

Supplemental eTables 1-34

Rosellini et al. (Under review). Using inception surveys to develop multi-outcome risk models in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)

eTable(s)	Page(s)
1. List and brief descriptions of administrative databases used to define adverse outcomes	2
2. Detailed descriptions of outcome definitions	3
3. Offenses code used to identify categories of criminal perpetration and victimization	4
4. Incidence of violence outcomes in the New Soldiers Study, by sex	5
5. Separation codes used to identify cases of attrition due to career or personal problems	6
6. Overview of the 772 independent variables used to predict the outcomes	7-8
7. Twenty-four rational personality scales derived from personality questions	9-10
8. Factor loadings for six higher-order personality constructs	11
9. Army STARRS neurocognitive constructs and test descriptions	12-13
10. Step-by-step overview of building the prediction models	14
11. Tetrachoric correlation matrix for all 12 observed outcomes	15
12. Model performance across steps of model building	16
13-21. Odd-ratios from the final penalized and unpenalized models for each outcome	17-25
22. Tetrachoric correlation matrix for the top-ventiles of predicted risk among men	26
23. Tetrachoric correlation matrix for the top-ventiles of predicted risk among women	27
24-34. Cross-outcome risk and risk-profile associations	28-45
eTable References	46-49

Table 1. List and brief descriptions of administrative databases used to define adverse outcomes

Database Acronym (Relevant outcomes)	Description
ACMIS (All violence outcomes)	ARMY COURT MARTIAL INFORMATION SYSTEM (ACMIS): Contains data on soldiers arraigned on court-martial charges at either a Special or General Court-Martial. The database includes such information as where the Soldier was tried, which General Court-Martial Jurisdiction convened the case, the offenses charged, how the accused plead, the findings in the case as well as the sentence (if any). It also contains information concerning cases required to proceed through the appellate court process and outcome in the appellate court system. It includes the location of the offenses and trial, and tracks the dates of certain events in the court-martial process.
ACR (All violence outcomes)	ARMY CENTRAL REGISTRY (ACR): This is a victim-based registry documenting spouse and child abuse events involving Army service members.
AFMETS (Suicide attempt, to exclude suicide completions)	ARMED FORCES MEDICAL EXAMINER TRACKING SYSTEM (AFMETS): Variables include manner of death and cause of death, including self-inflicted.
CIMS/AC12 (All violence outcomes)	CRIMINAL INVESTIGATION DIVISION INFORMATION MANAGEMENT SYSTEM (CIMS) / AUTOMATED CRIMINAL INVESTIGATION/CRIMINAL INTELLIGENCE (ACI2): Event level crime record database. Entity IDs are associated with offenses.
CIMS/ASCRC (All violence outcomes)	CRIMINAL INVESTIGATION DIVISION INFORMATION MANAGEMENT SYSTEM (CIMS) / AUTOMATED SYSTEM CRIME RECORD CENTER (ASCRC): Receives, maintains, accounts for, disseminates information from, and disposes of Army crime records; retrieves and correlates data and statistics from the records and provides to authorized recipients; coordinates automation of crime records data and information; and serves as functional proponent for the electronic imaging of crime record.
COPS/MPRS (All violence outcomes)	CENTRALIZED OPERATIONS POLICE SUITE (COPS) / MILITARY POLICE REPORTING SYSTEM (MPRS): Centralized database that contains subsystems supporting the Military Police Corps Army wide. Contains information included in law enforcement reports.
COPS/Violations (Minor violence victimization)	CENTRALIZED OPERATIONS POLICE SUITE (COPS) / VIOLATIONS: Violation information contained in MPRS system (e.g., incident, time of incident).
DAMIS (Positive drug test)	DRUG AND ALCOHOL MANAGEMENT INFORMATION SYSTEM (DAMIS): Includes data from the Army drug and alcohol prevention training and substance abuse program.
DODSER (Suicide attempt)	DEPARTMENT OF DEFENSE SUICIDE EVENT REPORT (DODSER): Provides risk and protective factor information for suicide events. This file will contain unsuccessful attempts and completed suicide cases.
DMDC/Master Personnel & DMDC/Transaction files (Attrition; Demotion)	DEFENSE MANPOWER DATA CENTER (DMDC) / MASTER PERSONNEL & TRANSACTION FILES: The Active Duty Master File provides an inventory of all individuals on active duty (excluding reservists on active duty for training) at a point in time. It is a standardized and centralized database of present and past members of the active duty force. Personal data elements include social security number, education level, home of record, date of birth, marital status, number of dependents, race, ethnic group, and name. Military data elements include Service, pay grade, Armed Forces Qualification Test percentile (enlisted only), source of commission (officers only), military primary duty and secondary occupation, Unit Identification Code, months of service, duty location, Estimated Termination of Service date, basic active service date, date of current rank, pay entry base date, foreign language ability, and major command code.
DSAID (Sexual assault perpetration and victimization)	DEFENSE SEXUAL ASSAULT INCIDENT DATABASE (DSAID): This is the DoD's current system of record for all reported incidents of sexual assault involving Armed Forces members. DSAID replaced SADMS in 2012.
MDR (Traumatic brain injury; Mental hospitalization; Suicide attempt; Severe injury)	MEDICAL DATA REPOSITORY (MDR): This database contains information about medical, dental, pharmaceutical, and ancillary claims data for both in network and purchased care as well as both inpatient and outpatient treatment.
SADMS (Sexual assault perpetration and victimization)	SEXUAL ASSAULT DATA MANAGEMENT SYSTEM (SADMS): Centralized repository of relevant data regarding the entire lifecycle of sexual assault cases, involving victims and/or alleged offenders. SADMS was used until 2012 and then replaced by DSAID.
TMDS (Traumatic brain injury; Mental hospitalization; Suicide attempt; Severe injury)	THEATER MEDICAL DATA STORE (TMDS): Used to track, analyze, view and manage Soldier medical treatment information recorded on the battlefield. Features of TMDS: accessibility and visibility of service members' deployed medical records, outpatient and inpatient treatment records created in theater facilities, treatment records from other applications, reports on movement of patients, patient status and injury/illnesses.
TRAC2ES (Traumatic brain injury; Mental hospitalization; Suicide attempt; Severe injury)	TRANSCOM REGULATING AND COMMAND AND CONTROL EVACUATION SYSTEM (TRAC2ES): A tracking system for all medical transfers across the world for all DoD services.

eTable 2. Detailed descriptions of outcomes

Outcome	Definition
I. Mental-physical health	
Suicide attempt	Cases of suicide attempts were at first identified using the DoD-wide suicide event tracking database. Given the possibility that some case might not be included in this database, additional cases were identified in the databases that track outpatient and inpatient treatment records. We identified these additional cases based on ICD-9-CM codes E950-959.
Mental hospitalization	Hospitalization due to a mental health problem was also operationalized using the databases that store outpatient and inpatient treatment records classified by ICD-9-CM diagnostic codes. Records of inpatient treatment for any of the following codes were used to define cases of mental hospitalizations: 290.0-319 (excluding 310.2[TBI]); V15.81; V61-62.9; V71.01-71.09.
Positive drug test	All soldiers are subject to random drug tests. Positive screens for illicit drug use are recorded in a DoD-wide substance abuse database. We operationalized our outcome based on records of positive drug tests in this database.
Traumatic brain injury	Traumatic brain injury was operationalized using databases that store outpatient and inpatient treatment records classified by International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnostic codes. The following ICD-9-CM codes were used to identify cases of traumatic brain injury: 310.2; 800-804; 850-854; 873; 905; 907; 950.1-950.3; 959.01; and V15.52.
Severe injury	Severe injury, excluding traumatic brain injury, was operationalized using ICD-9-CM diagnostic code indicating any inpatient or outpatient treatment for amputations (885-887; 895-897), burns (948; 948.00-948.98; 949; 949.1-949.4; E990.0; E990.0), eye injuries/vision loss (369.3; 369.4; 369.6; 369.60-369.9; 871; 950), hearing loss (388.2; 389; 389.0; 389.00-389.22; 389.7-389.9), or trauma-related paralysis (342; 344; 780.72; 806; 952).
II. Violence	
Major physical, minor violence, and sexual assault perpetration	All perpetration outcomes were defined on the basis of "founded" records of committing a violent offense (in the criminal justice databases). A "founded" crime is one for which the Army found evidence sufficient to warrant a full investigation. In other words, "founded" cases exclude those that do not pass a test of probable cause based on review of the totality of the circumstances. This focus on founded offenses is consistent with other soldier research, ¹ which virtually always uses arrest rather than conviction as a dependent variable based on the fact that arrest records reflect actual violent behaviors much more closely than conviction records. Conviction records among founded cases, in comparison, largely reflect the vagaries of bureaucratic processing by the criminal justice system, including the fact that some soldiers with founded offenses escape conviction by accepting a Discharge Under Other Than Honorable Conditions (UO THC) in lieu of court martial. See eTable 3 for the specific crimes that were classified as major physical, minor violence, and sexual assault perpetration.
Minor violence and sexual assault victimization	The victimization outcomes were defined using <i>any</i> officially reported victimization (in the criminal justice databases), regardless of evidence, since the perpetrator may not have been known. Importantly, sexual assault victims are given the option to file two types of reports, restricted or unrestricted, using the Victim Preference Reporting Statement (DD Form 2910). Restricted reports allow victims to receive medical treatment and counseling without triggering an official investigation of the assault, while unrestricted reports trigger an official investigation in addition to allowing the services available in restricted reporting. Victims may also decide to convert restricted reports to unrestricted reports at any time. As only unrestricted reporting data were made available to Army STARRS, it is important to note that a recent RAND survey ² found that among Army respondents who said they filed official reports, 51% were unrestricted reports, 20% were restricted reports that were eventually converted to unrestricted reports, and 23% were restricted reports (the remaining 6% of Army respondents were not sure what type of report they filed). In comparison, the distinction between restricted and unrestricted reporting does not exist for victims of minor violence. See eTable 3 for the specific crimes that constituted minor violence and sexual assault victimization.
III. Army career	
Attrition	Soldiers may leave service for a variety of reasons. All soldiers who separate from service are assigned a code that represents the reason for leaving service. This code is stored in a DoD-wide master personnel database. We defined cases of attrition based on codes indicating the soldier left service due to career problems, but excluded cases of "typical" separation (e.g., expiration of term of service; voluntary release). There are 136 separation codes in total, 101 of which were used to define our attrition outcome. See eTable 5 for a list and definitions of the separation codes that were used.
Demotion	We also used the master personnel database to identify soldiers who were demoted. Specifically, we flagged soldiers who had any indication of a decrease in rank over the study period (e.g., having an E4 rank one month but an E3 rank in subsequent months).

eTable 3. The National Corrections Reporting Program (NCRP) offenses codes used to identify categories of criminal perpetration and victimization

I. Major Physical

A. Murder/Homicide/Manslaughter

Murder (010; 011; 012)
 Unspecified Homicide (013; 014)
 Voluntary/Nonnegligent Manslaughter (015; 016)
 Manslaughter – Non-Vehicular (030; 031; 032)

B. Kidnapping

Kidnapping (040; 041; 042)

C. Aggravated Arson

Aggravated Arson (200)

D. Aggravated Assault

Aggravated Assault (120; 121; 120)
 Aggravated Assault On A Public Officer (140; 141; 142)
 Aggravated Assault Of Military Official
 Violent Offenses, Other – Aggravated Assault (180)

E. Family-Related Aggravated Assault

Family Related Aggravated Assault (120; 580)
 Child Abuse (170; 171; 172)

F. Robbery

Armed Robbery (090; 091; 092)
 Unarmed Robbery (100; 101; 102)

II. Minor Violence

A. Simple Assault

Simple Assault (130; 131; 132)
 Simple Assault On A Public Officer (140; 141; 142)
 Simple Assault Of Military Official
 Violent Offenses, Other - Simple Assault (180)

B. Family-Related Simple Assault

Family-Related Simple Assault

C. Other Physical Violence

Violent Offenses, Other – Violent Offenses

D. Blackmail/Extortion/Intimidation

Blackmail/Extortion/Intimidation (150; 151; 152)

E. Harassment

Invasion Of Privacy – Other Harassment (600; 630)
 Other Public Order Offenses- Harassment (670)

F. Rioting

Rioting (510; 511; 512)

III. Sexual Assault

A. Rape/Sodomy/Sexual Assault

Rape – Force (050; 051; 052)
 Rape – Statutory – No Force (060; 061; 062)
 Forcible Sodomy (110; 111; 112)
 Sexual Assault - Other (070; 071; 072)
 Lewd Act With Children (080; 081; 082)

B. Family-Related Sexual Violence

Family-Related Sexual Offenses

eTable 4. Incidence per 1,000 person-years of violence outcomes in the New Soldiers Study, by sex (n=21,832)

Violence outcome	Men			Women			Total		
	Incidence/ 1,000 PYs	(SE)	(n)	Incidence/ 1,000 PYs	(SE)	(n)	Incidence/ 1,000 PYs	(SE)	(n)
Major physical perpetration	2.5	(0.3)	(71)	1.8 ¹	(0.5)	(10)	2.4	(0.3)	(81)
Minor violence perpetration	6.9	(0.5)	(202)	7.4	(1.3)	(32)	7.0	(0.5)	(234)
Sexual assault perpetration	3.1	(0.4)	(88)	0.5 ¹	(0.3)	(3)	2.8	(0.3)	(91)
Minor violence victimization	3.7	(0.4)	(111)	10.1	(1.5)	(51)	4.6	(0.4)	(162)
Sexual assault victimization	1.1 ¹	(0.3)	(34)	25.1	(2.6)	(118)	4.1	(0.4)	(152)
	(n)	(18,869)		(2,963)			(21,832)		

Abbreviations: SE, standard error; PY, person-years.

