

# Aggression in the Face of Trauma and the Role of Hostile Attention Bias in a Sample of Psychiatric Patients

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## Abstract

Previous research has found an association between the level of aggression and perceptual sensitivity to hostile cues in ambiguous situations in a student population. An association with the existence of trauma was suggested. The association between trauma symptoms, perceptual sensitivity to subtle facial cues of anger (hostile attention bias), and aggression was further explored in a sample of 83 psychiatric patients. In line with literature, a cross-sectional association between trauma symptoms and aggression was found. However, perceptual sensitivity was not associated with self-reported aggression nor with trauma symptoms in this population. The results indicate that the clear link between aggression and perceptual sensitivity thus far reported in students, is not necessarily generalizable to a population of psychiatric patients.

## Keywords

Aggression, Trauma, Anger, Emotion Recognition, Hostile Attention Bias

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## 1. Introduction

Violence is a major problem in all socioeconomic and demographic groups with widespread societal costs with regard to economics, health and social functioning (World Health Organization, 2002). Globally, it is estimated that one out of two children aged 2 - 17 years, experience some form of violence each year (Hillis et al., 2016; World Health Organization, 2020). Thirty-five percent of women worldwide have experienced intimate partner violence in their lifetime (World Health

Organization, 2019).

Aggressive behaviors are highly prevalent in long-term psychiatric inpatient care. De Bles et al. (2020) reported five incidents per day in an average psychiatric ward with 20 inpatients, whereby the annual direct cost for the setting would amount to €140,000 annually. Physical, mental and behavioral health consequences can persist long after the violence has stopped (World Health Organization, 2012). Reduction of behaviors on the violence-aggression continuum is highly relevant, given the detrimental societal and health consequences (Allen & Anderson, 2017).

The causes and mechanisms of aggression are complex and manifold and there remains no clear consensus among therapists and researchers on the best way to treat angry patients (Glancy & Saini, 2005). Research to further elucidate mechanisms underlying aggression is therefore crucial, because it may lead to the design of more adequate, tailored and effective prevention and treatment programs for aggressive patients (Klein Tunte et al., 2019).

Violence and aggression often occur in patients with symptoms of posttraumatic stress disorder (PTSD) (LaMotte & Taft, 2017; Taft et al., 2012). This association is found in various populations and established for several components of aggression among trauma exposed adults (Luijkx et al., 2024; Orth & Wieland, 2006; Taft et al., 2011). PTSD symptoms predicted subsequent levels of anger (the emotional component of aggression), but anger did not predict subsequent PTSD symptoms in a sample of crime victims (Orth et al., 2008; Semiatin et al., 2017; Shorey et al., 2018). Traumatic childhood experiences may lead to a non-psycho-pathic aggressive personality, that is marked by impulsivity and reactive aggressive behavior (Cima et al., 2008). Therapeutic interventions like trauma-focused treatment and reducing hostile attribution bias are considered as promising avenues for improving clinical treatment of aggressive patients (LaMotte & Taft, 2017; Lobbestael et al., 2013). However, more rigorous testing of hypotheses that aim to explain the relation between PTSD and anger is needed (Orth & Wieland, 2006; Semiatin et al., 2017).

For more than forty years, a prominent theoretical model explaining the relation between anger and PTSD is the survival mode theory (Chemtob et al., 1997; Chemtob et al., 1988). This theory states that the perception of threat activates a biologically predisposed survival mode, including both fear and flight reactions and aggressive responses, such as anger and fight reactions (Orth & Wieland, 2006). Aggressive responses are considered to be the result of several sequential steps in processing social information. Within these steps, inferring hostile intentions to the behavior of other persons is seen as a key component in increasing the likelihood to engage in aggressive behaviors (Calvete & Orue, 2012; Klein Tunte et al., 2019). Hostile attribution of intent, also called hostile attribution bias, is the phenomenon in which individuals tend to see hostile intent in others, despite the fact that environmental cues do not clearly support such an intent (Dodge, 1980; Dodge & Pettit, 2003).

Angry facial expressions are primarily perceived as threatening (Marsh et al., 2005) and thereby one of the most well-established nonverbal signals of hostile intent (Wilkowski & Robinson, 2012). Research suggests a robust relation between hostile attribution of intent and aggressive behavior in child studies (Orobio de Castro et al., 2002) and small to medium associations in a study among adults (Klein Tuente et al., 2019).

The hostile attribution bias was reinterpreted by Wilkowski and Robinson (2012) introducing the concept of perceptual sensitivity based on observations in students. This leads to the hypothesis that physically aggressive individuals are more sensitive to subtle differences in facial anger than non-aggressive individuals (Qiu et al., 2016; Wilkowski & Robinson, 2012). In other words, aggressive individuals may not be more biased but are more perceptually sensitive to hostile cues in ambiguous situations. Thus, what may appear to be a bias is actually a finely tuned skill. These results however have been observed in relatively healthy populations. It is not sure whether these processes also occur in psychiatric populations. Schönenberg and Jusyte (2014) for example, found that aggressive antisocial violent male prisoners (mis)interpreted ambiguous facial cues as hostile and showed a strong tendency to systematically overrate the perceived intensity of anger. This raises the question to what extent the findings of perceptual sensitivity to hostile cues in a student population can be generalized to patient populations, especially those with more extreme levels of aggression than students.

Moreover, Wilkowski and Robinson (2012) suggested an association of perceptual sensitivity to facial cues of anger and aggression with the existence of trauma. This is in line with literature indicating that the existence of trauma in childhood seems to influence the ability of adults to recognize facial expressions (Catalana et al., 2020). However, trauma symptoms were not measured in the study of Wilkowski and Robinson (2012). Williams et al. (2018) noticed that surprisingly little research has examined the relationship between current trauma symptoms and the perceptual sensitivity to subtle facial cues of anger in adult samples, and that the results of the few studies examining the relation between PTSD and facial affect recognition have been inconsistent, with a tendency to find PTSD being associated with poorer performance. For a better understanding of the association between trauma symptoms and the perceptual sensitivity to facial cues of anger, more research is needed, especially in patient populations.

For the first time, we therefore explored the relationship between trauma symptoms, the perceptual sensitivity to subtle facial cues of anger, and aggression in a population of psychiatric patients. We hypothesize that trauma symptoms affect aggression through its effect on perceptual sensitivity to subtle facial cues of anger. More specifically, the relation between trauma symptoms and the levels of aggression may be mediated by perceptual sensitivity to angry faces.

