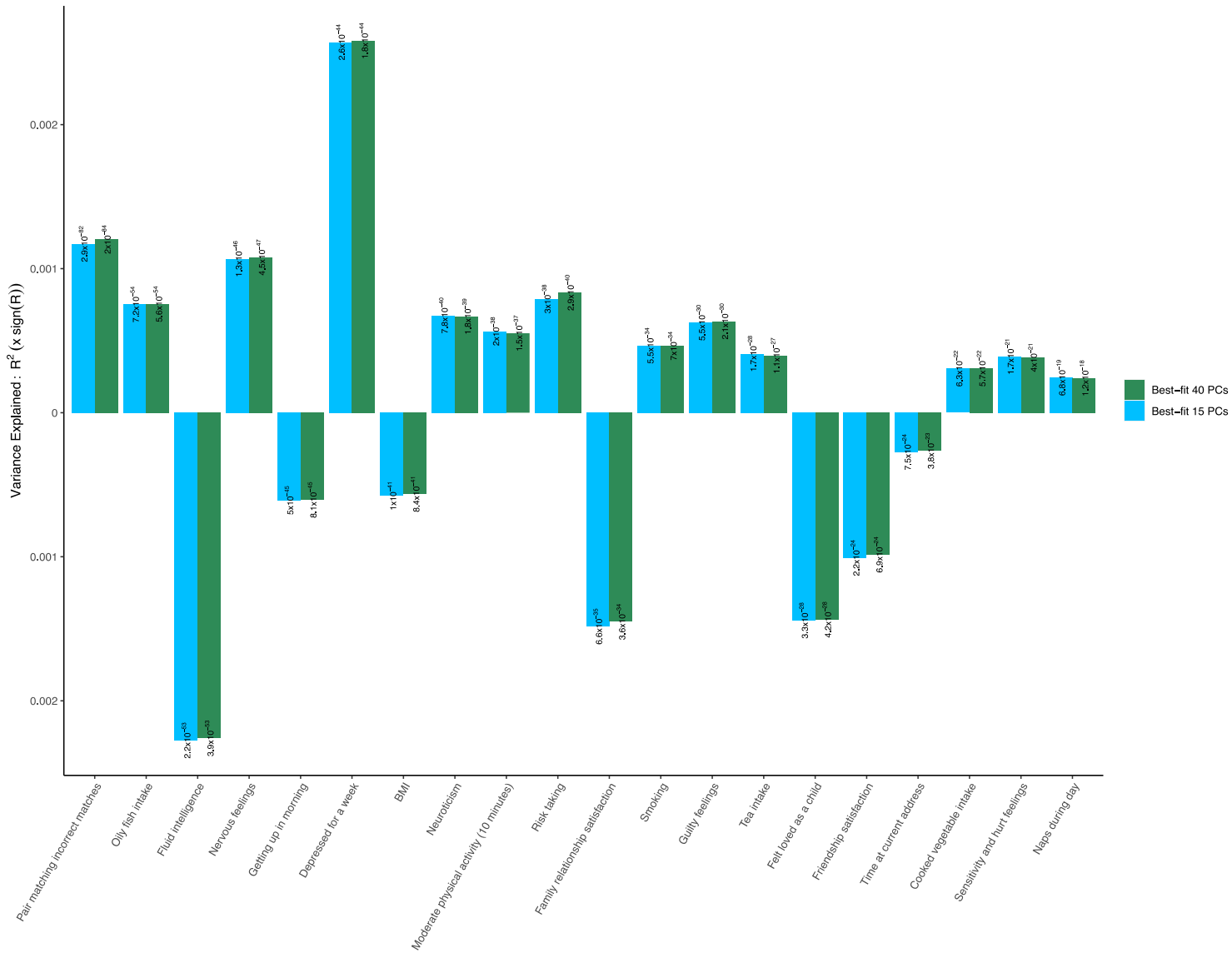


● General Population (screened)
● SCZ cases, non-medicated
● SCZ cases, medicated

