**Supplementary Online Content**

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

**eMethods** Supplementary Methods

**Cognitive Assessment: Penn Computerized Neurocognitive Battery (CNB)**

**Complex cognition**. Abstraction and mental flexibility were assessed by the Penn Conditional Exclusion Test (PCET; Kurtz, Ragland, Moberg, & Gur, 2004) in which participants must choose which of four objects does not belong based on a principle. The PCET evaluates the ability to utilize feedback in order to infer concepts.

Verbal reasoning was measured by the Penn Verbal Reasoning Test (PVRT; Gur et al., 2001), which consists of verbal analogies.

Nonverbal reasoning ability was assessed by the Penn Matrix Analysis Task (PMAT; Moore, Reise, Gur, Hakonarson, & Gur, 2015) in which participants must conceptualize spatial, design, and numerical relations by selecting one of 5 figures to complete a pattern.

Spatial reasoning ability was evaluated by the Penn Line Orientation Task (PLOT; Gur et al., 2012), which asks participants to rotate a line until it is parallel to a reference line. The two lines vary in length, relative locations on the screen, and starting angle.

**Executive function**. Visual attention and vigilance were measured by the Penn Continuous Performance Test (PCPT; Gur et al., 2001; Kurtz, Ragland, Bilker, Gur, & Gur, 2001) during which a series of red 7-segment displays flash in a digital numeric frame. Participants press the spacebar whenever the stimuli form a complete number (first half of test) or letter (second half).

Working memory was measured by the Letter N-Back Task (LNB; Ragland et al., 2002). Participants are asked to attend to flashing letters on the computer screen, one at a time, and to press the spacebar according to three different rules: the 0-back (respond when ‘X’ appears), the 1-back (respond when the letter displayed is identical to the preceding letter) and the 2-back (respond when the letter displayed is identical to the letter before the preceding letter). The three conditions are repeated.

**Episodic memory**. Face episodic memory was measured by the Penn Face Memory Test (CPF; Gur et al., 1997) during which participants see a series of 20 faces. Immediately after the presentation, participants are asked to identify the faces they just saw from 20 distractor faces by indicating whether each face was in the initially presented group. Word episodic memory was assessed by the Penn Word Memory Test (CPW; Gur et al., 1997), which is identical to CPF but instead of faces, participants are presented with words. Visual episodic memory was measured by the Visual Object Learning Test (VOLT; Glahn, Gur, Ragland, Censits, & Gur, 1997), which is identical to the aforementioned memory tasks, but the stimuli consist of 10 Euclidean shapes.

**Social cognition**. Emotion recognition was assessed by the Penn Emotion Identification (EID) Test (Carter et al., 2009; Kohler et al., 2014), in which participants are presented with 40 faces and are asked to identify the emotion each face displays out of 5 possible emotions (happy, sad, anger, fear, neutral).

The ability to detect emotion intensity differences was measured by the Penn Emotion Differentiation Test (EDI; Moore et al., 2015). Participants are presented with a pair of the same face displaying the same emotion at a different intensity and are asked to choose which face displays higher intensity or whether emotion intensity is equal.

The ability to perceive subtle differences in age was evaluated by the Penn Age Differentiation Test (ADI; Moore et al., 2015), during which participants are presented with a pair of the same neutral face at different ages and are asked to choose the older face or whether the faces are the same age.

**Sensorimotor speed**. Sensorimotor processing speed (SM) was measured by the Motor Praxis Test (Gur et al., 2001, 2010, 2012), during which the participant needs to move the computer mouse cursor over green box and click on it once each time it appears on a different location on the test-page. The box becomes smaller as the trial proceeds.

Motor speed (MOT) was assessed by the Finger Tapping Test (Gur et al., 2001, 2010, 2012), in which participants are asked to press the space bar with their index finger as many times as they can, alternating non-dominant and dominant hands. The task consists of 10 trials, 5 for each hand.

**Preliminary Exploratory Factor Analyses (EFAs) for the Psychopathology Model**

EFAs were conducted on the polychoric correlation matrix using least-squares extraction and promax rotation. Items assessing mania were collapsed into a single score due to high item correlations and Heywood cases (Heywood, 1931). Based on this approach, we arrived at a 6-factor solution, which was supported by minimum average partial (MAP), parallel analysis, subjective evaluation of the scree plot, and interpretability. While the original analyses of these items (Shanmugan et al., 2016) extracted four factors (and 'p'), here we wished to apply a data-driven approach to examine whether items might 'split' further into additional sub-factors (beyond 4), allowing relationships between psychopathology and cognition to be more specific, and indeed we found two additional factors in the present study.

**Psychopathology Bifactor Model: Model Considerations**

While the bifactor is the least parsimonious measurement model (Reise, Moore, & Haviland, 2010), given the borderline fit of the bifactor model (e.g., CFI = 0.91), that added complexity appears to be necessary. Sometimes a correlated-traits or second-order model will suffice—e.g., proportionality constraints placed on the loadings by the second-order model (Gignac, 2016) might not degrade fit at all—then the added complexity of the bifactor model is unnecessary, and “superior” fit of the bifactor is merely due to its estimating more parameters. However, in the data presented, this does not appear to be the case; the bifactor model does appear to be necessary because the fit indices of the correlated-traits and second-order models were unacceptable (e.g., CFI = 0.87 for second-order, suggesting its proportionality constraints prevent acceptable fit).

**Psychopathology Bifactor Model: Factor Indicators**

The strongest indicators of the Phobias factor were items created to assess social anxiety (*r* = .54 - .70), such as “was there ever a time in your life when you felt afraid or uncomfortable when you had to do something in front of a group of people, like speaking in class?”. For the obsessive-compulsive (OC) factor, which loaded only items that were created to assess obsessive-compulsive disorder, the strongest indicator was item “Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: …ordering or arranging things?” (*r* = .66). The generalized anxiety disorder item “Did you worry a lot more than most children/people your age?” was the strongest indicator of the Dysphoria/Distress factor (*r* = .75), while the item intended to assess oppositional defiant disorder “Was there a time when you often did things that got you into trouble with adults such as losing your temper, arguing with or talking back to adults, or being grouchy or irritable with them?” was the strongest indicator of the Behavioral/Externalizing factor (*r* = .67). The attention deficit hyperactivity (ADH) item “Did you often have trouble paying attention or keeping your mind on your school, work, chores, or other activities that you were doing?” was the strongest indicator of the ADH factor (*r* = .74), and the item “I believe that I have special natural or supernatural gifts beyond my talents and natural strengths.” was the strongest indicator of the Psychosis factor (*r* = .65). Finally, the items created to capture OC were the strongest indicators of the ‘p’ factor (*r* = .68 - .70).