## 2. Methods

### 2.1. Participants

Eighty-three patients from two mental health institutions in Netherlands (25 fe-

male, 58 male) participated on a voluntary base. The mean age was 40 years ( $SD = 10.79$ , range = 21 - 77). Sample demographics are presented in **Table 1**. Fifty-five percent of the participants were patients with a forensic legal status, forty-five percent of the participants were receiving treatment in a clinic for patients with addiction, trauma and personality disorders. To classify the level of education, the Dutch Verhage scale was used (Verhage, 1964). Its seven categories were merged to three ordinal categories: low (Verhage 1 - 3), middle (Verhage 4 - 5), and high educational level (Verhage 6 - 7). The level of education of participants varied from low (19%) to middle (63%) and high (18%). The vast majority of participants had the Dutch nationality (93%). Most of the participants were unmarried, widowed or divorced (93%), and not employed (86%).

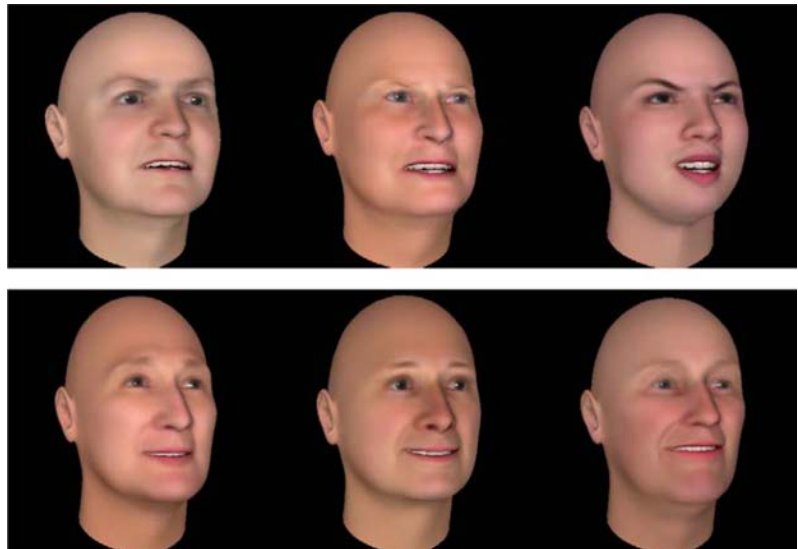
**Table 1.** Sample demographics.

<i>Variable</i>		Total (N = 83)
Gender	Male	58 (70%)
	Female	25 (30%)
Setting	Forensic mental health care	46 (55%)
	Mental health care	37 (45%)
Education	Low	16 (19%)
	Medium	52 (63%)
	High	15 (18%)
Marital status	Married/common law	6 (7%)
	Divorced/widowed	15 (18%)
	Unmarried	62 (75%)
Nationality	Dutch	77 (93%)
	Other	6 (7%)
Work status	Employed	12 (14%)
	Unemployed	71 (86%)

## 2.2. Stimuli

For the measurement of perceptual sensitivity to subtle facial cues of anger we used stimuli created by FaceGen Modeller, a software program that provides images of people in which facial expressions can be adjusted in emotional intensity. Both stimuli with facial cues of anger and stimuli with facial cues of happiness were included, as this study is part of a larger project. The faces displayed 40%, 50%, or 60% of either anger or happiness, with the remaining percentage left emotionally neutral. Stimuli created by this program have shown to be both valid and to provide adequate experimental control for research purposes. Wilkowski and Robinson (2012) used the stimuli in their study and characterized the faces as non-Hispanic Caucasian and gender neutral in appearance. Participants completed two blocks of trials, one involving 60 mixtures of anger and neutral expressions

and the other involving 60 mixtures of happy and neutral expressions. Each block consisted of twenty exemplars of each blend (i.e., 40% emotional, 50% emotional, 60% emotional) (See **Figure 1**).



Top row faces display (from left to right) 40% anger, 50% anger, and 60% anger. Bottom row faces display (from left to right), 40% happiness, 50% happiness, and 60% happiness.

**Figure 1.** Example stimuli (Wilkowski & Robinson, 2012).

For each block, one of four versions was given to the participant. The version of the block, the order in which the participants completed the blocks, and the order of the response columns (emotional-neutral, or neutral-emotional), were randomly assigned to the participants to prevent biases. Participants were asked to indicate which expression each face displays in a two-alternative forced-choice task (i.e., anger vs. neutral for the anger/neutral blends; happy vs. neutral for the happy/neutral blends). Participants clicked at their own pace through the stimuli presented on a laptop, and crisscrossed their perceptions with a pen on a paper.

### 2.3. Measures

For the measurement of symptoms of trauma and aggression we used two self-report questionnaires.

The Trauma Screening Questionnaire (TSQ) (Brewin et al., 2002) is a 10-item instrument consisting of five re-experiencing and five arousal items from the DSM IV (American Psychiatric Association, 2000) PTSD criteria. The TSQ achieved very good performance in a systematic review of screening instruments for adults at risk of PTSD (Brewin, 2005). The Dutch version of the Trauma Screening Questionnaire is an effective screening instrument to distinguish between subjects with PTSD, without PTSD and with subthreshold PTSD (Dekkers et al., 2010). According to Dekkers et al. (2010) sensitivity and specificity of the Dutch version of the TSQ are balanced best at a cut-off score of 7, although a cut-off score of 6 is also

suggested (Brewin et al., 2002). Participants were asked whether they had experienced each symptom at least twice in the past week.

Furthermore, participants completed the Dutch version of the Buss-Perry Aggression Questionnaire-Short Form (AQ-SF; Bryant & Smith (2001)/AVL-AV; Hornsveld et al. (2009)). Participants indicated how accurately each of the 12 statements described them using a 1 (totally disagree) to 5 (totally agree) response scale. Scores on the scale may range from 12 to 75. The four subscales measure different components of aggression: Physical Aggression, Verbal Aggression, Anger, and Hostility. The AQ-SF is a reliable and valid instrument to measure components of aggressive behavior in university students of both genders (Meesters et al., 1996) and has adequate reliabilities in a sample of male and female federal offenders (Diamond & Magaletta, 2006). In a student sample, Cronbach's alpha for the total score was .84, indicating good internal consistency (Meesters et al., 1996). Construct validity of the Dutch version of the AQ was demonstrated in adolescent male offenders (Morren & Meesters, 2002). The AQ-SF is a reliable and valid instrument with even better psychometric properties than the original full-length version, which is found in a sample of Dutch violent forensic psychiatric male patients (Hornsveld et al., 2009). Internal consistency coefficients (Cronbach's alpha) for the total score of the AQ-SF were between .72 and .88.

