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Acute Stress Disorder Diagnosis, Clusters, and Symptoms as Predictors of Posttraumatic Stress Disorder, and Gender Differences in Victims of Violent Crimes

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Additional information is available at the end of the chapter

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Abstract

Violent crimes represent a societal problem, and victims, namely women, often develop posttraumatic stress disorder (PTSD). Previous studies have identified acute stress disorder (ASD) as a predictor of PTSD, as well as dissociation. However, there are some inconsistencies regarding which cluster or symptom has better predictive power, and the impact of gender is still unknown in victims of violent crimes. The aim of this study was to determine the predictive power of full and partial ASD diagnosis, clusters, and symptoms according to gender. To do so, 39 women and 36 men were evaluated using validated semi-structured clinical interviews within 30 days post crime for ASD and 2 months later for PTSD. Results showed that 52% of individuals had full ASD and 20% has partial ASD, 40% had full PTSD and 17% had partial PTSD. Both full and partial ASD diagnoses, as well as all clusters, and most symptoms, were good predictors of PTSD. No gender differences were observed concerning the predictive power of ASD clusters and symptoms. The decreased emphasis on dissociative reactions in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM 5) to establish an ASD diagnosis appears relevant to better identify women and men at risk of PTSD after a violent crime, and to deliver appropriate early preventive interventions.

Keywords: violent crime, acute stress disorder, PTSD, predictors, gender

1. Introduction

1.1. Victims of violent crimes

Criminal acts are the most common traumatic events to which the general population is exposed [1]. According to Canada's General Social Survey [2], 6% of the population reported having been a victim of a violent crime in the last 12 months (e.g., sexual assault, armed robbery, and physical assault). Interpersonal violence represents a significant societal problem and has a detrimental impact on victims' health. Studies have shown that victims of violent crimes usually report important impairment to their functioning and psychological difficulties. Up to 20–21% subsequently develop posttraumatic stress disorder (PTSD) that might become chronic without intervention [3, 4], and this is all the more true for women [5, 6]. Indeed, lifetime prevalence rates of PTSD are twice as high in women as in men (10.4 vs. 5%) and women are four times more likely to develop PTSD when exposed to the same trauma. Thus, it appears important to identify victims at risk of developing subsequent PTSD, and to better understand gender differences regarding this risk.

The acute stress disorder (ASD) diagnosis was first introduced into the 4th edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [7] to recognize stress reactions within the first month following a traumatic event and to identify victims at risk of developing PTSD [8]. To meet criteria for ASD in DSM-IV, the individual must have experienced, witnessed, or been confronted to a traumatic event that triggered fear, helplessness, or horror (criteria A1 and A2). Moreover, the individual has to report symptoms from four clusters: three dissociative symptoms (criterion B), one reexperiencing symptom (criterion C), one avoidance symptom (criterion D), and one arousal symptom (criterion E). Symptoms have to cause distress or impairment (criterion F), and persist for at least 2 days, but no longer than 4 weeks (criterion G). However, in the recent DSM-5 [9], no dissociative reaction is mandatory to establish an ASD diagnosis. According to Bryant [10], people who are at high risk for PTSD may not have met ASD criteria in the DSM-IV because of the requirement of dissociative symptoms. Other studies suggest that the impact of dissociation may vanish on long-term adjustment [11, 12]. In the DSM-5, the individual must report nine symptoms out of 14, with onset or exacerbation occurring after the traumatic event. Symptoms for ASD in the DSM-5 include intrusion (4), negative mood (1), dissociation (2), avoidance (2), and arousal (5). Hence, it appears relevant to comment on the DSM-5 decisions in the hope of better detecting victims at risk for PTSD.

