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Non-clinical normative data for ptsd checklist-5 (pcl-5)

Dominique Renyer
Pacific University

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Abstract
Previous research on the PTSD Checklist-5 (PCL-5) (Weathers et al., 2013) does not include non-clinical normative data; therefore, clinicians are unable to utilize the recommended Cutoff C calculation (Jacobson & Truax, 1991) to calculate a clinical cutoff score for their clients’ PCL-5 scores. Further, previous research on the PCL-5 recommends values to determine clinical change; however, the recommended values are not calculated using a Reliable Change Index (RCI). The purpose of this study was to collect data from a non-clinical population to aid in the process of determining a RCI and clinical cutoff score for the PCL-5. Two non-clinical samples were available: individuals who had experienced a trauma but were not in mental health treatment, and individuals who had not experienced a trauma and were also not in treatment. For treatment outcome purposes, the non-clinical sample that endorsed a traumatic experience was determined to be the most likely comparison group for a clinical trauma sample, although a proposed clinical cutoff was calculated for each group. Results revealed a RCI of 12, indicating that a 12-point change between PCL-5 pretest and posttest scores is indicative of reliable change. Further, results determined a clinical cutoff score of 27, which suggests scores of 27 or above are more likely to fall within the clinical population and scores below 27 are more likely to fall within the non-clinical population. The findings of this study could be used to aid clinician use of the PCL-5 for evaluating treatment outcome.

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NON-CLINICAL NORMATIVE DATA FOR PTSD CHECKLIST-5 (PCL-5)

A DISSERTATION

SUBMITTED TO THE FACULTY

OF

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APPROVED BY THE COMMITTEE:
Lisa R. Christiansen, PsyD
Matthew R. Hunsinger, PhD

PROFESSOR AND DEAN:
Christiane Brems, PhD, ABPP
Abstract

Previous research on the PTSD Checklist-5 (PCL-5) (Weathers et al., 2013) does not include non-clinical normative data; therefore, clinicians are unable to utilize the recommended Cutoff C calculation (Jacobson & Truax, 1991) to calculate a clinical cutoff score for their clients’ PCL-5 scores. Further, previous research on the PCL-5 recommends values to determine clinical change; however, the recommended values are not calculated using a Reliable Change Index (RCI). The purpose of this study was to collect data from a non-clinical population to aid in the process of determining a RCI and clinical cutoff score for the PCL-5. Two non-clinical samples were available: individuals who had experienced a trauma but were not in mental health treatment, and individuals who had not experienced a trauma and were also not in treatment. For treatment outcome purposes, the non-clinical sample that endorsed a traumatic experience was determined to be the most likely comparison group for a clinical trauma sample, although a proposed clinical cutoff was calculated for each group. Results revealed a RCI of 12, indicating that a 12-point change between PCL-5 pretest and posttest scores is indicative of reliable change. Further, results determined a clinical cutoff score of 27, which suggests scores of 27 or above are more likely to fall within the clinical population and scores below 27 are more likely to fall within the non-clinical population. The findings of this study could be used to aid clinician use of the PCL-5 for evaluating treatment outcome.

Keywords: PCL-5, Reliable Change Index (RCI) for PCL-5, clinical cutoff score for PCL-5
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Introduction

When individuals seek mental health treatment, they question whether therapy will work for them. Their symptoms have passed the threshold of tolerance and they come to the conclusion they can no longer function without additional support. They want to function better in their daily lives and they want their symptoms to decrease. They want to feel better. How can we, as clinicians, determine whether our interventions are helping provide relief for our clients?

Numerous quantitative measurements have been developed to assist in determining improvement or deterioration in therapy. However, if changes in scores are observed on the quantitative measurements, clinicians should not necessarily interpret the change in scores as proof of improvement or deterioration. Instead, clinicians should determine whether those changes in scores are significant before determining whether their clients have improved or deteriorated. Significant change can be determined by computing whether the change is statistically significant or whether the change is clinically significant. Throughout history there has been a debate as to whether statistical significance or clinical significance provides better insight into whether change seen on quantitative measurements is meaningful or not (LeFort, 2007). However, according to LeFort (2007), there is a general agreement that statistical significance tests do not provide information about the practical or clinical importance of research results. Further, tests of clinical significance provide clinicians with more information on the clinical implications of the changes seen on the quantitative measures. Therefore, one tool clinicians use to determine whether clients are improving or deteriorating based on changes seen on their assessment scores is clinical significance.

Clinical significance is a tool used to measure the impact of treatment and to quantify clients’ progress. Clinical significance allows clinicians to determine whether their clients are
experiencing tangible and significant decreases in symptoms (Kazdin, 1999). Jacobson, Follette, and Revenstorf (1984) were the first to suggest the importance of using clinical significance to the field of psychology. They suggested that using clinical significance could determine whether therapy, and more specifically treatment interventions, were effectively adequate that clients no longer met criteria for their diagnoses. Further, clinical significance allows clinicians to quantify the results of participation in therapy and report it to their clients in a way they can understand (Jacobson, Roberts, Berns, & McGlinchey, 1999). Using clinical significance to determine the effectiveness of therapy interventions allows clients to answer the question: is therapy working for me; am I getting better?

Determining clinical significance traditionally involves a two-step process that involves determining reliable change and clinical cutoff scores. First, reliable change allows clinicians to determine whether a change in clients’ scores, whether in a positive or negative direction, is a result of true change or is a result of measurement error. Second, establishing a clinical cutoff score allows clinicians to determine whether clients’ scores are more closely associated with individuals who are clinically distressed and are receiving mental health treatment compared to individuals who are not clinically distressed and are not receiving mental health treatment (Jacobson & Truax, 1984).

**Clinical Cutoff Scores**

According to Jacobson and Truax (1991), establishing a clinical cutoff point measures clients’ functioning and separates the ‘non-clinical’ population from the ‘clinical’ population. There are three options to consider using to establish the clinical cutoff point—*Cutoff A, Cutoff B*, and *Cutoff C*. 
Cutoff point A has high sensitivity and is established when an individual’s score moves from being within the clinical population towards being in the non-clinical population. Jacobson and Truax (1991) define Cutoff point A as being, “two standard deviations beyond (in the direction of functionality) the mean for that population” (p. 13). When the non-clinical mean is lower than the clinical mean, the equation for Cutoff A is as follows: $M_{\text{clinical}} - 2SD_{\text{clinical}}$

When the non-clinical mean is higher than the clinical mean, the equation for Cutoff A is as follows: $M_{\text{clinical}} + 2SD_{\text{clinical}}$

Cutoff B has high specificity; however, it can only be used when non-clinical data is available. Jacobson and Truax (1991) defined Cutoff B as, “the point 2 SD within a recognized non-clinical mean” (p. 13). The overlap between the functional and non-functional groups found when using this Cutoff B makes this cutoff the most lenient of the three cutoff options (Jacobson & Truax, 1991). When the non-clinical mean is lower than the clinical mean, the equation for Cutoff B is as follows: $M_{\text{non-clinical}} - 2SD_{\text{non-clinical}}$

When the non-clinical mean is higher than the clinical mean, the equation for Cutoff B is as follows: $M_{\text{non-clinical}} + 2SD_{\text{non-clinical}}$

According to Jacobson et al. (1999), Cutoff C is based on the theory that suggests relative probability will ensure that scores will fall into one category and not the other. Cutoff C can be defined as a weighted midpoint between the means of the clinical and the non-clinical populations; therefore, the calculation requires the availability of normative data for both a clinical and a non-clinical group (Jacobson & Truax, 1991). The equation for Cutoff C is as follows:

$$Cutoff\ C = \left( \frac{SD_{\text{Non-clinical}}M_{\text{Clinical}} + (SD_{\text{Clinical}}M_{\text{Non-clinical}})}{SD_{\text{Clinical}} + SD_{\text{Non-clinical}}} \right)$$
Jacobson and Truax (1991) provide recommendations for utilizing the three cutoff points. The authors recommend that first, if normative data is available, clinicians should use Cutoff B or C before using Cutoff A. Second, Cutoff C is superior when non-clinical data is available and there is an overlap between the clinical and non-clinical distributions. Third, if non-clinical data is available, but there is no overlap between the clinical and non-clinical distributions, using Cutoff B is recommended. Last, Cutoff A is the only option when non-clinical normative data is unavailable.