¹ Excluded from model building person-month sample due to rarity of the outcome

eTable 5. Separation codes used to identify cases of attrition due to career or personal problems

Code	Label	Code	Label
1010	Condition existing prior to service	1102	Dropped from strength, imprisonment
1011	Disability, severance pay	1104	Dropped from strength, MIA or POW
1012	Permanent disability (retirement)	1105	Dropped from strength, other
1013	Temporary disability (retirement)	2008	Involuntary release, convenience of the government
1014	Disability, no condition existing prior to service	2009	Involuntary release, other
1015	Disability, Title 10 (retirement)	2010	Condition existing prior to service
1016	Unqualified for active duty, other	2011	Disability, severance pay
1017	Failure to meet weight or body fat standards	2012	Permanent disability (retirement)
1022	Dependency or hardship	2013	Temporary disability (retirement)
1031	Death, non-battle, disease	2015	Disability, Title 10 USC (retirement)
1032	Death, non-battle, other	2016	Unqualified for active duty, other
1033	Death, cause not specified	2017	Failure to meet weight or body fat standards
1060	Character or behavior disorder	2022	Dependency or hardship
1061	Motivational problems (apathy)	2031	Death, non-battle, disease
1062	Enuresis	2032	Death, non-battle, other
1063	Inaptitude	2033	Death, cause not specified
1064	Alcoholism	2060	Character or behavior disorder
1065	Discreditable incidents, civilian or military	2061	Motivational problems (apathy)
1066	Shirking	2063	Failure of course of instruction
1067	Drugs	2064	Alcoholism
1068	Financial irresponsibility	2065	Discreditable incidents, civilian or military
1069	Lack of dependent support	2067	Drugs
1070	Unsanitary habits	2068	Financial Irresponsibility
1071	Civil court conviction	2071	Civil court conviction
1072	Security	2072	Security
1073	Court-martial	2073	Court-martial
1074	Fraudulent entry	2074	Fraudulent entry
1075	AWOL or desertion	2075	AWOL or desertion
1076	Homosexuality	2076	Homosexuality
1077	Sexual perversion	2077	Sexual perversion
1078	Discharge in lieu of court-martial	2078	Discharge in lieu of court-martial
1079	Juvenile offender	2080	Unsuitability, other
1080	Misconduct, reason unknown	2081	Unfitness or unacceptable conduct, other
1081	Unfitness, reason unknown	2083	Pattern of minor disciplinary infractions
1082	Unsuitability, reason unknown	2084	Commission of a serious offense
1083	Pattern of minor disciplinary infractions	2085	Failure meeting retention requirements
1084	Commission of a serious offense	2090	Secretarial authority
1085	Failure meeting retention requirements	2091	Erroneous enlistment or induction
1086	Unsatisfactory performance	2092	Sole surviving family member
1087	Entry level performance/ conduct problem	2093	Marriage
1088	Unsatisfactory performance, Ready Reserve	2094	Pregnancy
1090	Secretarial authority	2095	Underage
1091	Erroneous enlistment or induction	2096	Conscientious objector
1092	Sole surviving family member	2097	Parenthood
1093	Marriage	2098	Breach of contract
1094	Pregnancy	2099	Other
1095	Underage	2100	Change in status
1096	Conscientious objector	2102	Dropped from strength, imprisonment
1097	Parenthood	2104	Dropped from strength, MIA or POW
1098	Breach of contract	2105	Dropped from strength, other
1099	Other		

eTable 6. 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 affiliation(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). 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).

**Stressors
(222 variables)**

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).

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 affectivity^{34,35}; thoughtfulness^{36,37}; fearlessness^{38,39}; self-assertion/expansion (“beta”^{40,41}); social/emotional independence^{42,43}; and negative cognitions.^{44,45} See eTable 8 for the factor loadings for the second-order scales.

Several questions were adapted from the National Comorbidity Survey – Adolescent Supplement^{46,47} 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-R^{11,48} 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)

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; difficulty 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).

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

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).

Personality
(55 variables)

Social networks
(64 variables)

Self-harm
(39 variables)

II. Neurocognitive (8 variables)

III. Administrative (37 variables)

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

1.

eTable 7. Twenty-four rational scales derived from personality items in the Army STARRS New Soldiers Study and Pre-Post Deployment Study¹

Scale Name	# Items	Example Items ²
1. Bipolar/Affective Lability ³	5	Frequent ups and downs in mood without cause. Mood changes often and not know why.
2. Borderline personality traits	6	When I am under a lot of stress, I get suspicious of other people or feel really spaced out. I often feel empty inside.
3. Anger/irritability ⁴	9	Feel so angry that you think you might explode. Feel a lot more angry than most people would be in the same situation
4. Negative urgency (impulsivity)	2	When I am upset I often act without thinking. It is hard for me to resist acting on my feelings.
5. Emotional reactivity	2	I'm a very emotional person. I have very strong emotional reactions to things.
6. Neuroticism	7	I have a harder time than most people handling stressful situations. I worry about things a lot more than other people. I often have to lie to get what I want.
7. Antisocial personality traits	6	I have done things that are against the law like stealing, using or selling drugs, or writing bad checks. There are many things I would just never do because I believe they are wrong.
8. Moral standards	2	I feel a strong need to live up to my moral values. I am a cautious person.
9. Premeditation (impulsivity)	2	I usually think carefully before doing anything. I feel good when I help people.
10. Agreeableness	3	I am a very modest person, the sort of person who never brags about my accomplishments. I am usually very optimistic about the future. I usually look on the bright side of things.
11. Dispositional optimism	2	I almost always finish projects that I start. I am the kind of person who always gets the job done.
12. Perseverance (impulsivity)	2	I enjoy taking risks. I sometimes like doing things just because they are dangerous.
13. Sensation seeking (impulsivity)	2	Things that scare most people don't scare me. I can tolerate a lot more pain than most people.
14. Acquired suicide capability	3	I am pretty set in my ways. I am open-minded about how other people live their lives. I am much more shy than most people.
15. Openness to experience	4	I am pretty quiet around people I don't know well. Attach very little importance to having close friends. Much too independent to get involved with other people.
16. Extraversion	3	I rely heavily on my friends for emotional support. [I would talk or seek help from] parents or other family members. I often feel pretty hopeless about the future.
17. Social anhedonia ³	3	I have only negative thoughts about my future. The people in my life would be happier without me. I am a burden to the people in my life
18. Stoicism ⁵	4	I bring a lot of happiness to the people in my life. I am a big help to the people in my life. I sometimes don't follow through on things I promise to do. I am often disorganized.
19. Hopelessness	3	I try new approaches if old ones don't work. I keep calm and think of the right thing to do in a crisis. I often feel resentful when I don't get my way.
20. Perceived burdensomeness	2	I often take advantage of people.
21. Perceived mattering	2	
22. Conscientiousness	2	
23. Resiliency ⁶	5	
24. Social desirability	2	

Abbreviations: NSS, New Soldiers Survey; PPDS, Pre-Post Deployment Survey; Total = total sample (combined NSS/PPDS).

¹ The validity of the rational scales was evaluated in the NSS (n = 38,507), PPDS (n = 7,425), and combined (n = 45,932) samples by confirming their unidimensional structures using exploratory and confirmatory factor analysis. One- and two-factor solutions were inspected for all 24 rational scales. Four 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 other items loading $0.40 \leq$ onto a single substantively meaningful factor with an eigenvalue $1 \leq$.

² Survey instructions directed soldiers to rate how well each statement described themselves on a 0 ("Not at all like me") to 4 ("Exactly like me") scale for 19 of the 24 rational scales (all scales except social anhedonia, bipolar/affective lability, anger/irritability, resiliency, and 3 of 4 stoicism items).

³ Survey instructions directed soldiers to rate if the statement was generally true or false in describing themselves.

⁴ Survey instructions directed soldiers to rate how often they felt anger or engaged in anger-consistent behaviors on a 0 ("None of the time"; "Never") to 4 ("All or almost all the time"; "Very often") scale.

⁵ For 3 of the 4 stoicism items, survey instructions directed soldiers to rate how likely they talk to or seek help from different types of people on a 0 ("Definitely would not") to 4 ("Definitely would") scale.

⁶ Survey instructions directed soldiers to rate their ability to handle stress using different methods on a 0 ("Poor") to 4 ("Excellent") scale.

eTable 8. Factor loadings for six higher-order personality constructs extracted via exploratory factor analysis solution of 24 rational personality scales¹

Scales	Negative Affect			Thoughtfulness			Fearlessness			Assertion/ Expansion			Emotional Independence			Negative Cognitions		
	TOT	NSS	PPDS	TOT	NSS	PPDS	TOT	NSS	PPDS	TOT	NSS	PPDS	TOT	NSS	PPDS	TOT	NSS	PPDS
Bipolar/affective lability	0.85	0.84	0.85	0.00	0.00	0.06	-0.03	-0.03	0.00	0.09	0.08	0.11	0.15	0.14	0.15	0.16	0.15	0.13
Borderline personality traits	0.81	0.83	0.78	0.12	0.11	0.09	-0.03	-0.04	-0.01	0.01	0.00	0.03	0.04	0.03	0.06	0.12	0.11	0.14
Anger/irritability	0.74	0.76	0.73	-0.10	-0.09	-0.09	0.00	-0.01	-0.01	-0.05	-0.03	-0.06	0.06	0.07	0.07	0.00	-0.01	0.01
Negative urgency (impulsivity)	0.66	0.62	0.75	0.02	0.01	0.05	0.07	0.08	0.02	-0.01	-0.01	-0.02	-0.04	-0.04	-0.05	-0.17	-0.16	-0.16
Emotional reactivity	0.51	0.43	0.70	0.06	0.06	0.14	0.09	0.10	0.07	0.12	0.13	0.08	-0.15	-0.15	-0.18	-0.06	-0.04	-0.10
Neuroticism	0.43	0.38	0.59	0.10	0.09	0.10	0.00	0.00	0.03	-0.21	-0.22	-0.11	0.01	0.01	0.00	0.06	0.05	0.07
Antisocial personality traits	0.41	0.46	0.32	-0.02	-0.01	-0.10	0.00	-0.01	0.03	0.04	0.04	0.02	-0.03	-0.03	-0.03	0.29	0.27	0.33
Moral standards	0.08	0.10	0.03	0.71	0.71	0.81	0.05	0.00	-0.03	-0.12	-0.12	-0.16	-0.05	-0.04	-0.04	0.04	0.04	0.03
Premeditation (impulsivity)	0.00	-0.02	0.10	0.64	0.63	0.61	-0.19	-0.20	-0.19	-0.15	-0.15	-0.12	0.10	0.10	0.09	-0.01	-0.02	0.01
Agreeableness	0.07	0.03	0.17	0.63	0.64	0.65	0.04	0.04	0.06	-0.04	-0.07	0.07	-0.09	-0.10	-0.08	0.03	0.03	0.03
Dispositional optimism	0.09	0.09	0.03	0.60	0.60	0.60	-0.07	-0.07	-0.07	0.22	0.19	0.22	0.04	0.03	0.05	-0.14	-0.14	-0.12
Perseverance (impulsivity)	-0.03	-0.02	-0.02	0.50	0.50	0.54	0.14	0.14	0.12	-0.05	-0.05	-0.04	0.00	-0.01	0.06	0.00	0.01	-0.02
Sensation seeking (impulsivity)	0.04	0.00	0.11	-0.15	-0.13	-0.17	0.75	0.79	0.81	0.03	0.02	0.02	0.01	0.01	-0.04	-0.08	-0.07	-0.07
Acquired suicide capability	-0.03	0.01	-0.06	0.28	0.32	0.35	0.61	0.53	0.53	-0.04	-0.03	-0.07	0.05	0.06	0.07	0.08	0.08	0.07
Openness to experience	-0.02	-0.05	0.09	-0.01	0.00	-0.06	-0.04	-0.05	0.02	0.62	0.60	0.74	0.11	0.11	0.11	0.01	0.01	0.01
Extraversion	-0.05	-0.06	0.02	0.16	0.17	0.02	-0.03	-0.04	0.05	-0.61	-0.65	-0.45	0.11	0.11	0.13	-0.01	-0.01	-0.03
Social anhedonia	0.36	0.35	0.28	0.09	0.08	0.11	0.00	-0.01	-0.02	-0.01	-0.01	0.01	0.60	0.59	0.65	-0.01	-0.03	0.08
Stoicism	0.11	0.12	0.06	0.11	0.11	0.12	-0.05	-0.05	-0.01	0.01	0.02	-0.05	-0.60	-0.58	-0.70	0.13	0.12	0.17
Hopelessness	0.48	0.55	0.22	0.00	0.00	-0.01	-0.04	-0.05	-0.03	-0.01	-0.02	0.00	-0.12	-0.13	-0.09	0.67	0.64	0.80
Perceived burdensomeness	0.23	0.25	0.12	-0.07	-0.07	-0.03	0.04	0.04	0.00	0.07	0.07	0.04	0.05	0.06	0.03	0.41	0.40	0.43

Abbreviations: NSS, New Soldiers Survey; PPDS, Pre-Post Deployment Survey; TOT = total sample (combined NSS/PPDS).