The predictive ability of ASD to predict PTSD is evaluated through the concept of predictive power. *Positive predictive power* refers to the probability of developing PTSD when an ASD symptom is present, while *negative predictive power* represents the probability of not developing PTSD when an ASD symptom is absent. To date, some studies have examined the positive and negative predictive power of ASD diagnosis, clusters, and/or symptoms on subsequent PTSD, and found inconsistent results [13]. A review has observed variability in the predictive ability of ASD, which could be explained by the diversity of trauma samples studied [14]. Most included studies focused on victims of major vehicle accidents (MVAs). Victims of major vehicle accidents and violent crimes differ in particular in terms of the interpersonal nature of

the act. Victims of violence can struggle with feelings of injustice and betrayal as they attempt to come to terms with the fact that another human being is responsible for such reprehensive behavior [15]. A comparison study between MVA victims and violent crime victims revealed differences, such as lower positive predictive power in victims of violent crimes [8, 16]. In the literature, higher rates of PTSD are associated with intentionally inflicted violence [17]. Thus, these samples appear distinctive, which reinforces the importance of examining specific studies regarding victims of violent crimes.

1.2. ASD diagnosis, clusters, and symptoms as predictors of PTSD

To date, four studies have examined the prevalence of ASD, the incidence of PTSD, and the predictive power of ASD diagnosis and clusters between 48 h and 6 weeks after a violent crime (i.e., physical assault, rape, and bank robbery) on PTSD 3–6 months later [4, 18–20]. Full ASD diagnosis was found in 12–59% of victims, and partial ASD (i.e., meeting all criteria except for dissociation symptoms) in 7–21%. Subsequently, 7–35% met full PTSD criteria and 22% for partial PTSD (i.e., at least one severe symptom in each symptom category plus reported impairment from these symptoms). The highest percentages were found in victims of rape, which were all women. ASD diagnosis had the best PTSD classification compared to each cluster (i.e., 62–90% of correct classification). For each cluster, negative predictive power was high, while positive predictive power was low. Two studies reported dissociation as the best predictive cluster (i.e., between 49 and 80% of correct classification). However, in these studies, ASD and PTSD symptoms were self-reported.

Regarding all types of trauma, only two studies (MVA and burn victims) have examined the predictive ability of ASD symptoms [8, 21, 22]. Results have shown that all symptoms were predictors, ranging from low to high positive predictive power (i.e., 0.12–1.00) and moderate to high negative predictive power (i.e., 0.78–1.00). Difede et al. [21] found that victims of burn injuries who developed PTSD reported recurrent images or thoughts, distress on exposure, avoidance of thoughts and activities, difficulty sleeping, irritability, poor concentration, motor restlessness, reduced awareness, and derealization more often than did individuals without PTSD. However, the generalization of these results to victims of violent crimes, who generally report more PTSD symptoms than victims of accidents, may be limited [23].

1.3. Gender differences in the predictive power of ASD

A study on victims of MVA showed that ASD was a better predictor of PTSD in women [24]. The authors suggested that this result was attributable to dissociation being a greater risk factor of PTSD in women. Moreover, positive predictive power was higher in women while negative predictive power was higher in men. Another study on MVA victims found that women were at greater risk for PTSD, and also more likely to report arousal symptoms, avoidance, and numbing symptoms and some reexperiencing symptoms [25]. In this study, women with dissociation were more at risk of developing PTSD. Thus, studies suggested a better predictive power of ASD for PTSD in women mainly because of gender differences in dissociative reactions.

Globally, studies on victims of violent crimes have supported the relevance of ASD diagnosis to predict PTSD. Predictive ability of partial ASD has only been documented in one study. Overall, all ASD clusters have shown high negative predictive power and low positive predictive power. However, it remains unclear which cluster better predicts PTSD diagnosis. The predictive power of each ASD symptom has not been examined in victims of violent crimes. Moreover, the differential predictive power of ASD clusters and symptoms according to gender has not been studied in these victims. Finally, previous studies have used self-report measures to evaluate ASD and PTSD, which suggests that responses were influenced by the victims' perceptions.

Moreover, it is well known that women are twice as likely as men to develop PTSD, but the reasons underlying this discrepancy remain unclear [5]. If ASD is considered a predictor of PTSD, it appears pertinent to determine to what extent ASD clusters and symptoms predict PTSD according to gender.

