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ASD and PTSD in Rape Victims

Ask Elklit¹ and Dorte M. Christiansen¹

Abstract

In recent years, a number of studies have investigated the prediction of posttraumatic stress disorder (PTSD) through the presence of acute stress disorder (ASD). The predictive power of ASD on PTSD was examined in a population of 148 female rape victims who visited a center for rape victims shortly after the rape or attempted rape. The PTSD diagnosis based solely on the three core symptom clusters was best identified by a subclinical ASD diagnosis based on all ASD criteria except dissociation. However, a full PTSD diagnosis including the A₂ and F criteria was best identified by classifying victims according to a full ASD diagnosis. Regardless of whether cases were classified according to full PTSD status or according to meeting the criteria for the three PTSD core symptom clusters, the classification was correct only in approximately two thirds of the cases. A regression analysis based on ASD severity and sexual problems following the rape accounted for only 28% of the PTSD severity variance. In conclusion, the ASD diagnosis is not an optimal method for identifying those most at risk for PTSD. It remains to be seen whether a better way can be found.

Keywords

acute stress disorder, posttraumatic stress disorder, rape victims

Acute stress disorder (ASD) was introduced as a diagnosis in the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; American Psychiatric

¹University of Aarhus, Aarhus, Denmark

Corresponding Author:
Ask Elklit, Jens Chr. Skous Vej 4, DK 8000 Aarhus, Denmark
Email: aske@psy.au.dk
Association [APA], 1994) with a twofold purpose, which was to (a) recognize posttraumatic stress occurring within the first month after a traumatic event and (b) identify the victims most at risk of developing posttraumatic stress disorder (PTSD; Harvey & Bryant, 2002). A diagnosis of ASD can be given to patients who have experienced, witnessed, or been confronted with an event involving death, physical injury, or the threat thereof, or a threat against the physical integrity of self or others (criterion A1), and who during that event felt fear, helplessness, or horror (criterion A2). A diagnosis requires at least three dissociative symptoms (criterion B), one reexperiencing symptom (criterion C), marked avoidance (criterion D), and marked arousal (criterion E). It is a further diagnostic requirement that the symptoms cause significant impairment to the victim (criterion F). The symptoms must have persisted for at least 2 days but no more than a month; after the first month, victims still suffering from traumatic stress should be diagnosed with PTSD.

Bryant and Harvey (1997) have criticized that the symptom clusters of ASD differ from the PTSD symptom clusters in a number of ways. For reexperiencing, the PTSD criteria emphasize that the symptoms must be involuntary and cause distress, whereas no such requirement occurs in the ASD diagnostic criteria. For avoidance and arousal, a diagnosis of PTSD requires at least three and two symptoms, respectively, whereas the ASD criteria only state the somewhat diffuse requirement of marked avoidance and arousal. The ASD diagnosis has also been criticized for emphasizing one PTSD risk factor (dissociation) in the absence of evidence supporting that it should be more or less important than other well-known risk factors for PTSD (Marshall, Spitzer, & Liebowitz, 1999). Further criticism relates to the requirement of at least three dissociative symptoms, as this criterion is not empirically based (Bryant & Harvey, 1997; Marshall et al., 1999). This seems quite peculiar when one takes into consideration that this requirement results in a greater emphasis being put on dissociation than on the very symptoms the ASD diagnosis is meant to predict.

Many studies have tested the ability of ASD to predict PTSD in trauma samples. In a review of ASD and PTSD based on five samples of motor vehicle accident (MVA) survivors, Harvey and Bryant (2002) found that although the positive predictive power of ASD was fairly high (i.e., many trauma victims suffering from ASD go on to develop PTSD), the sensitivity was low to moderate (i.e., most of those who come to suffer from PTSD have not met the initial criteria for an ASD diagnosis). They suspected that this was probably due to a very high percentage of those suffering from subclinical ASD (ASD minus the dissociation criterion) also developing PTSD. Harvey and Bryant (2002) therefore suggested that the current ASD criteria were too narrow to include the full range of acute stress responses that may
develop into PTSD. Furthermore, they found the positive predictive power for the four ASD symptom clusters to be lower than the negative predictive power, meaning that the absence of ASD symptoms predicted the absence of PTSD better than the presence of ASD symptoms predicted the presence of PTSD. The results from this analysis are shown in the first part of Table 1.

Studies on ASD and PTSD in victims of interpersonal violence show a somewhat different picture. In contrast to the MVA studies included in the Harvey and Bryant (2002) meta-analysis, Brewin, Andrews, Rose, and Kirk (1999) studied victims of violent crimes (including rape victims). They found that the four ASD symptom clusters combined resulted in a higher sensitivity than positive predictive power, indicating that the percentage of PTSD cases that had previously met criteria for ASD was higher than the percentage of ASD cases that would go on to develop PTSD. Furthermore, when assessed individually, each symptom cluster had a lower positive predictive power than those reported by Harvey and Bryant (2002). The best classification of cases was achieved by using a full ASD diagnosis based on all four symptom clusters as well as the $A_2$ and F criteria. Results from this study are shown in the middle part of Table 1.