Unfortunately, non-clinical normative data are rarely collected or published, making the most recommended cutoff point (Jacobson & Truax, 1991), Cutoff C, impossible for clinicians to use. Further, without the aid of Cutoff C, clinicians are unable to determine whether their clients’ symptoms are more similar to the clinical or non-clinical population. The proposed study aims to collect non-clinical data in order to utilize Cutoff C, which will aid in filling this gap in information.

**Reliable Change Index**

Client progress can be observed through interactions and can be quantified using assessment measures over time. However, using observation and assessment alone to gauge client progress is not sufficient. As clinicians, we need to have another tool to help determine whether the observed change is true change. In the field of psychology, true change is referred to as reliable change resulting from a client’s involvement in a specific intervention, as opposed to change that results from clinician biases, practice effects, or measurement error (Maassen, 2000; Hsu, 1996). The Reliable Change Index is a tool used to determine if client progress is a result of reliable change.
The Reliable Change Index (RCI), first introduced by Jacobson, Follette, and Revenstorf (1984), is used to evaluate and compare changes in clients’ pretest and posttest scores on assessment measures. Clinicians use the RCI to determine whether the difference between pretest and posttest scores is evidence of reliable change—progress following intervention (Jacobson et al., 1984). Determining reliable change is an imperative part of psychotherapy because it answers the question of whether the client has changed significantly enough to be confident that the progress is a product of true change instead of measurement error (Evans, Margison, & Barkham, 1998). Further, using the RCI to track client progress assists clinicians in determining how clients are responding to treatment, whether treatment interventions need to be adjusted, and when client termination is appropriate.

Over the course of history, several individuals have developed varying methods to calculate reliable change. Although a number of methods exist, all use the same essential equation to compute the difference between pretest and posttest scores and all equations result in a standard Z score. The equation is as follows: \( RC = \frac{Y - Y'}{SE} \) where the numerator, \( Y - Y' \), refers to the difference between the pretest and posttest scores. According to Hinton-Bayre (2010), the most appropriate way to calculate the denominator, the standard error, has been the highest contention between the various methods for calculating reliable change.

**Methods for Calculating Reliable Change**

The various methods for calculating reliable change can be categorized into two groups—estimation interval methods and null hypothesis methods. The two differences between groups are the way in which true change is evaluated and the way in which the standard error is used (Shada, 2013). According to Maasson, Bossema, and Brand (2009), the estimation interval methods use normative data from the sample or population to estimate true change; whereas, the
null hypothesis method uses the observed change as an estimate of true change, which is advantageous because the observed change is unbiased compared to using normative data. Using different methods for calculating reliable change can result in different assumptions regarding the effect of a treatment intervention on a client (Shada, 2013). Therefore, it is imperative as clinicians to be informed of the varying methods for calculating reliable change in order to choose the most suitable method. The following sections will include descriptions of the various methods for calculating reliable change: the Jacobson and Truax Method, Gulliksen-Lord-Novick Method, Edwards-Nunnally Method, and the Hageman-Arrindells Methods.

**Jacobson and Truax Method.** The Jacobson and Truax (JT) method is a null hypothesis method of evaluating clinically significant change (Maassen, 2001) and is consistently one of the most used methods for analyzing change (Maassen, 200IV). The JT method was developed after Jacobson and Truax suggested that, through the course of therapy, clients’ progress from experiencing symptoms that fall within a clinical range to experiencing symptoms that then fall within a non-clinical range. Jacobson et al. (1999) reported that the JT method uses “a twofold criterion for clinically significant change: (a) The magnitude has to be statistically reliable and (b) by the end of therapy, clients have to end up in a range that renders them indistinguishable from well-functioning people” (p.300). The authors theorized that only when clients’ symptoms changed reliably from clinical range to non-clinical range could the change be considered clinically significant. Further, the JT method provides a classification system for client progress over time—deteriorated, unchanged, improved, or recovered in order to rule out change resulting from measurement error (Jacobson, Follette, & Ravenstrof, 1986). The classification system is explained by Jacobson et al.:
By applying our metric to a population of treated clients, one can determine the percentage of clients who improved but did not recover, the percentage of clients who recovered, and the percentage of clients who remained unchanged or who deteriorated in each treatment condition (p. 300).

An adaptation was made to the original method proposed to account for differences between initial and final variance in scores (Jacobson & Truax, 1991). Further, the adapted two-step process is empirically supported, making it a preference over the original method (Maasseen, 2004), and it also analyzes the pre- and posttest scores as two distinct distributions, which accounts for the unreliability seen in pre- and posttest scores (Hageman & Arrindell, 1993).

After choosing the appropriate cutoff point, the next step in the JT model is to determine whether the clients’ progress is a result of growth in positive characteristics and decrease in negative symptoms, as opposed to a result of measurement error. To obtain this information, the JT method uses a Reliable Change Index (RCI), which is an assessment tool that helps determine statistically significant reliable change by utilizing the assessment tools’ psychometric properties (Maasseen, 2004). Change, not due to measurement error, is determined when individuals’ scores pass the statistically determined RCI in a positive direction (Shada, 2013).

The original recommendation for calculating the RCI was to subtract the posttest score from the pretest score then divide the difference by the standard error of measurement (SE)—the test-retest reliability estimate. When using this calculation, an increase in change was required to achieve a statistically reliable change if the assessment instrument’s psychometric properties were less reliable than other measurements (Wise, 2004). In time, this calculation was updated by Christensen and Mendoza (1986) who proposed that instead of using the SE in the equation,
individuals should use $S_{\text{diff}}$, the difference between any two scores obtained on the same test by
the same individual to assess for measurement error. The equation for the JT method is as
follows: $\frac{Y - Y'}{\sqrt{2(SE)^2}}$

After completing the two-step JT method, clinicians can then determine which
classification best describes their clients’ progress by using the most appropriate cutoff point and
the calculated RCI. For example, individuals would be classified as *recovered* if their scores
exceeded the cutoff and the RCI in a positive direction; *improved* if their scores passed the RCI
in the positive direction, but did not pass the cutoff point; *unchanged* if they did not pass either
the cutoff point or the RCI; and last, individuals would be classified as *deteriorated* if they
passed the RCI in the negative direction (Atkins, Bedics, McGlinchey, & Beauchaine, 2005).

**Gulliksen-Lord-Novick Method.** The Gulliksen-Lord-Novick (GLN) method proposes
that individuals’ pre-treatment and post-treatment scores can be conceptualized as parallel
measurements when no treatment effects exist. Thus, standard errors of measurements are equal
for pre- and post-test scores (Hsu, 1999a). The GLN method differs from the JT method because
it uses the hypothesized population mean of a relevant group to control for regression to the
mean; retest scores are used if the population is unavailable (Bauer, Lambert, & Nielsen, 2004).
According to Marsden (2010), the GLN method produces a more conservative assessment of
reliable change compared to the RCI used in the JT method.