2. The current study

The purpose of the present study was to determine the predictive power of ASD diagnosis, clusters, and symptoms on PTSD diagnosis based on semi-structured interviews according to gender in victims of violent crimes. To do so, four operational objectives were defined. The first objective was to assess the percentage of individuals with or without ASD (i.e., full, partial, or no diagnosis) who will have developed PTSD (i.e., full and partial) 2 months after a violent crime. The second objective was to assess the predictive power of overall ASD diagnosis and each ASD cluster (i.e., B, C, D, and E) on PTSD diagnosis (full or partial compared to no diagnosis). Moreover, we predicted that dissociation would better classify PTSD compared to other clusters. The third objective was to evaluate the predictive power of each ASD symptom on PTSD diagnosis. The fourth objective was to examine the predictive power of each ASD cluster and symptom according to gender.

2.1. Method

2.1.1. *Participants and procedure*

The study was part of a larger longitudinal study that aimed to examine the evolution of distress and well-being after a violent crime, as well as predictive factors of PTSD. Individuals were recruited between 2009 and 2014 through the Trauma Studies Center (TSC) with the collaboration of the Montreal Crime Assistance Center (CAC). The inclusion criteria were the following: (a) being exposed to a violent crime (e. g., physical or sexual aggression and armed robbery) during the previous 30 days (i.e., the timeframe to screen for ASD), (b) being aged between 18 and 65 years old, and (c) being able to communicate in French or English. Exclusion criteria included a past or present psychotic episode, bipolar disorder, traumatic brain injury, an organic mental disorder or active suicidal ideations requiring an intervention.

Individuals were informed of the project by the CAC up to 30 days post crime. Interested individuals contacted the coordinator to clarify the circumstances of the crime and to be screened according to the research criteria. Then, symptoms of individuals admitted to the study were assessed with a semi-structured clinical interview (T0) conducted by a trained assistant to evaluate the ASD diagnosis and to fill out questionnaires. Individuals were reassessed for PTSD diagnosis after 2 months (T1) and questionnaires were sent by mail to be completed at home. For each completed assessment, individuals received a 20\$ compensation. For the present subset of the larger study, only quantitative information of semi-structured interviews was used (i.e., ASD diagnosis, clusters, and symptoms at T0 and PTSD diagnosis at T1). In total, 69% of individuals completed both assessments.

2.2. Sociodemographic characteristics at baseline

Table 1 presents the sociodemographic characteristics of individuals. In total, 39 female and 36 male victims of violent crimes participated in the study. The mean age was 35 years old for women and 42 years old for men. Most participants were Caucasians. Twenty-three percent of women and 38% of men were currently in a relationship. Thirty-nine percent of women and 50% of men were employed. Most often, women and men reported having been victims of a physical assault (i.e., 77 and 84%, respectively).

Variable	Men (<i>n</i> = 36)	Women (<i>n</i> = 39)
Age (mean)	41.9 (15.9)	35.1 (13.8)
Relationship status (% with partner)	37.8	22.5
Occupational status (%)		
Employed	50.0	38.9
Temporary Break from Work	33.3	41.7
Not working (retired or by choice)	16.7	19.4
Type of trauma (%)		
Physical assault	83.8	76.9
Sexual assault	2.8	5.1
Threats	13.9	10.2
Witness in others' events	0.0	2.6
Other	16.7	20.5
Time since trauma (# days)	28.3 (10.8)	24.7 (9.3)

Table 1. Sociodemographic characteristics at baseline.

2.3. Measurement

The acute stress disorder interview (ASDI) [26] is a semi-structured interview administered at T0 that assesses ASD symptoms according to the DSM-IV. Individuals meeting all criteria were

classified as having full ASD. Partial ASD was diagnosed when individuals met all criteria except for criteria B, for which only one out of three dissociative symptoms was required [18]. The ASDI has shown good internal consistency ($\alpha = 0.90$), temporal stability ($r = 0.90$), sensitivity (91%), and specificity (93%) based on clinicians’ judgment [26].

The structured clinical interview for DSM-IV axis I disorders (SCID-I) [27] was used at T1 to assess the presence or absence of PTSD (i.e., full, partial, or no diagnosis) and other axis I diagnoses. Partial PTSD was diagnosed when individuals met all criteria for each cluster except one (i.e., B, C, or D) [18]. This semi-structured interview showed good convergent validity according to clinicians’ judgment ($k = 0.69$), as well as an inter-rater reliability ranging from 0.77 to 0.92 [28].