Similar results were obtained in a Danish study on victims of physical assault (not including rape victims; Elklit & Brink, 2004). They found that the most accurate identification of future PTSD cases was achieved by combining the dissociative, reexperiencing, avoidance, and arousal clusters. The addition of the $A_2$ criterion and the impairment criterion did not improve correct classification of PTSD. Results from this study are shown last in Table 1.

Thus, two studies on victims of interpersonal violence have obtained similar results regarding the ability of ASD to identify PTSD cases at follow-up that differ from the results based on MVA victims. In conclusion, ASD and PTSD are common disorders in the aftermath of traumatic events. However, there appear to be some inconsistencies in how well ASD can be used to predict later PTSD across different trauma types. In the MVA studies, most ASD cases went on to develop PTSD (63%-82%), whereas the percentage of PTSD cases that initially met ASD criteria was somewhat lower (29%-73%). However, in victims of interpersonal violence, similar positive predictive power (44%-57%) and sensitivity (50%-57%) were found. Thus, in the two physical assault samples, only about half of those who suffered from ASD later developed PTSD, and similarly, only about half of those with PTSD had previously suffered from ASD.

Whereas the trauma samples used for comparison in the above-mentioned studies had a majority of men, rape samples generally consist almost exclusively of women. Bryant and Harvey (2003) found that ASD was a more accurate predictor of PTSD in women than in men and they concluded that this was
Table 1. Comparison of Results From Studies on MVA<sup>a</sup> and Interpersonal Violence<sup>b</sup>

<table>
<thead>
<tr>
<th>ASD Criteria</th>
<th>ASD (%)</th>
<th>PTSD (%)</th>
<th>Sensitivity&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Specificity&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Positive Predictive Power&lt;sup&gt;e&lt;/sup&gt;</th>
<th>Negative Predictive Power&lt;sup&gt;f&lt;/sup&gt;</th>
<th>Correct PTSD Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bryant &amp; Harvey</td>
<td>13-21</td>
<td>22-30</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>B (dissociation)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.61-.71</td>
<td>.86-.91</td>
<td>—</td>
</tr>
<tr>
<td>C (reexperiencing)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.42-.52</td>
<td>.87-.93</td>
<td>—</td>
</tr>
<tr>
<td>D (avoidance)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.52-.56</td>
<td>.93-.97</td>
<td>—</td>
</tr>
<tr>
<td>E (arousal)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.31</td>
<td>.94-1.00</td>
<td>—</td>
</tr>
<tr>
<td>B + C + D + E</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.63-.82</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>ASD</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Brewin et al.</td>
<td>19</td>
<td>20</td>
<td>0.79</td>
<td>.60</td>
<td>.33</td>
<td>0.92</td>
<td>64</td>
</tr>
<tr>
<td>B (dissociation)</td>
<td>0.82</td>
<td>.54</td>
<td>.31</td>
<td>0.92</td>
<td>0.92</td>
<td>59</td>
<td></td>
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<tr>
<td>C (reexperiencing)</td>
<td>0.89</td>
<td>.64</td>
<td>.39</td>
<td>0.96</td>
<td>0.96</td>
<td>70</td>
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<tr>
<td>D (avoidance)</td>
<td>0.96</td>
<td>.42</td>
<td>.30</td>
<td>0.98</td>
<td>0.98</td>
<td>53</td>
<td></td>
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<tr>
<td>E (arousal)</td>
<td>0.64</td>
<td>.83</td>
<td>.49</td>
<td>0.90</td>
<td>0.90</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>B + C + D + E</td>
<td>0.57</td>
<td>.89</td>
<td>.57</td>
<td>0.89</td>
<td>0.89</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>ASD</td>
<td>1.00</td>
<td>.54</td>
<td>.37</td>
<td>1.00</td>
<td>1.00</td>
<td>.64</td>
<td></td>
</tr>
<tr>
<td>Elklit &amp; Brink</td>
<td>24</td>
<td>22</td>
<td>0.92</td>
<td>.33</td>
<td>.28</td>
<td>0.94</td>
<td>.47</td>
</tr>
<tr>
<td>B (dissociation)</td>
<td>0.85</td>
<td>.64</td>
<td>.39</td>
<td>0.94</td>
<td>0.94</td>
<td>.68</td>
<td></td>
</tr>
<tr>
<td>C (reexperiencing)</td>
<td>1.00</td>
<td>.38</td>
<td>.30</td>
<td>1.00</td>
<td>1.00</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>D (avoidance)</td>
<td>0.80</td>
<td>.79</td>
<td>.52</td>
<td>0.93</td>
<td>0.93</td>
<td>.79</td>
<td></td>
</tr>
<tr>
<td>E (arousal)</td>
<td>0.44</td>
<td>.88</td>
<td>.50</td>
<td>0.85</td>
<td>0.85</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>ASD</td>
<td>1.00</td>
<td>.54</td>
<td>.37</td>
<td>1.00</td>
<td>1.00</td>
<td>.64</td>
<td></td>
</tr>
</tbody>
</table>

Note: MVA = motor vehicle accident; ASD = acute stress disorder; PTSD = posttraumatic stress disorder; B: dissociation; C: reexperiencing; D: avoidance; E: arousal.

