



# SELECTING A BRIEF PTSD MEASURE FOR LONGITUDINAL RESEARCH: EVIDENCE FROM THE MILLENNIUM COHORT PROGRAM

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## BACKGROUND

- The 20-item Posttraumatic Stress Disorder (PTSD) Checklist (PCL-5) is a widely used instrument that has demonstrated strong reliability and validity, consistent with Diagnostic and Statistical Manual of Mental Disorders (DSM-5) symptom criteria (Bovin et al., doi:10.1037/pas0000254; Forkus et al., 10.1037/cps0000111)
- The PCL-5 is constrained by its relatively long administration time (5 to 15 minutes to complete) and may contribute to survey burden
  - Carnes et al. (doi:10.1186/s12874-025-02620-3) found a higher likelihood of survey non-completion related to sensitive measures like the PCL-5
- Prior research has developed several abbreviated PCL-5 measures to assess minimal loss of information (Price et al., doi:10.1016/j.psychres.2016.03.014; Zuromski et al., 10.1002/da.22942)
- Although these abbreviated measures demonstrated strong psychometric properties, evidence supporting their suitability for use in broad longitudinal military research is not well established (Zuromski et al., *Depress Anxiety*, doi:10.1002/da.22942)

## METHODS

The Millennium Cohort Program is the longest-running and largest longitudinal research program designed to investigate the effects of military service on the health and well-being of U.S. service members, spouses, and children.



Data for this study were drawn from two separate samples:

- **Millennium Cohort Study (MCS)**, 2019–21 survey (n=130,273)
- **Millennium Cohort Family Study (MCFS)**, 2019–21 survey (n=20,115)

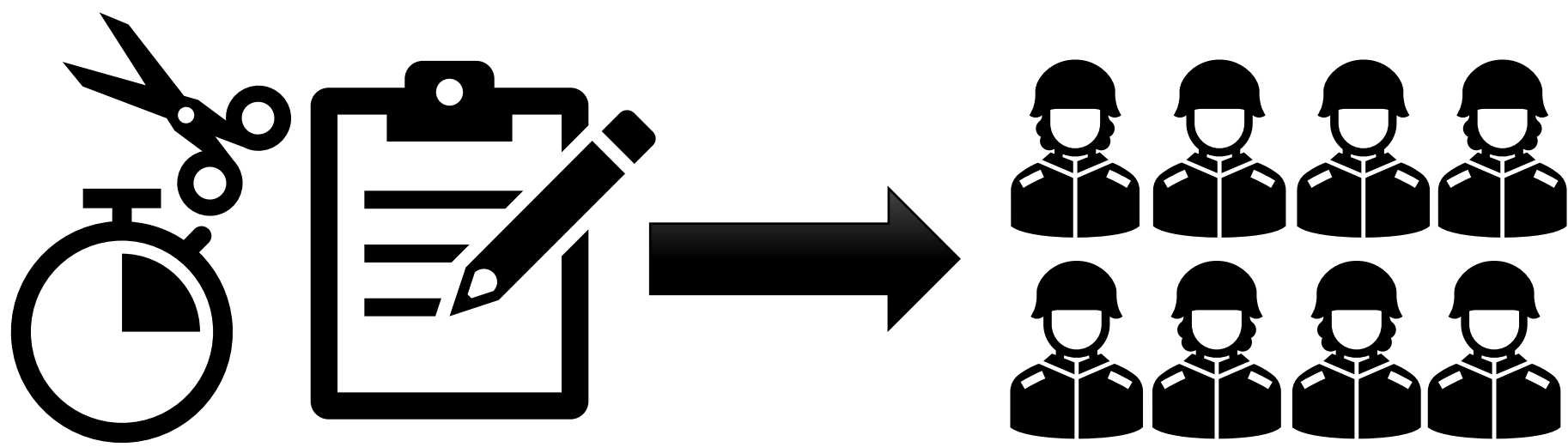
Abbreviated PCL-5 measures:

- 4- and 8-item Price et al. scales (PCL-5-4 and PCL-5-8)
- 4-item scale Zuromski et al. scales (PCL-5-SF)

### Analytic Strategy

- **Descriptive and psychometric examination** of the full-length and three abbreviated PCL scales
  - Internal consistency, area under the curve, kappa, positive predictive value (PPV), sensitivity, specificity
  - Optimal cut-points were determined by identifying the threshold that yielded a positive screen rate consistent with the full-length scale and maximized psychometrics
- **Construct validity**
  - problematic anger, depression, insomnia, care seeking, combat deployment exposure, sexual assault history, and separation from military service

## MAIN FINDINGS



**Transitioning to an abbreviated PCL-5 measure may reduce survey burden and increase response rates, while maintaining the ability to assess PTSD.**