¹ Given overlap among some of the rational scales (e.g., neuroticism and emotional reactivity), exploratory factor analyses of the 24 rational scale total scores were conducted in the NSS, PPDS, and combined samples in an attempt to identify a smaller number of meaningful and reliable second-order factors that accounted for shared variance among the 24 scales. Two-through 10-factor solutions were evaluated to ultimately define the six second-order scales outlined in the table above.

eTable 9. Army STARRS neurocognitive constructs and test descriptions¹

Construct	Test name	Test description
Mental flexibility	Penn Conditional Exclusion Test ⁵¹	The Penn Conditional Exclusion Test (PCET) assesses the ability to derive principles, concepts and rules through feedback and the ability to detect and adjust to changing rules. This test measures the frontal lobe (executive) functions of abstraction and mental flexibility, which are critical for effective problem-solving. The PCET is related to the Wisconsin Card Sorting Test in that it uses the "Odd Man Out" model where participants must decide which of four objects does not belong. The participant has 48 trials to get 6 consecutive answers correct for each principle. The test is scored based on the number of correct or incorrect responses as well as the median response times. Perseverative errors and perseverative correct responses are given in addition to the number of trials taken for each of the 3 criteria/principles.
Visual attention	Penn Continuous Performance Test ⁵²	The Penn Continuous Performance Test (CPT) is a measure of visual attention and vigilance that is sensitive to individual differences but is not contaminated by working memory or perceptual factors (which is a limitation of other available CPT paradigms). In this task, a series of red vertical and horizontal lines flash in a digital numeric frame (resembling a digital clock). The participant must press the spacebar whenever these lines form complete numbers or complete letters. The task is divided into two parts: one in which the participant is looking for complete numbers followed by another set of trials where the participant is looking for complete letters. Each part lasts 1.5m. Each stimulus flashes for 300 milliseconds followed by a blank page displayed for 700 milliseconds, giving the participant 1 sec to respond to each trial. The participant practices both types of trials before the task begins.
Working memory	Penn Working Memory Test ⁵³	Penn Working Memory Test (Fractal n-back task) is a measure of attention and working memory. In this task, participants pay attention to complex geometric shapes (fractals) that flash on the computer screen one at a time, and to press the spacebar according to two different principles or rules: the 1-back and the 2-back. During the 1-back, the participant must press the spacebar whenever the fractal on the screen is the same as the previous one. During the 2-back, the participant must press the spacebar whenever the fractal on the screen is the same as the one before the previous fractal. In all trials, the participant has 2.5 seconds to press the spacebar. The participant practices all three principles. During the actual test trials, the participant does two blocks each of the 1-back and 2-back in a pre-arranged order. This task is scored based on the total number of true/false positives, median reaction time for all correct responses, and number of true/false positives and median response times for each of the three conditions. This implementation of the N-back task uses non-verbal fractal images for improved sensitivity both to right and left hemispheric systems.
Facial memory	Penn Facial Memory Test ⁵⁴	The Penn Facial Memory Test is a measure of visual of face memory that involves greater right hemispheric activity. In the first part of this test, participants are shown 20 faces that they will be asked to identify later during both immediate and delayed recalls. During the immediate recall, participants are shown a series, one at a time, of 40 faces - the 20 faces they were asked to memorize mixed with 20 novel faces. The participants' task is to decide whether they have seen the face before by clicking with the mouse on one of four buttons, presented in a 4-point scale: "definitely yes", "probably yes", "probably no" and "definitely no." The memory system is to some extent domain specific, with greater left hemispheric involvement in verbal memory and greater right hemispheric involvement in face and shape memory.
Emotion identification	Penn Emotion Identification test ⁵⁵	The Emotion Identification Test is a measure of the ability to decode and correctly identify facial expressions of emotion. In this task participants are shown a series of 40 faces, one at a time, and asked to determine what emotion the face is showing for each trial. There are 5 answer choices: Happy, Sad, Angry, Scared and No Feeling. Participants respond to each trial by clicking with the mouse on the word describing the emotion each faces expresses. There are 4 female faces for each emotion (4 x 5 = 20) and 4 male faces for each emotion (4 x 5 = 20). The scores are based on the number of correct responses for female versus male faces; the number of correct happy, sad, angry, sad and no feeling faces; the number of false positives for happy, sad, angry, scared and no feeling faces; and the number of mild and intense emotion expressions correctly identified. Emotion recognition is a critical aspect of social information processing and social problem-solving.
Attentional bias to negative emotions	Emotional Stroop test ⁵⁶	The Stroop/Emotional Stroop Test is a reaction-time test that measures how quickly participants identify the color in which different words, either color names themselves or words of varying emotional content, are presented sequentially on a computer screen. Larger response latencies to incongruently colored words (relative to congruently colored word) are interpreted as attentional interference. A large body of literature has demonstrated attentional biases on the Emotional Stroop among those with depression (e.g., slower responses to depression-related words among those with or at risk for depression), anxiety disorders (e.g., slower responses to combat related words among those with PTSD), and suicide (e.g., slower responses to suicide related words among suicide attempters). The standard Stroop stimuli include the colors Red, Blue, and Green in which the words red, blue, and green will be presented. In the first half of the test, half the stimuli will match the color of the word (congruent items, 24 stimuli), and half will not (incongruent items, 24 stimuli). In the second half of the test, emotional words will be presented in these three colors from 6 categories: Positive (fun, reward, ecstatic), Negative (panic, rage, stressful), Neutral (chalk, ruler, notebook), Suicide-related (suicide, overdose, hang), PTSD-related (wound, explode, combat), and non-lexical foils (strings of "xxxxx"). Each word will be presented three times. In all conditions, subjects will be instructed to identify the color of each stimulus as quickly as possible.
Impulse control	Go-No Go ⁵⁷	The Go-No Go task is a measure of impulse control that require subjects to respond to either a single designated target or a series of targets, and to inhibit responding to a particular low frequency non-target. The goal of Go-No-Go tasks is to induce subjects to develop a tendency to respond, and then to interrupt that tendency with an intermittent non-target. Performance is typically quantified by the number of commission errors committed when presented with non-targets, with poorer performance associated with more commission errors. In their simplest form, Go-No Go tasks use a series of letters or symbols as targets, and a single letter or figure as a non-target. Because these tasks typically require a large number of trials to eliminate ceiling effects and produce an adequate distribution of error scores, more complex versions have been developed. These require subjects to make a more complex discrimination (i.e. respond when a tone and location match, or when a particular stimulus appears in a particular location) for targets, with targets still presented at a high frequency. Error scores typically increase in these tasks providing a better distribution of outcome scores.

¹The neurocognitive tests selected for inclusion in the STARRS battery were designed to assess a broad range of cognitive and emotional domains. Each construct assessed by the tests has been related to disorders and problems of interest in STARRS including suicidal behavior, PTSD, mood disorders, substance and alcohol use disorders and impulsive behavior. Most tests in this battery are from the Penn battery⁵⁸ because these tests have been normed on large samples and are adaptable for group administration. Other tasks chosen for this battery, specifically the Go No Go task and the Emotional Stroop task, have also been found to be related to psychiatric disorders of interest in STARRS. Tests selected are psychometrically sound, are able to be adapted to computerized large group administration and have shown relationships with functional neuroimaging measures.

eTable 10. Step-by-step overview of building the prediction models

<p>1) Examining the univariate associations between all independent variables and the outcomes</p>	<p>Univariate associations of temporally prior independent variables with the subsequent occurrence of the outcome were examined using SAS Version 9.3⁵⁹ <i>proc logistic</i>. This step was conducted in the person-month samples that were created for each outcome using a logistic link function and including control variables for number of months in service (range=0-32), season-year when the SAQ was completed, and site of Basic Combat Training. The functional forms of non-dichotomous independent variables with significant univariate associations involving were at times transformed to capture substantively plausible nonlinearities. Multivariate associations were then estimated for all significant univariate predictors for each outcome, but these models produced highly unstable coefficients.</p>
<p>2) Selecting the optimal number of predictors</p>	<p>We used 10-fold cross-validated forward stepwise regression to identify the optimal number of independent variables to maximize the proportion of observed occurrences of the outcome found among the 5% of soldiers (person-months) with highest cross-validated predicted risk (i.e., concentration of risk [COR] among soldiers with the top 5% of predicted risk). Ten-fold cross-validation is a method that estimates 10 separate stepwise models, each time holding out a separate 10% of the population, and then uses the coefficients from each 90% subsample to generate a predicted probability only for the 10% of the population in the hold-out subsample.⁶⁰ Changes in model fit associated with number of independent variables were then inspected in the aggregation of the 10 hold-out subsamples to determine the smallest number of independent variables needed to achieve optimal cross-validated prediction accuracy, thus minimizing risk of the over-fitting that often occurs when using stepwise regression analysis.⁶¹</p>
<p>3) Examining interactions among all independent variables with significant univariate associations with the outcome</p>	<p>A search for interactions among all independent variables with significant univariate associations with the outcome was carried out using the R-package <i>RandomForests</i> (RF).⁶² RF is a tree-based method that uses simulation across many different subsampled trees (500 trees in our models) to generate a single summary predicted outcome score that captures the significant interactions among the independent variables.⁶³ The incremental improvement in fit achieved by using RF was determined by adding a variable representing the RF predicted probability (from distinct RF models restricted to 4, 8, 12, or 16 terminal nodes) to the optimal regression equation estimated in the previous step and determining the extent to which this led to an increase concentration of risk in the top-ventile of risk. See eTable 12 for details of which node restriction was selected for each outcome.</p>
<p>4) Selecting the optimal independent variables to use in the final model</p>	<p>We identified the best sets of independent variables for each outcome that maximized on the proportion of observed crimes found among the top 5% of predicted risk by estimating elastic net penalized regression models using the R-package <i>glmnet</i>.⁶⁴ Penalized regression models trade off a small amount of conservative bias in coefficients to increase the efficiency and stability of estimates.⁶⁵ A series of elastic net models were estimated using various mixing penalty parameters (MPPs; set to .1, .3, .5, .7, .9, .99) and by setting <i>dfmax</i> to equal the number of variables determined to maximize model fit in Step II plus one (i.e., for the intercept term). See eTable 12 for details of which MPP was selected for each outcome. All independent variables with significant univariate associations with the outcome were permitted to enter the elastic net models. The best MPP was selected on the basis of which had the highest concentration of risk in the top-ventile of predicted risk. The RF predicted probability was permitted to enter the model only if it was determined to meaningfully improve model performance in the prior step. This step was repeated with and without neurocognitive variables with significant univariate associations with the outcomes in order to determine their incremental validity.</p>
<p>5) Creating ventiles of risk and validating the prediction model in an independent sample</p>	<p>Once the best predictor set was selected for each outcome, a conventional (unpenalized) discrete-time survival model was estimated using the same predictor sets in order to calculate 95% confidence intervals and variance inflation factors. The coefficients from the optimal penalized and unpenalized models were then used to calculate the predicted probability of the outcome for each soldier in the dataset. The association between this predicted probability and the observed occurrence of the outcome was then used to calculate the area under the receiver operating characteristic curve (AUC) as an estimate of model accuracy. In order to visualize this association, soldiers were ranked by predicted probability from highest to lowest risk and then grouped into 20 categories of equal size (ventiles; highest 5% of predicted risk is the "top-ventile"). Concentration of risk in each ventile was then calculated and plotted.</p>

eTable 11. Tetrachoric correlation matrix for all 12 observed outcomes in the total sample (n=21,832)

	a	b	c	d	e	f	g	h	i	j	k	l
II. Mental-physical health												
a. Suicide attempt	--											
b. Mental hospitalization	0.84	--										
c. Positive drug test	0.22	0.31	--									
d. Traumatic brain injury	0.10	0.24	0.16	--								
e. Other severe injury	0.17	0.18	-0.05	0.18	--							
I. Violence												
f. Major physical perpetration (Men)	0.27	0.29	0.36	0.08	-0.01	--						
g. Minor violence perpetration	0.23	0.27	0.18	-0.05	0.00	0.76	--					
h. Sexual assault perpetration (Men)	0.17	0.15	0.16	0.06	0.08	0.48	0.26	--				
i. Minor violence victimization	0.15	0.20	0.17	0.07	-0.14	0.41	0.54	0.15	--			
j. Sexual assault victimization (Women)	0.21	0.18	0.23	0.06	-0.01	-- ¹	-0.15	-- ¹	0.48	--		
III. Army career												
k. Attrition	0.42	0.40	0.55	-0.09	-0.07	0.21	0.16	0.15	-0.10	0.24	--	
l. Demotion	0.23	0.29	0.70	0.17	0.07	0.34	0.40	0.33	0.20	0.22	0.39	--