**Table S1**

*Exploratory Psychopathology Model Factor Loadings*

| Item | Item Description | Factor | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Phobias/fear | OC | Dysphoria/  Distress | Behavioral/  Externalizing | ADH | Psychosis |
| AGR006 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: traveling away from home? | .76 | .06 | -.01 | .02 | .00 | -.11 |
| SOC004 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable acting, performing, giving a talk/speech, playing a sport or doing a musical performance, or taking an important test or exam (even though you studied enough)? | .74 | -.11 | .04 | .03 | -.04 | -.04 |
| AGR005 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: traveling by yourself? | .73 | .05 | -.10 | -.03 | -.01 | -.01 |
| AGR004 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: going over bridges or through tunnels? | .71 | .04 | -.12 | .13 | -.04 | -.02 |
| SOC003 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable when you had to do something in front of a group of people, like speaking in class? | .71 | -.17 | .03 | .03 | -.03 | -.04 |
| SOC005 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable because you were the center of attention and were concerned something embarrassing might happen and you felt very afraid or felt uncomfortable? | .70 | -.09 | .03 | .06 | -.01 | -.03 |
| AGR008 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: using public transportation like a bus or SEPTA? | .69 | .09 | -.11 | .11 | -.01 | -.04 |
| SOC001 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable or really, really shy with people, like meeting new people, going to parties, or eating or drinking, writing or doing homework in front of others? | .68 | -.19 | .17 | -.04 | .06 | -.04 |
| AGR001 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: being in crowds (for example, a classroom, cafeteria, restaurant, or movie theater)? | .64 | .01 | .10 | -.05 | .10 | -.03 |
| AGR003 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: being in an open field? | .64 | .10 | -.05 | -.13 | .04 | .09 |
| PHB007 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of flying or airplanes? | .63 | -.02 | -.11 | .15 | -.09 | -.02 |
| AGR002 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: going to public places (such as a store or shopping mall)? | .61 | .00 | .12 | -.10 | .14 | -.01 |
| PHB002 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of being in really high places, like a roof or tall building? | .60 | -.08 | -.07 | .13 | -.10 | .03 |
| PHB004 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of storms, thunder, or lightning? | .60 | -.01 | -.17 | -.11 | .10 | .04 |
| SOC002 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable talking on the telephone or with people your own age who you don't know very well? | .60 | -.07 | .11 | -.02 | .00 | -.03 |
| PHB001 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of animals or bugs, like dogs, snakes, or spiders? | .57 | -.03 | -.09 | -.02 | -.03 | .02 |
| PHB006 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of closed spaces, like elevators or closets? | .52 | .10 | -.02 | -.03 | -.02 | .01 |
| SEP509 | Separation Anxiety: When you knew that you were going to be away from home or (attachment figure(s)), did you get very upset and worry (e.g., when you learned (attachment figure(s)) were going on an upcoming trip or night out)? | .48 | .01 | .19 | -.24 | .14 | -.04 |
| PHB003 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of water or situations involving water, such as a swimming pool, lake, or ocean? | .47 | -.05 | -.06 | .10 | .00 | .07 |
| PHB005 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of doctors, needles, or blood? | .42 | -.05 | -.09 | -.12 | .14 | .04 |
| PHB008 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of any other things or situations? | .41 | .08 | .07 | -.17 | .14 | .00 |
| SEP508 | Separation Anxiety: Has there ever been a time when you wanted to stay home from school or not go to other places (for example, sleep-overs) without your (attachment figures)? | .41 | -.03 | .24 | -.18 | .06 | -.04 |
| SEP500 | Separation Anxiety: Since you were 5 years old, has there ever been a time when you had a lot of worries about your (attachment figures) and were very upset or got sick (for example, felt sick to your stomach, headaches, thrown-up) when you were away from him/her? | .39 | -.11 | .34 | -.11 | .01 | -.01 |
| AGR007 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: traveling in a car? | .37 | .27 | .05 | .15 | -.06 | -.23 |
| PSY071 | Psychosis: Have you ever believed in things and later found out they weren't true, like people being out to get you, or talking about you behind your back, or controlling what you do or think? | .25 | .09 | .09 | .22 | -.03 | .18 |
| OCD016 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: ordering or arranging things? | -.15 | 1.00 | .02 | -.19 | .05 | -.04 |
| OCD012 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: counting? | -.11 | .92 | -.02 | -.08 | .04 | -.08 |
| OCD007 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as need for symmetry/exactness? | -.28 | .91 | .14 | -.11 | .02 | -.11 |
| OCD011 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: cleaning or washing (for example, your hands, house)? | .02 | .91 | -.07 | -.13 | .00 | -.09 |
|  |  |  |  |  |  |  |  |
| OCD017 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: doing things over and over again at bedtime, like arranging the pillows, sheets, or other things? | -.04 | .89 | -.13 | -.08 | .14 | .00 |
| OCD015 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: going in and out a door over and over again? | -.02 | .81 | -.17 | -.10 | .13 | .05 |
| OCD013 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: checking (for example, doors, locks, ovens)? | .18 | .79 | -.12 | -.07 | -.04 | -.05 |
| OCD003 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as thoughts about contamination/germs/illness? | .06 | .74 | .07 | -.06 | -.08 | -.08 |
| OCD019 | Obsessive Compulsive Disorder: Do you feel the need to do things just right (like they have to be perfect)? | -.03 | .74 | .01 | -.06 | -.02 | -.04 |
| OCD014 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: getting dressed over and over again? | .01 | .69 | -.05 | .04 | .03 | .03 |
| OCD008 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as religious thoughts? | -.02 | .60 | .06 | .18 | -.11 | .00 |
| OCD018 | Obsessive Compulsive Disorder: Have you ever saved up so many things that people complained or they got in the way? | -.02 | .59 | .00 | .00 | .10 | -.03 |
| OCD004 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as fear that you would do something/say something bad without intending to? | .06 | .51 | .16 | .13 | -.03 | .08 |
| OCD005 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as feelings that bad things that happened were your fault? | .02 | .47 | .30 | .05 | -.04 | .06 |
| OCD002 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as pictures of violent things? | .14 | .43 | .09 | .16 | -.07 | .10 |
| OCD001 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as concern with harming others/self? | -.03 | .37 | .32 | .27 | -.11 | .05 |
| OCD006 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as forbidden/bad thoughts? | .08 | .36 | .23 | .18 | -.06 | .13 |
| DEP001 | Depression: Has there ever been a time when you felt sad or depressed most of the time? | -.04 | -.01 | .83 | .16 | -.17 | .01 |
| SUI002 | Suicide: Have you ever thought about killing yourself? | -.09 | -.13 | .80 | .26 | -.06 | .02 |
| GAD002 | Generalized Anxiety Disorder: Did you worry a lot more than most children/people your age? | .09 | .09 | .73 | -.23 | .04 | -.15 |
| SCR007 | General Probes: Have you ever had to go to a hospital and stay overnight because of problems with your mood, feelings, or how you were acting? | -.18 | -.09 | .65 | .21 | .06 | -.03 |
| DEP002 | Depression: Has there ever been a time when you cried a lot, or felt like crying? | .13 | .02 | .65 | .12 | -.16 | .01 |
| SCR001 | General Probes: Have you ever talked to a counselor, psychologist, social worker, psychiatrist or some other professional about your feelings or problems with your mood or behaviors? | -.09 | -.10 | .64 | .10 | .19 | -.06 |
| SCR006 | General Probes: Are you currently taking medication because of your emotions and/or behaviors? | -.22 | -.13 | .63 | -.14 | .45 | .04 |
| SIP032 | SIPS- Structured Interview for Prodromal Symptoms: Do you ever feel a loss of sense of self or feel disconnected from yourself or your life? | -.15 | .10 | .63 | .13 | -.10 | .15 |
| GAD001 | Generalized Anxiety Disorder: Have you ever been a worrier? | .18 | .13 | .63 | -.27 | -.04 | -.10 |
| SCR008 | General Probes: Have you or anyone else (like your friends, parents, or teachers) ever thought you needed help because of problems with your mood, feelings, or how you were acting? | -.07 | -.23 | .62 | .19 | .25 | -.02 |
| PAN001 | Panic Disorder: Have you ever had an attack like this? | .22 | .09 | .58 | -.06 | -.15 | -.09 |
| PAN004 | Panic Disorder: Has there ever been a time when all of a sudden, you felt that you were losing control, something terrible was going to happen, that you were going crazy, or going to die? | .09 | .10 | .52 | .08 | -.04 | .07 |
| DEP006 | Depression: Has there ever been a time when nothing was fun for you and you just weren't interested in anything? | .08 | .03 | .49 | .24 | -.06 | .08 |
| SUI001 | Suicide: Have you ever thought a lot about death or dying? | .00 | .09 | .49 | .20 | -.05 | .02 |