**Edwards-Nunnally Method.** The Edwards-Nunnally (EN) method was proposed by
Speer (1995), who advocated for the inclusion of confidence intervals when calculating reliable
change. By using confidence intervals approximately two standard deviations based on
individuals’ true score helps establish whether individuals are improving or deteriorating
(Jacobson et al., 1999). The GLN method utilizes individuals’ post-test scores relative to an
established confidence interval around the estimate of the individuals’ pre-test score (Wise, 2004). This method decreases the influence of regression to the mean, which improves clinical significance (Bauer et al., 2004). According to Marsden et al. (2010) and Wise (2004), the GLN method produces conservative results—less incidence of individuals being categorized as reliably improved and more incidents of individuals categorized as reliably deteriorated.

**Hageman-Arrindells Method.** The Hageman-Arrindells (HA) method was developed to improve upon the pre-post difference score by taking regression to the mean into account (Hageman & Arrindell, 1999). The HA method expands beyond the EN method; the HA method adjusts for error and estimates the underlying true score, whereas the EN method uses observed scores (Wise, 2004). The HA method produces two levels for differential analysis of change—the individual level and the group level (Bauer et al., 2004). According to Jacobson et al. (1999), the individual level distinguishes which classification the scores fall within and the group level distinguishes the proportion of improvement estimations. The HA method uses the reliability of the difference scores ($r_{dd}$), which compares individuals’ change scores to the change scores in the classification the scores fall within. The reliability of differences score must reach a minimum threshold, giving increased estimation accuracy (Marsden et al., 2010).

**Comparison of RCI Methods: Which Is Best?**

With several methods of calculating reliable change, it is no surprise there has been historical disagreement on which method is best. A number of studies have been conducted in an attempt to answer the question of which is best at assessing change (McGlinchey & Jacobson, 1999; McGlinchey, Atkins, & Jacobson, 2002; Bauer, Lambert, & Nielsen, 2004; & Atkins, Bedics, McGlinchey, & Beauchaine, 2005). McGlinchey and Jacobson (1999) compared the HA method to the JT method using the same data set Jacobson and Truax (1991) used to develop the
The data set included outcomes from the Dyadic Adjustment Scale (DAS; Spanier, 1976) and the global distress scale of the Marital Satisfaction Inventory (GDS; Snyder, 1979) collected from couples in marital therapy. Results from this study suggest the JT and HA methods establish similar results; however, McGlinchey and Jacobson (1999) reported that the JT method is more ideal, due to its simplistic calculation, and therefore should be used over the HA method.

McGlinchey et al. (2002) compared four RCI methods—JT, GLN, EN, and HA. Each method was used to evaluate the accuracy in predicting substance abuse relapse. The results of this study indicate the HA method resulted in the least amount of individuals classified as recovered, making the HA method the most conservative of the four methods examined. However, the results also indicate no other method of calculating reliable change was superior to the JT method. McGlinchey et al. concluded that the JT method was preferable over the other three methods.

Atkins et al. (2005) compared the JT, GLN, HA, and EN methods in an attempt to help clinicians better understand the differences between the methods. The authors utilized simulation data of pre-therapy and post-therapy estimates established from several clinical trials. The results suggest that, as the reliability of the measure increased, the agreement between methods increased. Further, few differences were apparent at the reliability level most often used in psychotherapy research, .90. However, at a reliability of .90, the EN method resulted in the smallest standard error and the HA method resulted in the fewest cases classified as recovered. This suggests that, at a level of reliability used in psychotherapy research, the EN method and the HA method allow for more variance than the other methods. Last, the JT and
GLN methods produced approximately identical classifications; therefore, Atkins et al. recommend the using the JT or the GLN methods.

Altogether, according to the research conducted to answer the question of which method of calculating reliable change is better, it appears the JT method is most widely recommended. Therefore, the JT method will be used to calculate reliable change and clinical cutoff for the current study.

Treatment Outcome Measurements for PTSD

As with other diagnoses, there are several different methods for assessing PTSD symptoms. The least detailed option for assessing PTSD symptoms is basic screening forms. PTSD screening forms include, but are not limited to, the Primary Care PTSD Screen (PC-PTSD), the Short Screening Scale for PTSD, the Short Post-Traumatic Stress Disorder Rating Interview (SPRINT), and the Trauma Screening Questionnaire (TSQ). These screening tools are quick to administer, but may not capture adequate detail for use as treatment outcome measures. Using structured interviews, such as the Structured Clinical Interview (SCID) and the Clinician Administered PTSD Scale (CAPS), are a more detailed and in-depth option for assessing PTSD symptoms, but also take a great deal of time to administer and score. Last, the most user-friendly and accessible option is self-report checklists.

Several PTSD self-report checklists exist; however, they are not all alike. Some of the checklists are based on DSM criteria to allow clinicians to use them as diagnostic tools and treatment outcome measures; others are not mapped to DSM criteria and are only intended to be used for treatment outcome. Self-report measures that are based on DSM criteria include, but are not exhaustive to, the following: The PTSD Screening and Diagnostic Scale (PSDS; Kubany et al., 2000)), a 38-item self-report measure that includes a 4-part inventory that assesses for PTSD.
using the DSM-IV-TR criteria and the Los Angeles Symptom Checklist (LASC; King et al., 1995), a 43-item self-report measure that does not exclusively assess for any specific trauma; however, it does assess for the presence of symptoms in the past month. The 17 DSM-IV symptoms of PTSD are embedded into the items that assess for more general psychological distress. An example of a self-report measure for PTSD that is not based on DSM criteria for PTSD is the Trauma Symptom Checklist -40 (TSC-40; Briere & Runtz, 1989), which measures aspects of posttraumatic stress, as well as other symptoms typically seen in traumatized individuals. Another example is the Impact of Event Scale – Revised (IES-R; Weiss & Marmar, 1996), a 22-item self-report measure designed to assess subjective distress resulting from traumatic events. Items on the IES-R correspond to 14 of the 17 PTSD symptoms seen in the DSM-IV.

Due to the significant changes to the PTSD criteria seen in the DSM-5, the vast majority of the self-report PTSD measures designed to aid in diagnosis are no longer valid. Two measures that have been updated for the DSM-5, as of this writing, are the CAPS and the PCL. However, due to the recentness of their update, no psychometric data has been published for the revised editions.

**Changes in DSM-5 Criteria for PTSD**

Several changes have been made to the criteria for PTSD in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association, 2013). PTSD is no longer classified under the anxiety disorder chapter; rather, it is classified under a new chapter to the DSM—Trauma- and Stressor-Related Disorders (American Psychiatric Association, 2013a).
Language

The DSM-5 more clearly defines what constitutes a traumatic event. For example, sexual violence as an explicit form of trauma was added to Criterion A; the DSM-IV-TR Criterion A only considered actual or threatened death or serious injury, which inexplicitly encompassed sexual violence, or a threat to the physical integrity of self or others as traumatic events. Further, Criterion A can now be met if individuals learn that a traumatic event occurred to a close family member or close friend, or as a result of repeated or extreme exposure to aversive details of traumatic events (i.e., situations police officers and first responders repeatedly encounter). Last, the language used in the DSM-IV-TR to describe individuals’ reactions to traumatic events (intense fear, helplessness, and horror) have been removed as this criterion was not useful in predicting the onset of PTSD (American Psychiatric Association, 2013b).

Clusters

The PTSD criteria are now categorized into four diagnostic clusters, as opposed to the three clusters seen in DSM-IV-TR. The clusters are re-experiencing, avoidance, negative cognitions and mood, and arousal. Re-experiencing refers to spontaneous memories of the traumatic event, recurrent dreams related to the event, flashbacks, and other intense or prolonged psychological distress. Avoidance refers to avoiding distressing memories, thoughts, feelings, and external reminders of the event. Negative cognitions and mood represents a variety of feelings—from persistent and distorted sense of blame of self or others, to estrangement from others or markedly diminished interest in activities, to an inability to remember key aspects of the traumatic event. Arousal refers to aggressive, reckless or self-destructive behavior, sleep disturbances, and hypervigilance. Further, the DSM-5 accounts for the “fight” reaction often seen in arousal, as opposed to just the “flight” aspect addressed in the DSM-IV-TR. The number
of symptoms that must be endorsed depends on the specific cluster (American Psychiatric Association, 2013b).