¹Correlation could not be estimated because of sex-specific outcomes

eTable 12. Model performance across steps of model building

	Model 1: ¹ Cross-validated stepwise		Model 2: ² Model 1 variables + Random forests		Model 3: ³ Elastic net		Model 4: ³ Model 4 variables + Neurocognitive		Final model ⁴				
	Top 5%, COR ⁵	# Optimal nodes	Δ Top 5%, COR ⁵	Optimal MPP	Top 5%, COR ⁵	Δ Top 5%, COR ⁵	# Predictors, Controls	AUC	Top 5%, COR ⁵	AUC	Top 5%, COR ⁵		
I. Mental-physical health													
Suicide attempt	32.5	16	+1.4	0.99	24.2	0.0	23, 2	0.74	30.0	0.74	29.8		
Mental hospitalization	12.8	16	+2.5	0.99	14.0	0.0	11, 1	0.62	14.7	0.62	15.2		
Positive drug test	20.2	16	-2.9	0.50	16.6	-0.2	22, 4	0.71	21.8	0.71	21.6		
Traumatic brain injury	35.7	8	-3.7	0.99	33.3	+8.0	15, 7	0.80	40.9	0.80	38.2		
Severe injury	11.3	4	-2.2	0.99	11.3	-- ⁶	3, 4	0.62	11.2	0.62	11.2		
II. Violence													
Major physical perpetration	27.8	4	-8.6	0.70	30.6	-1.2	10, 3	0.78	31.1	0.78	34.0		
Minor violence perpetration	23.6	16	-5.3	0.70	20.9	0.1	18, 2	0.76	24.0	0.76	24.0		
Sexual assault perpetration	30.5	8	-1.9	0.99	28.9	-0.1	13, 4	0.77	32.2	0.78	32.1		
Minor violence victimization	17.4	16	-6.1	0.99	16.7	-0.4	11, 2	0.68	17.5	0.68	16.5		
Sexual assault victimization	22.2	16	0.0	0.99	22.1	0.0	12, 0	0.71	23.7	0.71	23.1		
III. Army career													
Attrition	12.3	8	+0.1	0.99	12.1	0.2	29, 3	0.65	13.4	0.65	13.2		
Demotion	10.9	12	+1.3	0.99	11.3	0.0	23, 1	0.65	11.2	0.65	11.2		

Abbreviations: AUC, area under the receiver operating characteristic curve; COR, concentration of risk; MPP, mixing penalty parameter.

¹ Corresponds to Step 2 described in the methods section. See eTable 10 for additional details.

² Corresponds to Step 3 described in the methods section. See eTable 10 for additional details.

³ Corresponds to Step 4 described in the methods section. See eTable 10 for additional details. Several iterations of the neurocognitive models were estimated, allowing a varying number of neurocognitive predictors to be selected. In this table we present the performance of the neurocognitive model that performed best.

⁴ Corresponds to Step 5 described in the methods section. Models with concentration of risk in the top-ventile of risk at least three times the expected value (15.0%≤) are bolded. See eTable 10 for additional details.

⁵ Top 5% COR refers to concentration of risk in the top 5% of predicted risk, or the percent of all observed occurrences of the outcome in the top-ventile (5%) of the predicted risk distribution.

⁶ Empty cell for severe injury in because models were not run as there were no significant univariate associations between severe injury and any of the neurocognitive variables.

eTable 13. Coefficients (odd-ratios) from the final penalized and unpenalized models for suicide attempt¹

	Penalized OR	OR ²	Unpenalized (95% CI)	VIF ³
I. Socio-demographic				
Male (Y-N)	0.7	0.7	(0.5-1.1)	1.1
Age at interview (Cat)	0.6	0.5*	(0.4-0.7)	1.0
Catholic religion (Y-N)	0.5	0.5*	(0.3-0.8)	1.0
Enlisted for self-growth, 25 th percentile (Y-N)	0.6	0.6*	(0.4-0.8)	1.1
II. Mental disorders-symptoms-treatment				
MDE, 5+ years with (Y-N)	1.2	1.2	(0.6-2.5)	1.3
GAD, 3+ years with (Y-N)	1.7	1.7*	(1.1-2.8)	1.3
Panic attacks, 8+ years with (Y-N)	1.4	1.5	(0.5-4.1)	1.2
PTSD, 8+ years with (Y-N)	2.1	2.2*	(1.0-4.7)	1.2
Anger attacks, 9+ years with (Y-N)	0.3	0.2*	(0.1-0.8)	1.1
Mental disorders, 3+ lifetime total (Y-N)	1.3	1.3	(0.8-2.1)	1.5
Any treatment, # lifetime years (Cont)	1.0	1.0	(1.0-1.1)	1.6
Specialty mental treatment, 3+ years (Y-N)	1.2	1.2	(0.4-3.7)	1.6
III. Stressors				
Both parents had MDE (Y-N)	1.4	1.4	(0.8-2.5)	1.3
Both parents had GAD (Y-N)	1.1	1.1	(0.6-2.1)	1.3
Abuse-neglect by family, Total score 0-4 (Ref)	--	--	--	--
Abuse-neglect by family, Total score 5-9 (Y-N)	1.3	1.4	(0.9-2.2)	1.1
Abuse-neglect by family, Total score 10+ (Y-N)	1.4	1.5	(0.9-2.4)	1.5
IV. Personality				
Preoccupied attachment style (Cat)	1.1	1.1	(1.0-1.2)	1.2
Dismissive attachment style (Cat)	1.3	1.3*	(1.0-1.6)	1.2
Social anhedonia (Cat)	1.1	1.1	(0.9-1.3)	1.3
V. Social networks				
Caring relationships, 3+ (Y-N)	0.6	0.6*	(0.4-1.0)	1.1
VI. Self-harm				
Suicide attempt, Lifetime (Y-N)	2.7	2.6*	(1.2-5.6)	1.4
Self-harm acts, 1+ lifetime total (Y-N)	1.3	1.3	(0.8-2.3)	1.4
VII. Administrative				
AFQT percentile (Cat)	0.7	0.7*	(0.5-0.8)	1.0

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Ref, reference group; GAD, generalized anxiety disorder; PTSD, posttraumatic stress disorder; MDE, major depressive episode.

¹ Final model coefficient are presented for suicide attempt because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0% \leq ; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values 10 \leq ^{66,67}).

eTable 14. Coefficients (odd-ratios) from the final penalized and unpenalized models for mental hospitalization¹

	Penalized	OR ²	Unpenalized	VIF ³
	OR		(95% CI)	
I. Mental disorders-symptoms-treatment				
PTSD, 8+ years with (Y-N)	1.9	1.9*	(1.2-3.0)	1.1
SUD symptoms, Lifetime # (Cont)	1.1	1.1*	(1.0-1.1)	1.4
Mental disorders, Lifetime # (Cat)	1.1	1.1	(1.0-1.2)	1.9
II. Stressors				
One or both parents had bipolar disorder (Y-N)	1.3	1.3*	(1.0-1.7)	1.4
Parents had GAD, #	1.2	1.2	(1.0-1.5)	1.3
Childhood adversities, Total # (Cat)	1.2	1.2*	(1.1-1.3)	1.4
II. Personality				
Preoccupied attachment style (Y-N)	1.6	1.6*	(1.2-2.3)	1.1
Negative cognitions, 90+ percentile (Y-N)	1.0	1.0	(0.8-1.3)	1.4
IV. Self-harm				
Suicide ideation, Lifetime (Y-N)	1.2	1.2	(1.0-1.5)	1.5
Suicide attempt, Lifetime (Y-N)	1.6	1.6*	(1.0-2.5)	1.3
Self-harm acts, 21+ lifetime total (Y-N)	1.8	1.8*	(1.1-3.0)	1.2

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Cont, continuous variable; GAD, generalized anxiety disorder; PTSD, posttraumatic stress disorder, SUD, substance use disorder.

¹ Final model coefficient are presented for mental hospitalization because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0%≤; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values $10 \leq^{66,67}$).

eTable 15. Coefficients (odd-ratios) from the final penalized and unpenalized models for positive drug test¹

	Penalized OR	OR ²	Unpenalized (95% CI)	VIF ³
I. Socio-demographic				
Male (Y-N)	1.6	1.7*	(1.1-2.8)	1.1
Non-Hispanic Black (Y-N)	1.6	1.6*	(1.3-2.1)	1.1
Some college or higher education (Y-N)	0.5	0.4*	(0.2-0.8)	1.0
Identifies with any religious group (Y-N)	1.2	1.2	(1.0-1.6)	1.2
Religiosity, Moderate-High (Y-N)	1.3	1.3*	(1.0-1.7)	1.2
Enlisted for self-growth (Cat)	1.3	1.4*	(1.1-1.7)	1.0
II. Mental disorders-symptoms-treatment				
SUD diagnosis, Lifetime (Y-N)	1.2	1.2	(0.7-2.0)	3.1
SUD symptoms, Any lifetime (Y-N)	1.1	1.1	(0.7-1.9)	3.1
SUD, 6+ years with (Y-N)	1.5	1.6	(0.8-3.0)	1.1
Insomnia, 3+ years with (Y-N)	1.4	1.5	(0.9-2.3)	1.1
Anger attacks, 3+ years with (Y-N)	1.1	1.1	(0.9-1.5)	1.2
Conduct disorder, 1+ years with (Y-N)	1.4	1.5*	(1.1-1.9)	1.3
III. Stressors				
Physical assaults, # lifetime total(Cat)	1.1	1.1*	(1.0-1.3)	1.4
Witnessed severe injury/death, 2+ lifetime (Y-N)	1.2	1.2	(0.8-1.6)	1.4
Traumatic events, Total types (Cat)	1.1	1.1	(1.0-1.2)	1.7
Head injuries, 5+ lifetime total (Y-N)	1.2	1.2	(0.9-1.6)	1.2
IV. Personality				
Antisocial, 4+ total traits(Y-N)	1.4	1.4*	(1.1-1.7)	1.3
Acquired suicide capability (Cat)	1.2	1.2*	(1.0-1.4)	1.1
V. Social networks				
Sexual partners, 0-5 in past year (Ref)	--	--	--	--
Sexual partners, 6 in past year (Y-N)	1.0	1.2	(0.5-2.7)	1.0
Sexual partners, 7-8 in past year (Y-N)	1.4	1.6	(0.8-3.0)	1.0
Sexual partners, 9 in past year (Y-N)	1.2	1.5	(0.5-4.8)	1.0
Sexual partners, 10+ in past year (Y-N)	1.7	1.8*	(1.2-2.8)	1.0

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Ref, reference group; SUD, substance use disorder.

¹ Final model coefficient are presented for positive drug test because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0% \leq ; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9.