| DEP004 | Depression: Has there ever been a time when you felt grouchy, irritable or in a bad mood most of the time; even little things would make you mad? | .11 | .04 | .47 | .27 | .03 | .01 |
| PAN003 | Panic Disorder: Has there ever been a time when all of a sudden you felt very, very scared or uncomfortable - and your chest hurt, you couldn't catch your breath, your heart beat very fast, you felt very shaky, and sweaty/tingly/numb in your hands or feet? | .34 | .11 | .36 | .04 | -.15 | .01 |
| SIP033 | SIPS- Structured Interview for Prodromal Symptoms: Has anyone pointed out to you that you are less emotional or connected to people than you used to be? | -.02 | .04 | .36 | .28 | -.04 | .12 |
| SIP038 | SIPS- Structured Interview for Prodromal Symptoms: Within the past 6 months, are you having a harder time getting your work or schoolwork done? | -.04 | .01 | .35 | -.05 | .20 | .06 |
| SEP510 | Separation Anxiety: Did you ever worry/have bad dreams about something terrible happening to you or your (attachment figures) so that you would not see them again? | .23 | .02 | .33 | .02 | -.01 | .05 |
| SIP039 | SIPS- Structured Interview for Prodromal Symptoms: Within the past 6 months, are you having a harder time getting normal activities done? | -.13 | .20 | .32 | -.02 | .19 | .03 |
| CDD002 | Conduct Disorder: Did you ever skip school, stay out at night later than you were supposed to (more than 2 hours), or run away from home overnight? | -.03 | -.17 | .21 | .83 | -.05 | -.14 |
| CDD004 | Conduct Disorder: Do you have a probation officer or have you ever been on probation? | -.11 | -.18 | .04 | .82 | -.03 | -.06 |
| CDD008 | Conduct Disorder: Did you ever: threaten someone? | .01 | -.08 | .01 | .80 | .16 | -.04 |
| CDD007 | Conduct Disorder: Did you ever: try to hurt someone with a weapon (a bat, brick, broken bottle, knife, or gun)? | -.06 | .05 | .02 | .79 | .09 | -.10 |
| CDD003 | Conduct Disorder: Did you ever set fires, break into cars, or destroy someone else's property on purpose? | -.22 | -.05 | .07 | .76 | .25 | -.03 |
| CDD006 | Conduct Disorder: Have you ever been physically cruel to an animal or person (on purpose)? | -.05 | .04 | -.01 | .67 | .21 | -.09 |
| CDD005 | Conduct Disorder: Did you often bully others (hitting, threatening or scaring someone who was younger or smaller), threaten or frighten someone on purpose, or often start physical fights with others? | -.01 | -.01 | -.05 | .65 | .32 | -.06 |
| CDD001 | Conduct Disorder: Was there ever a time when you often did things that got you into trouble with adults like lying or stealing (something worth more than $5, from family, others, or stores)? | -.01 | -.06 | .09 | .58 | .25 | -.14 |
| ODD005 | Oppositional Defiant Disorder: Did you ever get into trouble for getting even with other people by doing things to hurt them, telling lies about them, or messing up their things? | .01 | .07 | -.15 | .56 | .43 | -.06 |
| ODD002 | Oppositional Defiant Disorder: Was there a time when you often got into trouble with adults for refusing to do what they told you to do or for breaking rules at home/school? | .07 | -.03 | .00 | .52 | .47 | -.10 |
| ODD001 | Oppositional Defiant Disorder: Was there a time when you often did things that got you into trouble with adults such as losing your temper, arguing with or talking back to adults, or being grouchy or irritable with them? | .10 | .05 | .01 | .48 | .41 | -.14 |
| ODD006 | Oppositional Defiant Disorder: Were you often irritable or grouchy, or did you often get angry because you thought that things were unfair? | .18 | .01 | .02 | .44 | .39 | -.06 |
| PTD009 | Post-Traumatic Stress: Have you ever been very upset by seeing a dead body or by seeing pictures of the dead body of somebody you knew well? | .26 | -.05 | .03 | .31 | -.13 | .07 |
| PSY050 | Psychosis: Have you ever smelled strange odors other people could not smell? | .12 | .19 | .00 | .27 | -.09 | .18 |
| SEP511 | Separation Anxiety: Were you scared to be alone in your room (or any place in your house) or did you need your (attachment figure(s)) to stay with you while you fell asleep? | .21 | .13 | .21 | -.23 | .19 | -.12 |
| ADD011 | Attention Deficit Disorder: Did you often have trouble paying attention or keeping your mind on your school, work, chores, or other activities that you were doing? | .06 | .00 | -.01 | .04 | .83 | .06 |
| ADD012 | Attention Deficit Disorder: Did you often have problems following instructions and often fail to finish school, work, or other things you meant to get done? | .00 | -.04 | .06 | .09 | .80 | .03 |
| ADD022 | Attention Deficit Disorder: Did you often join other people's conversations or have trouble waiting your turn (e.g., waiting in line, waiting for a teacher to call on you in class)? | .03 | .12 | -.11 | .02 | .75 | .05 |
| ADD016 | Attention Deficit Disorder: Did you often have people tell you that you did not seem to be listening when they spoke to you or that you were daydreaming? | .07 | .01 | -.10 | .18 | .73 | .07 |
| ADD021 | Attention Deficit Disorder: Did you often blurt out answers to other people's questions before they finished speaking or interrupt people abruptly? | -.06 | .10 | -.08 | .16 | .69 | .00 |
| ADD014 | Attention Deficit Disorder: Did you often lose things you needed for school or projects at home (assignments or books) or make careless mistakes in school work or other activities? | .06 | .00 | .02 | .02 | .65 | .08 |
| ADD020 | Attention Deficit Disorder: Did you often have difficulty sitting still for more than a few minutes at a time, even after being asked to stay seated, or did you often fidget with your hands or feet or wiggle in your seat or were you "always on the go"? | .03 | .10 | -.05 | .06 | .64 | .10 |
| ADD015 | Attention Deficit Disorder: Did you often have trouble making plans, doing things that had to be done in a certain kind of order, or that had a lot of different steps? | .15 | .00 | .06 | -.02 | .63 | .07 |
| ADD013 | Attention Deficit Disorder: Did you often dislike, avoid, or put off school or homework (or any other activity requiring concentration) | -.01 | -.11 | .23 | .14 | .59 | -.02 |
| ODD003 | Oppositional Defiant Disorder: Did you often annoy other people on purpose or blame other people for your mistakes (excluding siblings)? | -.02 | .01 | -.06 | .45 | .55 | -.08 |
| SIP028 | SIPS- Structured Interview for Prodromal Symptoms: Do people ever seem to have difficulty understanding you? | .10 | .08 | .01 | .13 | .22 | .19 |
| SIP011 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I think I might feel like my mind is "playing tricks" on me. | -.07 | -.04 | .07 | -.10 | .02 | .76 |
| SIP007 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I think I may get confused at times whether something I experience or perceive may be real or may be just part of my imagination or dreams. | .04 | -.04 | -.02 | -.05 | .01 | .74 |
| SIP005 | SIPS- PRIME SCREEN-REVISED- Structured Interview for Prodromal Symptoms: I may have felt that there could possibly be something interrupting or controlling my thoughts, feelings, or actions. | -.06 | -.06 | .00 | -.10 | .04 | .73 |
| SIP012 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I have had the experience of hearing faint or clear sounds of people or a person mumbling or talking when there is no one near me. | .02 | -.04 | -.03 | -.07 | .00 | .72 |
| SIP013 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I think that I may hear my own thoughts being said out loud. | -.01 | -.02 | -.02 | -.08 | .00 | .69 |
| SIP003 | SIPS- PRIME SCREEN-REVISED: I think that I have felt that there are odd or unusual things going on that I can't explain. | -.01 | -.01 | .09 | -.01 | -.03 | .66 |
| SIP008 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I have thought that it might be possible that other people can read my mind, or that I can read others' minds | -.04 | -.06 | -.05 | -.07 | .03 | .65 |
| SIP006 | SIPS- PRIME SCREEN-REVISED- Structured Interview for Prodromal Symptoms: I have had the experience of doing something differently because of my superstitions. | -.03 | .04 | -.04 | -.06 | -.02 | .63 |
| SIP010 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I believe that I have special natural or supernatural gifts beyond my talents and natural strengths. | .04 | -.06 | -.13 | -.07 | .04 | .63 |
| SIP014 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I have been concerned that I might be "going crazy." | -.18 | -.02 | .30 | -.21 | .06 | .62 |
| SIP009 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I wonder if people may be planning to hurt me or even may be about to hurt me. | .01 | -.08 | .03 | .01 | .04 | .58 |
| SIP004 | SIPS- PRIME SCREEN-REVISED: I think that I might be able to predict the future. | -.03 | -.04 | -.06 | -.04 | .03 | .58 |
| PSY001 | Psychosis: Have you ever heard voices when no one was there? | .20 | .06 | .06 | .13 | -.05 | .41 |
| MANIA a | -- | .02 | .12 | .12 | .07 | .10 | .33 |
| PSY060 | Have you ever had strange feelings in your body like things were crawling on you or someone touching you and nothing or no one was there? | .26 | .18 | -.03 | .15 | -.08 | .32 |
| PSY029 | Have you ever seen visions or seen things which other people could not see? | .16 | .18 | -.02 | .18 | -.05 | .28 |
| PSY070 | Have you ever believed in things that most other people or your parents don't believe in? | .12 | .20 | .05 | .09 | .00 | .24 |
| SIP027 | Do people ever tell you that they can't understand you? | .11 | .05 | -.04 | .15 | .18 | .20 |