3. Results

3.1. ASD cases and incidence of PTSD

Table 2 presents the percentage of individuals who met criteria for ASD and PTSD diagnoses. At the initial assessment (T0), 39 victims of violent crimes (52%) met criteria for full ASD, and 15 victims (20%) for partial ASD. These 15 individuals did not meet criteria for dissociation (i.e., fewer than the three symptoms required). At the 2-month post-trauma assessment (T1), 21 victims (40%) met full criteria for PTSD and nine victims (17%) met criteria for partial PTSD. Partial diagnoses were due to individuals not meeting criteria for avoidance (i.e., $n = 9$, fewer than the three symptoms required).

ASD (T0)			PTSD (T1)			
Criteria	N	%	# contacted	Criteria	N	%
Full	39	52.0	25	Full	15	60.0
				Partial	6	24.0
				None	4	16.0
Partial	15	20.0	11	Full	6	54.5
				Partial	2	18.2
				None	3	27.3
None	21	26.9	16	Full	0	0.0
				Partial	1	6.3
				None	15	93.8
Total	75		52			

Table 2. Percentages of individuals with full, partial, and no ASD diagnoses who met criteria for full, partial, and no PTSD.

Among individuals who completed both assessments, 15 (60%) of those who had received a diagnosis of full ASD met full criteria for PTSD at the 2-month follow-up. Of those with a partial ASD diagnosis, six victims (55%) met full criteria for PTSD and two victims (18%) met partial criteria for PTSD. The 55% within the partial ASD group that met full criteria for PTSD consisted of individuals who did not meet criteria for dissociation.

3.2. Predictive power of ASD diagnosis and clusters on PTSD

Table 3 presents positive and negative predictive power of ASD clusters on PTSD. Positive predictive power was calculated by dividing the number of individuals who reported each ASD cluster and who later developed PTSD (i.e., full and partial diagnoses combined) by the total number of individuals who reported each ASD cluster. Negative predictive power was calculated by dividing the number of individuals who did not report each ASD cluster and who later did not develop PTSD (full and partial combined) by the total number of those who did not report the cluster.

Cluster	Positive predictive power ^a	Negative predictive power ^b	% of correct PTSD classification
B: Dissociation	0.59	0.67	65.4
C: Reexperiencing	0.60	0.50	82.7
D: Avoidance	0.65	0.50	82.4
E: Arousal	0.66	0.55	84.3
ASD diagnosis ^c	0.58	0.94	84.6

^a The probability of the presence of PTSD when the criteria for the cluster were met.

^b The probability of the absence of PTSD when the criteria for the cluster were not met.

^c Full and partial diagnoses combined.

Table 3. Positive and negative predictive power for PTSD of each ASD cluster.

Results show that both negative and positive predictive power were moderate for all clusters (i.e., 0.50–0.67) and negative predictive power was high for ASD diagnosis (i.e., 0.94) according to Cohen (0.2 for low, 0.5 for moderate, and 0.8 for high [23]). A logistic regression analysis with PTSD diagnosis as the dependant variable (i.e., full and partial combined compared to no diagnosis) and each individual cluster (i.e., B, C, D, and E) and overall ASD diagnosis (i.e., full and partial) as independent variables were performed to determine the percentage of correct PTSD classification. Dissociation provided the lowest score compared to clusters C, D, E, and ASD diagnosis. However, no significant differences emerged based on Cochran's Q-test.

3.3. Predictive power of ASD symptoms on PTSD

Table 4 presents the percentage of individuals who reported each ASD symptom as a function of their PTSD diagnostic status at 2 months post trauma. Full PTSD and partial PTSD diagnoses were grouped together for the purpose of these analyses. Chi-squared analyses of individuals

with and without PTSD were subjected to a Bonferroni adjustment in which the alpha level was set at 0.002. The presence of several ASD symptoms was significantly associated with a greater probability of having PTSD, recurrent images or thoughts, nightmares, distress on exposure, avoidance of thoughts, places and people, difficulty sleeping, poor concentration, exaggerated startle response, and motor restlessness. Individuals diagnosed with PTSD reported the abovementioned symptoms more often than individuals without a diagnosis of PTSD.