## 2.4. Procedures

Participants were recruited among patients of two mental health institutions in Netherlands. Patients were verbally informed about the study during a visit of the researcher in their treatment program, and received detailed information about the study on paper. Participants were ensured that all their data would only be stored anonymously. Volunteers willing to participate provided their contact details and were invited by the researcher afterwards for an individual appointment to participate. Participants signed the informed consent. Subsequently, they completed the facial expression perception task. Once the participants completed the facial expression perception task, demographic information was collected by a short interview, and afterwards participants completed the TSQ and the AQ-SF. Tasks were always completed in this order. The procedure was followed in an individual face-to-face contact with the researcher. Two participants were seen by a trainee. Due to COVID-19 provisions, two participants completed the questionnaires by video calling.

## 2.5. Ethics

Ethics approval was provided by the Commission Scientific Research of Foundation Mental Health Care Western North-Brabant, Netherlands. This study is part of a larger study design for which ethics approval was granted by the Medical Ethics Committee of Maastricht University (protocol no. NL60187.068.17). Given COVID-19 safety measures, we were limited in our abilities to recruit participants. Preliminary analysis indicated that our hypotheses would not be confirmed. Out

of ethical considerations we therefore decided to stop the data collecting at 83 participants.

### 3. Results

We analysed the data with SPSS, version 26, *IBM Corp. (2019)*. We reported all manipulations, measures, and exclusions in the study. Prior to analyses, the accuracy of data entry was examined by comparing double entered data. FaceGen scores were computed by dividing the sum of item scores by the number of completed items, in order to correct for four missing items on the FaceGen Angry-Neutral and three missing items on the FaceGen Happy-Neutral. Two forensic male participants had not completed the TSQ. For one of them, the TSQ-items were scored as zero because he reported that he has never experienced any traumatic event. Testing for outliers in FaceGen scores yielded no significant outliers defined by z-scores more than 3.29 standard deviations beyond the mean, following *Tabachnick and Fidell (2013)*. One case was identified with a multivariate outlier (FaceGen Angry-Neutral score 5%, FaceGen Happy-Neutral score 85%,  $p \leq .001$ ) and was excluded from analysis for that reason. A double scored answer on the AQ-SF (answer 2 and 4) was replaced by answer 3 (“don’t know”). **Table 2** presents mean scores and standard deviations of the FaceGen stimuli and the questionnaires.

**Table 2.** Means and Standard Deviations of FaceGen stimuli and measures.

Stimuli/Measures	Subschale	Total (N = 82)	
		<i>M</i>	<i>SD</i>
FaceGen A-N	Total	37.24	12.26
	60% angry	49.23	15.87
	50% angry	35.87	15.07
	40% angry	26.63	16.34
FaceGen H-N	Total	48.16	12.59
	60% angry	74.70	16.17
	50% angry	48.54	17.12
	40% angry	21.28	13.38
AQ-SF	Total	28.48	8.12
	Physical	7.34	3.37
	Verbal	6.05	1.98
	Anger	7.07	3.03
	Hostility	8.01	3.42
TSQ*	Total	4.37	3.28
	Re-experiencing	2.14	1.86
	Hyperarousal	2.23	1.70

Note: AQ-SF = Aggression Questionnaire-Short Form; FaceGen A-N = FaceGen Angry-Neutral (% angry faces); FaceGen H-N = FaceGen Happy Neutral (% happy faces); TSQ = Trauma Screening Questionnaire. \*TSQ: N = 81.

Preliminary analyses were performed to check for violation of the assumptions of linearity, homoscedasticity, and normality of estimation error. The FaceGen A-N score,  $D(82) = .093$ ,  $p = .077$ , the FaceGen H-N score,  $D(82) = .082$ ,  $p = .200$ , and the AQ total score,  $D(82) = .068$ ,  $p = .200$ , did not deviate significantly from normal; however, TSQ total,  $D(81) = .125$ ,  $p \leq .01$  was significantly non-normal. Also the subscales of the TSQ; TSQ arousal,  $D(81) = .141$ ,  $p \leq .001$ , TSQ re-experiencing,  $D(81) = .161$ ,  $p \leq .001$ , and the subscales of the AQ; AQ physical,  $D(82) = .120$ ,  $p \leq .01$ , AQ verbal,  $D(82) = .193$ ,  $p \leq .001$ , AQ anger,  $D(82) = .156$ ,  $p \leq .001$ , AQ hostility,  $D(82) = .116$ ,  $p \leq .01$ , deviated significantly from a normal distribution. For TSQ scores and AQ-SF subscales, non-parametric measures were used. Coefficients between the stimuli, measures and their subscales were computed and are presented in **Table 3**. The relation between trauma symptoms (as measured by the total score of the TSQ) and aggression (as measured by the total score of the AQ-SF) was investigated using Spearman's rank-order correlation. There was a small, positive correlation between the two variables  $r(82) = .22$ ,  $p < .05$ .

**Table 3.** Correlations table.

	1	2	3	4	5	6	7	8	9
1. FaceGen A-N									
2. FaceGen H-N	.269*								
3. AQ-SF (total)	.104	.015							
4. AQ-SF Physical <sup>a</sup>	.022	.026	.640**						
5. AQ-SF Verbal <sup>a</sup>	-.044	-.024	.652**	.238*					
6. AQ-SF Anger <sup>a</sup>	.171	-.028	.712**	.273*	.365**				
7. AQ-SF Hostility <sup>a</sup>	.120	-.011	.730**	.182	.449**	.339**			
8. TSQ (total) <sup>a</sup>	-.014	.137	.223*	.016	.187	.098	.289**		
9. TSQ Re-experiencing <sup>a</sup>	-.054	.120	.142	.004	.079	.045	.209	.926**	
10. TSQ Hyperarousal <sup>a</sup>	.037	.134	.275*	.018	.262*	.135	.342**	.917**	.704**

<sup>a</sup>Spearman correlation instead of Pearson's correlation. \*Correlation is significant at the .05 level (2-tailed). \*\*Correlation is significant at the .01 level (2-tailed).