**Timeframe and Subtypes**

The DSM-5 only requires that the disturbance continue for more than a month and eliminates the division between acute and chronic PTSD. However, the DSM-5 now includes a preschool subtype and a dissociative subtype. The preschool subtype can be applied to children younger than age 6 who have experienced a traumatic event and are experiencing subsequent marked distress. The dissociative subtype can be applied when individuals experience prominent dissociative symptoms, along with the other symptoms. Dissociative symptoms include experiences of feeling detached from one’s own mind or body, and experiences in which the world seems unreal, dreamlike, or distorted (American Psychiatric Association, 2013b).

Several clinical implications result from the numerous changes to the PTSD criteria found in the DSM-5. More specifically, what do the changes to the PTSD criteria mean for treatment outcome measures designed to assess for PTSD that were developed using the DSM-IV criteria? The treatment outcome measures used in PTSD treatment that were developed using the DSM-IV-TR may no longer be valid, especially for purposes of diagnostic assessment; they must be updated to map to the new DSM-5 criteria for PTSD.

**PTSD Checklist for DSM-5**

The PTSD Checklist for DSM-5 (PCL-5) is a 20-item self-report measure that has been updated to assess the 20 PTSD symptoms found in the DSM-5 (Weathers et al., 2013). The PCL-5 can be used to evaluate and monitor symptom change during and after treatment, screen individuals for PTSD, and make provisional PTSD diagnoses.
Changes from Previous PCL for DSM-IV-TR

Several revisions were made to the PCL to update it for the new DSM-5 criteria for PTSD. First, the PCL for DSM-IV-TR has three versions—PCL-M (military), PCL-C (civilian), and PCL-S (specific); the PCL-5 is most similar to the PCL-S (specific) version. Currently, there are no updated versions of the PCL-M or PCL-C for the DSM-5 PTSD criteria (Weathers et al., 2013). Second, as mentioned above, there are three formats in which the PCL-5 can be administered: without Criterion A, which is typically used when exposure to trauma is evaluated with another method; with a brief Criterion A assessment; and with the revised Life Events Checklist for DSM-5 and extended Criterion A assessment (Weather et al., 2013). Third, the changes in language found in the DSM-5 criteria for PTSD are reflected in the PCL-5. Fourth, the rating scale used on the self-report changed from a 5-point Likert scale ranging from 1-5 to a scale ranging from 0-4; however, the rating scale descriptions remain the same—“Not at all,” “A little bit,” “Moderately,” “Quite a bit,” and “Extremely.” Importantly, due to the change in rating scale, along with the increase from 17 to 20 items, PCL-5 scores are not compatible with the PCL for DSM-IV-TR scores and are not interchangeable (Weathers et al., 2013).

Administration and Scoring

The PCL-5 takes approximately 5-10 minutes to complete and should be interpreted by the clinician (Weather et al., 2013). There are several ways to score the PCL-5. The total symptom severity score is obtained by summing the scores for each of the 20 items; the total symptom severity score ranges from 0-80. The DSM-5 symptom cluster severity scores are obtained by summing the scores for the items within a given cluster. Further, a provisional PTSD diagnosis can be made by conceptualizing each item rated as two “Moderately” or above as an endorsed symptom and then follow the DSM-5 diagnostic rule, which requires at least 1
item from cluster B, 1 item from cluster C, two items from cluster D, and two items from cluster E. Cutoff scores appear to be, given the limited preliminary validation research, 11-14 points lower than the PCL for DSM-IV-TR cutoff points, with closer to an 11-point difference for more conservative cutoff scores and closer to a 14-point difference for less conservative cutoff scores. A cutoff score of 33 for the PCL-5 appears to be a reasonable value; however, further research on the psychometric properties of the PCL-5 are necessary (Weathers et al., 2013).

Unfortunately, no research is available on how the cutoff points were developed. This highlights the necessity to develop research-based cutoff points to better determine when clients’ symptoms are more similar to individuals in a clinical population versus individuals in a non-clinical population.

Measuring Change

According to Weathers and colleagues (2013), a 5-10 point change represents reliable change on the PCL for the DSM-IV-TR PTSD criteria. Further, a 10-20 point change represents clinically significant change. The authors recommended using 5 points as a minimum threshold for determining clinical change using the PCL for DSM-IV-TR. Although cutoff scores and reliable change data are not currently available for the PCL-5, Weathers et al. (2013) suggest they will be within a similar range to the PCL for the DSM-IV-TR. Unfortunately, there is no information on how these values were generated, which creates an issue for clinicians who want to use the measure to determine reliable change.

Improving Upon the PCL-5 Research: Current Study

Although most adult self-report questionnaires for PTSD include recommendations of values to determine clinical change; unfortunately, the recommended values are not calculated using a RCI. Therefore, clinicians may be determining whether their clients have made progress
by using the recommended change values; however, clinicians do not have a way of determining whether the change in symptoms is a result of true change or a result of measurement error. Further, no non-clinical normative data has been published for many of the self-report measures, including the PCL-5. This is an incredible hindrance for clinicians because it makes using the most generally recommended cutoff calculation, Cutoff C, impossible when determining whether their clients’ symptoms are more similar to the clinical or non-clinical population.

Therefore, the purpose of the current study is to collect data from a non-clinical population to aid in the process of determining clinical and non-clinical cutoff scores for the PCL-5. Developing a RCI and clinical/non-clinical cutoff scores for the PCL-5 will support clinicians in providing the best care for their clients by allowing them to quantify their clients’ progress and determine whether treatment interventions are providing clinically significant changes. Establishing a non-clinical/clinical cutoff score for the PCL-5 will also help clinicians determine whether their clients’ scores on the measure are more closely associated with individuals who are clinically distressed and in mental health treatment versus individuals who are not clinically distressed and are not in mental health treatment. Further, collecting data from a non-clinical sample is imperative for PTSD assessment because it will help identify individuals who have experienced a trauma, but that have developed sub-threshold symptoms and, thus, do not seek out mental health treatment.

Method

Participants

Participants included adults in the United States, age 18 and older, from various age, sex, race, education, and geographic location groups (N=205). In order to participate, participants needed to be literate in the English language and have access to a computer with an internet
connection. Based on a review of psychometric properties of PTSD measures research, the number of participants sampled ranged from 40 to 392 (Creamer, Bell, & Failla, 2003; Ruggiero, Ben, Scotti, & Rabalais, 2003; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Coffey et al., 1998). Therefore, the obtained 205 participants fall within the typical number of participants recruited for smaller psychometric research.

Participants were recruited using MTurk, an online marketplace that allows individuals to get paid for completing online tasks, including research surveys (Buhrmester, Kwang, & Gosling, 2011). According to Buhrmester, Kwang, and Gosling (2011), regardless of the amount the individuals are paid to complete psychological research studies—even at the lowest compensation level of two cents—the quality of the collected data was not affected. The authors concluded that MTurk is a reliable method to collect survey data. Participants were compensated with 10 cents for completing the survey. Participants were also recruited using the snowball method using psychology listservs, Facebook, family members, friends, and colleagues to distribute the survey.