- Harvey and Bryant (2002).
- Brewin et al. (1999); Elklit and Brink (2004).
- Sensitivity: The amount of PTSD cases that were originally ASD cases.
- Specificity: The amount of non-PTSD cases that were originally non-ASD cases.
- Positive predictive power: The amount of ASD cases that become PTSD cases.
- Negative predictive power: The amount of non-ASD cases that become non-PTSD cases.
attributable to dissociation being a more significant PTSD risk factor for women. There is some evidence to suggest that this gender difference in the predictive power of dissociation also holds true for persistent dissociation measured 3 months after a traumatic experience (Christiansen & Elklit, 2008). Bryant and Harvey (2003) also concluded that the positive predictive power of ASD was high in females; yet, the negative predictive power was high in males.

Female victims of physical assault are five times as likely to develop PTSD symptoms as female victims of trauma without criminal content, and this increased risk is even more pronounced following rape (Foa, 1997). Furthermore, PTSD risk factors for rape victims have been found to differ from the risk factors that predict PTSD in victims of nonsexual assault (Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999). Also, Dancu, Riggs, Hearst-Ikeda, Shoyer, and Foa (1996) found that adult female rape victims showed elevated levels of dissociation compared to both victims of nonsexual assault and a control group of women who reported no assault in the previous year. However, although dissociation significantly predicted PTSD in the nonsexual assault sample, it did not do so in the rape sample. The authors concluded that dissociation was related to PTSD following some traumatic events but not others. To our knowledge, ASD has not been assessed in rape victims. However, one study found a 94% prevalence of the *DSM-III* (APA, 1980) diagnosis of PTSD without the duration criterion within the first month post-rape (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992). In most rape victims, initial symptom elevation subsides during the first months posttrauma, but when it doesn’t, symptoms tend to persist over time (Bownes, O’Gorman, & Sayers, 1991). PTSD prevalence in the first 3 months following a rape has been found to be around 50% (Rothbaum et al., 1992).

As it appears that the predictive power of an ASD diagnosis on later PTSD status can differ across trauma type and as PTSD risk factors in rape samples may differ from risk factors in physical assault samples, we found it relevant to examine the predictive power of ASD on PTSD in rape victims. Therefore, the present study prospectively investigated ASD and PTSD in a study of female rape victims. We hypothesized that (a) high prevalences of ASD and PTSD will be found following rape; (b) as was the case in the physical assault studies but unlike the MVA studies, the sensitivity of the four ASD symptom clusters combined will be higher than the positive predictive power, indicating that although most victims with PTSD at T2 will previously have suffered from ASD, far from all victims with ASD will go on to develop PTSD; (c) as in the two physical assault studies, sensitivities and negative predictive powers for the individual symptom clusters are expected to be high, whereas specificities and positive predictive powers are expected to be low to moderate,
indicating that most victims with PTSD will have had ASD, and a failure to meet the ASD criteria is associated with a low PTSD risk, whereas the majority of ASD cases do not develop PTSD and many victims without PTSD have previously had ASD; (d) because it has been found that dissociation predicts PTSD better in women than in men, it could be hypothesized that dissociation would be a significant predictor of PTSD in this study on rape victims. However, as dissociation proved to be less predictive of PTSD in physical assault victims than in MVA victims, and as Dancu et al. (1996) found that dissociation did not significantly predict PTSD in rape victims, we expect, instead, that dissociation will not predict PTSD better than the other ASD symptom clusters in this study; and, finally, (e) ASD is expected to be a moderate predictor of PTSD.

Finally, whereas the MVA studies did not include the A2 (peritraumatic fear, helplessness, and horror) and F (functional impairment) criteria in either the ASD or the PTSD diagnosis, the two physical assault studies included these criteria in the ASD but not in the PTSD diagnosis. To ease comparison with these studies, we will examine the predictive power of ASD on the three PTSD symptom clusters combined. However, as the A2 and F criteria are part of the DSM-IV PTSD diagnosis and thus do influence whether a person can be diagnosed with PTSD, we find it highly relevant to include these criteria in the analyses and thus also examine how well ASD can predict a later diagnosis of full PTSD.

**Method**

**Subjects**

Participants included 148 female rape victims who had been in contact with the Centre for Rape Victims at the University Hospital of Aarhus, Denmark. Most victims (59%) had experienced a completed rape. The remaining victims had primarily been exposed to attempted rape (12%), other sexual assault (7%), or they could not remember the specific type of assault they had been subjected to (7%). The vast majority (92%) were of Danish origin. Ages ranged from 12 to 90 years with a mean age of 23.9 years and a median of 20.0 years ($SD = 11.1$).