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values 10 \leq ^{66,67}).

eTable 16. Coefficients (odd-ratios) from the final penalized and unpenalized models for traumatic brain injury¹

	Penalized OR	OR ²	Unpenalized (95% CI)	VIF ³
I. Socio-demographic				
Hispanic (Y-N)	1.7	1.9	(0.9-3.9)	1.0
Enlisted to escape from home, 50+ percentile	1.8	2.1*	(1.1-4.2)	1.1
II. Mental disorders-symptoms-treatment				
Panic attacks, 6+ years with (Y-N)	2.5	2.5	(0.7-9.0)	1.1
ODD, 7+ years with (Y-N)	1.5	1.6	(0.8-3.2)	1.1
III. Stressors				
Physical assaults, # lifetime (Cat)	1.3	1.4	(1.0-1.9)	1.1
One or both parents had GAD (Y-N)	1.3	1.4	(0.7-2.6)	1.1
Hit by family members, Rarely or more (Y-N)	1.2	1.2	(0.6-2.8)	1.3
Childhood adversities, 2+ types (Y-N)	1.7	1.9	(1.0-3.8)	1.2
Financial stress, Severe in past year (Y-N)	1.2	1.2	(0.5-2.8)	1.4
Health of loved ones, Severe in past year (Y-N)	1.4	1.4	(0.6-3.4)	1.4
Stress in any domain, Severe in past year (Y-N)	1.1	1.1	(0.5-2.7)	1.9
IV. Personality				
Preoccupied attachment style (Y-N)	1.8	1.9	(0.7-5.2)	1.1
V. Neurocognitive				
Composite efficiency, 0-29 percentile (Ref)	--	--	--	--
Composite efficiency, 30-79 percentile (Y-N)	1.0	1.4	(0.5-4.1)	3.2
Composite efficiency, 80+ percentile (Y-N)	1.9	2.8	(1.0-8.0)	3.1
VI. Administrative				
AFQT 75+ percentile (Y-N)	0.6	0.5	(0.3-1.1)	1.0

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Ref, reference group; AFQT, armed forces qualification test; GAD, generalized anxiety disorder; ODD, oppositional defiant disorder.

¹ Final model coefficients are presented for traumatic brain injury because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0%≤; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9.

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values $10 \leq^{66,67}$).

eTable 17. Coefficients (odd-ratios) from the final penalized and unpenalized models for major physical violence perpetration¹

	Penalized OR	OR ²	Unpenalized (95% CI)	VIF ³
I. Socio-demographic				
Non-Hispanic Black (Y-N)	3.7	3.8*	(2.2-6.6)	1.1
II. Mental disorders-symptoms-treatment				
Anger attacks, 5+ years with (Y-N)	1.6	1.7	(0.8-3.6)	1.2
Mental disorders, 2+ lifetime total (Y-N)	1.5	1.6	(0.6-4.0)	1.2
Any mental treatment, Lifetime (Y-N)	2.0	2.0	(0.9-4.7)	1.1
III. Stressors				
Romantic stress, Severe in past year (Y-N)	1.6	1.7	(0.8-3.6)	1.3
Overall stress, Severe in past year (Y-N)	1.6	1.6	(0.7-3.6)	1.4
IV. Personality				
Introversion (Cat)	0.8	0.7*	(0.6-0.9)	1.0
V. Administrative				
Medical failure at accession (Y-N)	2.1	2.4*	(1.2-4.8)	1.0
AFQT 0-42 percentile (Ref)	--	--	--	--
AFQT 43-74 percentile (Y-N)	0.9	0.8	(0.4-1.3)	1.2
AFQT 75+ percentile (Y-N)	0.4	0.3*	(0.1-0.7)	1.2

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Ref, reference group; AFQT, armed forces qualification test.

¹ Final model coefficients are presented for major physical violence perpetration because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0%≤; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values $10 \leq^{66,67}$).

eTable 18. Coefficients (odd-ratios) from the final penalized and unpenalized models for minor violence perpetration¹

	Penalized	Unpenalized		VIF ³
	OR	OR ²	(95% CI)	
I. Socio-demographic				
Non-Hispanic Black (Y-N)	1.9	1.9*	(1.4-2.6)	1.1
Some college or higher education (Y-N)	0.4	0.3*	(0.1-0.7)	1.0
Currently/previously married (Y-N)	1.7	1.7*	(1.2-2.5)	1.0
II. Mental disorders-symptoms-treatment				
SUD, Lifetime (Y-N)	1.8	1.8*	(1.0-3.2)	2.7
Insomnia, 0-2 years with (Ref)	--	--	--	--
Insomnia, 3-5 years with (Y-N)	1.9	1.9	(1.0-3.9)	1.0
Insomnia, 6+ years with (Y-N)	4.0	4.2*	(1.7-10.1)	1.1
Anger attacks, 4+ years with (Y-N)	2.0	2.1*	(1.3-3.4)	1.8
Conduct disorder, 1+ years with (Y-N)	1.7	1.7*	(1.2-2.5)	1.4
ODD, 0-4years with (Ref)	--	--	--	--
ODD, 5 years with (Y-N)	0.6	0.6	(0.3-1.2)	1.0
ODD, 6+ years with (Y-N)	0.4	0.4*	(0.2-0.6)	1.2
GAD symptoms, Any lifetime (Y-N)	0.6	0.5*	(0.4-0.7)	1.1
Mental disorders, 0 lifetime total (Ref)	--	--	--	--
Mental disorders, 1 lifetime total (Y-N)	1.0	1.1	(0.6-1.7)	2.4
Mental disorders, 2 lifetime total (Y-N)	1.0	1.0	(0.5-2.2)	3.0
Mental disorders, 3+ lifetime total (Y-N)	1.4	1.4	(0.4-4.5)	2.4
III. Stressors				
Sent to juvenile detention (Y-N)	4.0	4.0*	(2.3-6.8)	1.1
IV. Personality				
Introversion (Cont)	0.6	0.6*	(0.5-0.8)	1.0
V. Social networks				
Sexual partners, 5+ in past year (Y-N)	1.6	1.7*	(1.1-2.4)	1.1
VI. Administrative				
AFQT percentile (Cont)	0.7	0.7*	(0.6-0.9)	1.1

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cont, continuous variable; Ref, reference group; GAD, generalized anxiety disorder; ODD, oppositional defiant disorder; SUD, substance use disorder.

¹ Final model coefficient are presented for minor violence perpetration because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0%≤; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values $10 \leq^{66,67}$).

eTable 19. Coefficients (odd-ratios) from the final penalized and unpenalized models for sexual assault perpetration¹

	Penalized	OR ²	Unpenalized	VIF ³
	OR		(95% CI)	
I. Socio-demographic				
Non-Hispanic Black (Y-N)	2.4	2.6*	(1.5-4.5)	1.3
Hispanic (Y-N)	1.9	2.5*	(1.4-4.4)	1.2
Religiosity, None (Ref)	--	--	--	--
Religiosity, Low-Moderate (Y-N)	1.0	2.0	(0.8-5.0)	5.0
Religiosity, High (Y-N)	1.4	3.0*	(1.1-7.7)	5.0
II. Mental disorders-symptoms-treatment				
ODD diagnosis, Lifetime (Y-N)	1.7	1.9	(0.8-4.4)	1.2
III. Stressors				
Physical assaults, # lifetime (Cat)	1.1	1.2	(0.9-1.6)	1.1
Drinking problems, # relatives with (Cat)	0.7	0.6*	(0.4-0.8)	1.1
Physically abused at home, Frequency (Cat)	1.4	1.5	(0.9-2.3)	1.2
IV. Personality				
Perceived interpersonal mattering (Cat)	1.2	1.3	(0.9-1.8)	1.1
Introversion (Cat)	0.8	0.8*	(0.6-0.9)	1.1
Dismissive attachment style (Y-N)	1.5	1.6	(0.8-3.2)	1.1
V. Social networks				
Sexual partners, # in past year (Cont)	1.1	1.1*	(1.0-1.2)	1.0
VI. Self-harm				
Self-harm acts, 3+ lifetime total (Y-N)	1.6	2.2	(0.8-6.1)	1.1

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Cont, continuous variable; Ref, reference group; ODD, oppositional defiant disorder.

¹ Final model coefficient are presented for sexual assault perpetration because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0%≤; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values $10 \leq^{66,67}$).

eTable 20. Coefficients (odd-ratios) from the final penalized and unpenalized models for minor violence victimization¹

	Penalized OR	OR ²	Unpenalized (95% CI)	VIF ³
I. Socio-demographic				
Male (Y-N)	0.4	0.4*	(0.3-0.5)	1.0
Born in US (Y-N)	2.9	4.2*	(1.4-12.4)	1.0
II. Mental disorders-symptoms-treatment				
Mania/hypomania diagnosis, Lifetime (Y-N)	1.4	1.4	(0.5-3.8)	1.5
Insomnia, 2+ years with (Y-N)	1.6	1.7	(0.8-3.5)	1.1
Mental disorders, 1+ lifetime total (Y-N)	1.2	1.2	(0.7-2.2)	1.6
III. Stressors				
Lived in foster home (Y-N)	1.9	2.0	(1.0-4.2)	1.0
Health stress, Severe in past year (Y-N)	1.4	1.4	(0.7-2.7)	1.4
Romantic stress, Severe in past year (Y-N)	1.2	1.2	(0.8-2.0)	1.4
Overall stress, Severe in past year (Y-N)	1.5	1.5	(0.9-2.4)	1.5
IV. Personality				
Thoughtfulness, ≤20 percentile (Y-N)	2.7	2.9*	(1.6-5.3)	1.0
Fearful attachment style (Y-N)	1.3	1.4	(0.8-2.4)	1.1

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding.

¹ Final model coefficient are presented for minor violence victimization because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., 15.0%≤; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9.

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values 10 ≤^{66,67}).

eTable 21. Coefficients (odd-ratios) from the final penalized and unpenalized models for sexual assault victimization¹

	Penalized	OR ²	Unpenalized	VIF ³
	OR		(95% CI)	
I. Socio-demographic				
Non-Hispanic Black (Y-N)	0.4	0.4*	(0.2-0.7)	1.0
“Other” religious affiliation (Y-N)	2.0	2.1*	(1.0-4.2)	1.1
II. Mental disorders-symptoms-treatment				
PTSD, 6+ years with (Y-N)	1.4	1.5	(0.6-3.8)	1.1
ODD, 9+ years with (Y-N)	1.6	1.7	(1.0-2.9)	1.1
III. Stressors				
No parental history of GAD (Ref)	--	--	--	--
One parent had GAD (Y-N)	1.3	1.4	(0.8-2.3)	2.8
Both parents had GAD (Y-N)	1.4	1.3	(0.4-4.8)	2.7
Drinking problems, 5+ relatives with (Y-N)	1.4	1.4	(0.8-2.6)	1.3
Lived in foster home (Y-N)	1.8	1.9	(1.0-3.7)	1.2
Unwanted touching, Frequency (Cat)	1.1	1.1	(0.8-1.6)	2.3
Sexual victimization, Any (Y-N)	1.7	1.8*	(1.0-3.0)	2.0
Abuse-neglect by family, Total score (Cont)	1.0	1.0	(0.8-1.3)	1.8
IV. Personality				
Impulsive-sensation seeker (Cat)	1.2	1.3*	(1.0-1.5)	1.1

* Significant at the .05 level (2-sided test)

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; VIF, variance inflation factor; Y-N, yes-no dichotomous coding; Cat, categorical-ordinal coding (e.g., 0=0, 1=1-3, 2=4-5, 3=6-9, 4=10+); Cont, continuous variable; Ref, reference group; GAD, generalized anxiety disorder; ODD, oppositional defiant disorder; PTSD, posttraumatic stress disorder.

¹ Final model coefficient are presented for sexual assault victimization because this model achieved a concentration of risk in the top-ventile of risk at least three times the expected value (i.e., $15.0\% \leq$; see Table 2). Coefficients of control variables selected by elastic net are not presented. Detailed descriptions of the independent variables can be found in eTables 6-9.

² The proportion of final model predictors with statistically significant coefficients varied substantially across models (6.7% [TBI] to 72.2% [minor violence perpetration]). This is due to the fact that the elastic net variable selection was based on internal cross-validation to maximize prediction accuracy, not significance tests.