To test for mediation, a series of regression models was estimated, following **Baron and Kenny (1986)**. Since TSQ scores violated the assumption of normality of estimation error, the TSQ was entered as a dichotomous variable in the analyses (trauma:  $TSQ \geq 7$ , no trauma:  $TSQ \leq 6$ ).

First, a standard multiple regression was performed between FaceGen Angry-Neutral as dependent variable and the presence of trauma symptoms as dichotomous independent variable. The variance in FaceGen Angry-Neutral scores explained by trauma was .0%,  $F(1, 79) = .022$ ,  $p = .88$ . This already illuminates that the FaceGen is not the hypothesized mediator between TSQ-scores and AQ-scores. To complete the conditions for mediation, second, a standard multiple re-

gression was performed to assess the ability of the presence of trauma symptoms to predict levels of aggression (AQ-SF). The variance in aggression explained by the presence of trauma symptoms was 5.8%,  $F(1, 79) = 4.836$ ,  $p < .05$ . Third, a standard multiple regression analysis was performed between aggression (AQ-SF) as dependent variable and FaceGen Angry-Neutral scores as independent variable. The variance in aggression explained by FaceGen scores was 1.1%,  $F(1, 80) = .872$ ,  $p = .35$ .

As the analyses did not confirm our hypothesis on mediation, we performed post-hoc analyses to check whether the results could be explained by heterogeneity within the population. Independent-sample t-tests were conducted to compare the aggression scores for males and females, as it is known that the relationship between gender and aggression is a complex one (Padgett & Tremblay, 2020). No significant difference between males and females in the total aggression score of the AQ-SF was found. There was a significant difference in hostility scores for males ( $M = 7.47$ ,  $SD = 3.17$ ) and females ( $M = 9.24$ ,  $SD = 3.72$ ;  $t(80) = -2.20$ ,  $p = .03$ , two-tailed). The magnitude of the differences in the means (mean difference = 1.77, 95%  $CI = -3.36$  to  $-.17$ ) = was moderate (eta squared .057). No significant gender differences on the other subscales of the AQ-SF were found. Previous studies on PTSD have found a significant gender effect with an approximately twofold higher rate for women than for men (De Vries & Olf, 2009). A Mann-Whitney U Test revealed a significant difference in reported trauma symptoms levels of females ( $Mdn = 8$ ,  $n = 25$ ) and males ( $Mdn = 3$ ,  $n = 56$ ),  $U = 1085$ ,  $z = 3.96$ ,  $p \leq .0001$ ,  $r = .43$ . No significant differences in FaceGen scores for males and females were found. Because of the broad inclusion of patients in our study, we explored the data by comparing some potential subgroups within the population. A Mann-Whitney U Test also revealed a significant difference in reported trauma symptoms levels of forensic patients ( $Mdn = 3$ ,  $n = 45$ ) and regular patients ( $Mdn = 5$ ,  $n = 36$ ),  $U = 595$ ,  $z = -2.052$ ,  $p = .040$ ,  $r = .23$ . Regarding the scores on stimuli and measures, no other significant differences between forensic and regular mental health patients were found. The post-hoc analyses indicate that heterogeneity within the population could be relevant for trauma symptoms, but not for the hypothesized mediator.

#### 4. Discussion

In this study, we explored the relationship between trauma symptoms, the perceptual sensitivity to subtle facial cues of anger, and aggression in a broad population of psychiatric patients. Our results demonstrate a cross-sectional association between trauma symptoms and aggression. However, perceptual sensitivity to subtle cues of facial anger measured by FaceGen stimuli did not mediate the association between trauma symptoms and aggression in our population. We discuss the four main outcomes of our study to contribute to a better understanding of the mechanisms underlying aggression.

First, the findings of our study indicate that the clear link between (physical)

aggression and perceptual sensitivity to facial anger reported in students (Wilkowski & Robinson, 2012), is not necessarily generalizable to a patient population. This finding is reminiscent of the increasing interest in issues of replicability and generalizability of clinical science in recent years (Tackett et al., 2019). Braslow et al. (2005) found strong empirical support for the belief that mental health literature has paid scant attention to external validity. Therefore, they recommended researchers to study patients and context to which they wish to extend their findings, as we attempted partially by including a broad sample of psychiatric patients. Differences between students and patients may provide an explanation for the absence of a relation between self-reported aggression and perceptual sensitivity to angry faces in our population of psychiatric patients, whereas Wilkowski and Robinson (2012) had found a clear link in students. For example, it is known that traumatization often leads to schemas marked by Mistrust/Abuse (Rafaeli et al., 2011). Evidence has been found that, among others, schemas of Mistrust/Abuse uniquely differentiate (Borderline Personality Disorder) patients from healthy adults (Bach & Farrell, 2018). We recommend researchers and clinicians to take into account concerns about the generalizability of findings from one population to another.

Second, we found no relation between trauma symptoms and perceptual sensitivity to facial cues of anger. This result is in contrast with the findings of three recent studies. Passardi et al. (2018) found that (childhood) traumatization can be linked to enhanced emotion recognition abilities among adults. Other authors found that in addition to traumatic events that might culminate in PTSD symptomatology, all trauma occurring during childhood, including trauma types that would not qualify as a traumatic event based on criterion A of DSM-5 (PTSD) diagnosis, may have far-reaching consequences and entail greater distrust and threat perception later in life (Luijkx et al., 2024; Hepp et al., 2021). In a relatively healthy student population, Williams et al. (2018) found a clue that might help to explain the inconsistency between the results of those two recent studies among adults, and the results of our study. They suggested that the enhanced attention of people with higher levels of PTSD to affective information can be either beneficial or detrimental, depending on the precise circumstances, either various and diverse sources of information in their environment (Williams et al., 2018). Future research should include such other sources of information that may influence the performance of patients with trauma symptoms.