The mean age of participants was 36.40 (SD=13.83). In regard to trauma and mental health treatment, 14.1% of participants had experienced a traumatic event and were engaging in mental health treatment (clinical group); 54.1% of participants had experienced a traumatic event, but were not engaging in mental health treatment (non-clinical group); 26.8% of participants had not experienced any traumatic events and were not engaging in mental health treatment (non-clinical/non-trauma group); and 4.9% of participants had not experienced any traumatic event, but were engaging in mental health treatment (clinical/non-trauma group). Other sample characteristics are described in Table 1.
Table 1

Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage</th>
<th>Characteristics</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Sex</td>
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</tr>
<tr>
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<td>$10,000-$19,000</td>
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<td>Black or African American</td>
<td>5.4</td>
<td>$20,000-$29,000</td>
<td>9.3</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>2.9</td>
<td>$30,000-$39,000</td>
<td>10.2</td>
</tr>
<tr>
<td>Native American</td>
<td>1.0</td>
<td>$40,000-$49,000</td>
<td>9.8</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>2.4</td>
<td>$50,000-$59,000</td>
<td>8.3</td>
</tr>
<tr>
<td>Highest Level of Education Achieved</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9th grade</td>
<td>1.0</td>
<td>$70,000-$79,000</td>
<td>8.3</td>
</tr>
<tr>
<td>11th grade</td>
<td>2.4</td>
<td>$80,000-$89,000</td>
<td>1.5</td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>8.8</td>
<td>$90,000-$99,000</td>
<td>5.4</td>
</tr>
<tr>
<td>Less than one year of college</td>
<td>5.4</td>
<td>$100,000-$149,000</td>
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<td>One or more years of college</td>
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<td>$150,000 or more</td>
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<td>Associate degree</td>
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<td>Bachelor degree</td>
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<td>23.9</td>
<td>$100,000-$149,000</td>
<td>11.7</td>
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<td></td>
</tr>
<tr>
<td>Professional degree</td>
<td>1.0</td>
<td></td>
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</tr>
</tbody>
</table>

Measures

Demographic Questionnaire. The demographic questionnaire (Appendix A) asked specific questions regarding participants’ age, sex, race, level of education, household income, and geographic location to determine the representation of the sample compared to the population of the United States.

PCL-5 (Weathers et al., 2013). The PCL-5 (Appendix B), as previously described, is an adult self-report measure that assesses for PTSD. The PCL-5 can be administered using three different versions. For the purposes of this study, participants were administered the PCL-5
version that includes the brief Criterion A questions and the symptom checklist. To test internal consistency of the reliability of PCL-5 scores, Cronbach’s alpha was conducted for each group, as well as for the total sample. The alpha coefficient for the clinical group was ($\alpha = .97$), for the non-clinical group it was ($\alpha = .95$), for the non-clinical/non-trauma group it was ($\alpha = .91$), for the clinical/non-trauma group it was ($\alpha = .91$), and for the total sample it was ($\alpha = .96$). All alpha coefficients suggest high internal consistency and scale reliability.

**Procedure**

Upon opening the link to the survey, participants were presented with the informed consent document, which they were instructed to review. Participants were reminded their responses would be anonymous and that they were not required to respond to any question they did not feel comfortable answering. Participants who consented to completing the online survey were directed to the demographic questionnaire section of the survey, and those who did not consent were directed to an exit page with debriefing information.

After completing the demographic questionnaire section of the survey, participants were then directed to the PCL-5 section of the survey. Participants were first asked to answer the Criterion A question: *Have you ever experienced a traumatic event? For example, a very stressful experience involving actual or threatened death, serious injury, or sexual violence. It could be something that happened to you directly, something you witnessed, or something you learned happened to a close family member or close friend.* Participants were then asked, *Are you currently receiving mental health treatment?* Regardless of the response, participants were then presented with the PCL-5 symptom checklist. This process was established to differentiate between clinical and non-clinical participants.
All individuals, regardless of whether they consented to participate in the study, were directed to a debriefing section prior to exiting the survey. The debriefing section provided a website (http://www.healthyplace.com/other-info/resources/mental-health-hotline-numbers-and-referral-resources/) with various mental health hotline numbers in the case of emotional distress following the survey. Due to the nature of an online survey, in-person debriefing is not an option; therefore, including a page with a referral website for crisis intervention hotline numbers allowed the participants who experienced emotional distress following the survey to debrief with another individual via crisis hotline options.

**Analyses.** First, data were categorized into three groups: 1) Group 1 (Clinical sample)—participants who experienced a traumatic event and were engaged in mental health treatment; 2) Group 2 (Non-clinical sample)—participants who experienced a traumatic event, but were not engaged in mental health treatment; and 3) Group 3 (Non-clinical, Non-trauma sample)—participants who had not experienced a traumatic event and were not engaged in mental health treatment. Individuals who indicated they had not experienced a trauma, but who were receiving mental health care, were excluded from analysis as not fitting into either a non-clinical sample or a trauma sample. The mean and standard deviation of scores on the PCL-5 were calculated for each group. Characteristic statistics for age, gender, race, geographic region, level of education, and household income were also calculated for each group. Second, using the standard deviation of PCL-5 scores from Group 1 (Clinical sample) and Cronbach’s alpha, the reliable change index (RCI) was calculated.

Third, using the procedure documented in Bauer et al. (2004), clinical significance was determined by calculating *Cutoff C*. *Cutoff C* was calculated using the means and standard deviations from Group 1 (Clinical sample) and Group 2 (Non-clinical sample). An alternate
Cutoff C was also calculated using the means and standard deviations from Group 1 (Clinical Sample) and Group 3 (Non-clinical, Non-trauma sample).

**Results**

Descriptive data for the three groups are provided in Table 2.

Table 2

<table>
<thead>
<tr>
<th>PCL-5 Scores (Range = 0-80)</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1: Clinical sample</td>
<td>29</td>
<td>33.66</td>
<td>21.27</td>
<td>2</td>
<td>80</td>
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<tr>
<td>Group 2: Non-clinical sample</td>
<td>111</td>
<td>20.93</td>
<td>17.36</td>
<td>0</td>
<td>65</td>
</tr>
<tr>
<td>Group 3: Non-clinical, Non-trauma sample</td>
<td>55</td>
<td>7.47</td>
<td>8.60</td>
<td>0</td>
<td>40</td>
</tr>
</tbody>
</table>

Group characteristics for Group 1 (Clinical Sample) are provided in Table 3.

Table 3

<table>
<thead>
<tr>
<th>Characteristics (Range)</th>
<th>Percentage</th>
<th>Characteristics</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td>Geographic Region</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20.7</td>
<td>West</td>
<td>55.1</td>
</tr>
<tr>
<td>Female</td>
<td>79.3</td>
<td>Mid-West</td>
<td>17.2</td>
</tr>
<tr>
<td>Age (18-57)</td>
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<td>South</td>
<td>17.2</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td>East</td>
<td>10.3</td>
</tr>
<tr>
<td>White</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>6.9</td>
<td>Less than $10,000</td>
<td>24.1</td>
</tr>
<tr>
<td>Black or African American</td>
<td>10.3</td>
<td>$10,000-$19,000</td>
<td>6.9</td>
</tr>
<tr>
<td>Native American</td>
<td>3.4</td>
<td>$20,000-$29,000</td>
<td>10.3</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>3.4</td>
<td>$30,000-$39,000</td>
<td>24.1</td>
</tr>
<tr>
<td>Highest Level of Education Achieved</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>6.9</td>
<td>$40,000-$49,000</td>
<td>3.4</td>
</tr>
<tr>
<td>Less than one year of college</td>
<td>3.4</td>
<td>$50,000-$59,000</td>
<td>13.8</td>
</tr>
<tr>
<td>One or more years of college</td>
<td>27.6</td>
<td>$70,000-$79,000</td>
<td>6.9</td>
</tr>
<tr>
<td>Associate degree</td>
<td>10.3</td>
<td>$80,000-$89,000</td>
<td>3.4</td>
</tr>
<tr>
<td>Bachelor degree</td>
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<td>6.9</td>
</tr>
<tr>
<td>Master degree</td>
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<td></td>
<td></td>
</tr>
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</table>
Group characteristics for Group 2 are provided in Table 4.