**Procedures**

Due to limited resources, the center can offer help only to victims who contact the center within 48 hours after being raped. When first coming into contact with the center, victims were asked to give information on a number of
assault-related issues, including whether they had experienced helplessness, life threats, or fear of dying during the assault. Within the first 2 weeks after coming into contact with the center (up to 6 weeks after the assault; T1), victims were asked to fill out a questionnaire. This was used to assess symptoms related to ASD as well as a few other measures not relevant for this study. Approximately 3 months later (T2), participants were asked to fill out another questionnaire that assessed symptoms of PTSD.

The center provides for both male and female rape victims, but the male victims were excluded from analysis in this study due to low numbers (1.9%). As half the participants were teenagers/adolescents, we divided the sample into two groups (below/above the age of 20) in the initial analyses to control for any age effects. We found similar results in the cross-tabulations for the two groups. The same held true for victims of completed rape compared to other types of sexual assault. Ten percent of the sample had been exposed to previous sexual assault in the form of either previous rape or childhood sexual abuse. This group had a significantly higher prevalence of both ASD and PTSD compared to the rest of the sample. However, when analyses were carried out separately for this group, the relationship between ASD and PTSD did not differ from that found in the remaining part of the sample. Therefore, we have chosen to treat the female part of the sample as a single group in all analyses included in this article to keep the population as high and as representative of the clientele at the center as possible.

Measures

ASD. ASD was assessed using the Acute Stress Disorder Scale (ASDS; Bryant, Moulds, & Guthrie, 2000). The ASDS is a self-report measure based on the dissociative, reexperiencing, avoidance, and arousal symptoms listed in the DSM-IV. The scale has been found to possess fine psychometric qualities (Bryant et al., 2000). Alpha coefficients in this study were .82 for ASD total score, .66 for dissociation, .62 for reexperiencing, .66 for avoidance, and .73 for arousal. The ASDS consists of 19 questions relating to each of the ASD symptom clusters. Using a 5-point Likert scale ranging from 1 (not at all) to 5 (very much) respondents indicate the intensity of each symptom. The possible range for total score is 19-95, and the possible score range on the subscales is 5-25 (dissociation), 4-20 (reexperiencing), 4-20 (avoidance), and 6-30 (arousal). Individual item scores above 3 indicate symptom presence. As our study was based on a sample of rape victims, we assume that the A1 criterion is met. The A2 criterion is considered met if the victim during the assault experienced helplessness or fear of dying. The functional impairment criterion (F) is met if the victim has a score of at least 3 on Item 18 on the
Harvard Trauma Questionnaire–Part IV (HTQ; please see below), indicating that the symptoms at least some of the time cause problems in relation to work or other daily activities, or a symptom score of at least 2 on Item 23 on the Trauma Symptom Checklist (Briere & Runtz, 1989), indicating that the victim at least sometimes experiences sexual problems. ASD is diagnosed if at least one A2, one reexperiencing, one avoidance, one arousal, and three dissociative symptoms are present in combination with at least one functional impairment symptom. Subclinical ASD is diagnosed if all criteria except for dissociation are met.

**PTSD.** The HTQ (Mollica et al., 1992) measures PTSD severity and estimates PTSD diagnosis according to the *DSM-IV*. The HTQ measures the intensity of the three core symptom groups of PTSD (intrusion, avoidance, and arousal) and consists of 30 items, 16 of which correspond to the *DSM-IV*. The answers are scored on a 4-point Likert scale (1 = not at all, 2 = a little, 3 = quite a bit, 4 = all the time). Possible total HTQ scores are in the range of 32-128, and the possible score range on the three subscales is 4-16 (reexperiencing), 7-28 (avoidance), and 5-20 (arousal). Item scores above 3 indicate symptom presence. A PTSD diagnosis requires the presence of at least one reexperiencing symptom, three avoidance symptoms, and two arousal symptoms as well as the A2 criterion (same as for ASD) and the functional impairment criterion (same as for ASD, except here T2 measures were used). The HTQ-Part IV has been used extensively in Denmark (Bach, 2003), and good reliability and validity have been reported (Bach, 2003; Mollica et al., 1992). Alpha values in this study were .94 for HTQ total score, .74 for reexperiencing, .77 for avoidance, and .78 for arousal.

**Results**

**Initial Analyses**

The mean ASDS score was 59.6 (SD = 12.3). The means and the standard deviations on each of the ASD symptom clusters were as follows: dissociation (M = 16.2, SD = 4.4), reexperiencing (M = 11.9, SD = 3.5), avoidance (M = 12.1, SD = 3.7), and arousal (M = 19.6, SD = 5.3). Within 2 weeks after first coming into contact with the center, 65% of the victims met criteria for all four ASD symptom clusters, but only 59% met symptom criteria for a full ASD diagnosis and a further 7% met criteria for subclinical ASD, failing only to meet the dissociation criterion. In relation to the different symptom clusters, 75% met the dissociative criterion, 94% met the reexperiencing criterion, 90% met the avoidance criterion, and, finally, 99% of the victims met...
the arousal criterion. Eighty-six percent met at least one $A_2$ criterion, and 81% met the functional impairment criterion with 34% experiencing sexual problems and 73% having difficulties doing their job or doing daily chores. Thus, the dissociative criterion was the one that kept most victims from receiving an ASD diagnosis.