*Note*: ADH = attention deficit hyperactivity; AGR = agoraphobia; DEP = depression; GAD = generalized anxiety disorder; OCD = obsessive-compulsive disorder; OC = obsessive-compulsive; ODD = oppositional defiant; PAN = panic; PHB = phobia; PSY = psychosis; SEP = separation; SIP = Structured Interview for Prodromal Symptoms (v 4.0; McGlashan, Miller, & Woods, 2003); SOC = social anxiety; SUI = suicide.

a Items assessing mania were combined into a single “MANIA” item due to high item correlations and Heywood cases (Heywood, 1931).

**Table S2**

*Factor Loadings for the Cognition Correlated-Traits Model*

| **Factor** | **Item** | **Factor Loading** |
| --- | --- | --- |
| **Complex Cognition** |  |  |
|  | Abstraction and mental flexibility | .48 |
|  | Language reasoning | .60 |
|  | Nonverbal reasoning | .56 |
|  | Spatial processing | .54 |
| **Executive Function** |  |  |
|  | Visual attention and vigilance | .58 |
|  | Working memory | .60 |
| **Episodic Memory** |  |  |
|  | Verbal memory | .64 |
|  | Facial memory | .69 |
|  | Spatial memory | .56 |
| **Social Cognition** |  |  |
|  | Emotion identification | .68 |
|  | Emotion differentiation | .71 |
|  | Age differentiation | .60 |
| **Sensorimotor speed** |  |  |
|  | Motor speed | .49 |
|  | Sensorimotor speed | .56 |

*Note*: Items represent efficiency scores, defined as the sum of standardized speed and accuracy scores.

