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Research

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Some Influences on Perception and Justification of Aggression in Themselves and in their Social Environment

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ABSTRACT

The present study analyzes some factors associated with violence in pre-adolescents and adolescents, such as their self-rated aggression, the defensive or instrumental function of aggression, and the degree of violence perceived in others and their surroundings, namely family, friends and peers, neighborhood, city and world. Several self-report tests on aggression [Aggression Questionnaire (AQ), Barratt Impulsiveness Scale (BIS), State-Trait Anger Expression Inventory (STAXI-2), and an ad-hoc self-report developed by us (Self Appraisal Report (SAR))] were administered to 2110 subjects of both sexes between 9 and 17 years of age. Those subjects who perceived themselves as violent obtained significantly higher rates in aggression, impulsivity and anger, and believed that their surrounding was more violent than their self-rated non-violent ones did. Finally, they also showed a higher justification of violence, attributing it as a possible instrumental function. The best predictors of self-rated violence in the present study were the AQ physical aggressivity, the BIS motor impulse scale, and the STAXI expression index.

KEYWORDS: Adolescents; Anger; Violence; Environment; Socio-cultural factors.

ABBREVIATIONS: AQ: Aggression Questionnaire; BIS: Barratt Impulsiveness Scale ; STAXI-2: State-Trait Anger Expression Inventory; CNS: Central Nervous System; SED: Serious Emotional Disturbance; AEI: Anger Expression Index; AQ-PA: AQ subscale Physical Aggression; MI: Motor Impulsivity; GAM: General Aggression Model.

INTRODUCTION

The authors of the present study attempt to increase the knowledge of how pre-adolescents and adolescents perceive their own violence and those with whom they interact in their immediate environment: friends, family, school, neighborhood and those with more extent, unspecific, and global ranges, such as the city or the world. In this way, by understanding their mental perception of the violence in themselves and in their environments, parents and educators may be more successful in their effort to teach teenagers about how to behave in a non-violent way.

Perception can be defined as the meaning and interpretation of information. Even if it has a strong relation to the objective world, it corresponds with its interaction with the neural activity of the central nervous system (CNS) of each subject. This neural activity is unique to each person because it informs about the *Unwelt*[1] an environmental situation, specific to each individual and occasion. This explains why Mountcastle[2] said "*in certain respect, we are living amidst the world in the prison of our brain.*"

Far from being something universal, perception depends on the limitations in what and how we perceive. There is an interactive intervention of multiple factors on perception namely: a) biological factors (our knowledge is filtered through the knowing apparatus); b)

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psychological factors (our personal needs dictated by motivations and emotions); and c) socio-cultural factors (contexts shaping our knowledge with their assumptions, values, and prejudices).

Aggression should not be an exception to these assertions about perception. As any other behavior, aggression, far from being a static phenotype, is a flexible developmental process that reflects the neurobiological plasticity, open to any input experience. Its perception, therefore, is influenced in a certain way, by an interaction of different biological factors, ethnics, mental problems, and personality peculiarities, with a variety of socio-cultural factors, such as family dynamics, educational levels, cultural background, surrounding environment, closeness and familiarity of the diverse levels of our environment. Hence, there are human universals and individual differences.

Even within the typical universal trends, there are specific human ways and individual differences in the display of these universals. For instance, some situations demand a more specific approach, like young man *vs.* adult man *vs.* old man, or any other situation, as its closeness to the subject. The individual differences in the continuum of being aggressive or non-aggressive are, at least partially, a product of the interaction of a variety of bio-psychosocial factors. These factors may include different values, beliefs, and attitudes toward aggression and levels of justification of aggressive acts and feelings.