At T2, the mean score on the HTQ was 68.6 ($SD = 18.8$). On the three subscales, the means and standard deviations were as follows: reexperiencing ($M = 9.5$, $SD = 2.8$), avoidance ($M = 15.9$, $SD = 4.9$), and arousal ($M = 13.1$, $SD = 3.8$). Seventy-nine percent met the reexperiencing, 58% met the avoidance, and 74% met the arousal criterion. The $A_2$ criterion was met by 62% and 49% of the victims qualified for the impairment criterion with 30% experiencing daily functioning problems and 39% complaining of sexual problems. In total, 45% met the criteria for all three PTSD symptom clusters, but only 35% suffered from full PTSD. Most victims who failed to meet the criteria for a full PTSD diagnosis did so because they failed to meet either the $A_2$, the avoidance, or the functional impairment criterion.

**ASD and PTSD**

The potential for predicting PTSD by ASD diagnostic status was assessed by cross-tabulation tests. To ease comparison with the studies mentioned earlier, we conducted two sets of cross-tabulations—one set predicting PTSD diagnosis minus the $A_2$ and $F$ criteria and one predicting a full PTSD diagnosis. Significance was established by $\chi^2$ test.

Table 2 reports that the dissociative, reexperiencing, avoidance, and arousal symptom clusters had similar success rates in predicting PTSD subscale symptoms with high sensitivity and negative predictive power but low specificity and positive predictive power in the moderate range. When avoidance and arousal were used to classify PTSD cases, the result was no better than after a random classification. Classification based on meeting the dissociative or the reexperiencing criterion was better than a random classification, but it was only correct in about half the cases. Combined, the four ASD symptom clusters were better at predicting PTSD subscale diagnostic status than either of the clusters alone, correctly classifying 60% of the cases.

The number of correctly classified cases could be improved by increasing the number of reexperiencing, avoidance, and arousal symptoms required to receive an ASD diagnosis. However, the improvements were not impressive. When increasing the number of these three subscale symptoms, it did not make any difference whether dissociation was included in the criteria. Adding the $A_2$ and $F$ criteria improved diagnostic power, with a full ASD diagnosis
Table 2. Classification of Posttraumatic Stress Disorder (PTSD) Without Criteria A$_2$ and F

<table>
<thead>
<tr>
<th>ASD Criteria</th>
<th>Sensitivity$^a$</th>
<th>Specificity$^b$</th>
<th>Positive Predictive Power$^c$</th>
<th>Negative Predictive Power$^d$</th>
<th>Correct PTSD Classification</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (dissociation)</td>
<td>.84</td>
<td>.32</td>
<td>.51</td>
<td>0.70</td>
<td>56</td>
<td>$p \leq .05$</td>
</tr>
<tr>
<td>C (reexperiencing)</td>
<td>1.00</td>
<td>.12</td>
<td>.49</td>
<td>1.00</td>
<td>52</td>
<td>$p \leq .01$</td>
</tr>
<tr>
<td>D (avoidance)</td>
<td>0.94</td>
<td>.14</td>
<td>.48</td>
<td>0.75</td>
<td>51</td>
<td>n.s.</td>
</tr>
<tr>
<td>E (arousal)</td>
<td>1.00</td>
<td>.02</td>
<td>.46</td>
<td>1.00</td>
<td>47</td>
<td>n.s.</td>
</tr>
<tr>
<td>B + C + D + E</td>
<td>0.78</td>
<td>.46</td>
<td>.54</td>
<td>0.71</td>
<td>60</td>
<td>$p \leq .01$</td>
</tr>
<tr>
<td>ASD</td>
<td>0.72</td>
<td>.56</td>
<td>.63</td>
<td>0.65</td>
<td>64</td>
<td>$p \leq .01$</td>
</tr>
<tr>
<td>ASD ÷ B</td>
<td>0.92</td>
<td>.43</td>
<td>.63</td>
<td>0.82</td>
<td>70</td>
<td>$p \leq .0005$</td>
</tr>
</tbody>
</table>

Note: PTSD subscales: A minimum of one reexperiencing symptom, three avoidance symptoms, and two arousal symptoms. B: dissociation; C: reexperiencing; D: avoidance; E: arousal.

|   |   |   | Predictive Power$^c$ | Predictive Power$^d$ | Classification | Significance |

- **a. Sensitivity:** The amount of PTSD cases that were originally acute stress disorder (ASD) cases.
- **b. Specificity:** The amount of non-PTSD cases that were originally non-ASD cases.
- **c. Positive predictive power:** The amount of ASD cases that become PTSD cases.
- **d. Negative predictive power:** The amount of non-ASD cases that become non-PTSD cases.
correctly classifying 64% of the cases. However, the best result was achieved when the dissociative criterion was ignored, which led to correct classification in 70% of the cases.