Given the abovementioned results, we also considered the concern of measurement errors in our study due to the use of FaceGen stimuli to measure perceptual sensitivity. For three reasons we do not see a clear indication that the unexpected lack of relation between scores on the FaceGen, trauma and aggression questionnaire should be explained by measurement errors due to the use of FaceGen stimuli. First, angry facial expressions are useful in research for a deeper understanding of the (perceptual) processes underlying aggressive behavior (Teige-Mocigemba et al., 2016). Second, in accordance with Wilkowski and Robinson (2012), faces in

our study were endorsed as displaying an emotion (i.e., anger or happiness) on a higher proportion of trials as the intensity of the displayed emotion increased. Third, in line with Wilkowski and Robinson (2012) and Becker et al. (2011), emotion perceptions were more frequent in the happy/neutral block than the angry/neutral block. To explain that compared to angry faces, happy facial expressions are detected better when all potential confounds have been removed or controlled for Becker et al. (2011) speculated that given most people are happy most of the time (Diener & Diener, 2016), the detection of the happy face is more practiced.

Third, we noticed that the effect size between trauma and aggression we found was considerably smaller compared to the results of the meta-analysis of Orth and Wieland (2006). Literature suggests that the strength of the relation between trauma symptoms and aggression depends on the type of traumatic event. The relation appeared to be stronger in samples with military war experience than in samples with other types of traumatic events, such as criminal victimization (Orth & Wieland, 2006). We assume that the traumatic experiences participants of our study reported were relatively mild compared to those the participants in the meta-analysis of Orth and Wieland (2006) had experienced, or that the traumatic experiences concerned a different type of trauma. In our study, most participants self-categorized the types of events they had experienced as physical abuse or mental abuse, but they were not specified nor defined by Diagnostic Criteria A1 of the *DSM-IV* (American Psychiatric Association, 2000) as they were in the meta-analysis of Orth and Wieland (2006). Another explanation for the relatively small effect size we found is that the level of measurement of aggression in our study differs from the meta-analysis of Orth and Wieland. Buss and Perry (1992) stressed the need to assess overall aggression and its individual components; physical aggression, anger, hostility, and verbal aggression. We measured the relation between trauma symptoms and overall aggression, whereas the meta-analysis of Orth and Wieland (2006) concerned anger and hostility. Although trauma and aggression obviously are related, effect sizes seem to differ among samples and variables.

Fourth, the mean scores on aggression were not high in our study, despite our sample including criminal offenders. According to Holtzworth-Munroe et al. (2000) court-referred and clinical samples contain more generally violent men than a general community sample (Serie et al., 2017; Thijssen & De Ruiter, 2011). However, participants in our study did not perform differently from students in the study of Wilkowski and Robinson (2012) when comparing the mean scores of the subscale of physical aggression. This corresponds with the study of Hornsveld et al. (2009) in which inpatients were not found to display higher scores on the AQ-SF than students. They suggest that the restricted living environment of inpatients, which gives them lesser opportunities to exhibit aggressive or violent behavior, might explain this. It could also be explained by social desirability since participants may be less open about their aggression within a treatment context

(Taft et al., 2011). Moreover, Hornsveld et al. (2009) questioned the validity of comparing adult inpatients with adolescent students due to differences in age and a number of other variables such as marital status.

Noteworthy, the measure of trauma and aggression used in our study was based on self-report. Self-reporting of aggressive behavior relies heavily on the honesty of respondents about their tendency to become angry and behave aggressively, and on their recall of past events (Nijman et al., 2006). Patients with (severe) psychiatric disorders might lack insight into their own symptoms and behaviours. Despite this general belief that self-reports are questionable, it remains interesting that empirical literature suggests that self-report does not undermine the relationship between self-report and salient outcomes (Diamond & Magaletta, 2006; Mills & Kroner, 2005). Moreover, a recent Swedish study among incarcerated violent offenders found that self-ratings and clinician-ratings of aggression were highly convergent and concordant, especially regarding physical aggression (Berlin et al., 2021). Their results indicated that either self-reports and clinician-ratings yield such similar information that either alone would be sensitive enough. Furthermore, all our participants participated on a voluntary base without consequences for their treatment or forensic status.

All things considered, we assume that it is most likely that the unexplained direct relation between trauma symptoms and aggression indicates an omitted mediator (Zhao et al., 2010). Hypotheses and theories regarding the neurobiological and environmental determinants and their interaction of aggressive behavior, such as the influences of stress hormones, could be interesting to consider (Cima et al., 2008; De Wit-de Visser et al., 2023; Tonnaer et al., 2016). A variety of mental disorders are characterized by deficits in facial emotional recognition, including schizophrenia (Gao et al., 2021) and dysthymia/depression (Krause et al., 2021). Literature demonstrates that high anxiety students can identify threat stimuli from faces more accurately and faster than low anxiety students (Mustapha et al., 2019). Taft et al. (2012) mentioned that information processing models for aggression highlight the role of additional factors such as alcohol use problems that may affect the traumatized individual cognitively and further increase risk for aggression and impaired information processing. Briefly, further research is needed to investigate whether comorbid symptoms such as mood or anxiety disorders or substance abuse mediate the relation between trauma symptoms and aggression.

Some limitations of the present study should be noted. First, the current study focused on PTSD symptoms rather than diagnoses. Thus, associations may have been inflated because PTSD symptom measures not keyed to specific trauma may be capturing other nonspecific distress in addition to true PTSD symptoms (Taft et al., 2011). Second, the use of only self-report data for the assessment of aggression and trauma may have led to uncontrolled bias and inflation or deflation of associations among study variables. Third, due to the cross-sectional nature of the data for this study, directionality between aggression and trauma symptoms cannot be assumed. Fourth, the ratio of male to female participants was heavily in

favor of males, and there was a gender effect on trauma symptoms. We had not enough data to run models for males and females separately. Fifth, although our sample was highly diverse with respect to setting, we were underpowered to examine whether findings varied across certain settings. Sixth, since we did not classify patients according to the Diagnostic Criteria of the *DSM-5* (American Psychiatric Association, 2013), use of medication or participation in psychotherapy, we were not able to explore differences among the different types of patients. Seventh, the emotional intensity levels (40%, 50%, 60%) in the FaceGen stimuli were not validated for this particular psychiatric population, therefore, we do not know whether perceptual thresholds might differ from the general population.

The present study leaves some potentially important avenues for future research. Future research should utilize more comprehensive measures to examine associations between different symptom clusters of PTSD (e.g., hypervigilance, avoidance), several components of aggression (general aggression, anger, hostility, verbal and physical aggression), and the perceptual sensitivity to emotional facial cues. For PTSD symptoms, a structured diagnostic interview is recommended. Besides that, it would be fruitful to include a more representative sample of men and women in future research. The issue that self-report questionnaires of aggression do not seem to discriminate between forensic psychiatric inpatient or inmate populations and control samples requires further study (Hornsveld et al., 2009). Future studies should consider designing the materials to be more ecological, such as photographed facial expressions of real people and small videos with contextual backgrounds to create stimuli as close to life as possible for patients, so that they can be more realistic and accurate for basic research or clinically targeted treatments (Gao et al., 2021).