**Table S3**

*Factor Loadings for the Psychopathology Bifactor Model*

| **Factor** | **Item** | **Item Description** | **Factor Loading** | **General Psychopathology Loading** |
| --- | --- | --- | --- | --- |
| **Phobias/Fear** |  |  |  |  |
|  | AGR006 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: traveling away from home? | .45 | .49 |
|  | SOC004 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable acting, performing, giving a talk/speech, playing a sport or doing a musical performance, or taking an important test or exam (even though you studied enough)? | .67 | .37 |
|  | AGR005 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: traveling by yourself? | .44 | .44 |
|  | AGR004 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: going over bridges or through tunnels? | .39 | .45 |
|  | SOC003 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable when you had to do something in front of a group of people, like speaking in class? | .70 | .29 |
|  | SOC005 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable because you were the center of attention and were concerned something embarrassing might happen and you felt very afraid or felt uncomfortable? | .63 | .41 |
|  | AGR008 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: using public transportation like a bus or SEPTA? | .41 | .49 |
|  | SOC001 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable or really, really shy with people, like meeting new people, going to parties, or eating or drinking, writing or doing homework in front of others? | .63 | .39 |
|  | AGR001 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: being in crowds (for example, a classroom, cafeteria, restaurant, or movie theater)? | .47 | .52 |
|  | AGR003 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: being in an open field? | .35 | .51 |
|  | PHB007 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of flying or airplanes? | .38 | .32 |
|  | AGR002 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: going to public places (such as a store or shopping mall)? | .48 | .52 |
|  | PHB002 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of being in really high places, like a roof or tall building? | .36 | .29 |
|  | PHB004 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of storms, thunder, or lightning? | .34 | .31 |
|  | SOC002 | Social Anxiety: Looking at this card, was there ever a time in your life when you felt afraid or uncomfortable talking on the telephone or with people your own age who you don't know very well? | .54 | .38 |
|  | PHB001 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of animals or bugs, like dogs, snakes, or spiders? | .31 | .26 |
|  | PHB006 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of closed spaces, like elevators or closets? | .29 | .37 |
|  | SEP509 | Separation Anxiety: When you knew that you were going to be away from home or (attachment figure(s)), did you get very upset and worry (e.g., when you learned (attachment figure(s)) were going on an upcoming trip or night out)? | .26 | .43 |
|  | PHB003 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of water or situations involving water, such as a swimming pool, lake, or ocean? | .26 | .34 |
|  | PHB005 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of doctors, needles, or blood? | .25 | .25 |
|  | PHB008 | Specific Phobia: Looking at this card, have you ever been very nervous or afraid of any other things or situations? | .18 | .41 |
|  | SEP508 | Separation Anxiety: Has there ever been a time when you wanted to stay home from school or not go to other places (for example, sleep-overs) without your (attachment figures)? | .24 | .40 |
|  | SEP500 | Separation Anxiety: Since you were 5 years old, has there ever been a time when you had a lot of worries about your (attachment figures) and were very upset or got sick (for example, felt sick to your stomach, headaches, thrown-up) when you were away from him/her? | .19 | .43 |
|  | AGR007 | Agoraphobia: Looking at this card, have you ever been very nervous or afraid of: traveling in a car? | .25 | .40 |
|  | PSY071 | Psychosis: Have you ever believed in things and later found out they weren't true, like people being out to get you, or talking about you behind your back, or controlling what you do or think? | .01 | .63 |
|  | SEP511 | Separation Anxiety: Were you scared to be alone in your room (or any place in your house) or did you need your (attachment figure(s)) to stay with you while you fell asleep? | .11 | .36 |
| **OC** |  |  |  |  |
|  | OCD016 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: ordering or arranging things? | .66 | .50 |
|  | OCD012 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: counting? | .54 | .49 |
|  | OCD007 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as need for symmetry/exactness? | .64 | .44 |
|  | OCD011 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: cleaning or washing (for example, your hands, house)? | .59 | .48 |
|  | OCD017 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: doing things over and over again at bedtime, like arranging the pillows, sheets, or other things? | .53 | .53 |
|  | OCD015 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: going in and out a door over and over again? | .47 | .49 |
|  | OCD013 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: checking (for example, doors, locks, ovens)? | .49 | .52 |
|  | OCD003 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as thoughts about contamination/germs/illness? | .50 | .50 |
|  | OCD019 | Obsessive Compulsive Disorder: Do you feel the need to do things just right (like they have to be perfect)? | .53 | .45 |
|  | OCD014 | Obsessive Compulsive Disorder: Have you ever had to do something over and over again - that would have made you feel really nervous if you couldn't do it, like: getting dressed over and over again? | .45 | .53 |
|  | OCD008 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as religious thoughts? | .33 | .54 |
|  | OCD018 | Obsessive Compulsive Disorder: Have you ever saved up so many things that people complained or they got in the way? | .36 | .49 |
|  | OCD004 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as fear that you would do something/say something bad without intending to? | .31 | .69 |
|  | OCD005 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as feelings that bad things that happened were your fault? | .29 | .70 |
|  | OCD002 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as pictures of violent things? | .25 | .68 |
|  | OCD001 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as concern with harming others/self? | .25 | .69 |
|  | OCD006 | Obsessive Compulsive Disorder: Have you ever been bothered by thoughts that don't make sense to you, that come over and over again and won't go away, such as forbidden/bad thoughts? | .24 | .70 |
| **Dysphoria/**  **Distress** |  |  |  |  |
|  | DEP001 | Depression: Has there ever been a time when you felt sad or depressed most of the time? | .49 | .57 |
|  | SUI002 | Suicide: Have you ever thought about killing yourself? | .42 | .56 |
|  | GAD002 | Generalized Anxiety Disorder: Did you worry a lot more than most children/people your age? | .75 | .44 |
|  | SCR007 | General Probes: Have you ever had to go to a hospital and stay overnight because of problems with your mood, feelings, or how you were acting? | .40 | .41 |
|  | DEP002 | Depression: Has there ever been a time when you cried a lot, or felt like crying? | .42 | .57 |
|  | SCR001 | General Probes: Have you ever talked to a counselor, psychologist, social worker, psychiatrist or some other professional about your feelings or problems with your mood or behaviors? | .34 | .47 |
|  | SCR006 | General Probes: Are you currently taking medication because of your emotions and/or behaviors? | .39 | .47 |
|  | SIP032 | SIPS- Structured Interview for Prodromal Symptoms: Do you ever feel a loss of sense of self or feel disconnected from yourself or your life? | .27 | .57 |
|  | GAD001 | Generalized Anxiety Disorder: Have you ever been a worrier? | .66 | .42 |
|  | SCR008 | General Probes: Have you or anyone else (like your friends, parents, or teachers) ever thought you needed help because of problems with your mood, feelings, or how you were acting? | .35 | .52 |
|  | PAN001 | Panic Disorder: Have you ever had an attack like this? | .31 | .48 |
|  | PAN004 | Panic Disorder: Has there ever been a time when all of a sudden, you felt that you were losing control, something terrible was going to happen, that you were going crazy, or going to die? | .25 | .64 |