As can be seen in Table 3, the four ASD symptom clusters when assessed individually had similar success at predicting full PTSD as was the case for PTSD minus the A2 and F criteria, although a lower percentage of cases were correctly classified. When the clusters were combined, they correctly classified 55% of the cases. As was the case for PTSD based only on the three subscales, the diagnostic classification was improved by adding the A2 and F criteria to the ASD diagnosis. However, ignoring the dissociative criterion did not improve classification of full PTSD as was the case for PTSD without the A2 and F criteria.

A regression analysis was conducted to establish how much of the PTSD variance could be explained by ASD. Because this is a measure of PTSD severity, the dependent measure used was the HTQ total score, which means that PTSD criteria A2 and F were not included in this analysis. ASDS total score and sexual problems significantly predicted PTSD severity \((F = 26.58, p \leq .001)\), explaining 28% of the variance. Work-related problems or other problems with daily functioning did not significantly predict PTSD severity, nor did any of the individual ASD symptom clusters when sexual problems were controlled for, although all except dissociation were significant when first entered into the analysis. Previous sexual trauma (childhood sexual abuse or previous rape) did not reach significance or mediate the relationship between either ASDS total score or sexual problems and PTSD severity when entered into the analysis.

**Discussion**

As hypothesized, both ASD and PTSD were highly prevalent in this population. Sixty-five percent of the sample met the criteria for all four ASD symptom clusters compared to between 19% and 22% in the physical assault studies and between 13% and 21% in Harvey and Bryant’s (2002) meta-analysis. Fifty-nine percent met criteria for a full ASD diagnosis, and this number was increased to 66% if the dissociation criterion was ignored. After 3 months, 45% of the women met criteria for the three PTSD subscales. This number is comparable to the 47% who met PTSD criteria 3 months after being raped in the Rothbaum et al. (1992) study and higher than the probable PTSD diagnoses given in both the MVA (22%-30%) and the physical assault studies (20%-22%). When the A2 (peritraumatic fear, helplessness, and horror) and F (functional impairment) criteria were taken into account, only 35% could be considered as suffering from full PTSD.
Table 3. Classification of Full Posttraumatic Stress Disorder (PTSD), Including Criteria A2 and F

<table>
<thead>
<tr>
<th>ASD Criteria</th>
<th>Sensitivity&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Specificity&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Positive Predictive Power&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Negative Predictive Power&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Correct PTSD Classification</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (dissociation)</td>
<td>0.88</td>
<td>.29</td>
<td>.39</td>
<td>0.82</td>
<td>49</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>C (reexperiencing)</td>
<td>1.00</td>
<td>.08</td>
<td>.36</td>
<td>1.00</td>
<td>41</td>
<td>n.s.</td>
</tr>
<tr>
<td>D (avoidance)</td>
<td>0.98</td>
<td>.08</td>
<td>.36</td>
<td>0.86</td>
<td>39</td>
<td>n.s.</td>
</tr>
<tr>
<td>E (arousal)&lt;sup&gt;e&lt;/sup&gt;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>B + C + D + E</td>
<td>0.84</td>
<td>.40</td>
<td>.43</td>
<td>0.83</td>
<td>55</td>
<td>p ≤ .01</td>
</tr>
<tr>
<td>ASD</td>
<td>0.81</td>
<td>.52</td>
<td>.48</td>
<td>0.83</td>
<td>62</td>
<td>p ≤ .001</td>
</tr>
<tr>
<td>ASD ÷ B</td>
<td>0.95</td>
<td>.34</td>
<td>.44</td>
<td>0.92</td>
<td>56</td>
<td>p ≤ .001</td>
</tr>
</tbody>
</table>

Note: Full PTSD diagnosis: A minimum of one A2 symptom, one reexperiencing symptom, three avoidance symptoms, two arousal symptoms, and one functional impairment symptom. B: dissociation; C: reexperiencing; D: avoidance; E: arousal.

<sup>a</sup> Sensitivity: The amount of PTSD cases that were originally acute stress disorder (ASD) cases.

<sup>b</sup> Specificity: The amount of non-PTSD cases that were originally non-ASD cases.

<sup>c</sup> Positive predictive power: The amount of ASD cases that become PTSD cases.

<sup>d</sup> Negative predictive power: The amount of non-ASD cases that become non-PTSD cases.

<sup>e</sup> All of the women who had given all the information required for a full PTSD diagnosis met criteria for the ASD arousal cluster. Therefore, no analyses were carried out for this. However, 40 out of 116 participants who experienced ASD arousal went on to develop full PTSD.
The second hypothesis stating that the results for PTSD without the A2 and F criteria would be similar to those obtained in the physical assault studies was supported to some degree. The positive predictive power for the four ASD symptom clusters combined was similar to those in the two physical assault studies and lower than those found in Harvey and Bryant’s (2002) meta-analysis. As predicted, the sensitivity of the four ASD symptom clusters combined was higher than the positive predictive power. This was true for PTSD both with and without the A2 and F criteria, indicating that only about half of those reporting symptoms from all four ASD clusters later developed PTSD, whereas approximately 80% of those with full PTSD at T2 had previously reported such symptoms. All in all, both the combination of the four ASD subscales and the full ASD diagnosis correctly classified fewer cases in our study than in the studies of physical assault victims by Brewin et al. (1999) and Elklit and Brink (2004).