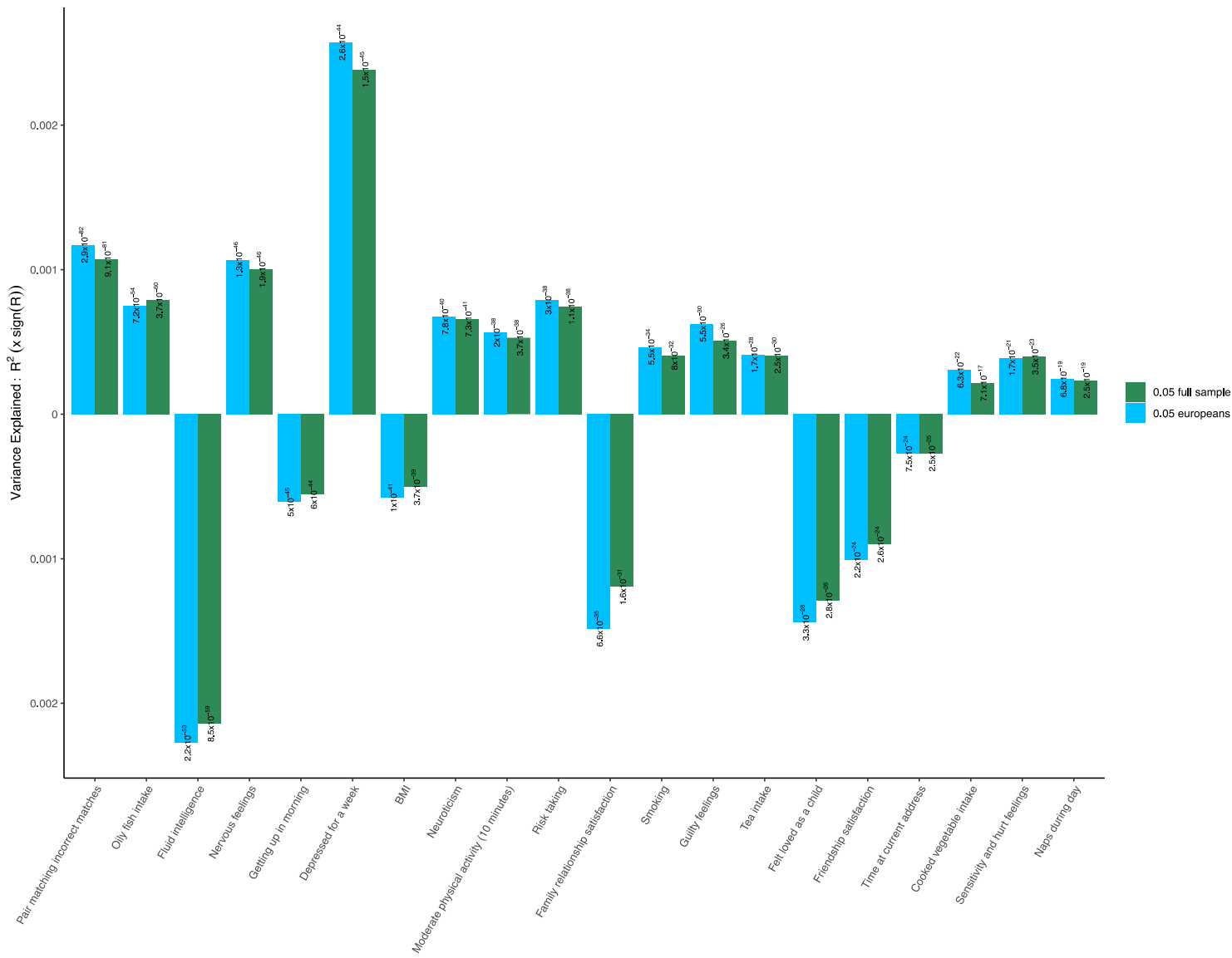
Supplementary Figure 7. PRS-by-trait quantile plots (in green) indicating the trends of association between the best-fit schizophrenia PRS and the target behavioural traits among all significant associations ($P < 1 \times 10^{-7}$), ordered by significance, excluding those of Fig. 1 (see Supplementary Table 2 for details). Each quantile plot is ordered from low to high genetic risk for schizophrenia, according to PRS in the target (UK Biobank) data, with each green point representing the average target trait value of a 5% quantile of the sample. Non-medicated (blue) and medicated (red), at baseline, diagnosed individuals are appended to the right end of each plot, reflecting the expected higher genetic burden of diagnosed individuals compared to unaffected individuals (see Main Text). Vertical lines represent 95% confidence intervals; these appear absent for some traits with a large range and are larger in the two categories of cases due to their smaller sample sizes.



Supplementary Figure 8. PRS-by-trait quantile plots (in green) indicating the trends of association between the best-fit schizophrenia PRS and the target behavioural traits among all significant associations ($P < 1 \times 10^{-7}$), ordered by significance, excluding those of Fig. 1 (see Supplementary Table 2 for details). Each quantile plot is ordered from low to high genetic risk for schizophrenia, according to PRS in the target (UK Biobank) data, with each green point representing the average target trait value of a 5% quantile of the sample. Non-medicated (blue) and medicated (red), at baseline, diagnosed individuals are appended to the right end of each plot, reflecting the expected higher genetic burden of diagnosed individuals compared to unaffected individuals (see Main Text). Vertical lines represent 95% confidence intervals; these appear absent for some traits with a large range and are larger in the two categories of cases due to their smaller sample sizes.



Supplementary Figure 9. A comparison between the results corresponding to Fig. 1 adjusting for 15 principal components (PCs), in green, and adjusting for 40 PCs, in blue.



Supplementary Figure 10. A comparison between the results corresponding to Fig. 1 showing the Europeans only sample, in green, and the full transethnic sample, in blue.