ASD symptom	Full and partial PTSD	No PTSD	$\chi^2, 1, n = 52$	Positive predictive power ^a	Negative predictive power ^b
Hurt/death	96.7	86.4	1.90	0.60	0.75
Fear	96.7	90.9	0.77	0.59	0.67
Helplessness	83.3	77.3	0.30	0.60	0.50
Numbing	56.7	40.9	1.26	0.65	0.50
Reduced awareness	70.0	50.0	2.15	0.66	0.55
Derealization	86.7	68.2	2.60	0.63	0.64
Depersonalization	23.3	13.6	0.77	0.70	0.63
Dissociative amnesia	63.3	54.5	1.65	0.66	0.52
Recurrent images or thoughts	93.3	50.0	12.71**	0.72	0.85
Nightmares	76.7	72.7	12.55**	0.79	0.70
Sense of reliving experience	26.7	90.9	2.52	0.80	0.48
Distress on exposure	93.3	59.1	17.00**	0.76	0.87
Avoidance of thoughts	100.0	54.5	21.27**	0.75	1.00
Avoidance of discussions	60.0	77.3	7.148	0.78	0.59
Avoidance of places	93.3	45.5	10.76*	0.70	0.83
Avoidance of people	93.1	72.7	23.74**	0.82	0.89
Difficulty sleeping	96.7	63.6	22.49**	0.78	0.93
Irritability	76.7	59.1	6.86	0.72	0.65
Poor concentration	86.7	50.0	8.314*	0.70	0.73
Hypervigilance	93.3	18.2	1.649	0.61	0.67
Exaggerated startle response	90.0	77.3	24.27**	0.84	0.85
Motor restlessness	90.0	61.9	15.46	0.77	0.81

^a The probability of the presence of PTSD when the symptom is present.

^b The probability of the absence of PTSD when the symptom is absent.

* $p < 0.002$.

** $p < 0.0001$.

Table 4. Percentages of each ASD symptom on the basis of their PTSD diagnostic status (full and partial or no PTSD) and positive and negative predictive power of each symptom.

Both positive and negative predictive powers were moderate according to Cohen [29] for the following symptoms: afraid, hurt/death, helplessness, numbing, reduced awareness, derealization, depersonalization, dissociative amnesia, nightmares, avoidance of discussions, irritability, poor concentration, and hypervigilance. Negative predictive power was high while

positive predictive power was moderate for recurrent thoughts or images, distress on exposure, avoidance of thoughts, avoidance of places, difficulty sleeping, and motor restlessness. Positive predictive power was high while negative predictive power was low for sense of reliving. Finally, both positive and negative predictive powers were high for avoidance of people and exaggerated startle response.

3.4. Gender differences in the positive and negative predictive power of ASD clusters and symptoms on PTSD

Table 5 presents the proportion of women and men who reported each ASD symptom and cluster. Chi-squared analyses were conducted with a Bonferroni adjustment, $p < 0.002$. There were no significant differences in the presence of ASD symptoms and clusters between men and women. **Table 5** shows the positive and negative predictive power of each ASD symptom and cluster for men and women as a function of PTSD diagnostic status post trauma. Positive and negative predictive powers were similar for men and women for all clusters and symptoms.

