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MMPI Scales for Diagnosing Acute and Chronic PTSD in Civilians

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To develop new Minnesota Multiphasic Personality Inventory (MMPI) scales for diagnosing acute and chronic posttraumatic stress disorder (PTSD), 237 civilians with PTSD or panic disorder (controls) completed the MMPI-R. All 399 items were submitted to chi-square analysis to select those differentiating acute or chronic PTSD from controls. The analyses yielded an MMPI Acute PTSD scale (32 items) and a MMPI Chronic PTSD scale (41 items). Discriminating between acute PTSD and controls, the MMPI Acute PTSD scale had a hit rate of 83% and the MMPI Chronic PTSD scale produced a hit rate of 75% to 80%. Cross-validation produced similar hit rates. These scales scores were not substantially influenced by gender or types of traumatic events, and only the MMPI Acute PTSD scale seemed to not be sensitive to comorbidity.

KEY WORDS: PTSD; MMPI; acute; chronic; assessment.

Thirteen years ago, an assessment strategy based on the Minnesota Multiphasic Personality Inventory (MMPI) was developed to diagnose posttraumatic stress disorder (PTSD) among Vietnam veterans with chronic combat-related PTSD (Fairbank, Keane, & Malloy, 1983; Keane, Malloy, & Fairbank, 1984). Stated briefly, this assessment strategy comprised a typical profile configuration (F-8-2), a decision rule ($F \geq 66$, $D \geq 78$, and $Sc \geq 79$), and an empirically developed PTSD scale, the MMPI Keane PTSD (PK) scale was made up of 49 items. Although the decision rule has been

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criticized for being unreliable (Koretzky & Peck, 1990; Vanderploeg, Sison, & Hickling, 1987), the profile configuration and the PK scale have received fairly good empirical support from researchers studying populations exposed to military combat (for a review on this topic, see Watson, 1990; Wolfe & Keane, 1993).

Over the last few years, the question of whether various aspects of this assessment strategy could be generalized to assist in the diagnosis of PTSD in civilians has begun to receive some attention (Chaney, Williams, Cohn, & Vincent, 1984; Frederick, 1985; Gaston, Brunet, Koszycki, & Bradwejn, 1996; Koretzky & Peck, 1990; McCaffrey, Hickling, & Marrazzo, 1989; Sloan, 1988; Wilson, & Walker, 1990). However, empirical results have been less encouraging. As far as the PK scale is concerned, only two cross-validation studies have been published. In one of those studies comprising a PTSD sample of 237 subjects (Gaston et al., 1996), the PK scale has shown a sensitivity of 18% and a specificity of 83% in classifying acute PTSD versus panic disorder subjects, for a hit rate of 46%. As for the classification of chronic PTSD versus panic disorder subjects, its sensitivity was found to be 42% and its specificity 83%, for a hit rate of 63%. Even when the PK scale's cutoff score was adjusted from 30 to an optimal 16, the results remained unsatisfactory (hit rates of 51% for acute PTSD and 60% for chronic PTSD). Gaston et al. cautioned clinicians and forensic workers to not rely on the PK scale for diagnostic purposes involving non-combat PTSD, especially in its acute form.

There has been another—apparently more successful—attempt at validating the PK scale with a restricted sample of civilian subjects. Koretzky and Peck (1990) found a hit rate of 87% (39/45) with the PK scale in their validation sample, and of 88% (21/24) in their cross-validation. The rate of true positives were 89% and 87%, respectively. However, while it is clear that the subjects in the Keane et al. (1984) study were chronic PTSD patients, the symptom duration or PTSD chronicity is not mentioned in Koretzky and Peck's study. This omission renders their data difficult to interpret and compare.