|  | DEP006 | Depression: Has there ever been a time when nothing was fun for you and you just weren't interested in anything? | .28 | .64 |
|  | SUI001 | Suicide: Have you ever thought a lot about death or dying? | .23 | .55 |
|  | DEP004 | Depression: Has there ever been a time when you felt grouchy, irritable or in a bad mood most of the time; even little things would make you mad? | .25 | .66 |
|  | PAN003 | Panic Disorder: Has there ever been a time when all of a sudden you felt very, very scared or uncomfortable - and your chest hurt, you couldn't catch your breath, your heart beat very fast, you felt very shaky, and sweaty/tingly/numb in your hands or feet? | .23 | .56 |
|  | SIP033 | SIPS- Structured Interview for Prodromal Symptoms: Has anyone pointed out to you that you are less emotional or connected to people than you used to be? | .09 | .50 |
|  | SIP038 | SIPS- Structured Interview for Prodromal Symptoms: Within the past 6 months, are you having a harder time getting your work or schoolwork done? | .09 | .42 |
|  | SEP510 | Separation Anxiety: Did you ever worry/have bad dreams about something terrible happening to you or your (attachment figures) so that you would not see them again? | .09 | .51 |
|  | SIP039 | SIPS- Structured Interview for Prodromal Symptoms: Within the past 6 months, are you having a harder time getting normal activities done? | .11 | .47 |
| **Behavioral/**  **Externalizing** |  |  |  |  |
|  | CDD002 | Conduct Disorder: Did you ever skip school, stay out at night later than you were supposed to (more than 2 hours), or run away from home overnight? | .38 | .31 |
|  | CDD004 | Conduct Disorder: Do you have a probation officer or have you ever been on probation? | .39 | .21 |
|  | CDD008 | Conduct Disorder: Did you ever: threaten someone? | .46 | .48 |
|  | CDD007 | Conduct Disorder: Did you ever: try to hurt someone with a weapon (a bat, brick, broken bottle, knife, or gun)? | .46 | .41 |
|  | CDD003 | Conduct Disorder: Did you ever set fires, break into cars, or destroy someone else's property on purpose? | .53 | .44 |
|  | CDD006 | Conduct Disorder: Have you ever been physically cruel to an animal or person (on purpose)? | .49 | .45 |
|  | CDD005 | Conduct Disorder: Did you often bully others (hitting, threatening or scaring someone who was younger or smaller), threaten or frighten someone on purpose, or often start physical fights with others? | .53 | .48 |
|  | CDD001 | Conduct Disorder: Was there ever a time when you often did things that got you into trouble with adults like lying or stealing (something worth more than $5, from family, others, or stores)? | .45 | .44 |
|  | ODD005 | Oppositional Defiant Disorder: Did you ever get into trouble for getting even with other people by doing things to hurt them, telling lies about them, or messing up their things? | .46 | .52 |
|  | ODD002 | Oppositional Defiant Disorder: Was there a time when you often got into trouble with adults for refusing to do what they told you to do or for breaking rules at home/school? | .63 | .56 |
|  | ODD001 | Oppositional Defiant Disorder: Was there a time when you often did things that got you into trouble with adults such as losing your temper, arguing with or talking back to adults, or being grouchy or irritable with them? | .67 | .57 |
|  | ODD006 | Oppositional Defiant Disorder: Were you often irritable or grouchy, or did you often get angry because you thought that things were unfair? | .46 | .64 |
|  | PTD009 | Post-Traumatic Stress: Have you ever been very upset by seeing a dead body or by seeing pictures of the dead body of somebody you knew well? | .02 | .31 |
|  | PSY050 | Psychosis: Have you ever smelled strange odors other people could not smell? | -.04 | .52 |
| **ADH** |  |  |  |  |
|  | ADD011 | Attention Deficit Disorder: Did you often have trouble paying attention or keeping your mind on your school, work, chores, or other activities that you were doing? | .74 | .54 |
|  | ADD012 | Attention Deficit Disorder: Did you often have problems following instructions and often fail to finish school, work, or other things you meant to get done? | .71 | .52 |
|  | ADD022 | Attention Deficit Disorder: Did you often join other people's conversations or have trouble waiting your turn (e.g., waiting in line, waiting for a teacher to call on you in class)? | .51 | .53 |
|  | ADD016 | Attention Deficit Disorder: Did you often have people tell you that you did not seem to be listening when they spoke to you or that you were daydreaming? | .60 | .56 |
|  | ADD021 | Attention Deficit Disorder: Did you often blurt out answers to other people's questions before they finished speaking or interrupt people abruptly? | .52 | .48 |
|  | ADD014 | Attention Deficit Disorder: Did you often lose things you needed for school or projects at home (assignments or books) or make careless mistakes in school work or other activities? | .56 | .48 |
|  | ADD020 | Attention Deficit Disorder: Did you often have difficulty sitting still for more than a few minutes at a time, even after being asked to stay seated, or did you often fidget with your hands or feet or wiggle in your seat or were you "always on the go"? | .50 | .53 |
|  | ADD015 | Attention Deficit Disorder: Did you often have trouble making plans, doing things that had to be done in a certain kind of order, or that had a lot of different steps? | .51 | .54 |
|  | ADD013 | Attention Deficit Disorder: Did you often dislike, avoid, or put off school or homework (or any other activity requiring concentration) | .59 | .49 |
|  | ODD003 | Oppositional Defiant Disorder: Did you often annoy other people on purpose or blame other people for your mistakes (excluding siblings)? | .32 | .54 |
|  | SIP028 | SIPS- Structured Interview for Prodromal Symptoms: Do people ever seem to have difficulty understanding you? | -.07 | .67 |
| **Psychosis** |  |  |  |  |
|  | SIP011 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I think I might feel like my mind is "playing tricks" on me. | .58 | .56 |
|  | SIP007 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I think I may get confused at times whether something I experience or perceive may be real or may be just part of my imagination or dreams. | .59 | .53 |
|  | SIP005 | SIPS- PRIME SCREEN-REVISED- Structured Interview for Prodromal Symptoms: I may have felt that there could possibly be something interrupting or controlling my thoughts, feelings, or actions. | .59 | .49 |
|  | SIP012 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I have had the experience of hearing faint or clear sounds of people or a person mumbling or talking when there is no one near me. | .59 | .58 |
|  | SIP013 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I think that I may hear my own thoughts being said out loud. | .57 | .50 |
|  | SIP003 | SIPS- PRIME SCREEN-REVISED: I think that I have felt that there are odd or unusual things going on that I can't explain. | .51 | .52 |
|  | SIP008 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I have thought that it might be possible that other people can read my mind, or that I can read others' minds | .61 | .41 |
|  | SIP006 | SIPS- PRIME SCREEN-REVISED- Structured Interview for Prodromal Symptoms: I have had the experience of doing something differently because of my superstitions. | .57 | .45 |
|  | SIP010 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I believe that I have special natural or supernatural gifts beyond my talents and natural strengths. | .65 | .38 |
|  | SIP014 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I have been concerned that I might be "going crazy." | .47 | .63 |
|  | SIP009 | SIPS- PRIME SCREEN-REVISED Structured Interview for Prodromal Symptoms: I wonder if people may be planning to hurt me or even may be about to hurt me. | .46 | .55 |
|  | SIP004 | SIPS- PRIME SCREEN-REVISED: I think that I might be able to predict the future. | .60 | .35 |
|  | PSY001 | Psychosis: Have you ever heard voices when no one was there? | .45 | .60 |
|  | MANIA a | -- | .07 | .54 |
|  | PSY060 | Have you ever had strange feelings in your body like things were crawling on you or someone touching you and nothing or no one was there? | .28 | .58 |
|  | PSY029 | Have you ever seen visions or seen things which other people could not see? | .33 | .53 |
|  | PSY070 | Have you ever believed in things that most other people or your parents don't believe in? | .22 | .53 |
|  | SIP027 | Do people ever tell you that they can't understand you? | -.05 | .64 |

