Application of the Postconcussive Syndrome Questionnaire with Medical and Psychiatric Outpatients

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The Postconcussive Syndrome Questionnaire (PCSQ; Lees-Haley, 1992) was previously found (Axelrod, Fox, Lees-Haley, Earnest, Dolezal-Wood, & Goldman, 1996) to produce four factors, named Psychological, Somatic, Cognitive, and Infrequency. These four factors of the questionnaire were evaluated across five groups of medical and psychiatric outpatients. The patients were from neurology, mental health, family practice, and internal medicine clinics as well as from a clinic that evaluated new patients to a health maintenance organization. Mental health patients had greater psychological symptoms and fewer health concerns than the other groups. Neurology patients differed from the other groups by having greater Infrequency symptoms. Patients who were referred for their screening evaluation or were seen by internal medicine had fewer overall symptoms than the other three patient groups. The data from this study provide support for the use of the PCSQ as a multifactorial self-report measure of symptom presentation. © 1998 National Academy of Neuropsychology. Published by Elsevier Science Ltd

A 44-item Postconcussive Syndrome Questionnaire (PCSQ) was initially developed to better understand the base rate occurrence of symptoms associated with postconcussive syndrome (PCS; Lees-Haley, 1992). The original checklist questionnaire contained 37 items. Additional items were subsequently added to detect poor motivation or unreliability and to obtain additional historical information. This PCS questionnaire has been used in reporting the incidence
of PCS symptoms in personal injury litigants (Lees-Haley, 1992; Lees-Haley & Brown, 1993) and psychiatric outpatients (Fox, Lees-Haley, Earnest, & Dolezal-Wood, 1995b). Fox and colleagues gave the PCS Questionnaire to four medical departments within a health maintenance organization (HMO) in southern California. The departments included neurology, family practice, internal medicine, and health screening for new patient who presented for non-emergent care. The data from the psychiatric outpatients and the HMO were compiled for a total of 1116 patients (Fox, Lees-Haley, Earnest, & Dolezal-Wood, 1995a).

Factor analyses and assessment of the internal consistency of the PCSQ was accomplished with the medical and psychiatric database (Axelrod et al., 1996). The results supported a four-factor model of the PCS questionnaire as being the most parsimonious model with the highest internal consistency and best goodness-of-fit. The overall composite reliability of this model was computed to be .89. The factors were named Psychological, Somatic, Cognitive, and Infrequency. The Infrequency factor of the PCSQ is composed of 10 items that were the least frequently endorsed by the sample. This factor includes endorsing impotence, hair pain, teeth itching, bumped head, and bump into things, among others. The other three factors in the PCSQ include sets of symptoms that are primarily psychological (e.g., anxiety, depression, anhedonia, sleep disruption), somatic (e.g., gastrointestinal changes, nausea, headaches, back pain), and cognitive (e.g., memory problems, word-finding difficulties, decreased reading comprehension). The factors generated by the PCSQ mirror the theoretically derived factors thought to underlie PCS in general. Gouvier, Uddo-Crane, and Brown (1988) explicitly mentioned the need to evaluate “cognitive, psychological and physical symptoms.” Subsequent papers that also sought to better define the incidence of PCS symptoms noted the clusters of symptoms falling in these three subsets (Mittenberg, Tremont, Zielinski, Fichera, & Rayls, 1996; Wong, Regennitter, & Barrios, 1994). Recently, Cicerone and Kalmar (1995) also presented a four-factor model (affective, cognitive, somatic, and sensory) based on cluster analyses with 50 mild traumatic brain-injured outpatients using a PCS questionnaire proposed by Levin and colleagues (1987).

The utility of the factor structure of the PCSQ will be realized in its application to patients who present with different primary symptoms, not just patients presenting with PCS. The relative strengths and weaknesses across factors might be used in differentiating aspects of patient presentation. In fact, the PCS Questionnaire might even be useful as a measure of four aspects of physical and psychological health. The purpose of the present study was to apply the factor scores to subsets of patients in an attempt to evaluate the clinical utility of the four factor model of the PCS Questionnaire. The sample used was the same from which the factors were initially generated and cross-validated, with subjects grouped by the hospital/clinic referral source from which they came.

**METHOD**

**Participants**

The 1,116 participants used in this study is the same sample described elsewhere (Axelrod et al., 1996; Fox et al., 1995a). The participants were outpatients in a health maintenance organization in southern California. They were seen in mental health (n = 400), family practice (n = 124), internal medicine (n = 192), or neurology (n = 104) clinics. None of the patients were seen for emergency treatment. A final subgroup of 296 patients were patients new to the HMO who had been referred for an initial screening evaluation.

The screening evaluation patients were significantly younger (M = 34.6, SD = 10.7) than the mental health patients (M = 37.5, SD = 14.2), who in turn were significantly younger than the patients seen by family practice (M = 48.0, SD = 15.8), internal medicine (M =
Procedure

The PCS Questionnaire contains 44 items that describe symptoms or events that the participants experienced in the preceding 2 years. Items were scored dichotomously, as either present or absent. The summary scores that were computed included the total number of items endorsed as well as the totals for each of the four factors, Psychological, Somatic, Cognitive, and Infrequency. Standard scores were computed for Total PCS Questionnaire responses as well as for each of the four factor scores based on the frequency distribution observed in the overall sample of 1,116 patients. These tables are available from the first author.