In accordance with our third hypothesis, the individual ASD symptom clusters all had high sensitivity and negative predictive power, which means that most of the participants who were later given a PTSD diagnosis initially reported dissociation, reexperiencing, avoidance, and arousal. Thus, the absence of these symptoms within the first weeks following rape is consistent with a low risk of developing PTSD in the following months. However, the positive predictive power was in the moderate range, meaning that only about half or less of those reporting ASD symptoms at T1 would also meet diagnostic criteria for PTSD at T2. This was true both when the PTSD diagnosis was based solely on the three core symptoms and for a full PTSD diagnosis. In addition, the low specificity indicates that only up to 30% of those who were not diagnosed with PTSD at T2 did not report ASD symptoms at T1. This was particularly true for arousal because nearly all the participants had experienced at least one arousal symptom during the first weeks posttrauma. In fact, all the participants providing the necessary information for classification according to full PTSD status met criteria for ASD arousal.

In accordance with our fourth hypothesis and consistent with the physical assault studies and the study of Dancu et al. (1996), dissociation did not impress with its ability to predict PTSD. Although it classified more cases correctly than the other symptom clusters in the cross-tabulations, it quickly lost the ability to improve the model as soon as more symptoms were included from the other symptom clusters. In addition, in the regression model for PTSD severity, dissociation was not significant even when the four ASD symptom clusters were examined alone.

The values for the full PTSD diagnosis were somewhat different from those for the combined PTSD symptom clusters. The cross-tabulations for the individual ASD symptom clusters were similar for PTSD with and without the
A2 (peritraumatic fear, helplessness, and horror) and F (functional impairment) criteria but led to somewhat fewer correctly classified cases in the case of full PTSD. The four ASD symptom clusters combined could be used to correctly classify 60% of the victims according to whether they would later meet the criteria for all three PTSD symptom clusters. This classification was improved by adding the A2 and F criteria to the ASD diagnosis, but the highest correct classification rate was obtained by a subclinical ASD diagnosis, leading to correct classification of 70% of the cases. Less cases of full PTSD were correctly classified with full ASD as the best basis of classification being correct in 62% of the cases. All in all, though most victims with PTSD did meet criteria for ASD in the first month postrape, only about half of the victims initially meeting criteria for ASD actually went on to develop PTSD.

We used both cross-tabulation models and linear regression to analyze the relationship between ASD and later PTSD. We used the cross-tabulations to examine ASD predictive power based on PTSD diagnostic status and thus do not take symptom severity into consideration. Contrary to this, the regression analysis examined the predictive power of ASD severity on PTSD severity. When categorizing participants according to diagnostic status, there is no consideration of intragroup variances in symptom scores. However, analyzing the same data using a regression model made up for this shortcoming. This analysis showed that PTSD severity was best predicted by ASD severity in combination with the degree to which the victims experienced sexual problems following their rape. However, together these two variables accounted for only 28% of the variance in PTSD severity. Combined, the results from the cross-tabulations and the regression model support our hypothesis that ASD is not an optimal predictor of PTSD in a sample of rape victims, neither at the categorical level nor at the severity level.

**Limitations**

Our results are based on a sample of female rape victims seeking help to deal with their trauma. Thus, the generalization of our findings to non-help-seeking or male rape victims should be made with caution. Furthermore, as the purpose of the center is to help victims of rape, the participants in this study have received various degrees of assistance and counseling, and thus they may not be directly comparable to rape victims who have not been offered the same amount of practical and emotional support.

Finally, this study is subject to all the limitations, which are associated with participants’ self-reporting of symptoms. Clinician-administered interviews may be more suited for obtaining as much and as accurate information...
as possible. However, due to limited resources, such thorough assessment is rarely available to rape centers, and as such, this way of obtaining information is more ecologically valid.

Future Research

This study adds to the accumulating amount of research pointing to the ASD diagnosis as being only a moderate predictor of PTSD across different trauma types. More importantly, our findings highlight the need for better ways of identifying those most at risk for developing PTSD following rape as well as other types of trauma. There is some evidence that it is not early posttraumatic symptomatology per se that predicts the development of PTSD but rather the negative appraisal of such symptoms (e.g., Michael, Ehlers, Halligan, & Clark, 2005; O’Donnell, Elliott, Wolfgang, & Creamer, 2007). Future research should broaden the focus on possible predictors of PTSD beyond the ASD diagnosis to make room for possible mediating factors between acute and chronic stress reactions such as symptom appraisal.