³ None of the unpenalized coefficients had variance inflation factors indicating problems with multicollinearity (i.e., values $10 \leq^{66,67}$).

eTable 22. Tetrachoric correlation matrix for the top-ventiles of predicted risk among men (n=18,869)¹

	Suicide attempt	Mental hospitalization	Positive drug test	Traumatic brain injury	Major physical perpetration	Minor violence perpetration	Sexual assault perpetration
Suicide attempt	--						
Mental hospitalization	0.71	--					
Positive drug test	0.41	0.60	--				
Traumatic brain injury	0.43	0.52	0.41	--			
Major physical perpetration	0.30	0.27	0.41	0.19	--		
Minor violence perpetration	0.31	0.44	0.58	0.14	0.49	--	
Sexual assault perpetration	0.20	0.20	0.44	0.17	0.62	0.45	--

¹ Correlations are only shown for outcomes that had a within-sex concentration of risk at least three times the expected value (15.0%) in the top-ventile of predicted risk from the final unpenalized models. We show the within-sex correlations here because we conducted the cross-outcome and risk-profile analyses separately among men and women as the number of outcomes varied by sex (see eTables 24-34). We calculated within-sex risk scores using the predicted values from the final unpenalized models and excluded models for which the top-risk ventile had a within-sex concentration of risk <15.0%: minor violence victimization (men-women; 12.1-13.5%); mental health hospitalization (women, 12.0%); and positive drug test (women, 3.9%).

eTable 23 Tetrachoric correlation matrix for the top-ventiles of predicted risk among women (n=2,963)¹

	Suicide attempt	Traumatic brain injury	Minor violence perpetration	Sexual assault victimization
Suicide attempt	--			
Traumatic brain injury	0.46	--		
Minor violence perpetration	0.07	-0.09	--	
Sexual assault victimization	0.62	0.41	0.42	--

¹ Correlations are only shown for outcomes that had a within-sex concentration of risk at least three times the expected value (15.0%) in the top-ventile of predicted risk from the final unpenalized models. We show the within-sex correlations here because we conducted the cross-outcome and risk-profile analyses separately among men and women as the number of outcomes varied by sex (see eTables 24-34). We calculated within-sex risk scores using the predicted values from the final unpenalized models and excluded models for which the top-risk ventile had a within-sex concentration of risk <15.0%: minor violence victimization (men-women; 12.1-13.5%); mental health hospitalization (women, 12.0%); and positive drug test (women, 3.9%)

eTable 24. Associations between all top-ventiles of risk and suicide attempt among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Suicide attempt	10.2*	(6.7-15.5)	8.6*	(5.6-13.3)	6.9*	(4.1-11.8)	8.0*	(5.2-12.6)	7.0*	(3.3-14.8)	5.6*	(2.5-12.6)	7.0*	(3.3-14.8)
χ^2_1	117.5*		93.9*		50.9*		84.3*		26.2*		16.9*		25.9*	
Any other outcome	--	--	1.5	(1.0-2.2)	--	--	--	--	--	--	--	--	--	--
χ^2_1			3.5											
Mental hospitalization	--	--	--	--	2.4*	(1.3-4.3)	--	--	--	--	--	--	--	--
Positive drug test	--	--	--	--	0.6	(0.3-1.4)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.3	(0.7-2.4)	--	--	--	--	--	--	--	--
Major physical perpetration	--	--	--	--	1.0	(0.4-2.6)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	1.5	(0.7-3.1)	--	--	--	--	--	--	--	--
Sexual assault perpetration	--	--	--	--	0.8	(0.3-2.0)	--	--	--	--	--	--	--	--
χ^2_6					0.0									
Exactly 1 other outcome	--	--	--	--	--	--	1.0	(0.6-1.9)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	2.8*	(1.8-4.4)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.2	(0.4-3.8)	--	--	--	--	--	--
χ^2_3							19.2*							
Suicide attempt AND														
Any other outcome	--	--	--	--	--	--	--	--	1.5	(0.6-3.8)	--	--	--	--
χ^2_1									0.6					
Mental hospitalization	--	--	--	--	--	--	--	--	--	--	1.4	(0.4-4.8)	--	--
Positive drug test	--	--	--	--	--	--	--	--	--	--	0.3	(0.1-1.6)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	6.1*	(1.1-32.6)	--	--
Major physical perpetration	--	--	--	--	--	--	--	--	--	--	0.6	(0.1-3.2)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.8	(0.2-4.5)	--	--
Sexual assault perpetration	--	--	--	--	--	--	--	--	--	--	3.2	(0.6-17.1)	--	--
χ^2_6											7.4			
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.6	(0.1-2.3)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	3.5*	(1.0-11.9)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	1.3	(0.1-15.6)
χ^2_3													7.2	

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the "index top-ventile"), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way

high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown).

eTable 25. Associations between all top-ventiles of risk and mental hospitalization among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Mental hospitalization	4.0*	(3.2-5.1)	3.2*	(2.4-4.3)	3.0*	(2.2-4.3)	3.2*	(2.4-4.3)	4.0*	(2.7-6.1)	3.6*	(2.5-5.1)	4.0*	(2.7-6.1)
χ^2_1		131.4*		60.7*		40.7*		66.9*		43.3*		50.6*		43.3*
Any other outcome	--	--	1.5*	(1.2-1.9)	--	--	--	--	--	--	--	--	--	--
χ^2_1				12.8*										
Suicide attempt	--	--	--	--	1.5*	(1.0-2.3)	--	--	--	--	--	--	--	--
Positive drug test	--	--	--	--	1.3	(0.7-2.2)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.0	(0.7-1.5)	--	--	--	--	--	--	--	--
Major physical perpetration	--	--	--	--	0.9	(0.6-1.4)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	1.3	(0.9-1.9)	--	--	--	--	--	--	--	--
Sexual assault perpetration	--	--	--	--	1.2	(0.8-1.9)	--	--	--	--	--	--	--	--
χ^2_6						0.3								
Exactly 1 other outcome	--	--	--	--	--	--	1.5*	(1.1-1.9)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	1.9*	(1.4-2.6)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.1	(0.6-2.0)	--	--	--	--	--	--
χ^2_3								18.7*						
Mental hospitalization AND														
Any other outcome	--	--	--	--	--	--	--	--	0.7	(0.4-1.3)	--	--	--	--
χ^2_1										1.3				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	0.8	(0.4-1.7)	--	--
Positive drug test	--	--	--	--	--	--	--	--	--	--	1.1	(0.6-2.0)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	1.1	(0.6-2.3)	--	--
Major physical perpetration	--	--	--	--	--	--	--	--	--	--	0.3*	(0.1-1.0)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.6	(0.3-1.2)	--	--
Sexual assault perpetration	--	--	--	--	--	--	--	--	--	--	1.2	(0.5-2.9)	--	--
χ^2_6												8.2		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.6	(0.3-1.3)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.8	(0.4-1.5)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	1.1	(0.3-3.7)
χ^2_3														2.1

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of

logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the “index top-ventile”), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

eTable 26. Associations between all top-ventiles of risk and positive drug test among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Positive drug test	5.5*	(4.1-7.4)	4.6*	(3.2-6.4)	4.8*	(3.4-6.9)	4.7*	(3.3-6.6)	6.2*	(4.2-9.1)	5.9*	(4.1-8.6)	6.2*	(4.2-9.1)
χ^2_1		122.6*		75.2*		72.9*		76.4*		83.5*		86.1*		83.3*
Any other outcome	--	--	1.4*	(1.1-1.9)	--	--	--	--	--	--	--	--	--	--
χ^2_1				5.9*										
Suicide attempt	--	--	--	--	1.0	(0.6-1.7)	--	--	--	--	--	--	--	--
Mental hospitalization	--	--	--	--	1.0	(0.6-1.7)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.0	(0.7-1.6)	--	--	--	--	--	--	--	--
Major physical perpetration	--	--	--	--	0.9	(0.5-1.5)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	1.4	(0.9-2.2)	--	--	--	--	--	--	--	--
Sexual assault perpetration	--	--	--	--	1.2	(0.8-1.9)	--	--	--	--	--	--	--	--
χ^2_6						0.2								
Exactly 1 other outcome	--	--	--	--	--	--	1.4*	(1.0-2.0)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	1.5	(1.0-2.2)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.2	(0.6-2.2)	--	--	--	--	--	--
χ^2_3								7.1						
Positive drug test AND														
Any other outcome	--	--	--	--	--	--	--	--	0.6	(0.4-1.0)	--	--	--	--
χ^2_1										3.4				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	0.4	(0.2-1.1)	--	--
Mental hospitalization	--	--	--	--	--	--	--	--	--	--	0.8	(0.3-1.9)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	1.6	(0.6-4.0)	--	--
Major physical perpetration	--	--	--	--	--	--	--	--	--	--	0.3*	(0.1-0.9)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.8	(0.4-1.6)	--	--
Sexual assault perpetration	--	--	--	--	--	--	--	--	--	--	0.9	(0.4-2.4)	--	--
χ^2_6												13.6*		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.5*	(0.3-0.9)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	1.1	(0.4-2.7)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.3	(0.1-1.1)
χ^2_3														7.7

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of

logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the “index top-ventile”), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

eTable 27. Associations between all top-ventiles of risk and traumatic brain injury among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Traumatic brain injury	7.0*	(3.2-15.1)	7.6*	(3.4-16.9)	6.8*	(3.0-15.6)	7.5*	(3.3-16.9)	6.3*	(2.1-19.2)	6.4*	(2.4-17.5)	6.3*	(2.1-19.0)
χ^2_1		24.4*		24.3*		20.7*		23.5*		10.6*		13.2*		10.7*
Any other outcome	--	--	0.8	(0.3-1.8)	--	--	--	--	--	--	--	--	--	--
χ^2_1				0.3										
Suicide attempt	--	--	--	--	0.6	(0.2-2.0)	--	--	--	--	--	--	--	--
Mental hospitalization	--	--	--	--	1.0	(0.2-4.5)	--	--	--	--	--	--	--	--
Positive drug test	--	--	--	--	2.0	(0.5-8.3)	--	--	--	--	--	--	--	--
Major physical perpetration	--	--	--	--	0.9	(0.3-2.7)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	0.9	(0.3-2.6)	--	--	--	--	--	--	--	--
Sexual assault perpetration	--	--	--	--	0.4	(0.1-1.5)	--	--	--	--	--	--	--	--
χ^2_6						0.0								
Exactly 1 other outcome	--	--	--	--	--	--	0.8	(0.3-2.6)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	0.3	(0.1-1.7)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.3	(0.4-4.4)	--	--	--	--	--	--
χ^2_3								2.3						
Traumatic brain injury AND														
Any other outcome	--	--	--	--	--	--	--	--	2.2	(0.4-11.7)	--	--	--	--
χ^2_1										0.8				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
Mental hospitalization	--	--	--	--	--	--	--	--	--	--	2.6	(0.2-38.4)	--	--
Positive drug test	--	--	--	--	--	--	--	--	--	--	0.8	(0.1-7.0)	--	--
Major physical perpetration	--	--	--	--	--	--	--	--	--	--	5.4	(0.6-51.5)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.5	(0.1-4.9)	--	--
Sexual assault perpetration	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
χ^2_6												-- ³		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	3.4	(0.3-34.3)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	1.4	(0.1-29.1)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.7	(0.1-6.9)
χ^2_3														1.2

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of

logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the “index top-ventile”), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

³ Model/coefficient was not interpretable and is thus not presented (e.g., OR=999.99).

eTable 28. Associations between all top-ventiles of risk and major physical violence perpetration among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Major physical perpetration	10.1*	(6.0-17.0)	7.7*	(3.9-15.3)	10.1*	(5.3-19.2)	8.5*	(4.4-16.2)	12.8*	(6.3-26.0)	14.1*	(8.1-24.6)	12.8*	(6.3-26.1)
χ^2_1		76.3*		34.6*		49.1*		41.8*		49.1*		86.8**		49.3*
Any other outcome	--	--	1.9	(0.9-3.9)	--	--	--	--	--	--	--	--	--	--
χ^2_1				2.8										
Suicide attempt	--	--	--	--	1.3	(0.4-3.7)	--	--	--	--	--	--	--	--
Mental hospitalization	--	--	--	--	0.3	(0.1-1.4)	--	--	--	--	--	--	--	--
Positive drug test	--	--	--	--	1.3	(0.6-2.7)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.7	(0.7-4.4)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	1.9	(0.7-5.0)	--	--	--	--	--	--	--	--
Sexual assault perpetration	--	--	--	--	0.5	(0.2-1.2)	--	--	--	--	--	--	--	--
χ^2_6						2.3								
Exactly 1 other outcome	--	--	--	--	--	--	2.5*	(1.2-5.4)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	0.4	(0.1-1.7)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.2	(0.4-3.5)	--	--	--	--	--	--
χ^2_3								9.5*						
Major physical perpetration AND														
Any other outcome	--	--	--	--	--	--	--	--	0.4	(0.2-1.0)	--	--	--	--
χ^2_1										3.8				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	1.0	(0.1-9.6)	--	--
Mental hospitalization	--	--	--	--	--	--	--	--	--	--	0.3	(0.0-5.1)	--	--
Positive drug test	--	--	--	--	--	--	--	--	--	--	3.0	(0.5-19.5)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	0.3	(0.0-2.0)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.3	(0.1-1.2)	--	--
Sexual assault perpetration	--	--	--	--	--	--	--	--	--	--	0.8	(0.1-5.4)	--	--
χ^2_6												12.7*		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.4	(0.2-1.2)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.3	(0.1-1.8)
χ^2_3														-- ³

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of

logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the “index top-ventile”), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown).