RESULTS

Standard scores for total items endorsed and the factor scores appear in Table 1. A significant difference in symptom reporting was observed among the groups, $F(4, 1111) = 22.3$, $p < .0001$, with the internal medicine and screening evaluation patients endorsing significantly fewer items than the other three groups. The Psychiatric factor score was significantly highest for the mental health patients, $F(4, 1111) = 46.6$, $p < .0001$. Family practice and neurology patients endorsed significantly more mental health symptoms than did the internal medicine and screening evaluation patients. On the Somatic factor, screening evaluation patients had significantly fewer somatic complaints than did mental health, neurology, or family...
practice patients, $F(4, 1111) = 3.9, p < .004$. The pattern of Cognitive scores across the groups was similar to that observed for the Psychiatric factor, $F(4, 1111) = 24.3, p < .0001$. Specifically, patients seen in internal medicine and screening evaluation clinics had significantly fewer cognitive complaints than the family practice, neurology, and mental health patients. Internal medicine patients reported significantly greater cognitive concerns than did the screening patients. The Infrequency factor was significantly higher for neurology patients relative to patients in the mental health, internal medicine, and screening evaluation clinics, $F(4, 1111) = 5.1, p = .0005$.

The relative strengths and weaknesses across the factors within each referral group are presented qualitatively in Figure 1. Patients seen in the outpatient mental health clinic produced relatively high psychological symptoms and low somatic concerns. Overall, internal medicine patients and new patients seen for an initial screening both presented with somatic concerns, but the latter group did not report significant cognitive deficits. The family practice patients tended to have comparable complaints across domains. Interestingly, the neurology clinic patients had a significantly higher report of infrequent symptoms in comparison to the other three factors.

Standard errors of estimation (SEE) were computed for each of the factor scores (Dudek, 1979) using the sample of 1116 patients from which the PCSQ was derived. The corresponding SEEs for the Psychological, Somatic, Cognitive, and Infrequency factors were 5.04, 6.21, 6.87, and 7.5, respectively. The differences between factor scores required to be considered significant for an individual were computed using the method outlined by Atkinson (1991). The differences between indices for statistical significance at the 10% and 1% levels appear in Table 2. Atkinson (1991) reported that the 10% level is used for test interpretation, while the 1% level is to demonstrate “extreme statistical significance.” Of the six difference scores among the factors, Psychological-Somatic differences of more than 21 points occurred in
TABLE 2
Differences Between Factor Scores Required for Significance at the 10% and 1% Levels

<table>
<thead>
<tr>
<th></th>
<th>Psychological</th>
<th>Somatic</th>
<th>Cognitive</th>
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<tbody>
<tr>
<td>Somatic</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10%</td>
<td>13</td>
<td></td>
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<tr>
<td>1%</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td></td>
<td>14</td>
<td>15</td>
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<tr>
<td>10%</td>
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<td>22</td>
<td>24</td>
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<td>1%</td>
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<td>Infrequency</td>
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<td>15</td>
<td>16</td>
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<tr>
<td>10%</td>
<td></td>
<td>23</td>
<td>25</td>
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<tr>
<td>1%</td>
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<td>26</td>
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15% of the total sample. Examination of the referral groups revealed mental health patients to more frequently have that difference due to Psychological scores greater than Somatic scores, while the internal medicine and neurological patients had difference scores of greater than 21 with the opposite pattern. Psychological-Cognitive differences were least often observed to fall outside of the 1% level (6% of the total sample).

DISCUSSION

The present study was the first attempt to evaluate the clinical validity of the factor scores for the PCS Questionnaire. The four-factor solution of the PCS Questionnaire bore out clinical support in the symptom presentation of five different medical referral sources. The factor scores seem to respond to the thought proposed by Fox and colleagues (1995b) that sets of symptoms may be clinically meaningful. Mental health patients presented a pattern of significant psychological and somatic concerns with relatively lower reports of other symptoms. Patients that came from internal medicine clinics and patients referred for a health screening produced a similar pattern of having lower complaints across all levels of psychological, somatic, cognitive, and infrequent symptoms relative to the three other referral groups. Neurological patients had a significantly higher incident of Infrequent complaints, which requires additional study. Perhaps the symptoms that fall within this Infrequent factor are rarely occurring in the general population, but not unusual for patients who suffer neurological disorders.

It is obvious that additional research needs to be conducted with the PCS Questionnaire. We have already altered the scoring of items from dichotomous to a 5-point Likert scale in hope of even better defining the factor scores. We are currently in the process of examining the relationship of the PCS Questionnaire factors with other measures of psychopathology and somatic concern. The study of PCS symptoms in patients sustaining moderate head injuries versus those with mild head injuries and resulting PCS needs to be evaluated as an additional validation of the PCS Questionnaire.

Prior studies have proposed the existence of at least three factors associated with PCS symptoms (Cicerone & Kalmar, 1995; Gouvier et al., 1988; Mittenberg et al., 1996; Wong et al., 1992). The PCS Questionnaire objectively demonstrates the application of this construct. If there are indeed subtypes of PCS that are more exclusively psychological (Youngjohn et al., 1995) or the result of psychological and somatic interactions (Putnam & Millis, 1994), the PCS Questionnaire holds promise in their study.
REFERENCES