Our sample differs from the samples assessed by Brewin et al. (1999) and Elklit & Brink (2004), not only in trauma type but also in gender distribution. Thus, it is possible that our results differ from theirs not only because of the sexual content of the trauma but also because our population was made up exclusively of women. However, as PTSD risk factors for rape victims have been found to differ from the risk factors that predict PTSD in female victims of nonsexual assault (Acierno et al., 1999; Dancu et al., 1996), there is some support for the idea that the differences between our study and the two physical assault studies are not simply a result of gender differences. Thus, our results emphasize the importance of future studies assessing female victims of sexual and nonsexual assault separately.

Implications for Intervention

Rape crisis centers are faced with the challenge of providing the best possible help for very limited resources. To this purpose, there is a need for early identification of those most in need of help. Therefore, the use of ASD as an instrument aimed at identifying probable PTSD cases within the first month posttrauma may appear appealing. However, there are two major problems with the use of the ASD diagnosis for this purpose.

First of all, this study suggests that ASD is of limited use in categorizing cases according to probable later PTSD status. Only between 48% and 63% of the ASD cases actually go on to develop PTSD, which means that resources...
are not aimed directly at where they are most needed. Furthermore, despite an estimated prevalence of full ASD of 59% in this study, it still failed to identify between 20% and 30% of the PTSD cases. This means that if the majority of resources are used on victims meeting criteria for ASD, up to one third of the PTSD cases are not offered the much-needed assistance. Though these numbers can be somewhat improved by manipulating the criteria needed for an ASD diagnosis, the fact remains that ASD is not a very reliable way of identifying PTSD cases.

Second, an important subject to consider is whether a categorical approach to posttraumatic symptoms is appropriate in relation to deciding where resources should be focused. Ten percent of the rape victims in this study fell just one symptom short of a PTSD diagnosis. Without evidence supporting that this one symptom makes the difference between having a high and a low need for help, it does not seem appropriate to use it as a basis for deciding who should receive which amount of help. There is an urgent need for more evidence-based guidance for the direction of resources at such centers. However, at the present time, unfortunately, research appears to have failed in providing one.

**Conclusions**

In conclusion, the ASD diagnosis has been found to be of limited use in identifying those most at risk for developing PTSD in victims of MVAs (Harvey & Bryant, 2002), victims of interpersonal violence (Brewin et al., 1999; Elklit & Brink, 2004), and now also in rape victims. Although ASD does not predict PTSD similarly across different trauma types, different studies point in the same direction when it comes to evaluating ASD as a diagnosis primarily aimed at identifying trauma victims at risk for PTSD: The overall predictive power is not sufficient. This is true both when a PTSD diagnosis is based only on the three core symptoms and when it is based on all the *DSM-IV* diagnostic criteria. In this study, PTSD core symptoms were best identified when using a subclinical ASD diagnosis based on ASD reexperiencing, avoidance, arousal, and the A2 and F criteria. However, classification of full PTSD was best when based on a complete ASD diagnosis. Even though the predictive power of ASD is not impressive, it remains to be seen whether any alternatives can be found that are superior in predicting PTSD status and severity.

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Note

1. The meta-analysis also included a study on assault victims by Brewin, Andrews, Rose, and Kirk (1999), referred to elsewhere in this article. However, Harvey and Bryant appear to have misinterpreted the results by Brewin et al. and thus mistaken the percentage of correctly classified PTSD cases for the positive predictive power (i.e., the percentage of ASD cases who later developed PTSD). Thus, they have reported that 83% of the ASD cases in Brewin et al.’s study later developed PTSD. The correct number is 57%. Two other studies included in the meta-analysis are left out here because the data relevant for comparison are missing (Classen, Koopman, Hales, & Spiegel, 1998) and because we felt that findings based on a single study were not enough to include typhoon victims in our analysis (Staab, Grieger, Fullerton, & Ursano, 1996).

References


**Bios**

**Ask Elklit**, M. Psych., is a professor of psychology and head of the National Research Centre for Psychotraumatology at the University of Southern Denmark. According to a recent study, he has been involved in most of the Danish studies on trauma populations and crisis intervention. He is also the author of a dozen methodological studies. He is engaged in popularization of scientific results through a bimonthly journal distributed to all Danish psychologists and through the Web (www.voldtaegt.dk; www.psykotraume.dk). He has served the Danish Red Cross, Doctors Without Borders, and the National Association for Polio, Traffic and Accident victims (PTU). He was the cofounder of the first Danish Centre for Rape Victims and of the experiments with intensive language learning (utilizing suggestopedia) for traumatized refugees. He has been supervising several Danish rehabilitation centers for torture victims for 10 years and is involved in developing a specialist program in psychotraumatology for licensed psychologists. He is a licensed psychologist and a licensed specialist and supervisor in psychotherapy and psychotraumatology. He has a private practice focusing on personality disorders and severely traumatized clients.

**Dorte M. Christiansen**, M. Psych., is a PhD student at the University of Aarhus. She has been involved in research carried out at the Centre for Rape Victims in Aarhus and is currently working on gender differences in relation to the development of PTSD.