³ Model/coefficient was not interpretable and is thus not presented (e.g., OR=999.99).

eTable 29. Associations between all top-ventiles of risk and minor violence perpetration among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Minor violence perpetration	6.3*	(4.3-9.1)	5.6*	(3.6-8.8)	5.2*	(3.2-8.4)	5.6*	(3.6-8.9)	6.4*	(3.5-11.6)	6.5*	(4.0-10.8)	6.3*	(3.5-11.5)
χ^2_1	93.3*		55.9*		45.0*		54.6*		36.7**		54.1*		36.7*	
Any other outcome	--	--	1.3	(0.9-1.9)	--	--	--	--	--	--	--	--	--	--
χ^2_1			1.8											
Suicide attempt	--	--	--	--	0.4	(0.2-1.1)	--	--	--	--	--	--	--	--
Mental hospitalization	--	--	--	--	0.7	(0.3-1.4)	--	--	--	--	--	--	--	--
Positive drug test	--	--	--	--	1.7	(1.0-2.9)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.3	(0.7-2.5)	--	--	--	--	--	--	--	--
Major physical perpetration	--	--	--	--	2.2*	(1.3-3.8)	--	--	--	--	--	--	--	--
Sexual assault perpetration	--	--	--	--	0.7	(0.4-1.3)	--	--	--	--	--	--	--	--
χ^2_6					8.7*									
Exactly 1 other outcome	--	--	--	--	--	--	1.3	(0.8-2.0)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	1.3	(0.6-2.8)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.3	(0.6-2.7)	--	--	--	--	--	--
χ^2_3							1.8							
Minor violence perpetration AND														
Any other outcome	--	--	--	--	--	--	--	--	0.8	(0.3-1.8)	--	--	--	--
χ^2_1									0.3					
Suicide attempt	--	--	--	--	--	--	--	--	--	--	9.3*	(1.0-83.9)	--	--
Mental hospitalization	--	--	--	--	--	--	--	--	--	--	1.3	(0.2-7.0)	--	--
Positive drug test	--	--	--	--	--	--	--	--	--	--	0.8	(0.3-1.8)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	0.8	(0.2-2.9)	--	--
Major physical perpetration	--	--	--	--	--	--	--	--	--	--	0.4	(0.2-1.1)	--	--
Sexual assault perpetration	--	--	--	--	--	--	--	--	--	--	0.6	(0.2-1.7)	--	--
χ^2_6											16.1*			
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.9	(0.4-2.3)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.6	(0.2-1.8)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.7	(0.1-4.5)
χ^2_3													1.0	

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the "index top-ventile"), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-

ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

eTable 30. Associations between all top-ventiles of risk and sexual assault perpetration among new male soldiers in the Regular Army (n=18,869)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Sexual assault perpetration	9.4*	(5.4-16.4)	9.1*	(5.0-16.6)	8.3*	(4.3-16.0)	9.1*	(4.9-16.9)	10.2*	(4.6-22.3)	10.3*	(5.0-21.5)	10.2*	(4.6-22.4)
χ^2_1		62.0*		51.2*		40.7*		48.2*		33.6*		39.4*		33.5*
Any other outcome	--	--	1.1	(0.6-1.9)	--	--	--	--	--	--	--	--	--	--
χ^2_1				0.1										
Suicide attempt	--	--	--	--	1.2	(0.5-3.2)	--	--	--	--	--	--	--	--
Mental hospitalization	--	--	--	--	0.4	(0.1-1.4)	--	--	--	--	--	--	--	--
Positive drug test	--	--	--	--	1.1	(0.5-2.6)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	2.8*	(1.4-5.5)	--	--	--	--	--	--	--	--
Major physical perpetration	--	--	--	--	1.2	(0.5-2.6)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	0.8	(0.3-1.9)	--	--	--	--	--	--	--	--
χ^2_6						0.1								
Exactly 1 other outcome	--	--	--	--	--	--	1.1	(0.6-2.2)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	0.8	(0.3-2.4)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	1.3	(0.4-4.6)	--	--	--	--	--	--
χ^2_3								0.5						
Sexual assault perpetration AND														
Any other outcome	--	--	--	--	--	--	--	--	0.8	(0.2-2.4)	--	--	--	--
χ^2_1										0.2				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	2.8	(0.4-21.1)	--	--
Mental hospitalization	--	--	--	--	--	--	--	--	--	--	0.5	(0.0-6.7)	--	--
Positive drug test	--	--	--	--	--	--	--	--	--	--	0.9	(0.2-3.8)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	0.8	(0.2-4.0)	--	--
Major physical perpetration	--	--	--	--	--	--	--	--	--	--	0.6	(0.1-2.6)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.2*	(0.0-1.0)	--	--
χ^2_6												9.4		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.8	(0.3-2.7)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	6.3	(0.5-72.7)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.2	(0.0-1.5)
χ^2_3														5.6

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding one additional model that had a within-sex top-ventile concentration of risk <15.0% among men: minor violence victimization. We then estimated a series of

logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the “index top-ventile”), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

eTable 31. Associations between all top-ventiles of risk and suicide attempt among new female soldiers in the Regular Army (n=2,963)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Suicide attempt	3.9*	(1.4-10.5)	3.0*	(1.0-9.0)	3.9*	(1.3-11.4)	3.5*	(1.2-9.7)	4.3	(0.8-22.1)	4.8*	(1.3-18.0)	4.3	(0.8-22.1)
χ^2_1		7.2*		3.9*		6.0*		5.7*		3.1		5.6*		3.1
Any other outcome	--	--	2.0	(0.8-5.0)	--	--	--	--	--	--	--	--	--	--
χ^2_1				2.0										
Traumatic brain injury	--	--	--	--	1.0	(0.2-5.1)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	3.3*	(1.2-8.9)	--	--	--	--	--	--	--	--
Sexual assault victimization	--	--	--	--	0.8	(0.2-3.1)	--	--	--	--	--	--	--	--
χ^2_3						5.5*								
Exactly 1 other outcome	--	--	--	--	--	--	2.2	(0.9-5.4)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--
χ^2_3								-- ³						
Suicide attempt AND														
Any other outcome	--	--	--	--	--	--	--	--	0.5	(0.0-5.2)	--	--	--	--
χ^2_1										0.4				
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	0.9	(0.1-11.4)	--	--
Sexual assault victimization	--	--	--	--	--	--	--	--	--	--	1.5	(0.1-26.7)	--	--
χ^2_3												-- ³		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.6	(0.1-7.6)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	0.3	(0.1-1.7)
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
χ^2_3														-- ³

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding three additional models that had a within-sex top-ventile concentration of risk <15.0% among women: mental hospitalization, positive drug test, and minor violence victimization. We then estimated a series of logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the "index top-ventile"), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

³ Model/coefficient was not interpretable and is thus not presented (e.g., OR=999.99).

eTable 32. Associations between all top-ventiles of risk and traumatic brain injury among new female soldiers in the Regular Army (n=2,963)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Traumatic brain injury	17.6*	(6.5-47.4)	18.5*	(6.5-47.4)	17.4*	(6.5-46.3)	17.5*	(6.4-48.3)	16.8*	(5.9-47.4)	15.6*	(5.5-44.3)	16.9*	(5.9-47.8)
χ^2_1		32.0*		32.0*		32.6*		30.7*		28.3*		26.8*		28.2*
Any other outcome	--	--	0.4	(0.0-3.2)	--	--	--	--	--	--	--	--	--	--
χ^2_1				0.7										
Suicide attempt	--	--	--	--	0.5	(0.1-2.2)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--	--	--
Sexual assault victimization	--	--	--	--	1.4	(0.3-6.1)	--	--	--	--	--	--	--	--
χ^2_3						-- ³								
Exactly 1 other outcome	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	1.2	(0.1-9.5)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--
χ^2_3								-- ³						
Traumatic brain injury AND														
Any other outcome	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--
χ^2_1										-- ³				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	8.8	(0.2-394.9)	--	--
Sexual assault victimization	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
χ^2_3												-- ³		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	0.2	(0.0-1.3)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
χ^2_3														-- ³

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding three additional models that had a within-sex top-ventile concentration of risk <15.0% among women: mental hospitalization, positive drug test, and minor violence victimization. We then estimated a series of logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the "index top-ventile"), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

³ Model/coefficient was not interpretable and is thus not presented (e.g., OR or $\chi^2 > 999.99$).

eTable 33. Associations between all top-ventiles of risk and minor violence perpetration among new female soldiers in the Regular Army (n=2,963)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Minor violence perpetration	6.6*	(2.6-16.9)	6.6*	(2.6-17.0)	6.7*	(2.6-17.0)	6.4*	(2.6-15.6)	4.7*	(1.8-12.6)	4.8*	(1.8-12.5)	4.7*	(1.8-12.6)
χ^2_1		15.7*		15.5*		16.1*		16.5*		9.7*		10.3*		9.7*
Any other outcome	--	--	0.7	(0.2-3.4)	--	--	--	--	--	--	--	--	--	--
χ^2_1				0.1										
Suicide attempt	--	--	--	--	0.5	(0.1-5.3)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.3	(0.3-6.8)	--	--	--	--	--	--	--	--
Sexual assault victimization	--	--	--	--	1.0	(0.2-5.9)	--	--	--	--	--	--	--	--
χ^2_3						0.0								
Exactly 1 other outcome	--	--	--	--	--	--	0.4	(0.1-2.3)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	1.8	(0.3-12.0)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--
χ^2_3								-- ³						
Minor violence perpetration AND														
Any other outcome	--	--	--	--	--	--	--	--	35.8*	(2.4-525.1)	--	--	--	--
χ^2_1										6.8*				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	12.2	(0.7-216.5)	--	--
Sexual assault victimization	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³	--	--
χ^2_3												-- ³		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	16.2	(0.8-338.6)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
χ^2_3														-- ³

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding three additional models that had a within-sex top-ventile concentration of risk <15.0% among women: mental hospitalization, positive drug test, and minor violence victimization. We then estimated a series of logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the "index top-ventile"), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

³ Model/coefficient was not interpretable and is thus not presented (e.g., OR=999.99).

eTable 34. Associations between all top-ventiles of risk and sexual assault victimization among new female soldiers in the Regular Army (n=2,963)¹

	Model 1: Direct effects of index top-ventile of risk		Model 2: Cross-outcome risk, any		Model 3: Cross-outcome risk, specific		Model 4: Cross-outcome risk, number		Model 5: Model 2 interactions ²		Model 6: Model 3 interactions ²		Model 7: Model 4 interactions ²	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Top-ventile of risk for...														
Sexual assault victimization	7.8*	(4.7-12.9)	6.8*	(4.4-10.6)	6.0*	(3.7-9.9)	6.9*	(4.4-10.9)	2.9*	(1.3-6.7)	4.3*	(2.3-8.2)	2.9*	(1.3-6.7)
χ^2_1		61.8*		72.7*		49.6*		71.1*		6.4*		19.9*		6.3*
Any other outcome	--	--	1.6	(0.9-2.6)	--	--	--	--	--	--	--	--	--	--
χ^2_1				3.1										
Suicide attempt	--	--	--	--	1.9	(0.9-4.1)	--	--	--	--	--	--	--	--
Traumatic brain injury	--	--	--	--	1.5	(0.6-3.6)	--	--	--	--	--	--	--	--
Minor violence perpetration	--	--	--	--	0.5	(0.1-1.6)	--	--	--	--	--	--	--	--
χ^2_3						1.4								
Exactly 1 other outcome	--	--	--	--	--	--	1.6	(1.0-2.8)	--	--	--	--	--	--
Exactly 2 other outcomes	--	--	--	--	--	--	1.2	(0.3-4.5)	--	--	--	--	--	--
3 or more other outcomes	--	--	--	--	--	--	-- ³	-- ³	--	--	--	--	--	--
χ^2_3								-- ³						
Sexual assault victimization AND														
Any other outcome	--	--	--	--	--	--	--	--	7.4*	(2.0-27.5)	--	--	--	--
χ^2_1										9.0*				
Suicide attempt	--	--	--	--	--	--	--	--	--	--	2.1	(0.4-10.8)	--	--
Traumatic brain injury	--	--	--	--	--	--	--	--	--	--	3.4	(0.6-17.7)	--	--
Minor violence perpetration	--	--	--	--	--	--	--	--	--	--	1.9	(0.2-22.3)	--	--
χ^2_3												5.6		
Exactly 1 other outcome	--	--	--	--	--	--	--	--	--	--	--	--	8.0*	(2.0-32.7)
Exactly 2 other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
3 or more other outcomes	--	--	--	--	--	--	--	--	--	--	--	--	-- ³	-- ³
χ^2_3														-- ³

¹ The cross-outcome and risk-profile analyses shown here were conducted by first re-drawing the top-ventiles of risk separately among men and women using the predicted values from the final unpenalized models. This resulted in excluding three additional models that had a within-sex top-ventile concentration of risk <15.0% among women: mental hospitalization, positive drug test, and minor violence victimization. We then estimated a series of logistic regression models where, controlling for the top-ventile of risk for the outcome of interest (i.e., the "index top-ventile"), each outcome was regressed onto dummy variables defined by (i) the type and total number of top-ventiles of risk for non-index outcomes (i.e., cross-outcome risk profile), and (ii) interactions between the index top-ventile and the type-number of non-index top-ventiles (i.e., two-way high-risk profiles). As shown here, the vast majority of these associations were non-significant. The few that were significant did not improve concentration of risk in the top-ventile of risk over the index top-ventile of risk.