## RESULTS

| Table 1. Comparison of PTSD Checklist Items, Criteria, and Item                                                                                                                                                                   |                   |                        |                          |                      |                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------|--------------------------|----------------------|----------------------|
| Full-length PCL-5                                                                                                                                                                                                                 | Crit <sup>a</sup> | Item corr <sup>b</sup> | PCL-5 Abbreviated Scales |                      |                      |
|                                                                                                                                                                                                                                   |                   |                        | PCL-5-SF <sup>c</sup>    | PCL-5-4 <sup>d</sup> | PCL-5-8 <sup>d</sup> |
| Repeated, disturbing, and unwanted memories of the stressful experience?                                                                                                                                                          | B                 | .83                    |                          | X                    | X                    |
| Repeated, disturbing dreams of the stressful experience?                                                                                                                                                                          | B                 | .78                    |                          |                      |                      |
| Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?                                                                                         | B                 | .79                    | X                        |                      |                      |
| Feeling very upset when something reminded you of the stressful experience?                                                                                                                                                       | B                 | .85                    |                          |                      | X                    |
| Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?                                                                              | B                 | .83                    |                          |                      |                      |
| Avoiding memories, thoughts, or feelings related to the stressful experience?                                                                                                                                                     | C                 | .84                    |                          |                      | X                    |
| Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?                                                                                         | C                 | .84                    | X                        | X                    | X                    |
| Trouble remembering important parts of the stressful experience?                                                                                                                                                                  | D                 | .70                    |                          |                      |                      |
| Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)? | D                 | .80                    |                          | X                    | X                    |
| Blaming yourself or someone else for the stressful experience or what happened after it?                                                                                                                                          | D                 | .79                    |                          |                      |                      |
| Having strong negative feelings such as fear, horror, anger, guilt, or shame?                                                                                                                                                     | D                 | .85                    |                          |                      |                      |
| Loss of interest in activities that you used to enjoy?                                                                                                                                                                            | D                 | .80                    |                          |                      | X                    |
| Feeling distant or cut off from other people?                                                                                                                                                                                     | D                 | .81                    | X                        |                      |                      |
| Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?                                                                                             | D                 | .80                    |                          |                      |                      |
| Irritable behavior, angry outbursts, or acting aggressively?                                                                                                                                                                      | E                 | .75                    | X                        |                      |                      |
| Taking too many risks or doing things that could cause you harm?                                                                                                                                                                  | E                 | .63                    |                          |                      |                      |
| Being "super alert" or watchful or on guard?                                                                                                                                                                                      | E                 | .76                    |                          |                      |                      |
| Feeling jumpy or easily startled?                                                                                                                                                                                                 | E                 | .77                    |                          | X                    | X                    |
| Having difficulty concentrating?                                                                                                                                                                                                  | E                 | .79                    |                          |                      | X                    |
| Trouble falling or staying asleep?                                                                                                                                                                                                | E                 | .72                    |                          |                      |                      |

| PCL-5 Scale Characteristics <sup>a</sup> |             |           |           |           |
|------------------------------------------|-------------|-----------|-----------|-----------|
| Total items                              | 20          | 4         | 4         | 8         |
| Score range                              | 0-80        | 0-16      | 0-16      | 0-32      |
| Sample, mean (SD)                        | 13.6 (16.6) | 2.8 (3.5) | 2.6 (3.6) | 5.8 (7.2) |
| Internal consistency (Cronbach's Alpha)  | .97         | .85       | .87       | .94       |
| Area under the curve (AUC)               | .99         | .98       | .98       | .99       |

<sup>a</sup>DSM-5 criterion: B: re-experience/intrusion, C: avoidance, D: negative alterations of cognition/mood, E: hyperarousal/reactivity; <sup>b</sup>Indicates correlation between item and full-length PCL-5 score (excluding that item) using data from the Millennium Cohort Study (2019–2021); <sup>c</sup>Scale developed by Zuromski et al. 2019; <sup>d</sup>Scales developed by Price et al.; <sup>e</sup>PCL-5 scale characteristics calculated using data from MCS (2019–2021)