It seems obvious that Gaston et al. (1996) devised a more stringent test than did Koretzky and Peck (1990). Indeed, it is likely to be more difficult to discriminate PTSD from panic disorder than PTSD from other mixed psychiatric diagnoses. A powerful assessment strategy consists of discriminating between PTSD patients and patients having a related disorder, such as another severe anxiety disorder, and the PK scale could not achieve such a task in the civilian sample of Gaston et al. Other researchers (McCaffrey, Hickling, & Marrazzo, 1989; Penk et al., 1989) have also pointed to the need for developing MMPI scales that are better tailored to the various PTSD populations under scrutiny.

This paper reports on an attempt to devise two new MMPI PTSD scales for diagnosing acute and chronic PTSD. Those scales were derived empirically from a civilian sample gathered by Gaston et al. (1996).

Method

Subjects and Procedure

A total of 237 subjects participated in this study; 98 had an acute PTSD, 67 had a chronic PTSD, and 72 had a panic disorder. PTSD patients were all seeking treatment at a private clinic specialized in treating this disorder. According to their reports, they had been victims of one of the following traumatic events: armed robbery (44%); physical assault (32%); sexual assault (6%); hostage taking (2%); serious death threats (1%); and other traumatic events (14%). In the Acute PTSD group, 30% of the subjects had more than one psychiatric diagnosis whereas, in the Chronic PTSD group, this figure amounted to 58%, which corresponds to a significant difference. None of the PTSD subjects was involved in litigation at the time of treatment. Sixty percent of the subjects were randomly assigned to the validation procedure of the two MMPI PTSD scales while 40% were assigned to the cross-validation sample.

The validation sample. The Acute PTSD validation group ($n = 60$) was comprised of 14 men (23%) and 46 women (77%) presenting with a PTSD diagnosis of less than 6 months duration (American Psychiatric Association [APA], 1987). The mean duration of their PTSD symptoms was 6.9 weeks ($SD = 5.4$) with a range of 4 to 25 weeks. Their mean age was 36.8 years old ($SD = 10.7$). The Chronic PTSD validation group ($n = 41$) included 22 men (54%) and 19 women (46%) presenting with a PTSD diagnosis of at least 6 months duration (APA, 1987). The mean duration of their PTSD symptoms was 67.3 weeks ($SD = 65.3$) with a range of 26 to 312 weeks. Their mean age was 38.3 years old ($SD = 11.1$). The Panic Disorder validation group ($n = 43$) included 17 men (40%) and 26 women (60%). Their mean age was 37.4 years old ($SD = 8.6$). This group of patients completed the MMPI while voluntarily participating in a study of the psychophysiology of panic disorders; the diagnoses were assigned by a senior researcher in this field.

The cross-validation sample. The Acute PTSD cross-validation group ($n = 38$) included 9 men (24%) and 29 women (76%). The mean symptoms duration was 5.5 weeks ($SD = 5.2$) with a range of 4 to 20 weeks. The group's mean age was 36.2 years old ($SD = 12.9$). The Chronic PTSD cross-validation group ($n = 26$) comprised 7 men (24%) and 19 women (76%).

The mean symptoms duration was 63.7 weeks ($SD = 65.1$) with a range of 29 to 246 weeks. The mean age was 34.9 years old ($SD = 9.8$). The Panic Disorder group ($n = 29$) included 13 men (47%) and 16 women (53%). Their mean age was 36.5 years old ($SD = 8.9$). According to the appropriate tests, each of the three validation groups was not significantly different from cross-validation samples in terms of gender, age, and symptoms duration.

Measures

The measure employed was the Minnesota Multiphasic Personality Inventory-Revised (MMPI-R; Hathaway & McKinley, 1970) because it contains only 399 items. PTSD diagnoses were made by an experienced clinical psychologist trained in using the Structured Clinical Interview for DSM-III-R (Spitzer & Williams, 1985). The PTSD diagnosis was subsequently confirmed by the treating psychologist, leading to a Kappa of 1.0, but this reliability check was not conducted blindly by the second assessor which renders it less robust. At the time of the study, the DSM-IV criteria for PTSD (American Psychiatric Association, 1994) were not available; nonetheless, the subjects' files were reviewed to assess the presence of a PTSD diagnosis according to those criteria. Only 3 of the 165 PTSD patients did not meet the DSM-IV criteria for PTSD because they presented only two avoidance symptoms rather than three, as required; one was part of the Acute PTSD validation group and two were part of the Acute PTSD cross-validation group.