ASD symptom	Individuals meeting symptom/criterion		χ^2 (df = 1)	Positive predictive power ^a		Negative predictive power ^b	
	Male (n = 36)	Female (n = 39)		Male	Female	Male	Female
Cluster A: exposure to trauma	94.4	94.9	0.01	0.61	0.62	1.00	1.00
Hurt/death	94.4	89.7	0.56	0.61	0.60	1.00	0.67
Fear	88.9	97.4	2.20	0.59	0.59	0.50	1.00
Helplessness	77.8	87.2	1.16	0.56	0.63	0.67	0.75
Cluster B: dissociation	58.3	66.7	0.56	0.77	0.63	0.64	0.56
Numbing	52.8	43.6	0.63	0.67	0.64	0.50	0.50
Reduced awareness	55.6	69.2	1.50	0.77	0.58	0.64	0.44
Derealization	72.2	82.1	1.03	0.64	0.63	0.57	0.75
Depersonalization	19.4	20.5	0.01	0.75	0.67	0.45	0.45
Dissociative amnesia	52.8	51.3	0.02	0.64	0.67	0.50	0.54
Cluster C: reexperiencing	86.1	92.3	0.75	0.74	0.62	1.00	1.00
Recurrent images/thoughts	66.7	87.2	4.49	0.86	0.64	0.80	1.00
Nightmares	55.6	59.0	0.09	0.79	0.80	0.70	0.69
Sense of reliving experience	25.0	15.4	1.08	0.60	1.00	0.42	0.52
Distress on exposure	63.9	76.9	1.53	0.87	0.68	0.89	0.83
Cluster D: avoidance	86.1	87.2	0.02	0.67	0.70	1.00	1.00
Avoidance of thoughts	66.7	82.1	2.34	0.78	0.73	1.00	1.00
Avoidance of discussions	44.4	51.3	0.35	0.75	0.82	0.58	0.59

ASD symptom	Individuals meeting symptom/criterion		χ^2 (df = 1)	Positive predictive power ^a		Negative predictive power ^b	
	Male (n = 36)	Female (n = 39)		Male	Female	Male	Female
Avoidance of places	77.8	71.8	0.35	0.65	0.75	0.75	0.88
Avoidance of people	65.7	64.1	0.02	0.80	0.83	0.88	0.90
Cluster E: arousal	91.7	94.9	0.31	0.64	0.59	1.00	1.00
Difficulty sleeping	72.2	76.9	0.22	0.82	0.75	1.00	0.88
Irritability	63.9	61.5	0.04	0.75	0.69	0.75	0.58
Poor concentration	69.4	79.5	1.00	0.75	0.67	0.75	0.71
Hypervigilance	88.9	87.2	0.05	0.64	0.58	1.00	0.50
Exaggerated startle response	58.3	69.2	0.97	0.92	0.79	0.81	0.88
Motor restlessness	77.8	60.5	2.57	0.74	0.81	1.00	0.73

^a The probability of the presence of PTSD when the symptom is present.

^b The probability of the absence of PTSD when the symptom is absent.

Table 5. Proportion of women and men reporting symptoms and predictive power of each ASD clusters and symptoms and gender differences.

4. Discussion

To our knowledge, this is the first study to examine the predictive power of full and partial ASD diagnosis, clusters, and symptoms according to gender in victims of violent crimes. Results showed that 52% of victims met criteria for full ASD and 20% for partial ASD, while 40% met criteria for full PTSD and 17% for partial PTSD. Both full and partial ASD diagnoses, as well as all symptom clusters, and most symptoms, were predictive of PTSD. No gender differences were observed concerning the predictive power of ASD clusters and symptoms.

4.1. ASD cases and incidence of PTSD

In the present study, 60% of the participants who had a full diagnosis of ASD met full criteria for PTSD and 24% received a partial diagnosis of PTSD, compared to 89 and 11% in the Elklit and Brink study [18]. Of those with a partial ASD diagnosis, 55% met full criteria for PTSD and 18% met partial criteria for PTSD, compared to 51 and 46% in the previous study. Differences in the results could be attributable to the traumatic event experienced (i.e., bank robbery compared to violent crimes in our study) and the methodology used (i.e., questionnaires compared to clinical interviews in our study). Globally, these results showed that both full and partial ASD diagnoses are useful in predicting PTSD among victims of violent crimes. In both studies, partial ASD was attributed because cluster B for dissociation was not fulfilled. However, this situation is no longer an issue considering the decreased emphasis on dissociation in the DSM-5. Indeed, the fact that partial ASD is as good as full ASD to predict PTSD

supports changes made in the DSM-5 not to require dissociative symptoms to meet criteria of PTSD.