- All three abbreviated scales demonstrated high internal consistency ( $\alpha \geq 0.85$ ) and excellent diagnostic accuracy (AUC  $\geq 0.98$ )
- Across both MCS and MCFS samples, a cut-off score of  $\geq 7$  for the 4-item PCL-5 scales and  $\geq 15$  for the 8-item PCL-5 scales was optimal
- The prevalence and correlate estimates using these optimal abbreviated cut-offs closely mirrored estimates from the full-length PCL-5

| Table 2. Prevalence and Criterion Validity of Abbreviated PCL-5 Scales Compared With Full-length PCL-5 Scales |           |                                          |     |     |     |     |                                          |     |     |      |     |
|---------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------|-----|-----|-----|-----|------------------------------------------|-----|-----|------|-----|
| Abbreviated Measure                                                                                           | Cut point | Millennium Cohort Study                  |     |     |     |     | Millennium Cohort Family Study           |     |     |      |     |
|                                                                                                               |           | Probable PTSD <sup>d</sup> (DSM-5) n (%) | k   | Sen | Spe | PPV | Probable PTSD <sup>d</sup> (DSM-5) n (%) | k   | Sen | Spe  | PPV |
| PCL-5-SF <sup>a</sup>                                                                                         | $\geq 6$  | 24,343 (18.7)                            | .74 | .91 | .93 | .69 | 3,248 (16.2)                             | .71 | .86 | .94  | .67 |
|                                                                                                               | $\geq 7$  | 19,474 (15.0)                            | .78 | .84 | .96 | .79 | 2,496 (12.4)                             | .73 | .76 | .97  | .77 |
|                                                                                                               | $\geq 8$  | 15,535 (11.9)                            | .76 | .73 | .98 | .86 | 1,914 (9.5)                              | .70 | .64 | .98  | .85 |
|                                                                                                               | $\geq 9$  | 11,942 (9.2)                             | .69 | .60 | .99 | .92 | 1,390 (6.9)                              | .61 | .50 | .99  | .91 |
|                                                                                                               | $\geq 10$ | 9,175 (7.0)                              | .60 | .48 | 1.0 | .95 | 1,030 (5.1)                              | .51 | .39 | 1.00 | .95 |
| PCL-5-4 <sup>b</sup>                                                                                          | $\geq 6$  | 23,536 (18.1)                            | .76 | .91 | .94 | .71 | 3,446 (17.1)                             | .72 | .89 | .93  | .66 |
|                                                                                                               | $\geq 7$  | 19,142 (14.7)                            | .79 | .84 | .97 | .80 | 2,746 (13.7)                             | .75 | .82 | .96  | .75 |
|                                                                                                               | $\geq 8$  | 15,443 (11.9)                            | .77 | .74 | .98 | .87 | 2,158 (10.7)                             | .74 | .71 | .98  | .84 |
|                                                                                                               | $\geq 9$  | 12,031 (9.2)                             | .70 | .61 | .99 | .92 | 1,641 (8.2)                              | .67 | .58 | .99  | .89 |
|                                                                                                               | $\geq 10$ | 9,429 (7.2)                              | .61 | .49 | 1.0 | .95 | 1,249 (6.2)                              | .67 | .58 | .99  | .89 |
| PCL-5-8 <sup>b</sup>                                                                                          | $\geq 13$ | 21,830 (16.8)                            | .82 | .93 | .96 | .78 | 3,159 (15.7)                             | .79 | .92 | .95  | .74 |
|                                                                                                               | $\geq 14$ | 19,669 (15.1)                            | .83 | .89 | .97 | .83 | 2,836 (14.1)                             | .80 | .88 | .96  | .78 |
|                                                                                                               | $\geq 15$ | 17,617 (13.5)                            | .83 | .83 | .98 | .87 | 2,510 (12.5)                             | .80 | .83 | .98  | .83 |
|                                                                                                               | $\geq 16$ | 15,791 (12.1)                            | .81 | .77 | .99 | .90 | 2,204 (11.0)                             | .78 | .76 | .98  | .87 |
|                                                                                                               | $\geq 17$ | 13,928 (10.7)                            | .77 | .70 | .99 | .92 | 1,876 (9.3)                              | .73 | .66 | .99  | .89 |
|                                                                                                               | $\geq 18$ | 12,328 (9.5)                             | .73 | .64 | .99 | .94 | 1,635 (8.1)                              | .69 | .60 | .99  | .92 |
|                                                                                                               | $\geq 19$ | 10,859 (8.3)                             | .68 | .57 | 1.0 | .96 | 1,428 (7.1)                              | .64 | .53 | .99  | .93 |

Abbreviations: PCL-5, Posttraumatic Stress Disorder Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; PPV, positive predictive value; sen, sensitivity; spe, specificity.  
<sup>a</sup>Scale developed by Zuromski et al.; <sup>b</sup>Scales developed by Price et al., 2016; <sup>c</sup>Based on DSM-5 criteria (1 = Criterion B, 2 = Criterion C, 3 = Criterion D, 4 = Criterion E items as "moderately" or higher).