Co-morbidity was assessed by the treating psychologist using only the DSM-III-R criteria (APA, 1987), which renders the reliability of these data questionable. Consequently, the associated results should be interpreted with caution.

Results

MMPI Acute and Chronic PTSD Scales

The 399 MMPI items were submitted to a chi-square analysis to determine which ones differentiated each PTSD validation group (Acute and Chronic) from the Panic Disorder validation group. Items were selected only if they were endorsed ($p < .05$) in one direction by the PTSD validation group (goodness-of-fit test) and if they were endorsed differentially ($p < .05$) by the Panic Disorder validation group (test of independence).

MMPI PTSD Scales

This procedure yielded a set of 32 items⁴ for the Acute PTSD validation group. Items were summed to produce the 32-point MMPI Acute PTSD scale with a range of 0-32 (1 point for each item endorsed, as the reference group). For the Chronic PTSD validation group, the summation of differentially endorsed items produced the 41-point MMPI Chronic PTSD scale.⁵

The validation sample. On the MMPI Acute PTSD scale, the mean of the Acute PTSD group was 21.18 ($SD = 3.34$) while the mean of the Panic Disorder group was 15.14 ($SD = 3.32$). The mean of the Chronic PTSD group was 18.83 ($SD = 3.53$). An analysis of variance (ANOVA) indicated a group effect, $F(2, 141) = 39.86, p < .0001$. Newman-Keuls post-hoc analyses revealed that the three groups differed significantly from each other at an alpha level of $p < .01$. Scores were more elevated for the Acute PTSD group than the Chronic PTSD group, which were in turn higher than for the Panic Disorder group. With a cutoff score of 19 or greater for case identification, the sensitivity of the MMPI Acute PTSD scale was 80% (48/60) and its specificity was 86% (37/43), for a hit rate of 83% (85/103) in discriminating between acute PTSD and panic disorder subjects.

On the MMPI Chronic PTSD scale, the mean of the Chronic PTSD group was 27.39 ($SD = 6.55$) and the mean of the Panic Disorder group was 17.26 ($SD = 6.64$). The mean of the Acute PTSD group was 22.85 ($SD = 6.86$). An ANOVA indicated a group effect, $F(2, 141) = 24.11, p < .0001$. Newman-Keuls post-hoc analyses revealed that all three groups differed significantly from each other at an alpha level of $p < .01$. Scores were higher for the Chronic PTSD group than the Acute PTSD group, which were in turn more elevated than for the Panic Disorder group. With a cutoff score of 21 or greater for case identification, the sensitivity of the MMPI Chronic PTSD scale was 80% (33/41) and its specificity was 70% (30/43), for a hit rate of 75% (63/84), in discriminating chronic PTSD sub-

⁴The MMPI items that discriminated the Acute PTSD group from the Panic Disorder group at the .01 alpha level are the following (items endorsed as true by the Acute PTSD group are light-faced, while those endorsed as false are in boldface): 5, 9, 10, 15, 29, 31, 32, 43, 46, 74, 77, 107, 138, 141, 152, 153, 176, 181, 182, 188, 191, 236, 237, 277, 301, 307, 321, 351, 367, 371, 375, 391. The MMPI-2 corresponding items are the following (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989): 5, 10, 11, 16, 28, 30, 31, 39, 43, 62, 64, 95, 127, 129, 140, 141, 163, 169, 170, 173, 178, 215, 217, 250, 273, 279, 289, 317, 335, 340, 346, 362.