Personality can be conceptualized as "a set of stable structures that individuals use to interpret events in their social world and to guide their behavior".[3] Each individual has specific personality traits, which can be predictors of behavioral outcomes as well as of their perception. For instance, they have been used for identifying high-risk adolescents with aggression and serious emotional disturbance (SED).[4]

In the case of human aggression, one should expect a positive correlation with other related psychological constructs, such as anger, hostility, and impulsivity, as suggested by some empirical findings of our group.[5,6] Certain traits predispose individuals to higher levels of aggression. One breakthrough, for example, was the discovery that certain types of people who frequently aggress against others do so in large part because of some susceptibility towards hostile attribution, perception, and expectation biases.[7,8] Another one contradicts longstanding beliefs of many theoreticians and the lay public alike: high self-esteem (and not low self-esteem) may lead to high aggression. Specifically, individuals with inflated or unstable self-esteem (narcissists) are prone to anger and are highly aggressive when their high self-image is threatened.[9-13] Moreover, other researchers reported that people with narcissistic personalities who experience social rejection are more aggressive than those who are not so self-absorbed, a finding that may help explain why some teens resort to violence whereas others do not.[14]

Mental disorders, affecting the capability of the subject for learning, communicating, behaving, etc., can also constitute a risk for perpetrating or being victims of violence.[15] Contrary to non-psychopathic criminals and psychopaths who are not killers, psychopathic murderers fail to see violence as unpleasant.[16] The finding that psychopathic murderers had more positive reactions to violence may also help to understand some justification of aggressiveness, at least in some subjects with abnormal cognitive associations regarding violence, which may underpin their actions.[17-19] It has also been found in normal samples (i.e., subjects without any clinical abnormal diagnosis) that aggression can bring pleasure, which consequently leads to its instrumental justification,[20] usually meant as a planned, controlled, unemotional aggressive act, in contrast with the emotionally charged, uncontrolled type of aggressive display, known as hostile.[5,21]

Besides the individual psychobiological factors, we cannot forget the influence of our social context: family, peers and friends, school, and different levels of community as well as other socio-cultural factors on the perception and evaluation of an eventual risk, such as aggression might be. We all learn our adequate coping skills and behavior for living in our own environment, especially during the critical period of development.[22] For example, research shows that people who have experienced violence in early ages have a higher probability of being aggressive themselves when they become adults.[23]

The effect of family violence on childhood and personal development has become the subject of social science analysis.[24] Negative family dynamics, such as stress, conflict, or lack of communication within the family, may favor the justification of violence, and consequently its level of manifestation. The vicarious experience of violence within the family has nearly as profound an effect on children and adolescents as if they were the victims.[24] Parents who say "we don't hit our children but we smack each other around" still harm their children. Exposure to violence between parents significantly increases the risk for adult partner violence. It has also been reported that teenage girls who were the subject of violence from a parent or witnessed domestic violence engaged in riskier sexual activity at least three times more than a teenager who did not experience violence in the home.[25]

Peer-group influence on adolescent violence is also well established. Having delinquent friends or belonging to a gang often means a higher probability of committing violent acts.[26] It also extends to bullying behavior: peer groups influence early adolescent bullying behavior.[27] Besides repeated anecdotal evidence from a series of school shootings across America, some findings suggested that social exclusion or rejection by peers may indeed lead to aggressive behavior and violence, even in children who might not have been aggressive otherwise.[28] But, on the contrary, another study[29] found that aggression equals popularity among young teens: seventh- and ninth-graders perceived their relationally aggressive classmates to be more popular than meeker students.

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School is another important factor related to the expression of aggression in pre-adolescents. Between 20% and 50% of the high risk behaviors in youngsters are related to the following three aspects: poor academic performance, too much free time, and having delinquent peers.[30] Poor academic performance and dropping out of school seem to be consistent predictors of violent acts and delinquency in adulthood.[24,31] Attending low quality schools may also foment an inner sensation of being abandoned by society and, consequently, it is not surprising that they experience a surge of anger and alienation.

Our environment may also offer other risk factors, such as the deterioration of the community, abuse and misuse of mass media,[32] alcohol and illegal drugs, having suffered violence, access to weapons, and discomfort. Related to the latter one, for instance, noise may act as a stress or that causes unwanted aversive changes in an affective state, such as anger.[33] All of these, therefore, may have a negative influence, thereby reducing the desensitization towards violence.

The level of perception and justification of aggression according to its closeness or familiarity to the subject and its relationship to personality has not been totally analyzed yet. There are different levels of environment if one considers it in a closer and familiar context, such as the neighborhood or the school, or in a much wider one, such as in the world, or even just 'globally speaking'. We may call them: direct and indirect social surroundings, respectively.