Despite its limitations, we believe that this investigation adds to research to the mechanisms underlying aggression. We advise clinicians designing therapeutic interventions for aggressive patients to be careful in using the results of studies performed in student populations, because these may not fit into patient populations. More research to the complex and manifold mechanisms underlying aggression is needed, especially in populations of psychiatric patients.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- Allen, J. J., & Anderson, C. A. (2017). Aggression and Violence: Definitions and Distinctions. In P. Sturmey (Ed.), *The Wiley Handbook of Violence and Aggression* (pp. 1-14). John Wiley & Sons Ltd. <https://doi.org/10.1002/9781119057574.whbva001>
- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., Text rev.).
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). American Psychiatric Association. <https://doi.org/10.1176/appi.books.9780890425596>

- Bach, B., & Farrell, J. M. (2018). Schemas and Modes in Borderline Personality Disorder: The Mistrustful, Shameful, Angry, Impulsive, and Unhappy Child. *Psychiatry Research*, *259*, 323-329. <https://doi.org/10.1016/j.psychres.2017.10.039>
- Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, *51*, 1173-1182. <https://doi.org/10.1037//0022-3514.51.6.1173>
- Becker, D. V., Anderson, U. S., Mortensen, C. R., Neufeld, S. L., & Neel, R. (2011). The Face in the Crowd Effect Unconfounded: Happy Faces, Not Angry Faces, Are More Efficiently Detected in Single- and Multiple-Target Visual Search Tasks. *Journal of Experimental Psychology: General*, *140*, 637-659. <https://doi.org/10.1037/a0024060>
- Berlin, J., Tärnhäll, A., Hofvander, B., & Wallinius, M. (2021). Self-Report versus Clinician-ratings in the Assessment of Aggression in Violent Offenders. *Criminal Behaviour and Mental Health*, *31*, 198-210. <https://doi.org/10.1002/cbm.2201>
- Braslow, J. T., Duan, N., Starks, S. L., Polo, A., Bromley, E., & Wells, K. B. (2005). Generalizability of Studies on Mental Health Treatment and Outcomes, 1981 to 1996. *Psychiatric Services*, *56*, 1261-1268. <https://doi.org/10.1176/appi.ps.56.10.1261>
- Brewin, C. R. (2005). Systematic Review of Screening Instruments for Adults at Risk of PTSD. *Journal of Traumatic Stress*, *18*, 53-62. <https://doi.org/10.1002/jts.20007>
- Brewin, C. R., Rose, S., Andrews, B., Green, J., Tata, P., McEvedy, C. et al. (2002). Brief Screening Instrument for Post-Traumatic Stress Disorder. *British Journal of Psychiatry*, *181*, 158-162. <https://doi.org/10.1192/bjp.181.2.158>
- Bryant, F. B., & Smith, B. D. (2001). Refining the Architecture of Aggression: A Measurement Model for the Buss-Perry Aggression Questionnaire. *Journal of Research in Personality*, *35*, 138-167. <https://doi.org/10.1006/jrpe.2000.2302>
- Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, *63*, 452-459. <https://doi.org/10.1037/0022-3514.63.3.452>
- Calvete, E., & Orue, I. (2012). Social Information Processing as a Mediator between Cognitive Schemas and Aggressive Behavior in Adolescents. *Journal of Abnormal Child Psychology*, *40*, 105-117. <https://doi.org/10.1007/s10802-011-9546-y>
- Catalana, A., Díaz, A., Angosto, V., Zamalloa, I., Martínez, N., Guede, D. et al. (2020). Can Childhood Trauma Influence Facial Emotion Recognition Independently from a Diagnosis of Severe Mental Disorder? *Revista de Psiquiatría y Salud Mental (English Edition)*, *13*, 140-149. <https://doi.org/10.1016/j.rpsmen.2020.08.001>
- Chemtob, C. M., Novaco, R. W., Hamada, R. S., Gross, D. M., & Smith, G. (1997). Anger Regulation Deficits in Combat-Related Posttraumatic Stress Disorder. *Journal of Traumatic Stress*, *10*, 17-36. <https://doi.org/10.1002/jts.2490100104>
- Chemtob, C., Roitblat, H. L., Hamada, R. S., Carlson, J. G., & Twentyman, C. T. (1988). A Cognitive Action Theory of Post-Traumatic Stress Disorder. *Journal of Anxiety Disorders*, *2*, 253-275. [https://doi.org/10.1016/0887-6185\(88\)90006-0](https://doi.org/10.1016/0887-6185(88)90006-0)
- Cima, M., Smeets, T., & Jelicic, M. (2008). Self-Reported Trauma, Cortisol Levels, and Aggression in Psychopathic and Non-Psychopathic Prison Inmates. *Biological Psychology*, *78*, 75-86. <https://doi.org/10.1016/j.biopsycho.2007.12.011>
- de Bles, N. J., Hazewinkel, A. W. P., Bogers, J. P. A. M., van den Hout, W. B., Mouton, C., van Hemert, A. M. et al. (2020). The Incidence and Economic Impact of Aggression in Closed Long-Stay Psychiatric Wards. *International Journal of Psychiatry in Clinical Practice*, *25*, 430-436. <https://doi.org/10.1080/13651501.2020.1821894>
- De Castro, B. O., Veerman, J. W., Koops, W., Bosch, J. D., & Monshouwer, H. J. (2002).