⁵The MMPI items that discriminated the Chronic PTSD group from the Panic Disorder group at the .01 alpha level are the following (items endorsed as true by the Chronic PTSD group are light-faced, while those endorsed as false are in boldface): 5, 9, 10, 20, 26, 31, 32, 43, 44, 48, 51, 77, 89, 114, 126, 127, 141, 152, 159, 161, 168, 169, 176, 188, 190, 238, 253, 265, 277, 278, 280, 281, 303, 305, 328, 330, 336, 348, 351, 356, 391. The MMPI-2 corresponding items are the following (Butcher et al., 1989): 5, 10, 11, 12, 26, 30, 31, 39, 40, 60, 64, 64, 76, 101, 112, 113, 129, 140, 147, 149, 180, 186, 163, 173, 176, 218, 230, 241, 250, 251, 254, 255, 274, 277, 31, 295, 302, 315, 317, 325, 362.

jects from panic disorder subjects. A cutoff score of 25 produced a hit rate of 80%, indicating that a score of 25 or greater suggests an 80% probability of the presence of a chronic PTSD diagnosis.

It was also found that the MMPI Acute PTSD scale scores were negatively correlated to the MMPI Chronic PTSD scale scores (-0.20) and the PK scale scores (-0.46). The MMPI Chronic PTSD scale scores were positively correlated to the PK scale scores ($.79$). All correlations were significant at $p < .01$.

The cross-validation sample. On the MMPI Acute PTSD scale, the mean of the Acute PTSD cross-validation group was 21.37 ($SD = 3.52$) and the mean of the Panic Disorder cross-validation group was 14.93 ($SD = 2.98$). The mean of the Chronic PTSD cross-validation group was 17.92 ($SD = 2.62$). An ANOVA indicated a group effect, $F(2, 90) = 35.32, p < .0001$. Newman-Keuls post-hoc analyses revealed that all three groups differed significantly from each other at an alpha level of $p < .01$. With a cutoff score of 19 or greater for case identification, the sensitivity of the MMPI Acute PTSD scale was 76% (29/38) and its specificity was 86% (25/29), for a hit rate of 80% (54/67) in discriminating between the acute PTSD and panic disorder cross-validation groups.

On the MMPI Chronic PTSD scale, the mean of the Chronic PTSD cross-validation group was 26.88 ($SD = 7.28$) and the mean of the Panic Disorder cross-validation group was 18.14 ($SD = 5.62$). The mean of the Acute PTSD cross-validation group was 23.00 ($SD = 6.13$). An ANOVA indicated a group effect, $F(2, 90) = 13.27, p < .0001$. Newman-Keuls post-hoc analyses revealed that all three groups differed significantly from each other at an alpha level of $p < .05$. With a cutoff score of 21 for case identification, the sensitivity of the MMPI Chronic PTSD scale was 81% (21/26) and its specificity was 66% (19/29), for a hit rate of 73% (40/55) in discriminating between the chronic PTSD and panic disorder subjects.

Influencing Factors

Since the validation and cross-validation groups yielded similar results, they were pooled for the investigation of the influencing factors. It was first tested whether gender was differentially associated with scores on the MMPI Acute and Chronic PTSD scales. An independent t -test revealed a significant difference between men and women on the MMPI Acute PTSD scale, $t(163) = 2.17, p < .05$, with a modest effect size of .3. Women had a mean score of 20.5 ($SD = 3.8$) while men scored an average 19.2 (SD

$= 2.9$). No significant difference was observed between men and women on the MMPI Chronic PTSD scale or the PK scale.

The influence of types of traumatic events was also examined (criminal vs. noncriminal acts). In the overall PTSD sample, independent t -tests showed no significant, or substantial, differences between those two types of traumatic events on both the MMPI Acute and Chronic PTSD scales, or the PK scale.