It would be very useful to have a deeper understanding of the multiple risk factors that increase the level of acceptance of aggressive and violent attitudes in society, because it may help develop better ways of dealing with this social problem and reduce unnecessary human aggression. The more the adolescents are exposed to these factors, then the greater is the probability of violence.[23] Those subjects exposed to such risk factors without enough psychological protective factors may be the most vulnerable to violence.[22,34]

Consequently, the present paper will focus mainly on the consideration of how the perception of their own aggressive acts and other related phenomena may depend on how people self-report themselves, as having an aggressive or non-aggressive personality. The influence of some socio-cultural factors, which has also been studied,[3,4] suggests questions such as: a) Is there any influence of the closeness or familiarity of the environment on the perception of aggression by aggressive and non-aggressive people? b) Do aggressive and non-aggressive people justify aggression in the same manner? Findings related to important biological factors, such as age and sex, will not be addressed in this work.

The following hypotheses are put forth:

1. There is a positive correlation between the aggressive or non-aggressive personality of the subjects and their perception level of aggression and other related psychological constructs, such as anger, hostility, and impulsivity.

2. Subjects with higher aggressive personality will also show a higher justification for aggression in others.

3. It is expected that a stronger positive correlation exists between closer or more direct surroundings (e.g., school) and aggression than between wider or more indirect surroundings (e.g., world) and aggression.

METHOD

Four self-report instruments were administered to 2110 subjects of both sexes (45% males and 55% females) and different ages (9 to 17 years of age, mean 12.67, standard deviation (SD)=2.76). The subjects were pupils at public secondary schools in Madrid. Their participation in the study was voluntary and anonymous.

1. The Aggression Questionnaire (AQ), is a 29 item self-report instrument assessing aggression, anger, and hostility.[35] Each item is scored using a 5-point scale. AQ scores have a large cross-cultural validation. Originally developed for its application in the Anglo-Saxon culture, it has been used by researchers of different countries and translated into several languages, including Dutch,[36] Slovak,[37] and Spanish and Japanese.[38] In the present study, an adapted version for Spanish adolescents and pre-adolescents was administered.[32,39] The Cronbach's reliability of the overall scores obtained in the present study was α=.87 and the 95% confidence interval (CI) ranged from .86 to .88. The subscale score reliabilities were: α=.79 (CI .78, .81) for physical aggression, α=.72 (CI .70, .74) for verbal aggression, α=.66 (CI .64, .69) for hostility, and α=.68 (CI .65, .70) for anger.

2. The Barratt Impulsiveness Scale (BIS) is the first self-report measure developed to measure trait impulsiveness (Barratt, 1959). Its original version had 80 items. However, over several decades, newer versions have been developed in order to improve the construct validity of the scores. The newest version is the BIS-11, with 34 items.[40,41] It is an internally consistent measure of impulsiveness (α=.82 in non-clinical subjects, and α=.83 in psychiatric patients). A version for Spanish adolescents and pre-adolescents has been adapted and the scores have been validated by us.[42] In the present study, the reliability of the whole scale scores was α=.81 (CI .79, .82). The reliabilities for the subscale scores were; α=.66 (CI .63, .68) for motor impulse, α=.61 (CI .59, .64) for unplanned impulse, and α=.64 (CI .62, .67) for cognitive-attentional impulse.

3. The State-Trait Anger expression Inventory (STAXI-2)[42] provides a relatively brief, objectively scored measure of the experience, expression, and control of anger.[43,44] It has three parts: Anger state, anger trait, and the anger expression index (AEI). It has been shown to be useful in normal and abnormal individuals.[33,45] The reliability of the whole

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scale scores was α=.82 (CI .81, .83). The reliabilities of the subscale scores were α=.91 (CI .90, .92) for anger state, α=.83 (CI .82, .84) for anger trait, and α=.71 (CI .69, .73) for AEI.

4. Perception and justification of violence were measured by an ad-hoc self-report created by the researchers, under the acronym SAR. Subjects were asked about their own violence (the self-perception of their personality), as well as that of their peers and their environment, distinguishing different levels of closeness or familiarity. It consists of 10 questions with two possible answers, structured in three parts: a) 2 items on the consideration of themselves and their peers as being aggressive or non-aggressive (1=non-violent, 2=violent); b) 6 items on the level of aggression perceived in different social environments: world, city, neighborhood, school, their immediate friends and peers, and home (1=low, 2= high); and c) 2 items on its degree of justification of the use of violence, perceived as an instrumental tool in two contexts: for defense, and for being respected by others (1=Yes, 2=No).