- Hostile Attribution of Intent and Aggressive Behavior: A Meta-Analysis. *Child Development*, 73, 916-934. <https://doi.org/10.1111/1467-8624.00447>
- de Vries, G., & Olff, M. (2009). The Lifetime Prevalence of Traumatic Events and Posttraumatic Stress Disorder in Netherlands. *Journal of Traumatic Stress*, 22, 259-267. <https://doi.org/10.1002/jts.20429>
- De Wit-De Visser, B., Rijckmans, M., Vermunt, J. K., & van Dam, A. (2023). Pathways to Antisocial Behavior: A Framework to Improve Diagnostics and Tailor Therapeutic Interventions. *Frontiers in Psychology*, 14, Article ID: 993090. <https://doi.org/10.3389/fpsyg.2023.993090>
- Dekkers, A. M. M., Olff, M., & Näring, G. W. B. (2010). Identifying Persons at Risk for PTSD after Trauma with TSQ in Netherlands. *Community Mental Health Journal*, 46, 20-25. <https://doi.org/10.1007/s10597-009-9195-6>
- Diamond, P. M., & Magaletta, P. R. (2006). The Short-Form Buss-Perry Aggression Questionnaire (BPAQ-SF): A Validation Study with Federal Offenders. *Assessment*, 13, 227-240. <https://doi.org/10.1177/1073191106287666>
- Diener, E., & Diener, C. (2016). Most People Are Happy. *Psychological Science*, 7, 181-185. <https://doi.org/10.1111/j.1467-9280.1996.tb00354.x>
- Dodge, K. A. (1980). Social Cognition and Children's Aggressive Behavior. *Child Development*, 51, 162-170. <https://doi.org/10.2307/1129603>
- Dodge, K. A., & Pettit, G. S. (2003). A Biopsychosocial Model of the Development of Chronic Conduct Problems in Adolescence. *Developmental Psychology*, 39, 349-371. <https://doi.org/10.1037//0012-1649.39.2.349>
- Gao, Z., Zhao, W., Liu, S., Liu, Z., Yang, C., & Xu, Y. (2021). Facial Emotion Recognition in Schizophrenia. *Frontiers in Psychiatry*, 12, Article ID: 633717. <https://doi.org/10.3389/fpsyg.2021.633717>
- Glancy, G., & Saini, M. A. (2005). An Evidenced-Based Review of Psychological Treatments of Anger and Aggression. *Brief Treatment and Crisis Intervention*, 5, 229-248. <https://doi.org/10.1093/brief-treatment/mhi013>
- Hepp, J., Schmitz, S. E., Urbild, J., Zauner, K., & Niedtfeld, I. (2021). Childhood Maltreatment Is Associated with Distrust and Negatively Biased Emotion Processing. *Borderline Personality Disorder and Emotion Dysregulation*, 8, Article No. 5. <https://doi.org/10.1186/s40479-020-00143-5>
- Hillis, S., Mercy, J., Amobi, A., & Kress, H. (2016). Global Prevalence of Past-Year Violence against Children: A Systematic Review and Minimum Estimates. *Pediatrics*, 137, e20154079. <https://doi.org/10.1542/peds.2015-4079>
- Holtzworth-Munroe, A., Meehan, J. C., Herron, K., Rehman, U., & Stuart, G. L. (2000). Testing the Holtzworth-Munroe and Stuart (1994) Batterer Typology. *Journal of Consulting and Clinical Psychology*, 68, 1000-1019. <https://doi.org/10.1037//0022-006x.68.6.1000>
- Hornsveld, R. H. J., Muris, P., Kraaimaat, F. W., & Meesters, C. (2009). Psychometric Properties of the Aggression Questionnaire in Dutch Violent Forensic Psychiatric Patients and Secondary Vocational Students. *Assessment*, 16, 181-192. <https://doi.org/10.1177/1073191108325894>
- IBM Corp. (2019). *IBM SPSS Statistics for Windows (26.0)*. IBM Corp.
- Klein Tuente, S., Bogaerts, S., & Veling, W. (2019). Hostile Attribution Bias and Aggression in Adults—A Systematic Review. *Aggression and Violent Behavior*, 46, 66-81. <https://doi.org/10.1016/j.avb.2019.01.009>
- Krause, F. C., Linardatos, E., Fresco, D. M., & Moore, M. T. (2021). Facial Emotion Recog-

- nition in Major Depressive Disorder: A Meta-Analytic Review. *Journal of Affective Disorders*, 293, 320-328. <https://doi.org/10.1016/j.jad.2021.06.053>
- LaMotte, A. D., & Taft, C. T. (2017). PTSD, Anger, and Trauma-Informed Intimate Partner Violence Prevention. *Current Treatment Options in Psychiatry*, 4, 262-270. <https://doi.org/10.1007/s40501-017-0121-1>
- Lobbestael, J., Cima, M., & Arntz, A. (2013). The Relationship between Adult Reactive and Proactive Aggression, Hostile Interpretation Bias, and Antisocial Personality Disorder. *Journal of Personality Disorders*, 27, 53-66. <https://doi.org/10.1521/pedi.2013.27.1.53>
- Luijckx, J., van Loon, L. M. A., De Wit-De Visser, B., & van Dam, A. (2024). Presence and Impact of Adverse Childhood Experiences and Reflective Functioning on Aggression in Adults with Antisocial Behaviour. *Clinical Psychology & Psychotherapy*, 31, e70011. <https://doi.org/10.1002/cpp.70011>
- Marsh, A. A., Ambady, N., & Kleck, R. E. (2005). The Effects of Fear and Anger Facial Expressions on Approach- and Avoidance-Related Behaviors. *Emotion*, 5, 119-124. <https://doi.org/10.1037/1528-3542.5.1.119>
- Meesters, C., Muris, P., Bosma, H., Schouten, E., & Beuving, S. (1996). Psychometric Evaluation of the Dutch Version of the Aggression Questionnaire. *Behaviour Research and Therapy*, 34, 839-843. [https://doi.org/10.1016/0005-7967\(96\)00065-4](https://doi.org/10.1016/0005-7967(96)00065-4)
- Mills, J. F., & Kroner, D. G. (2005). An Investigation into the Relationship between Socially Desirable Responding and Offender Self-Report. *Psychological Services*, 2, 70-80. <https://doi.org/10.1037/1541-1559.2.1.70>
- Morren, M., & Meesters, C. (2002). Validation of the Dutch Version of the Aggression Questionnaire in Adolescent Male Offenders. *Aggressive Behavior*, 28, 87-96. <https://doi.org/10.1002/ab.90010>
- Mustapha, R., Shahadan, M. A., & Hamzah, H. (2019). The Effect of Trait Anxiety on Recognition of Threatening Emotional Facial Expressions: A Study among High School Students. *The International Journal of Social Sciences and Humanities Invention*, 6, 5312-5318. <https://doi.org/10.18535/ijsshi/v6i2.07>
- Nijman, H., Bjørkly, S., Palmstierna, T., & Almvik, R. (2006). Assessing Aggression of Psychiatric Patients: Methods of Measurement and Its Prevalence. In D. Richter, & R. Whittington (Eds.), *Violence in Mental Health Settings* (pp. 11-23). Springer. <https://doi.org/10.1007/978-0-387-33965-8>
- Orth, U., & Wieland, E. (2006). Anger, Hostility, and Posttraumatic Stress Disorder in Trauma-Exposed Adults: A Meta-Analysis. *Journal of Consulting and Clinical Psychology*, 74, 698-706. <https://doi.org/10.1037/0022-006x.74.4.698>
- Orth, U., Cahill, S. P., Foa, E. B., & Maercker, A. (2008). Anger and Posttraumatic Stress Disorder Symptoms in Crime Victims: A Longitudinal Analysis. *Journal of Consulting and Clinical Psychology*, 76, 208-218. <https://doi.org/10.1037/0022-006x.76.2.208>
- Padgett, J. K., & Tremblay, P. F. (2020). Gender Differences in Aggression. In B. J. Carducci, & C. S. Nave (Eds.), *The Wiley Encyclopedia of Personality and Individual Differences* (Vol. III, pp. 173-177). John Wiley & Sons Ltd. <https://doi.org/10.1002/9781118970843.ch206>
- Passardi, S., Peyk, P., Rufer, M., Plichta, M. M., Mueller-Pfeiffer, C., Wingenbach, T. S. H. et al. (2018). Impaired Recognition of Positive Emotions in Individuals with Posttraumatic Stress Disorder, Cumulative Traumatic Exposure, and Dissociation. *Psychotherapy and Psychosomatics*, 87, 118-120. <https://doi.org/10.1159/000486342>
- Qiu, F., Luo, Y., & Jia, S. (2016). The Influence of Individual Aggression on Categorical Perception of Angry Expression. *Acta Psychologica Sinica*, 48, 946-956.