Table 4

*Group 2 (Non-Clinical) Sample Characteristics (N=111)*

<table>
<thead>
<tr>
<th>Characteristics (Range)</th>
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<td>Male</td>
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<td>South</td>
<td>34.2</td>
</tr>
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<tr>
<td>Race</td>
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<td></td>
<td></td>
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<tr>
<td>Native American</td>
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<td>$30,000-$39,000</td>
<td>9.0</td>
</tr>
<tr>
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<td>$40,000-$49,000</td>
<td>13.5</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>3.6</td>
<td>$50,000-$59,000</td>
<td>6.3</td>
</tr>
<tr>
<td>Highest Level of Education Achieved</td>
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<td>$70,000-$79,000</td>
<td>10.8</td>
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<td>9th</td>
<td>1.8</td>
<td>$80,000-$89,000</td>
<td>0.9</td>
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<td>11th</td>
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<td>$90,000-$99,000</td>
<td>6.3</td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>9.9</td>
<td>$100,000-$149,999</td>
<td>11.7</td>
</tr>
<tr>
<td>Less than one year of college</td>
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<td>Bachelor degree</td>
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<td>Master degree</td>
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<td>Professional degree</td>
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</table>
Group characteristics for Group 3 (Non-Clinical, Non-Trauma) are provided in Table 5.

Table 5

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<tr>
<th>Characteristics (Range)</th>
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<th>Characteristics</th>
<th>Percentage</th>
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<td>Mid-West</td>
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<td>7.3</td>
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<td>Black or African American</td>
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<td>$10,000-$19,000</td>
<td>5.5</td>
</tr>
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<td>Asian or Pacific Islander</td>
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<td>$20,000-$29,000</td>
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<td>Achieved</td>
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<td>$40,000-$49,000</td>
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</tr>
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<td>High school diploma/GED</td>
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<td>$50,000-$59,000</td>
<td>10.9</td>
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<td>Less than one year of college</td>
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<td>One or more years of college</td>
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<td>$70,000-$79,000</td>
<td>3.6</td>
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<td>Associate degree</td>
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<td>$80,000-$89,000</td>
<td>1.8</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>27.3</td>
<td>$90,000-$99,000</td>
<td>3.6</td>
</tr>
<tr>
<td>Master degree</td>
<td>40.0</td>
<td>$100,000-$149,999</td>
<td>18.2</td>
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<td>$150,000 or more</td>
<td>14.5</td>
</tr>
</tbody>
</table>

Reliable Change Index

Using the standard deviation of PCL-5 scores from Group 1 (Clinical sample) and Cronbach’s alpha calculated for this sample (α = .96), the reliable change index (RCI) was calculated (RCI=12). The calculation of RCI=12 was completed as follows:

\[
RCI = 1.96 \sqrt{2(SD_{\text{Clinical}}\sqrt{1-\alpha})^2}
\]

\[
RCI = 1.96 \sqrt{2(21.27\sqrt{1-.96})^2}
\]

The RCI allows clinicians to determine whether a change in clients’ scores, whether in a positive or negative direction, is a result of true change or is a result of measurement error (Jacobson et
al., 1984). The RCI of 12 suggests that clients who evidence a 12-point change between their pretest and posttest PCL-5 scores have experienced reliable change—change not due to error.

**Clinical Cutoff**

To determine a clinical cutoff point comparing the clinical sample to individuals who had experienced a trauma but were not receiving mental health treatment, *Cutoff C* was calculated 

\[ C = 27 \]

using the means and standard deviations from Group 1 (Clinical sample) and Group 2 (Non-clinical sample). The calculation of *Cutoff C*=27 was completed as follows:

\[
\text{Cutoff C} = \frac{SD_{\text{Non-clinical}} \times M_{\text{Clinical}} + SD_{\text{Clinical}} \times M_{\text{Non-clinical}}}{SD_{\text{Clinical}} + SD_{\text{Non-clinical}}}
\]

\[
\text{Cutoff C} = \frac{17.36 \, (33.66) + 21.27 \, (20.93)}{21.27 + 17.36}
\]

To determine an alternate clinical cutoff point comparing the clinical sample to individuals who had never experienced a trauma and were not in treatment, *Cutoff C* was calculated 

\[ C = 15 \]

using the means and standard deviations from Group 1 (Clinical sample) and Group 3 (Non-clinical, Non-trauma sample). The calculation of *Cutoff C*=15 was completed as follows:

\[
\text{Cutoff C} = \frac{SD_{\text{Non-clinical}} \times M_{\text{Clinical}} + SD_{\text{Clinical}} \times M_{\text{Non-clinical}}}{SD_{\text{Clinical}} + SD_{\text{Non-clinical}}}
\]

\[
\text{Cutoff C} = \frac{8.60 \, (33.66) + 21.27 \, (7.47)}{21.27 + 8.60}
\]

Establishing a clinical cutoff score allows clinicians to determine whether clients’ scores are more closely associated with individuals who are clinically distressed and are receiving mental health treatment compared to individuals who are not clinically distressed and are not
receiving mental health treatment (Jacobson & Truax, 1984). For purposes of treatment outcome, individuals who had experienced a trauma but were not receiving mental health treatment were determined to be the most likely comparison group for a clinical sample of individuals in treatment who had experienced a trauma. The clinical cutoff score ($C=27$) between these two groups indicates that clients who obtain a score of 27 or higher on the PCL-5 should be classified as falling within the clinical population in terms of PTSD symptoms, and clients who score less than 27 should be classified as falling within the non-clinical population.

**Discussion**

The PCL-5 includes recommendations of values to determine clinical change; however, the recommended values are not calculated using a RCI. Therefore, when calculating the reliability of change, clinicians are unable to determine whether the change in symptoms is a result of true change or a result of measurement error. Further, no non-clinical normative data have been published for the PCL-5, which is a hindrance for clinicians because it makes using the clinical significance *Cutoff C* impossible. As a result, clinicians are unable to determine whether their clients’ symptoms are more similar to the clinical or non-clinical population in terms of PTSD severity. Therefore, the purpose of this study was to collect data from a non-clinical population to aid in the process of determining a RCI and clinical cutoff score for the PCL-5.

The descriptive statistics of the study groups, described in Table 2, evidenced differences in mean PCL-5 scores between groups. The clinical sample had the highest PCL-5 mean score ($M=33.6$) when compared to the non-clinical sample mean score ($M=20.93$) and the non-clinical, non-trauma sample mean score ($M=7.47$). These results suggest that individuals who have experienced a traumatic event and are currently engaged in mental health treatment are
experiencing, on average, the highest level of distress when compared to individuals who have experienced a traumatic event and are not currently engaged in mental health treatment and individuals who have never experienced a traumatic event and are not currently engaged in mental health treatment. Further, these results support the high internal consistency and scale reliability of the PCL-5 determined in the current study (α = .96). In other words, the results indicate the items on the PCL-5 reliably measure PTSD symptoms as evidenced by the fact that the clinical sample had the highest mean PCL-5 scores and the non-clinical, non-trauma sample had the lowest mean PCL-5 scores—individuals who have experienced a traumatic event, on average, scored higher on the PCL-5 when compared to individuals who have experienced a traumatic event and are not currently engaged in mental health treatment and individuals who have never experienced a traumatic event and are not currently engaged in mental health treatment.