RESULTS

A discriminant analysis was applied in order to determine whether the AQ, BIS and STAXI measures discriminate between violent and non-violent groups. The distribution of the test scores was analyzed using Z-scores to detect outliers (cut-off: Z=3.0, $p<.0028$). Moreover, the predictor variables did not show any problem of multicollinearity and the skewness and kurtosis coefficients were lower than 1.0 in all the tests, therefore verifying the assumption of normality.

The discriminant function of global scores of AQ, BIS and STAXI (Wilks' λ=.90, $\chi^2(3)=190.59$, $p<0.001$) resulted in a 77% correct classification in of the cases. However, in a separate analysis, when using all the subscales, the best predictors of violent discriminant function were AQ subscale Physical Aggression (AQ-PA), the STAXI (AEI) expression of anger, and the BIS motor impulsivity (MI) (Wilks' λ=.87, $\chi^2(3)=256.33$, $p<0.001$). This resulted in an 81% correct classification of the cases. Consequently, the latter alternative was chosen (test of independence $\chi^2(1)=186.4$, $p<0.001$).

The standardized canonical discrimination coefficients were .80, .28 and .09 for AQ-PA, AEI and MI respectively, and the Fisher's linear discriminant function in each group were:

Non-violent=-10.58+0.25(AQ-PA)+0.04(AEI)+0.76(MI)
Violent=-17.72+0.46(AQ-PA)+0.09(AEI)+0.79(MI)

The predictive usefulness of the discriminant analysis was high: 82% of the self-rated non-violent subjects (1389 from 1699) and 75% of the violent ones (79 from 106) were identified correctly (Odds ratio (OR)=1.53, $p<.007$). Table 1 shows the correlation between scale means of these measures as a function of violent and non-violent subjects.

	MI	AQ-PA	AEI	Non-violent	Violent	*t*-test
MI	1	.35***	.45***	18.77(4.52)	22.47(4.76)	-8.15***
AQ-PA	.31***	1	.47***	18.01(6.10)	27.90(7.72)	-7.87***
AEI	.34***	.55***	1	27.26(10.24)	39.24(10.19)	-11.69***

***$p<.001$

Table 1: Pearson correlations for the three scales of the discriminant function: scores above the diagonal belong to non-violent subjects, and those under the diagonal to the violent group. Right: Means (SD) of both groups in the three tests. The statistically significant differences were calculated by Student's *t*-test (df=1803).

Although it may have also included among the non-violent ones some self-rated violent subjects with a non-violent profile, the ratings of most of them are very close to the value 0 (Figure 1). Consequently, it would be convenient to analyze in detail those subjects with a profile near 0 in order to get a more accurate classification.

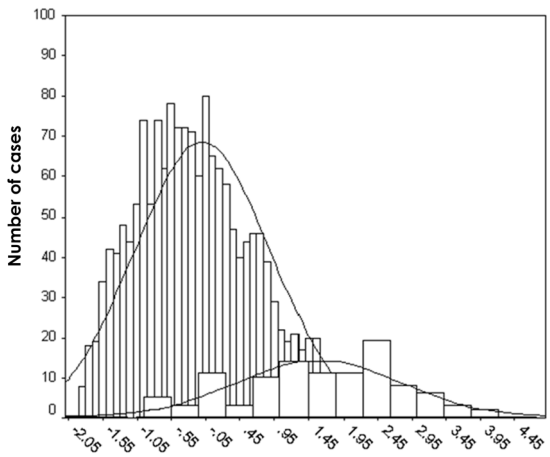

Figure 1: Number of cases in each score obtained applying the discriminant function. Thin bars represent non-violent subjects (each bar represents an interval of 0.10 points), and thick bars violent subjects (each bar represents an interval of 0.40 points).

The SAR intended to find out whether there was any relationship between the self-perceived violent personality and the perception of an aggressive environment (their world), and the justification of violence as an instrumental function, for instance as a defensive tool or for being respected by others.

