|  |
| --- |
| **Appendix Table 1. Overview of the 772 independent variables used to predict the outcomes, organized by broad conceptual category** |
|  |  |
| **I. Self-report** (727 predictors)1 |  |
| Socio-demographic (114 variables) | Standard survey questions were used to define the majority of the socio-demographic variables. Variables included: sex; age at interview; race-ethnicity; religious afflation(s); several aspects of religiosity (e.g., religiosity/spirituality; religious participation; fundamentalism); educational attainment; marital and non-marital relationship status; length of marriage or divorce; number of dependents (e.g., total number; number of children; ages of children); number of older/younger siblings; and immigration status. These variables were primarily dichotomous (nested and non-nested dummies), though a few were continuous (e.g., age). In addition, the NSS included 11 questions that asked about reasons why the soldier decided to enlist. These questions were adapted from a prior survey of new recruits.3 The 11 items were subjected to an exploratory factor analysis, which resulted in defining two continuous scales: (i) enlisting for reasons related to patriotism and personal growth (e.g. enlisting to “serve your country” and “do something you can be proud of” ), and (ii) enlisting to escape from home (e.g., enlisting to “be away from home” ).  |
| Mental disorders (233 variables) | Most of the lifetime DSM-IV mental disorder constructs were assessed using the self-report computerized version of the Composite International Diagnostic Interview screening scales (CIDI-SC),4 including: major depressive episode, bipolar I-II or subthreshold bipolar disorder, generalized anxiety disorder, panic disorder, intermittent explosive disorder, conduct disorder, oppositional defiant disorder, substance use disorder, and attention-deficit/hyperactivity disorder (ADHD in the past 6 months, not lifetime). Lifetime posttraumatic stress disorder (PTSD) was assessed using a screening version of the PTSD Checklist.5 Lifetime insomnia was assessed using an adapted version of the American Insomnia Survey.6 In addition to defining dichotomous variables representing the presence-absence of each of these disorders, we also created continuous variables representing the severity of symptoms during a lifetime episode. Lifetime social phobia, agoraphobia, specific phobia, and obsessive-compulsive disorder were assessed using single-item screeners adapted from the Family History Screen.7 Continuous and nested dichotomous (e.g., 1+, 2+, 3+ disorders) variables were defined to represent the total number of lifetime disorders. Disorder persistence (number of years with the disorder) was assessed for all disorders using questions adapted from the CIDI.4 Nested dichotomous variables were also defined for the persistence of each disorder that was assessed (e.g., 1+ years with the disorder, 2+ years with the disorder). Frequency of use of nine substances (e.g., alcohol, marijuana, prescription medications) during the peak period of use was also assessed using questions adapted from the CIDI.4 Nested dichotomous variables were also operationalized for frequency of use (e.g., less than once a month or more; 1-3 days per month or more; 1-3 days per week or more). Lifetime treatment or counseling (for psychological problems) with a mental health professional or any other type of provider (e.g., medical doctor, spiritual leader) was assessed using questions adapted from the Land Combat Study.8 We operationalized variables representing the present-absence of lifetime treatment as well as the nested dichotomous for number of years with treatment (e.g., 1+ years, 2+ years, 3+ years). |
| Stressors(222 variables) | The stress variables were operationalized using questions that assessed 12-month and lifetime events and chronic strains occurring both within and outside of the family, lifetime traumatic events, and adversity experienced during childhood. Questions assessing 13 stressful events in the 12-months prior to enlistment within social (e.g., divorce, break-up) and non-social domains (e.g., car accident, police trouble) were adapted from the Life Events Questionnaire9 and DoD Survey of Health Related Behaviors.10 We defined dichotomous variables for each stressful event as well as a composite (continuous) variable of total number of stressful events in the past 12 months. Extent of chronic role strain in eight domains (e.g., finances, health, overall stress) over the 12-months prior to enlistment were assessed using questions adapted from the National Comorbidity Survey – Replication (NCS-R11). We defined nested dichotomous variables within each domain (e.g., severe or very severe strains) as well as a composite (continuous) variable of total extent chronic strain across domains. Questions assessing the number of times each of 15 traumatic events (e.g., physical assault, sexual assault, suicide of close friend) occurred over the soldiers’ lifetime were adapted from the CIDI4 and used to define categorical (e.g., 0=never; 1=1 time; 2=2-4 times; 3=5-9 times; 4=10 or more times) and nested dichotomous (e.g., being physically assaulted 1+, 2+, 3+ times) independent variables, as well as a composite (continuous) variable for total number of lifetime traumas. Questions asking about lifetime number of head injuries (e.g., perforated eardrum; losing consciousness) were developed by the STARRS study team and used to operationalize nested dichotomous head trauma variables (1+ head injury, 2+ head injuries). Questions asking about the occurrence-frequency of childhood adversities were adapted from the Family History Screen,7 CIDI,4 Adverse Childhood Experiences Survey,12 and Childhood Trauma Questionnaire13 to assess parent-family psychopathology (e.g., anxiety, mood, substance use disorder), maladaptive family functioning (e.g., emotional, physical, or sexual abuse or neglect at home; having a parent in prison) and other family adversities (e.g., death of a parent or separation from a parent), positive family functioning (e.g., feeling cared for by family), and non-family adversities (e.g., victim of bullying; sexual abuse outside the family). We operationalized ordinal and nested dichotomous independent variables from these questions, the only exceptions being adversities that would be very unlikely to occur more than once (only presence-absence dichotomies were defined, e.g., for having a parent commit suicide; parental divorce). We also operationalized 6 composite (continuous) scales based on the questions assessing: (i) parental psychopathology (i.e., total number of mental disorders between both parents); (ii) total familial abuse-neglect (i.e., total frequency of emotional, physical, and sexual abuse-neglect in the family);(iii) total number of maladaptive family functioning events; (iv) total number of types of different maladaptive family function events; (v) total number of sexual assaults occurring inside and outside of the family; and (vi) the total number of positive family experience (adaptive family functioning).  |