² Models examining interactions controlled for the direct effects of the predictors (odds ratios not shown)

³ Model/coefficient was not interpretable and is thus not presented (e.g., OR=999.99).

REFERENCES (eTables only)

1. Department of the US Army. *Army 2020: Generating Health & Discipline in the Force ahead of the Strategic Reset*. Washington, DC: US Army; 2012.
2. Morral AR, Gore KL, Schell TL, et al. *Sexual Assault and Sexual Harassment in the U.S. Military: Volume 2. Estimates for Department of Defense Service Members from the 2014 RAND Military Workplace Study*. Santa Monica, CA: RAND Corporation; 2015.
3. Rostker BD, Klerman JA, Zander-Cotugno M. *Recruiting Older Youths: Insights from a New Survey of Army Recruits*. Santa Monica, CA: RAND Corporation; 2014.
4. Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res*. 2004;13(2):93-121.
5. Weathers F, Litz B, Herman D, Huska J, Keane T. The PTSD Checklist (PCL): Reliability, Validity, and Diagnostic Utility. Paper presented at: Annual Convention of the International Society for Traumatic Stress Studies; 1993; San Antonio, TX.
6. Kessler RC, Coulouvrat C, Hajak G, et al. Reliability and validity of the brief insomnia questionnaire in the America insomnia survey. *Sleep*. 2010;33(11):1539-1549.
7. Weissman MM, Wickramaratne P, Adams P, Wolk S, Verdelli H, Olfson M. Brief screening for family psychiatric history: the family history screen. *Arch Gen Psychiatry*. 2000;57(7):675-682.
8. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med*. 2004;351(1):13-22.
9. Brugha TS, Cragg D. The List of Threatening Experiences: the reliability and validity of a brief life events questionnaire. *Acta Psychiatr Scand*. 1990;82(1):77-81.
10. Bray RM, Pemberton MR, Hourani LL, et al. *2008 Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel*. Research Triangle Park, NC: Research Triangle Institute; 2009.
11. Kessler RC, Merikangas KR. The National Comorbidity Survey Replication (NCS-R): background and aims. *Int J Methods Psychiatr Res*. 2004;13(2):60-68.
12. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998;14(4):245-258.
13. Bernstein DP, Ahluvalia T, Pogge D, Handelsman L. Validity of the Childhood Trauma Questionnaire in an adolescent psychiatric population. *J Am Acad Child Adolesc Psychiatry*. 1997;36(3):340-348.
14. Posner K, Brent D, Lucas C, et al. *Columbia-Suicide Severity Rating Scale (C-SSRS)*. New York: Center for Suicide Risk Assessment, Columbia University Medical Center; 2008.
15. Akiskal HS, Mendlowicz MV, Jean-Louis G, et al. TEMPS-A: validation of a short version of a self-rated instrument designed to measure variations in temperament. *J Affect Disord*. 2005;85(1-2):45-52.
16. Bartholomew K, Horowitz LM. Attachment styles among young adults: a test of a four-category model. *J Pers Soc Psychol*. 1991;61(2):226-244.
17. Chapman LJ, Chapman JP, Raulin ML. Scales for physical and social anhedonia. *J Abnorm Psychol*. 1976;85(4):374-382.
18. First MB, Gibbon M, Spitzer RL, Williams JBW, Benjamin LS. *Structured Clinical Interview for DSM-IV Axis II Personality Disorders, (SCID-II)*. Washington D.C.: American Psychiatric Press, Inc.; 1997.
19. Frost RO, Marten P, Lahart C, Rosenblate R. The dimensions of perfectionism. *Cognitive Ther Res*. 1990;14(5):449-468.
20. Gosling SD, Rentfrow PJ, Swann Jr. WB. A very brief measure of the Big-Five personality domains. *J Res Pers*. 2003;37:504-528.
21. Hazan C, Shaver P. Romantic love conceptualized as an attachment process. *J Pers Soc Psychol*. 1987;52(3):511-524.
22. Kugler K, Jones WH. On conceptualizing and assessing guilt. *J Pers Soc Psychol*. 1992;62(2):318-327.

23. Mullins-Sweatt SN, Jamerson JE, Samuel DB, Olson DR, Widiger TA. Psychometric properties of an abbreviated instrument of the five-factor model. *Assessment*. 2006;13(2):119-137.
24. Nock MK, Wedig MM, Holmberg EB, Hooley JM. The emotion reactivity scale: development, evaluation, and relation to self-injurious thoughts and behaviors. *Behav Ther*. 2008;39(2):107-116.
25. Reynolds WM. Development of reliable and valid short forms of the Marlowe-Crowne social desirability scale. *J Clin Psychol*. 1982;38(1):119-125.
26. Scheier MF, Carver CS, Bridges MW. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a reevaluation of the Life Orientation Test. *J Pers Soc Psychol*. 1994;67(6):1063-1078.
27. Van Orden KA, Witte TK, Gordon KH, Bender TW, Joiner TE, Jr. Suicidal desire and the capability for suicide: tests of the interpersonal-psychological theory of suicidal behavior among adults. *J Consult Clin Psychol*. 2008;76(1):72-83.
28. Wagstaff GF, Rowledge AM. Stoicism: its relation to gender, attitudes toward poverty, and reactions to emotive material. *J Soc Psychol*. 1995;135(2):181-184.
29. Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: using a structural model of personality to understand impulsivity. *Pers Individ Diff*. 2001;30:669-689.
30. Coovert MD, McNelis K. Determining the number of common factors in factor analysis: a review and program. *Educ Psychol Meas*. 1988;48(3):687-692.
31. Hayton JC, Allen DG, Scarpello V. Factor retention decisions in exploratory factor analysis: a tutorial on parallel analysis. *Organ Res Meth*. 2004;7(2):191-205.
32. Browne MW, Cudeck R. Alternative ways of assessing model fit. *Socio Meth Res*. 1992;21(2):230-258.
33. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling*. 1999;6(1):1-55.
34. Watson D, Clark LA. Negative affectivity: the disposition to experience aversive emotional states. *Psychol Bull*. 1984;96(3):465-490.
35. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington, D.C.: American Psychiatric Association; 2013.
36. Costa PT, McCrae RR, Dye DA. Facet scales for agreeableness and conscientiousness: a revision of the NEO Personality Inventory. *Pers Individ Diff*. 1991;12:887-898.
37. Congard A, Antoine P, Gilles P-Y. Assessing the structural and psychometric properties of a new personality measure for use with military personnel in the French Armed Forces. *Mil Psychol*. 2012;24(3):289-311.
38. Arnaut GLY. Sensation seeking, risk taking, and fearlessness. In: Thomas JC, Segal DL, eds. *Comprehensive Handbook of Personality and Psychopathology: Personality and Everyday Functioning*. Hoboken, N.J.: John Wiley & Sons, Inc.; 2006.
39. De Vries RE, De Vries A, Feij JA. Sensation seeking, risk-taking, and the HEXACO model of personality. *Pers Individ Diff*. 2009;47:536-540.
40. Digman JM. Higher-order factors of the Big Five. *J Pers Soc Psychol*. 1997;73(6):1246-1256.
41. Blackburn R, Renwick SJD, Donnelly JP, Logan C. Big Five or Big Two? Superordinate factors in the NEO five factor inventory and the antisocial personality questionnaire. *Pers Individ Diff*. 2004;37(957-970).
42. Addis ME, Mahalik JR. Men, masculinity, and the contexts of help seeking. *Am Psychol*. 2003;58(1):5-14.
43. Murray G, Judd F, Jackson H, et al. Big boys don't cry: an investigation of stoicism and its mental health outcomes. *Pers Individ Diff*. 2008;44:1369-1381.
44. Ribeiro JD, Joiner TE. The interpersonal-psychological theory of suicidal behavior: current status and future directions. *J Clin Psychol*. 2009;65(12):1291-1299.
45. Van Orden KA, Lynam ME, Hollar D, Joiner TE. Perceived burdensomeness as an indicator of suicidal symptoms. *Cognitive Ther Res*. 2006;30:457-467.

46. Kessler RC, Avenevoli S, Costello EJ, et al. National comorbidity survey replication adolescent supplement (NCS-A): II. Overview and design. *J Am Acad Child Adolesc Psychiatry*. 2009;48(4):380-385.
47. Kessler RC, Avenevoli S, Green J, et al. National comorbidity survey replication adolescent supplement (NCS-A): III. Concordance of DSM-IV/CIDI diagnoses with clinical reassessments. *J Am Acad Child Adolesc Psychiatry*. 2009;48(4):386-399.
48. Kessler RC, Berglund P, Chiu WT, et al. The US National Comorbidity Survey Replication (NCS-R): design and field procedures. *Int J Methods Psychiatr Res*. 2004;13(2):69-92.
49. Kessler RC, Stein MB, Bliese PD, et al. Occupational differences in US Army suicide rates. *Psychol Med*. 2015;45(15):3293-3304.
50. Nock MK, Thomas ML, Brown GG, Gur RC. Executive functioning and suicidal behavior among Soldiers: Results from the Army STARRS Study. In: Proceedings of the American College of Neuropsychopharmacology (ACNP) 51st Annual Meeting; Dec 2-6, 2012; Hollywood, FL.
51. Kurtz MM, Ragland JD, Moberg PJ, Gur RC. The Penn Conditional Exclusion Test: a new measure of executive-function with alternate forms of repeat administration. *Arch Clin Neuropsychol*. 2004;19(2):191-201.
52. Kurtz MM, Ragland JD, Bilker W, Gur RC, Gur RE. Comparison of the continuous performance test with and without working memory demands in healthy controls and patients with schizophrenia. *Schizophr Res*. 2001;48(2-3):307-316.
53. Ragland JD, Turetsky BI, Gur RC, et al. Working memory for complex figures: an fMRI comparison of letter and fractal n-back tasks. *Neuropsychology*. 2002;16(3):370-379.
54. Gur RC, Ragland JD, Mozley LH, et al. Lateralized changes in regional cerebral blood flow during performance of verbal and facial recognition tasks: correlations with performance and "effort". *Brain Cogn*. 1997;33(3):388-414.
55. Kohler CG, Turner TH, Bilker WB, et al. Facial emotion recognition in schizophrenia: intensity effects and error pattern. *Am J Psychiatry*. 2003;160(10):1768-1774.
56. Williams JM, Mathews A, MacLeod C. The emotional Stroop task and psychopathology. *Psychol Bull*. 1996;120(1):3-24.
57. Keilp JG, Sackeim HA, Mann JJ. Correlates of trait impulsiveness in performance measures and neuropsychological tests. *Psychiatry Res*. 2005;135(3):191-201.
58. Gur RC, Richard J, Hughett P, et al. A cognitive neuroscience-based computerized battery for efficient measurement of individual differences: standardization and initial construct validation. *J Neurosci Methods*. 2010;187(2):254-262.
59. SAS/STATR Software [computer program]. Version Version 9.3 for Unix. Cary, NC: SAS Institute Inc.; 2010.
60. Kohavi R. A study of cross-validation and bootstrap for accuracy estimation and model selection. *Proceedings of the 14th International Joint Conference on Artificial Intelligence*. Vol 2. Montreal, Quebec, Canada: Morgan Kaufmann Publishers Inc.; 1995:1137-1143.
61. Anderssen E, Dyrstad K, Westad F, Martens H. Reducing over-optimism in variable selection by cross-model validation. *Chemometr Intell Lab Syst*. 2006;84(1-2):69-74.
62. Liaw A, Wiener M. Classification and regression by randomForest. *R News*. 2002;2(3):18-22.
63. Svetnik V, Liaw A, Tong C, Culberson JC, Sheridan RP, Feuston BP. Random forest: a classification and regression tool for compound classification and QSAR modeling. *J Chem Inf Comput Sci*. 2003;43(6):1947-1958.
64. Friedman J, Hastie T, Tibshirani R. Regularization paths for generalized linear models via coordinate descent. *J Stat Softw*. 2010;33(1):1-22.
65. Zou H, Hastie T. Regularization and variable selection via the elastic net. *J R Stat Soc Series B Stat Methodol*. 2005;67(2):301-320.
66. Hair JFJ, Anderson RE, Tatham RL, Black WC. *Multivariate Data Analysis*. 4th ed. Upper Saddle River, NJ: Prentice Hall College Division; 1995.

67. Kleinbaum DG, Kupper LL, Muller KE. *Applied Regression Analysis and Other Multivariable Methods*. 4th ed. Belmont, CA: Duxbury Press; 2007.