4.2. Predictive power of ASD diagnosis, clusters, and symptoms

In line with previous studies, ASD diagnosis showed the highest correct PTSD classification compared to each cluster. However, both positive and negative predictive powers were generally moderate, and each cluster was a relatively good predictor. Previous studies on victims of violent crimes found high negative predictive power (i.e., between 0.82 and 1.00) and low positive predictive power (i.e., between 0.22 and 0.39) for each cluster [4, 18–20]. Thus, the absence of a specific cluster (i.e., true negative) was more relevant in the prediction of PTSD diagnosis than the presence of that cluster (i.e., true positive). However, our results support the importance of both the presence and the absence of ASD clusters in predicting PTSD. The likelihood of developing PTSD without ASD seems weaker than when a victim is diagnosed with ASD. In the absence of acute stress reactions in the first days following trauma, it seems unlikely that posttraumatic stress symptoms appear. However, a partial or complete presence of ASD does not seem to systematically turn into PTSD, particularly due to the fact that coping strategies (e.g., seeking social support) set up by the victims following the violent crime may alter the psychopathological path of the individual.

Second, dissociation was not a better predictor compared to other clusters. These results may reflect differences between samples of victims of violent crimes and MVA. Indeed, a comparison study suggested that dissociation has a higher positive predictive power in samples of MVA compared to violent crimes (i.e., 0.71 and 0.61 compared with 0.33) [8]. MVA may induce more threatening stimuli (e.g., the sound of broken windows, risk of explosion, numerous smells), which may increase the risk of peritraumatic dissociation. Moreover, MVA occurs rapidly and suddenly, and victims may not have the time to react and to fully realize what is occurring, which may facilitate the onset of dissociative reactions. In studies on MVA, dissociation appears as an independent predictor of PTSD.

Contrary to previous studies on victims of MVA and burn injury [8, 21, 22], in our sample most symptoms had moderate to high positive and negative predictive powers, and were relatively good predictors of PTSD. As for clusters, our results support the pertinence of considering both the presence and the absence of ASD symptoms. Our findings on the predictive ability of ASD symptoms were similar to the ones obtained by Difede et al. [21] with the exception of nightmares and startle responses, which are more discriminative in victims of violent crimes, and reduced awareness, derealization, and irritability, which are more predictive of PTSD in burn victims. Similar to MVA, burn victims may be more at risk for dissociative reactions because of the rapid nature of the event and elevated risk of severe injury. They may also feel more irritable because of physical pain and the visibility of their burns.

4.3. Gender differences in the predictive power of ASD clusters and symptoms

Contrary to previous studies on MVA samples, our results revealed no gender differences in the predictive power of ASD on PTSD. Moreover, positive and negative predictive powers

were similar for gender across all clusters and symptoms. Several factors could explain this absence of gender differences. In our sample, women and men reported similar percentages of ASD diagnosis (i.e., 51.3 and 52.8%, respectively) contrary to Bryant and Harvey [24] for MVA (i.e., 23 and 8%, respectively). In addition, in studies on MVA, dissociation was a better predictor in women, [8], but not in our study on victims of violent crimes. Indeed, a study found that dissociation was a better predictor for PTSD in women after an accidental traumatic event, but not after a violent crime [30]. Again, these findings highlight the potential indirect association between dissociation and PTSD in interpersonal traumatic events. Other factors may better explain gender differences in the prevalence of PTSD in victims of violent crimes. For instance, social support has been identified as a strongest effect size among several types of risk factors of PTSD ($d = 0.28$ and 0.40 [8, 24]). A study found that negative social interactions after a violent crime mediated the relation between gender and PTSD symptoms [3]. Hence, greater PTSD symptoms found in women were explained by more frequent negative social interactions.