| Personality(55 variables) | The survey included 91 questions adapted from previously validated self-report personality questionnaires,15-29 intended to assess a total of 28 constructs. Four of the items were used to define dichotomous variables representing four attachment style (secure; dismissive; fearful; preoccupied)16 as well as nested dummies representing the degree of four attachment styles (e.g., someone or very characteristic; very characteristic). The remaining 87 items were used to develop 24 “rational” scales (continuous) based on 24 personality traits of interest. The same set of items was included in both the NSS and the Pre-Post Deployment Study (PPDS) baseline survey, allowing us to define and compare scales across independent samples. The validity of the rational scales was evaluated in the total NSS, PPDS, and combined samples by confirming their unidimensional structures using exploratory and confirmatory factor analysis. Solutions were evaluated based on scree plot slopes,30 parallel analysis,31 and goodness of model fit (e.g., root mean squared error of approximation).32,33 Four of the 87 items did not have salient loadings onto their rationale scales and were thus excluded from scale generation. Each rational scale was otherwise determined to be unidimensional with all items loading .40≤ onto a single substantively meaningful factor. The names of the rationale scales and example items are presented in eTable 7. Given potential overlap among the rational scales (e.g., neuroticism and emotional reactivity) and our explicit interest in higher-order traits, exploratory factor analyses of the rational scale scores (standardized) were then conducted in an attempt to identify a smaller number of meaningful and reliable factors that accounted for shared variance among the 24 scales. Using the same model evaluation procedures described above, we identified six empirically-interpretable second-order factors (standardized scales) using 20 of the rationale scales: negative affectivity34,35; thoughtfulness36,37; fearlessness38,39; self-assertion/expansion (“beta”40,41); social/emotional independence42,43; and negative cognitions. 44,45 See eTable 8 for the factor loadings for the second-order scales. |
| Social networks (64 variables) | Several questions were adapted from the National Comorbidity Survey – Adolescent Supplement46,47 to assess social networks during adolescence, including popularity with peers and involvement in sports and school activities. We created nested dichotomous variables based on these questions (somewhat involved or very involved; very involved with peers) and also used the questions to define a composite (continuous) total peer involvement variable. Army STARRS also developed questions to assess size of affiliative network (e.g., number of people who the soldier had to spend time with, number of people the soldier felt close to, number of people the soldier felt cared for them, number of family or friends their could rely on during times of need). Nested dichotomous independent variables were defined based on these questions (e.g,. 1+ person, 2+ people). Questions were also adapted from the NCS-R11,48 to assess number of sexual partners in the year prior to enlistment. Nested dichotomous independent variables were defined using these questions (e.g., 1+ partners, 2+ partners) |
| Self-harm(39 variables) | Questions assessing lifetime history of suicidal and self-harm behaviors were adapted from the Columbia-Suicide Severity Rating Scale.14 Dichotomous (non-nested and nested) and categorical (e.g., 0=1-2 lifetime self-harm behaviors; 1=3-5 behaviors; 2=6-10 behaviors) variables were created to operationalize lifetime presence-frequency of (i) suicidal ideation, plans, and attempts (presence of any of the three; age at onset; number of days with ideation during worst week of suicidality; duration of the days with ideation during worst week; difficultly controlling ideation during worst week), (ii) dangerous activities because of suicidality (e.g., reckless driving), and (iii) non-suicidal self-injury (e.g., cutting or burning oneself; age at onset; number of lifetime self-harm behaviors). |
|  |  |
| **II. Neurocognitive** (8 variables)  | Seven neurocognitive tests were used to assess seven neurocognitive constructs of interest: mental flexibility, attention, working memory, impulse control, facial memory, emotion identification, and bias toward negative emotions. See eTable 9 for detailed descriptions of the seven neurocognitive test that were used. Each test was scored based on two dimensions, accuracy and speed, which were averaged to define continuous “efficiency” scores. The seven standardized efficiency scores were included among the independent variables. We also included a general (composite) efficiency score variable based on results from a previously reported bifactor confirmatory factor model in the New Soldier Study.50  |
|  |  |
| **III. Administrative** (37 variables) | Administrative data available for all soldiers at the time of accession were used to operationalize a select number of military-specific independent variables, including: Armed Forces Qualifications Test score (i.e., used by the Army to determine intelligence-aptitude of enlistees); Physical Profile scores (i.e., PULHES: physical capacity, upper extremities, lower extremities, hearing, eyes/vision, psychiatric); having a medical failure at accession; enlistment waiver at accession; positive drug test at accession; and enlisted military occupational specialty (MOS). AFQT was categorically (i.e., 0=0-42nd percentile; 1=43-56th percentile; 2=57-74th percentile; 3=75th-100th percentile) and continuously coded, all other variables were non-nested dichotomous variables. MOS was defined both using three broad occupational classes (combat arms, combat support, combat service support) as well 21 specific classes (e.g., infantry, cannon crewmember, cavalry scout, combat engineer, other “direct” combat arms, see elsewhere for additional details of this MOS classification scheme49). |
|  |  |

1 The entire self-administered questionnaire can be accessed online at <http://starrs-ls.org/#/page/instruments>