The descriptive statistics of the study groups, described in Table 2, also evidenced a large range in minimum and maximum PCL-5 scores across all three study groups. The clinical sample had a range in scores from 2 to 80, the non-clinical sample had a range in scores from 0 to 65, and the non-clinical, non-trauma sample had a range in scores from 0 to 40. Although the ranges are large across all three study groups, the clinical sample had the highest maximum score and the non-clinical, non-trauma sample had the lowest maximum score, which is consistent with the assumed high symptom severity of individuals who have experienced a traumatic event and sought mental health treatment when compared to the assumed lower symptom severity of individuals who have not experienced a traumatic event. These results also further support the high internal consistency and scale reliability of the PCL-5. It is unclear at this time, due to the limitations of the study (described in detail in the Limitations and Strengths section), why a
minimum score of 0 occurred in the clinical sample and a minimum score of two occurred in the non-clinical sample and the non-clinical, non-trauma sample; however, it is proposed that the low minimum score seen in the clinical sample may be a result of length of time between when the traumatic experience occurred and when the participants took the survey in the current study. Further, the low minimum score may also be a result of the effects of treatment interventions. The low minimum scores observed in the other two study groups may be a result of the aforementioned factors, as well as the fact that the individuals in the non-clinical group did not seek out mental health treatment following their traumatic experience and thus may not have experienced significant enough distress and the fact that the individuals in the non-clinical, non-trauma group did not endorse experiencing a traumatic event.

The high maximum PCL-5 score of 40 seen in the non-clinical, non-trauma group was surprising given that individual in this group did not endorse experiencing a traumatic event and thus should not have scored above the clinical cutoff score of 33 recommended by Weathers et al. (2013) or the proposed clinical cutoff score of 27 calculated in the current study. Again, it is unclear at this time, due to the limitations of the study (described in detail in the Limitations and Strengths section), why the participants in the non-clinical, non-trauma group had a maximum score of 40; however, one possible explanation is that some participants in this group experience anxiety disorders, which have similar physiological symptoms to PTSD. Another possible explanation for these results is the participants’ interpretation of criterion A, which was provided in within the survey—“Have you ever experienced a traumatic event? For example, a very stressful experience involving actual or threatened death, serious injury, or sexual violence. It could be something that happened to you directly, something you witnessed, or something you learned happened to a close family member or close friend.” If participants misinterpreted their
traumatic experiences as not fitting within this criterion, they would have answered the question as “no” and then been classified as non-clinical, non-trauma; therefore potentially skewing the results if they had actually experienced a traumatic event.

The sample characteristics of the study groups, described in Tables 3 – 5 highlight demographic differences between groups. The most notable difference in demographics between groups was geographic region; unfortunately, the sample was not representative of the U.S. population. Participants living in the West region of the U.S. made up 51.9% of the total sample population, 24.8% live in the South region, 19.3% live in the Mid-West region, and only 3.8% live in the East region. Participants living in the West region of the U.S. made up over half of the study population due to the geographic location of the researcher and the limitations of the recruitment procedures. As described in Tables 3 – 5, participants across all groups were primarily living in the West region of the U.S.—clinical sample (55.1%), non-clinical sample (45.9%), and non-clinical, non-trauma sample (46.2%). The lowest percentage of participants are living in the East region of the U.S.—clinical sample (10.3%), non-clinical sample (2.7%), and non-clinical, non-trauma sample (5.5%). Although participants across groups were mostly evenly distributed across the Mid-West and South regions, the non-clinical sample evidenced a significantly larger percentage of participants from the South region (34.2%) when compared to the participants living in the South region in the clinical-sample (17.2%) and a slightly larger percentage when compared to the participants living in the South region in the non-clinical, non-trauma sample (27.7%). The significantly large difference may be a result of potentially higher stigma surrounding engaging in mental health treatment in the South region of the U.S.

Upon calculating the RCI in the present study, it was determined that a 12-point change represents a reliable change in scores. According to Weathers et al. (2013), a 5-10 point change
represents reliable change on the PCL for the DSM-IV-TR PTSD criteria. Further, a 10-20 point change represents clinically significant change. Following the update to DSM-5, Weathers et al. (2013) recommended to continue using the above point changes to determine reliable change and clinically significant change for scores on the PCL-5. Although the 12-point change score falls within the recommended point change range recommended by Weathers et al. (2013), having a specific number to recommend to clinicians is an improvement when determining reliable change in scores.

Weathers et al. (2013) suggests that an appropriate cutoff score for the PCL-5 is a value of 33; unfortunately, no research is currently available on how this cutoff point was calculated. According to Jacobson et al. (1999), three cutoff points—Cutoff A, B, and C—are appropriate methods of calculating cutoff points. Jacobson and Truax (1991) provide recommendations for utilizing the three cutoff points: 1) If normative data is available, clinicians should use Cutoff B or C before using Cutoff A; 2) Cutoff C is superior when non-clinical data is available and there is an overlap between the clinical and non-clinical distributions; 3) If non-clinical data is available, but there is no overlap between the clinical and non-clinical distributions, using Cutoff B is recommended; 4) Cutoff A is the only option when normative data is unavailable.

Due to the availability of both clinical and non-clinical normative data gathered during the present study, Jacobson and Truax’s (1991) recommendation was followed and Cutoff C was used to calculate the cutoff score (C=27) for the PCL-5. Cutoff C is based on the theory that suggests relative probability will ensure that scores will fall into one category and not the other. Cutoff C can be defined as a weighted midpoint between the means of the clinical and the non-clinical populations (Jacobson & Truax, 1991). The cutoff score of 27 calculated in this study is somewhat less than the proposed cutoff score of 33 recommended by Weathers et al. (2013).
Running head: NON-CLINICAL NORMATIVE DATA PCL-5

The discrepancy in cutoff scores is most likely related to the small clinical population sample size (N=29). Further, the large range in PCL-5 scores in both the clinical sample (2-80) and the non-clinical sample (0-65) described in Table 2, most likely impacted the calculation. However, the discrepancy may also be related to the changes seen in the PTSD criteria between the DSM-IV-TR and DSM-5, and the resulting potential for an increase in individuals meeting criteria for PTSD. Last, the discrepancy could be present due to the potential for the PCL-5 to identify subthreshold PTSD.

Limitations and Strengths

Several limitations of this study may have influenced the results. One limitation is the small total sample size because it creates the potential for measurement error and difficulty generalizing results due to potential issues with distribution and significance of scores. Also, as mentioned above, the small clinical population sample size may have impacted the Cutoff C calculation and produced the noted discrepancy between the cutoff score calculated in the present study and the recommended cutoff score by Weathers et al. (2013). As a result of the small sample sizes, generalizing and utilizing the cutoff score should be done with caution. Despite the small sample sizes, it is important to note that mean PCL-5 scores reflected group differences in an expected way, in that the clinical group had the highest mean score, the non-clinical group had the second highest mean score, and the non-clinical, non-trauma group had the lowest score. Another limitation is that the participants were primarily living in the West region of the U.S., which further limits generalizability of results. Uneven distribution of participants’ region of residence is most likely a result of a limitation with recruitment procedures. Participants were primarily recruited using the snowball method using psychology listservs, Facebook, family members, friends, and colleagues to distribute the survey. The region of
residence of the researcher—the West region of the U.S.—most likely resulted in the high percentage of participants from the West region. The participants recruited using MTurk most likely resulted in the participants living in the other regions of the U.S. and according to Buhrmester, Kwang, and Gosling (2011), MTurk is a reliable method to collect survey data.

An additional limitation was that participants who endorsed experiencing a traumatic event were not asked a follow up question to assess the length of time between when the traumatic experience occurred and when they took the survey in the current study. As a result of not having this information, it makes it difficult to determine why low scores on the PCL-5 occurred in the clinical and non-clinical groups—lower scores could have been a result of a longer period of time between when the traumatic experience occurred and when the survey was taken. Low scores on the PCL-5 in the clinical group could have also been a result of engaging in mental health treatment.