<https://doi.org/10.3724/sp.j.1041.2016.00946>

- Rafaëli, E., Bernstein, D. P., & Young, J. (2011). *Schema Therapy—Distinctive Features*. Routledge.
- Schönenberg, M., & Jusyte, A. (2014). Investigation of the Hostile Attribution Bias toward Ambiguous Facial Cues in Antisocial Violent Offenders. *European Archives of Psychiatry and Clinical Neuroscience*, *264*, 61-69. <https://doi.org/10.1007/s00406-013-0440-1>
- Semiatin, J. N., Torres, S., LaMotte, A. D., Portnoy, G. A., & Murphy, C. M. (2017). Trauma Exposure, PTSD Symptoms, and Presenting Clinical Problems among Male Perpetrators of Intimate Partner Violence. *Psychology of Violence*, *7*, 91-100. <https://doi.org/10.1037/vio0000041>
- Serie, C. M. B., van Tilburg, C. A., van Dam, A., & de Ruiter, C. (2017). Spousal Assaulters in Outpatient Mental Health Care: The Relevance of Structured Risk Assessment. *Journal of Interpersonal Violence*, *32*, 1658-1677. <https://doi.org/10.1177/0886260515589932>
- Shorey, R. C., Fite, P. J., Menon, S. V., Cohen, J. R., Stuart, G. L., & Temple, J. R. (2018). The Association between PTSD Symptoms and IPV Perpetration across 6 Years. *Journal of Interpersonal Violence*, *36*, NP5340-NP5361.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics*. Pearson.
- Tackett, J. L., Brandes, C. M., King, K. M., & Markon, K. E. (2019). Psychology's Replication Crisis and Clinical Psychological Science. *Annual Review of Clinical Psychology*, *15*, 579-604. <https://doi.org/10.1146/annurev-clinpsy-050718-095710>
- Taft, C. T., Creech, S. K., & Kachadourian, L. (2012). Assessment and Treatment of Post-traumatic Anger and Aggression: A Review. *The Journal of Rehabilitation Research and Development*, *49*, 777-788. <https://doi.org/10.1682/jrrd.2011.09.0156>
- Taft, C. T., Watkins, L. E., Stafford, J., Street, A. E., & Monson, C. M. (2011). Posttraumatic Stress Disorder and Intimate Relationship Problems: A Meta-Analysis. *Journal of Consulting and Clinical Psychology*, *79*, 22-33. <https://doi.org/10.1037/a0022196>
- Teige-Mocigemba, S., Hölzenbein, F., & Christoph Klauer, K. (2016). Seeing More than Others: Identification of Subtle Aggressive Information as a Function of Trait Aggressiveness. *Social Psychology*, *47*, 136-149. <https://doi.org/10.1027/1864-9335/a000266>
- Thijssen, J., & de Ruiter, C. (2011). Identifying Subtypes of Spousal Assaulters Using the B-SAFER. *Journal of Interpersonal Violence*, *26*, 1307-1321. <https://doi.org/10.1177/0886260510369129>
- Tonnaer, F., Cima, M., & Arntz, A. (2016). Aggression. In M. Cima (Ed.), *The Handbook of Forensic Psychopathology and Treatment* (pp. 270-312). Routledge Mental Health.
- Verhage, F. (1964). *Intelligentie en leeftijd onderzoek bij Nederlanders van twaalf tot zeventenzeventig jaar [Intelligence and Age: Research Study in Dutch Individuals Aged Twelve to Seventy-Seven]*. Van Gorcum/Prakke & Prakke.
- Wilkowski, B. M., & Robinson, M. D. (2012). When Aggressive Individuals See the World More Accurately: The Case of Perceptual Sensitivity to Subtle Facial Expressions of Anger. *Personality and Social Psychology Bulletin*, *38*, 540-553. <https://doi.org/10.1177/0146167211430233>
- Williams, C. L., Milanak, M. E., Judah, M. R., & Berenbaum, H. (2018). The Association between PTSD and Facial Affect Recognition. *Psychiatry Research*, *265*, 298-302. <https://doi.org/10.1016/j.psychres.2018.04.055>
- World Health Organization (2002). *World Report on Violence and Health: Summary*. World Health Organization.
- World Health Organization (2012). *Understanding and Addressing Violence against Women:*

*Health Consequences*. World Health Organization.

World Health Organization (2019). *Violence against Women*. World Health Organization.

World Health Organization (2020). *Global Status Report on Preventing Violence against Children*. World Health Organization.

Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis. *Journal of Consumer Research*, *37*, 197-206.

<https://doi.org/10.1086/651257>