*Note*: ADH = attention deficit hyperactivity; AGR = agoraphobia; DEP = depression; GAD = generalized anxiety disorder; OCD = obsessive-compulsive disorder; OC = obsessive-compulsive; ODD = oppositional defiant; PAN = panic; PHB = phobia; PSY = psychosis; SEP = separation; SIP = Structured Interview for Prodromal Symptoms (v 4.0; McGlashan et al., 2003); SOC = social anxiety; SUI = suicide.

a Items assessing mania were combined into a single “MANIA” item due to high item correlations and Heywood cases (Heywood, 1931).

**Table S4**

*Reliability Indices for the Psychopathology Bifactor Model*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Psychopathology Factors** | **ECVSS** | **ECVSG** | **ECVGS** | **Omega** | **OmegaH** | **H** | **FD** |
| **Phobias/fear** | 0.492 | 0.090 | 0.508 | 0.921 | 0.420 | 0.860 | 0.926 |
| **Dysphoria** | 0.323 | 0.056 | 0.677 | 0.927 | 0.254 | 0.798 | 0.902 |
| **Behavioral** | 0.510 | 0.059 | 0.490 | 0.892 | 0.421 | 0.799 | 0.914 |
| **ADH** | 0.504 | 0.068 | 0.496 | 0.933 | 0.435 | 0.841 | 0.938 |
| **OC** | 0.398 | 0.075 | 0.602 | 0.946 | 0.362 | 0.833 | 0.914 |
| **Psychosis** | 0.464 | 0.091 | 0.536 | 0.946 | 0.404 | 0.864 | 0.932 |
| **Overall P** | 0.561 | 0.561 | 0.561 | 0.981 | 0.879 | 0.974 | 0.970 |
| *Note*. Percent Uncontaminated Correlations (PUC) = 0.83. ECVSS = explained common variance for the specific factor. ECVSG = explained common variance of a specific factor with respect to the general factor. ECVGS = explained common variance of the general factor with respect to a specific factor. OmegaH = hierarchical omega. FD = factor determinacy. ADH = attention deficit hyperactivity; OC = obsessive-compulsive. | | | | | | | |

**Table S5**

*Comparative Strengths of Associations of Psychopathology Factors with Cognition*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factor** | **Beta** | **Standard Error** | **CI low** | **CI high** | **p-value**1 | **Sig vs. other**  **factors**2 |
| 1. **Phobias with** |  |  |  |  |  |  |
| Complex Cognition | -0.126 | 0.017 | -0.159 | -0.093 | <.0005 |  |
| Executive Function | -0.110 | 0.019 | -0.147 | -0.073 | <.0005 |  |
| Episodic Memory | -0.134 | 0.017 | -0.167 | -0.101 | <.0005 |  |
| Social Cognition | -0.121 | 0.016 | -0.152 | -0.090 | <.0005 |  |
| Sensorimotor Speed | -0.191 | 0.021 | -0.232 | -0.150 | <.0005 |  |
| 1. **OC with** |  |  |  |  |  |  |
| Complex Cognition | 0.065 | 0.023 | 0.020 | 0.110 | 0.005 | a |
| 1. **Dysphoria/distress with** |  |  |  |  |  |  |
| Complex Cognition | 0.036 | 0.018 | 0.001 | 0.071 | 0.043 | a |
| 1. **Behavioral/externalizing with** |  |  |  |  |  |  |
| Complex Cognition | -0.073 | 0.019 | -0.110 | -0.036 | <.0005 | a, b, c |
| Executive Function | -0.075 | 0.021 | -0.116 | -0.034 | <.0005 |  |
| 1. **ADH with** |  |  |  |  |  |  |
| Complex Cognition | -0.111 | 0.017 | -0.144 | -0.078 | <.0005 | b, c, d |
| Executive Function | -0.148 | 0.019 | -0.185 | -0.111 | <.0005 | a, d |
| Episodic Memory | -0.076 | 0.018 | -0.111 | -0.041 | <.0005 | a |
| Social Cognition | -0.064 | 0.017 | -0.097 | -0.031 | <.0005 | a |
| Sensorimotor Speed | -0.076 | 0.022 | -0.119 | -0.033 | <.0005 | a |
| 1. **Psychosis with** |  |  |  |  |  |  |
| Complex Cognition | -0.091 | 0.018 | -0.126 | -0.056 | <.0005 | b, c |
| Executive Function | -0.056 | 0.02 | -0.095 | -0.017 | 0.006 | a, e |
| Episodic Memory | -0.110 | 0.018 | -0.145 | -0.075 | <.0005 |  |
| Social Cognition | -0.127 | 0.017 | -0.160 | -0.094 | <.0005 | e |
| Sensorimotor Speed | -0.044 | 0.022 | -0.087 | -0.001 | 0.048 | a |
| **P-factor with** |  |  |  |  |  |  |
| Complex Cognition | -0.085 | 0.016 | -0.116 | -0.054 | <.0005 | a, b, c |