The DSM-IV (APA, 1994) defines chronic PTSD as having enduring symptoms for at least 3 months while DSM-III-R (APA, 1987) defined chronic PTSD as occurring only after 6 months of symptoms duration. Therefore, in the present study, it was evaluated whether this change of definition can be supported by data, that is, whether the MMPI Acute PTSD scores varied within the Acute PTSD group according to time. First, using an independent t -test, it was tested whether the means of subjects having PTSD symptoms for less than 3 months and of those having PTSD symptoms for more than 3 months were different; no significant difference was observed. Looking at this question from another angle, a correlation was computed between the number of weeks of PTSD symptoms and scores on the MMPI Acute PTSD scale, and a near 0 correlation was obtained, $r(98) = .02, p > .05$. These findings indicated that, during the first 6 months of the presence of PTSD symptoms, scores on the MMPI Acute PTSD scale were not influenced by symptoms duration, which lends supports to the DSM-III-R criteria of 6-month symptoms duration for diagnosing chronic PTSD.

The influence of co-occurring mental disorders (those mostly observed by the clinicians involved in this study) on the MMPI PTSD scales was examined. In the overall PTSD sample, it was found that the presence of a major depressive disorder (MDD) produced significantly higher mean scores (28.9 vs. 23.5) on the MMPI Chronic PTSD scale, $t(162) = 4.18, p < .001$. MDD also produced higher scores (27.4 vs. 20.3) on the PK scale, $t(162) = 3.54, p < .001$. The presence of a panic disorder only influenced the PK scale, with higher mean scores associated with its presence (26.0 vs. 20.4), $t(162) = 2.92, p < .01$. The presence of agoraphobia produced significant mean elevations (29.0 vs. 23.6) on the MMPI Chronic PTSD scale, $t(162) = 4.01, p < .0001$, and on the PK scale (27.5 vs. 20.5), $t(162) = 3.31, p < .001$, but not on the MMPI Acute PTSD scale. Finally, the presence of a personality or dissociative disorder also produced higher mean scores (31.1 vs. 24.2) on the MMPI Chronic PTSD scale, $t(162) = 2.97, p < .01$, and on the PK scale (32.4 vs. 21.1), $t(162) = 3.20, p < .001$. Similar findings were observed when these analyses were conducted within the Acute and Chronic PTSD groups. It thus appears that the MMPI Acute PTSD scale is not influenced by these important factors of variation.

Discussion

The present article emphasized the utility of different MMPI scales for diagnosing acute and chronic PTSD across various populations. This study is the first to provide a set of MMPI PTSD scales that are tailored specifically to the clinical picture of civilian PTSD in its acute and chronic forms. Gaston et al. (1996) had previously demonstrated (1) that the MMPI profile of acute civilian PTSD was dissimilar to the one most frequently found in chronic combat-related PTSD, and (2) that the PK scale did not apply well to civilian populations. It is therefore not surprising that the PK scale and the two MMPI PTSD scales devised in this study do not share a substantial number of items. In fact, the MMPI Acute PTSD scale shares only four of its items (31, 32, 43, & 152) with the PK scale, while the MMPI Chronic PTSD scale shares only seven items (31, 32, 43, 114, 152, 303, & 336). When the correlations among those three PTSD scales were examined, the MMPI Acute PTSD scale was found to be markedly different from the two other scales designed to assess chronic PTSD.

In this study, the MMPI Acute and Chronic PTSD scales shared less than half of their items. Furthermore, the MMPI Acute PTSD scale also contains items such as "I am happy most of the time" (endorsed as true) or "Life is a strain for me most of the time" (endorsed as false) which are counterintuitive to most clinicians specializing in PTSD. It thus appears that acute PTSD has not yet succeeded in transforming individuals' concepts of self and of the world, which seems to be somehow damaged in chronic PTSD subjects, as illustrated by the endorsement (as true) of MMPI items such as "There is something wrong with my mind" or "It takes a lot of argument to convince most people of the truth." Such findings provide support for the validity of the two categories of acute and chronic PTSD as defined in the DSM-III-R (APA, 1987).