| Table 3. Construct Validity of Abbreviated PCL-5 Scales With Comorbid Conditions and Correlates |                                |                                |                              |                                |
|-------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------|------------------------------|--------------------------------|
|                                                                                                 | Full-length PCL-5 <sup>a</sup> |                                | Abbreviated PCL-5            |                                |
|                                                                                                 | DSM-5 criteria OR (95% CI)     | PCL-5-SF OR (95% CI)           | PCL-5-4 OR (95% CI)          | PCL-5-8 OR (95% CI)            |
| Millennium Cohort Study (2019–2021)                                                             |                                |                                |                              |                                |
| Problematic anger                                                                               | 18.2 (17.5, 18.9)              | 23.7 (22.8, 24.6) <sup>a</sup> | 17.6 (17.0, 18.3)            | 18.8 (18.1, 19.5)              |
| Probable depression                                                                             | 29.8 (28.5, 31.2)              | 38.4 (36.6, 40.2) <sup>a</sup> | 30.4 (29.1, 31.8)            | 40.0 (38.2, 41.9) <sup>a</sup> |
| Probable insomnia                                                                               | 11.2 (10.8, 11.5)              | 10.7 (10.3, 11.1)              | 9.9 (9.6, 10.3) <sup>d</sup> | 11.4 (11.0, 11.8)              |
| Care seeking for PTSD                                                                           | 14.8 (14.2, 15.5)              | 14.2 (13.6, 14.9)              | 15.6 (15.0, 16.3)            | 15.4 (14.8, 16.1)              |
| Separated from service                                                                          | 2.1 (2.0, 2.2)                 | 2.1 (2.1, 2.2)                 | 2.2 (2.1, 2.2)               | 2.1 (2.1, 2.2)                 |
| Combat/Deployment                                                                               |                                |                                |                              |                                |
| Never deployed                                                                                  | 1.3 (1.2, 1.4)                 | 1.3 (1.2, 1.4)                 | 1.3 (1.2, 1.4)               | 1.3 (1.3, 1.4)                 |
| Deployed, with combat                                                                           | 2.4 (2.3, 2.5)                 | 2.4 (2.3, 2.6)                 | 2.4 (2.3, 2.5)               | 2.4 (2.3, 2.6)                 |
| Sexual assault                                                                                  | 3.2 (3.1, 3.3)                 | 3.0 (2.9, 3.1) <sup>a</sup>    | 3.2 (3.1, 3.3)               | 3.3 (3.1, 3.4)                 |
| Millennium Cohort Family Study (2019–2021)                                                      |                                |                                |                              |                                |
| Problematic anger                                                                               | 13.4 (12.0, 15.0)              | 18.3 (16.4, 20.5) <sup>a</sup> | 12.3 (11.0, 13.7)            | 13.8 (12.3, 15.4)              |
| Probable depression                                                                             | 30.6 (27.0, 34.7)              | 35.7 (31.4, 40.6)              | 28.9 (25.5, 32.9)            | 39.7 (34.8, 45.3) <sup>a</sup> |
| Probable insomnia                                                                               | 9.5 (8.6, 10.4)                | 9.1 (8.2, 10.0)                | 8.1 (7.4, 8.9) <sup>d</sup>  | 9.4 (8.5, 10.4)                |
| Sexual assault                                                                                  | 3.8 (3.5, 4.2)                 | 3.4 (3.1, 3.7)                 | 3.8 (3.5, 4.1)               | 3.7 (3.4, 4.1)                 |

## DISCUSSION

- The abbreviated measures and their respective thresholds effectively balanced diagnostic accuracy, yielding a positive screen prevalence that closely mirrored the estimated prevalence of probable PTSD
- While all three abbreviated scales demonstrated strong psychometric performance, the PCL-5-4, developed by Price, outperformed the other brief scales by:
  - Having strong psychometrics with an optimal cut-off of 7+ in two distinct military populations
  - Having more specific items related to PTSD symptomology rather than comorbid conditions (e.g., anger, depression)
  - Being more widely adopted ensures the results are more generalizable and easily compared with other studies
- Results support the use of an abbreviated PCL-5 measure in large longitudinal studies to help reduce survey burden and fatigue, while maintaining the ability to assess PTSD symptoms

## CLINICAL IMPLICATIONS

- The selection of optimal cut-offs often *varies* by population, prevalence, and setting
- In both military samples, a cut-off of 7+ for the 4-item Price measure produced robust prevalence estimates and strong diagnostic alignment with the full-length PCL-5 (DSM-5 criteria and cut-off of  $\geq 33$ ).
- Applying the recommended cut-off of 10+ (Price et al.) may not be appropriate for a population cohort study because it may result in an *under-estimation* of PTSD rates in military populations
- Cut-offs derived from small, high-prevalence clinical samples may not be universally applicable to broader, population-based military settings

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