Another limitation is that participants in the clinical group were not asked whether their mental health treatment was trauma focused or if other mental health issues were being addressed. Also, participants were not asked if they had any other mental diagnoses; this is a limitation because participants in the non-clinical, non-trauma group had a maximum score of 40 on the PCL-5 and it is unclear why participants who denied experiencing a traumatic event would obtain a score above the clinical cutoff score of 33 recommended by Weathers et al. (2013) or the proposed clinical cutoff score of 27 calculated in the current study. Assessing for other mental health disorders would help determine whether co-occurring or different mental health disorders with similar symptoms to PTSD were being touched on when participants answered the items on the PCL-5. Last, participants who denied being engaged in mental health treatment were not asked if they had ever engaged in mental health treatment. This is a
limitation because it decreases the ability to determine if participants in the non-clinical group have lower PCL-5 scores compared to the clinical group because of previously receiving mental health treatment to process the traumatic events they experienced or because of other factors such as lower perceived symptom severity or supportive social networks.

This study also has several strengths. One strength is that it is the only study to collect non-clinical normative data on the PCL-5, and as a result, it is the only study to utilize the Cutoff C method to calculate a proposed cutoff score. It is also the only study to calculate a proposed RCI. Although Weathers et al. (2013) recommended a reliable change score and clinical cutoff score for the PCL-5, the recommendations were based on the PTSD criteria of the outdated DSM-IV-TR. Further, no research was published documenting how the clinical cutoff score was calculated. Due to the data gathered in the present study, clinicians now have the option of using a clinical cutoff score calculated using the Jacobson and Truax’s (1991) recommended method, which aids in determining whether clients’ scores fall within the clinical or non-clinical population. The option of using a RCI to determine whether changes in PCL-5 scores are reliable is also a significant improvement for clinicians. Clinicians now have the opportunity to determine whether the change in scores is a result of true change, which is helpful when utilizing self-report measures.

**Future Directions**

This study contributed to the research on the PCL-5 in terms of developing a RCI to calculate a reliable change score and by collecting non-clinical normative data to utilize Cutoff C and calculate a clinical cutoff point. The next step in this research is to replicate the study and address the aforementioned limitations to increase generalizability and to provide further insight into the results. When replicating this study, it will be important to aim to gather data from a
larger total sample population with a larger clinical sample, as this will increase generalizability, decrease measurement error, and help determine whether results with a larger clinical sample would produce an alternative RCI or clinical cutoff score. Further, it is recommended to use MTurk, as it is a reliable method for collecting survey data, and the snowball effect; however, it will be important to widen the recruitment area to include other geographic regions. To address the limited insight into the effects of engaging in mental health treatment versus not engaging in mental health treatment on PCL-5 scores, it will be important to ask participants further follow-up questions such as length of time between experiencing the traumatic event and taking the survey, whether mental health treatment was trauma focused, and whether participants in the non-clinical and non-trauma, non-clinical groups have ever engaged in mental health treatment.

To address the potential confounding variable of co-occurring mental health issues, such as anxiety disorders, it will be important to ask participants if they have any mental health diagnoses. This additional information would help determine the impact of other mental health disorders on the way participants answer the items on the PCL-5, especially participants who scored high on the PCL-5 but denied experiencing a traumatic event. In order to gain further information on how PCL-5 scores are impacted by factors other than engaging in mental health treatment, it will be important to assess for protective factors such as positive social support, religious or spiritual beliefs, and community involvement.

**Conclusion**

Prior to conducting this research, non-clinical normative data was unavailable for the PCL-5. As a result, clinicians were unable to utilize Cutoff C to calculate a clinical cutoff point and best assess whether their clients’ symptoms were more similar to the clinical or non-clinical population in terms of PTSD symptoms. Further, the recommended change scores to determine
reliable change in scores were not developed using a RCI (Weathers et al., 2013). Therefore, the purpose of this study was to collect data from a non-clinical population to aid in the process of determining a RCI and clinical cutoff score for the PCL-5, which in turn would help clinicians better determine whether changes in their clients’ PCL-5 scores are attributable to true change instead of measurement error; as well as help clinicians better determine whether their clients’ scores indicate movement towards a non-clinical population. Results of this study produced both a RCI (RCI=12) and clinical cutoff score (C=27) and, despite the small sample sizes, these established recommendations for clinicians represent movement in the right direction to help clinicians provide the best evidence-based care to clients.
References


Appendix A

Demographic Questionnaire

1. How old are you?  
   ______________

2. What is your sex?  
   - Male  
   - Female  
   - Other __________

3. What is your race? Choose all that apply:  
   - White  
   - Hispanic or Latino  
   - Asian or Pacific Islander  
   - Black or African American  
   - Native American

4. What is the highest degree or level of school you have completed? If currently enrolled, choose the previous grade or highest degree received.  
   - Nursery school to 8th grade  
   - 9th, 10th, or 11th grade  
   - 12th grade, no diploma  
   - High School Diploma/GED  
   - Some college credit, but less than 1 year  
   - Associate degree (for example: AA, AS)  
   - Bachelor’s degree (for example: BA, AB, BS)  
   - Master’s degree (for example: MA, MS, MEng, Med, MSW, MBA)  
   - 1 or more years of college, no degree
5. What is your total household income?

- Less than $10,000
- $10,000 to $19,999
- $20,000 to $29,999
- $30,000 to $39,999
- $40,000 to $49,999
- $50,000 to $59,999
- $60,000 to $69,999
- $70,000 to $79,999
- $80,000 to $89,999
- $90,000 to $99,999
- $100,000 to $149,999
- $150,000 or more

6. Where do you live?

- Outside the United States
- United States

   o Which state do you live in?

   - Alabama
   - Alaska
   - Arizona
   - Arkansas
   - California
   - Colorado
   - Connecticut
   - Delaware
   - Florida
   - Georgia
   - Hawaii
   - Idaho
   - Illinois
   - Indiana
   - Iowa
   - Kansas
   - Kentucky
   - Louisiana
   - Maine
   - Maryland
   - Massachusetts
   - Michigan
   - Minnesota
   - Mississippi
   - Missouri
   - Montana
   - Nebraska
   - Nevada
   - New Hampshire
   - New Jersey
   - New Mexico
   - New York
   - North Carolina
   - North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming
### Appendix B

**PCL-5**

<table>
<thead>
<tr>
<th>In the past month, how much were you bothered by:</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repeated, disturbing, and unwanted memories of the stressful experience?</td>
<td></td>
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<tr>
<td>2. Repeated, disturbing dreams of the stressful experience?</td>
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<td>3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?</td>
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<td>4. Feeling very upset when something reminded you of the stressful experience?</td>
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<td>5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?</td>
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<td>6. Avoiding memories, thoughts, or feelings related to the stressful experience?</td>
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<tr>
<td>7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?</td>
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<td>8. Trouble remembering important parts of the stressful experience?</td>
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<td>9. 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)?</td>
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<td>10. Blaming yourself or someone else for the stressful experience or what happened after it?</td>
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<tr>
<td>11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?</td>
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<td>12. Loss of interest in activities that you used to enjoy?</td>
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<td>13. Feeling distant or cut off from other people?</td>
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<td>14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?</td>
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<td>15. Irritable behavior, angry outbursts, or acting aggressively?</td>
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<td>16. Taking too many risks or doing things that could cause you harm?</td>
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<td>17. Being “super alert” or watchful or on guard?</td>
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<td>18. Feeling jumpy or easily startled?</td>
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<td>19. Having difficulty concentrating?</td>
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<td>20. Trouble falling or staying asleep?</td>
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