The selection of PTSD items specifically for civilians increased sharply the hit rate from 46% using the PK scale (Gaston et al., 1996) to 83% using the MMPI Acute PTSD scale in the Acute PTSD validation group, with a rate of true positives increasing dramatically from 14% to 80%. Moreover, a score of 19 or more yielded an 83% probability of the presence of an acute PTSD. The cross-validation procedure yielded similar results.

For the Chronic PTSD group, the hit rate went from 63% using the PK scale (Gaston et al., 1996) to a more acceptable 75% using the Chronic MMPI PTSD scale, with a rate of true positives increasing sharply from 42% to 80%. A cutoff score of 21 yielded a 75% probability of the presence of a chronic PTSD, while a cutoff of 25 increased this probability to 80%. Again, the cross-validation procedure yielded similar results. These findings

support the further examination of those MMPI PTSD scales in the diagnosis of acute and chronic PTSD.

Furthermore, the differentiation of the two PTSD categories, acute and chronic, was observed on those two MMPI PTSD scales. On the MMPI Acute PTSD scale, the scores of the Acute PTSD group were found to be higher than those of the Chronic PTSD group and, on the MMPI Chronic PTSD scale, the scores of the Chronic PTSD group were found to be higher than those of the Acute PTSD group. Therefore, not only can those two MMPI PTSD scales differentiate most PTSD sufferers from patients presenting with a panic disorder but they also tend to react differentially when they are applied to the two major types of PTSD, acute versus chronic.

For acute PTSD as defined in DSM-III-R (APA, 1987), the duration of PTSD symptoms had no significant impact on the scores of the MMPI Acute PTSD scale. No difference in mean scores was found between subjects presenting with acute PTSD who had symptoms for less than 3 months and those who had symptoms for at least 3 months and less than 6 months. A near 0 correlation was observed between the number of weeks of the presence of PTSD symptoms and the scores on the MMPI Acute PTSD scale. Such findings support the use of this scale for assessing PTSD on either DSM-III-R or DSM-IV (APA, 1987, 1994). Further, they tend to support the DSM-III-R definition of PTSD chronicity, which requires a 6-month duration of PTSD symptoms in order to diagnose chronic PTSD, in opposition to the one proposed by the DSM-IV, which specifies only a 3-month duration of symptoms.

Finally, the MMPI Acute and Chronic PTSD scales did not appear to be substantially influenced by gender or types of traumatic events experienced. The presence of co-morbidity on Axis I or II was associated with the MMPI Chronic PTSD scale and the PK scale only, producing higher scores in PTSD patients presenting also with a major depressive disorder, a panic disorder with or without agoraphobia, and personality or dissociative disorder. In contrast, the MMPI Acute PTSD scale appeared to not be influenced by the presence of such co-morbidity. PTSD may become contaminated by co-morbid disorders as it develops over time. Nevertheless, these findings need to be replicated in larger sample, using a reliable assessment method for co-morbid disorders. In the meantime, these findings are to be considered with caution.

In conclusion, the MMPI Acute and Chronic PTSD scales appear to be promising instruments for diagnosing acute and chronic PTSD in civilians seeking treatment following an array of traumatic events. These scales have, however, limitations in assessing psychiatric disorders (Allen, 1994). (1) They do not provide information on the target traumatic event. (2) They do not reflect all PTSD symptoms. (3) Finally, the use of a dichoto-

mous cutoff score, sensical from a psychometric point of view, may sometimes be clinically misleading for cases scoring close to the cut-off score. Nevertheless, they provide a powerful diagnostic tool as part of a multi-method assessment strategy. Unlike other self-report measures, these MMPI PTSD scales could be relatively immune to falsification but more research needs to be done on this question before they can be safely utilized in a litigation context. In the meanwhile, caution should be employed in their use.

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