*Note.* CI = 95% Confidence Interval. OC = obsessive-compulsive; ADH = attention deficit hyperactivity.

1 *p*-values refer to the association between each psychopathology and cognitive domain.

2 Significant differences in the strength of associations between two psychopathology factors and cognition are indicated by a letter such that: **a** = significantly different from Factor a (Phobias); **b** = significantly different from Factor b (OC); **c** = significantly different from Factor c (Dysphoria-distress); **d** = significantly different from Factor d (Behavioral/externalizing); **e** = significantly different from Factor e (ADH).

**Supplementary References**

Carter, C. S., Barch, D. M., Gur, R., Gur, R., Pinkham, A., & Ochsner, K. (2009). CNTRICS Final Task Selection: Social Cognitive and Affective Neuroscience-Based Measures. *Schizophrenia Bulletin*, *35*(1), 153–162. https://doi.org/10.1093/schbul/sbn157

Glahn, D. C., Gur, R. C., Ragland, J. D., Censits, D. M., & Gur, R. E. (1997). Reliability, performance characteristics, construct validity, and an initial clinical application of a visual object learning test (VOLT). *Neuropsychology*, *11*(4), 602–612. https://doi.org/10.1037//0894-4105.11.4.602

Gur, R. C., Ragland, J. D., Moberg, P. J., Turner, T. H., Bilker, W. B., Kohler, C., … Gur, R. E. (2001). Computerized Neurocognitive Scanning: I. Methodology and Validation in Healthy People. *Neuropsychopharmacology*, *25*(5), 766–776. https://doi.org/10.1016/S0893-133X(01)00278-0

Gur, R. C., Ragland, J. D., Mozley, L. H., Mozley, P. D., Smith, R., Alavi, A., Bilker, W., & Gur, R. E. (1997). Lateralized changes in regional cerebral blood flow during performance of verbal and facial recognition tasks: Correlations with performance and “effort.” *Brain and Cognition*, *33*(3), 388–414. https://doi.org/10.1006/brcg.1997.0921

Gur, R. C., Richard, J., Calkins, M. E., Chiavacci, R., Hansen, J. A., Bilker, W. B., Loughead, J., Connolly, J. J., Qiu, H., Mentch, F. D., Abou-Sleiman, P. M., Hakonarson, H., & Gur, R. E. (2012). Age group and sex differences in performance on a computerized neurocognitive battery in children age 8–21. *Neuropsychology*, *26*(2), 251–265. https://doi.org/10.1037/a0026712

Gur, R. C., Richard, J., Hughett, P., Calkins, M. E., Macy, L., Bilker, W. B., Brensinger, C., & Gur, R. E. (2010). A cognitive neuroscience-based computerized battery for efficient measurement of individual differences: Standardization and initial construct validation. *Journal of Neuroscience Methods*, *187*(2), 254–262. https://doi.org/10.1016/j.jneumeth.2009.11.017

Moore, T. M., Reise, S. P., Gur, R. E., Hakonarson, H., & Gur, R. C. (2015). Psychometric properties of the Penn Computerized Neurocognitive Battery. *Neuropsychology*, *29*(2), 235–246. https://doi.org/10.1037/neu0000093

Heywood, H. B. (1931). On finite sequences of real numbers. *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character*, *134*(824), 486–501. https://doi.org/10.1098/rspa.1931.0209

Kohler, C. G., Richard, J. A., Brensinger, C. M., Borgmann-Winter, K. E., Conroy, C. G., Moberg, P. J., Gur, R. C., Gur, R. E., & Calkins, M. E. (2014). Facial emotion perception differs in young persons at genetic and clinical high-risk for psychosis. *Psychiatry Research*, *216*(2), 206–212. https://doi.org/10.1016/j.psychres.2014.01.023

Kurtz, M. M., Ragland, J. D., Bilker, W., Gur, R. C., & Gur, R. E. (2001). Comparison of the continuous performance test with and without working memory demands in healthy controls and patients with schizophrenia. *Schizophrenia Research*, *48*(2–3), 307–316. https://doi.org/10.1016/S0920-9964(00)00060-8

Kurtz, M. M., Ragland, J. D., Moberg, P. J., & Gur, R. C. (2004). The Penn Conditional Exclusion Test: A new measure of executive-function with alternate forms of repeat administration. *Archives of Clinical Neuropsychology: The Official Journal of the National Academy of Neuropsychologists*, *19*(2), 191–201. https://doi.org/10.1016/S0887-6177(03)00003-9

McGlashan, T. H., Miller, T. J., & Woods, S. W. (2003). *Structured interview for prodromal syndromes, version 4.0.* Prime Clinic Yale School of Medicine.

Ragland, J. D., Turetsky, B. I., Gur, R. C., Gunning-Dixon, F., Turner, T., Schroeder, L., Chan, R., & Gur, R. E. (2002). Working Memory for Complex Figures: An fMRI Comparison of Letter and Fractal n-Back Tasks. *Neuropsychology*, *16*(3), 370–379.

Shanmugan, S., Wolf, D. H., Calkins, M. E., Moore, T. M., Ruparel, K., Hopson, R. D., … Satterthwaite, T. D. (2016). Common and Dissociable Mechanisms of Executive System Dysfunction Across Psychiatric Disorders in Youth. *The American Journal of Psychiatry*, *173*(5), 517–526. https://doi.org/10.1176/appi.ajp.2015.15060725