4.4. Research implications

This study comprises several strengths, such as the examination of the positive and negative predictive powers of full and partial ASD diagnosis, clusters, and symptoms according to gender in victims of crimes. Moreover, ASD and PTSD were evaluated with validated semi-structured interviews by trained assistants. Our results revealed that both full and partial ASD diagnoses are useful in predicting subsequent PTSD. Hence, our findings support the decision of the DSM-5 to decrease the emphasis on dissociative reactions to establish the ASD diagnosis. The prevalence of ASD was possibly underestimated in the DSM-IV because of the required dissociative symptoms [10], which were overly restrictive. As the decision to remove the dissociation requirement in the DSM-5 was not only based on ASD's power to predict PTSD, it remains to be seen whether this change could affect the prediction of PTSD. Henceforth, future studies could determine the ability of ASD to predict PTSD, with both diagnoses based on the new formulation of the DSM-5. Furthermore, findings indicate the usefulness of evaluating both the presence and the absence of each ASD cluster and most symptoms to better detect victims at risk for PTSD.

Interestingly, dissociation did not appear to be a better predictor of PTSD, in contradiction to studies on victims of MVA. Hence, future studies could examine the role of peritraumatic dissociation (i.e., during the trauma) compared to acute dissociation (i.e., within the first month following the trauma) in the prediction of PTSD. Persistent dissociation may imply ongoing dissociation reactions which negatively impact on the emotional processing of the traumatic experience [31], and may be more predictive of ASD and PTSD [32]. In fact, the restricted awareness aspect of acute dissociation was demonstrated to be the only significant predictor of PTSD variance [18]. In the same line, future studies could test the relation between persistent dissociation, PTSD, and risk factors such as childhood traumatic experiences. Moreover, contrary to studies on MVA victims, no gender differences were found in the predictive ability of ASD cluster and symptoms. Future studies could examine gender dimensions. Gender is culturally understood as a socially prescribed and experienced dimension of femaleness and

maleness in a society, exemplified by gender roles [33]. Future studies could explore the relation between adherence to feminine and masculine characteristics and the expression of distress, symptoms, and the way individuals seek help after a traumatic event, using the Bem Sex Inventory [34]. Finally, future studies should examine the relation between ASD, PTSD, gender dimensions, and social support to better explain women's greater vulnerability for PTSD.

4.5. Limitations

The results of this study should be considered along with their limitations. It should be noted that our moderate sample size was associated with limited statistical power to detect significant effects, specifically for gender differences. Moreover, 31% of individuals did not complete both assessments. Victims were recruited within the 30 days following the crime, but the mean of 24 days is close to the maximum of 30 days allowed for establishing an ASD diagnosis and the minimum required for a PTSD diagnosis. In addition, a selection bias was possible because individuals referred to the research project may have been experiencing more difficulties and distress than usual. This fact may have decreased the potential of specific clusters of symptoms, such as dissociation, to predict PTSD.

4.6. Clinical and policy implications

The changes made to the diagnosis of ASD in the DSM-5 should allow for more distressed individuals, specifically those that previously had a partial ASD because of insufficient dissociative symptoms, to have access to mental health services. In spite of the fact that women are twice as likely as men to develop PTSD, our results suggest that screening both men and women for ASD after a violent crime is judicious. Moreover, some ASD symptoms were more predictive of PTSD. Thus, it seems relevant for clinicians to target these symptoms throughout the treatment to prevent the development of PTSD. Furthermore, it would be important to facilitate the access to psychological services, and to offer training to mental health providers in order to adequately screen for ASD using the DSM-5. Also, it would be pertinent to deliver evidence-based interventions. Indeed, trauma-focused cognitive behavioral therapy (CBT) for individuals with PTSD has been shown to be an efficient treatment to reduce PTSD symptoms [6]. Thus, it would be pertinent to test the effectiveness of an early brief preventive CBT for victims of crimes with ASD to prevent PTSD. This intervention has been shown to be efficient in female rape victims [35] but less so among victims of different violent crimes at long term [36].

5. Conclusion

The present study highlights the importance of preventing PTSD in victims of violent crimes. Results indicate that ASD diagnosis, clusters, and symptoms appear pertinent to predict PTSD. Globally, findings support the DSM-5 decision regarding the decreased emphasis on dissociative reactions for an ASD diagnosis to better identify women and men at risk for PTSD.

Hence, screening for ASD after a violent crime appears to be an appropriate measure to detect at-risk victims, and subsequently to deliver appropriate interventions in order to prevent the development of PTSD.

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