Table 2 shows a positive correlation for each question of the SAR between self-perceived personalities (1=non-violent, 2=violent) and their perception of violence among their peers, (1=non-violent, 2=violent), and the amount of aggressive people in their social environment-world, city, neighborhood, school, friends and peers, and home (1=few, 2=many): the more violent you feel yourself, the higher level of aggression you perceive in your environment. This correlation is higher when the group is closer to you – for instance, peers (τ_b=.25), friends (τ_b=.23) and home (τ_b=.19) than in farther or more abstract environments, such as the world (τ_b=.07) or the city (τ_b=.07). There were sta-

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	Oneself	World	City	Neighbors	School	Friends	Home	Peers	Respect	Defense
Oneself	---	.07	.07	.11*	.10	.23*	.19*	.25*	.24*	.17*
World		---	.02	.03	-.01	-.04	-.05	.06	.06	.08
City			---	.30*	.22*	.05*	.07	.26*	.09*	.04
Neighbors				---	.20*	.16*	.12*	.19*	.09*	.01
School					---	.18*	.12*	.34*	.10*	.08*
Friends						---	.26*	.15*	.14*	.09*
Home							---	.05	.06	.05*
Peers								---	.25*	.18*
Respect									---	.31*
Defense										---

*p<.05

Table 2: Kendall's τ_b Correlations between the degree of aggressivity perceived in different environments (World, City, Neighborhood, School, Friends and Peers, and Home), the degree of violence perceived (towards oneself and towards the peers), and the justification of violence as an instrument to get respect or as a mean of defense. Given there are a larger number of correlations, a Bonferroni correction for p values were done.

tistically significant differences among the pairwise dependent correlations(Footnote 1); Peer *vs.* world or city (Z=5.7, p<.001, Z=6.4, p<.001), friends *vs.* world or city (Z= 4.8, p<.001, Z=4.8, p<.001, 5.0 p<.001), and home *vs.* world or city (Z= 3.6, p<.001, Z=3.8, p<.001).

Finally, getting respect had a significantly higher correlation with oneself (τ_b=.24) than defensive justification did (τ_b=.17). The difference between both correlations was statistically significant (Z=2.61, p=.009), even if it was considered a small effect size (Cohen's q=.07).

DISCUSSION

This study analyzed whether there was any relationship between the self-rating of having a violent or non-violent personality and their aggression, the perception of violence in their environment, and the justification of its eventual instrumental function.

One of the most interesting aspects of our findings is that the perception and justification of aggression depends on the personality of the subject. The more violent one perceives oneself, the more aggression one perceives. More specifically, the results showed that: a) those subjects who considered themselves violent express significantly higher scores in several aggression tests than those who considered themselves non-violent; b) those subjects who consider themselves violent perceive a higher aggression level based on their surroundings. That is, perceived aggression is higher in their closer and more familiar environments (such as peers and family) than in more 'unspecific' and far ones, such as the community or the world in general; and c) they feel a higher justification of aggression than the rest of people. This includes instrumental means for solving problems or for obtaining a variety of objectives, such as being respected by others.

What is the picture of the relationship revealed between aggression and other aggression-related variables? There is a consistency in the level of different types of aggression with other psychological correlates, such as anger, hostility, and impulsivity. Reports of engaging in hostile aggression are associated with expressing anger, more general irritability, and an inability to inhibit action. Aggression would be significantly related not only to the personality traits of anger/hostility but also to those of impulsiveness. The individual who uses hostile aggression might be characterized as one who is not only inhibited in social interaction but also is likely to experience and express anger. Our own research group found that aggression can be reflected in the different personality constructs, measured by self-reports in which anger and impulsiveness are positively correlated with hostile aggression, but not with instrumental aggression; non-planning impulsiveness is positively correlated with some situations related to hostile aggression, such as emotional agitation or lack of communication, but not with instrumental aggression; and hostility is positively correlated with anger and different kinds of aggression, but not with its degree of justification.[48,49] Reports of engaging in instrumental aggression show that if one wants to be really skillful in a pretended goal, then you should control anger. An aggressive act thus does not have to be necessarily accompanied by anger or by the desire to hurt.[48,50]

The traditional assumption that anger necessarily causes aggression had been already questioned.[51] Anger plays several causal roles in aggression. First, it reduces inhibitions against being aggressive in atleast two ways. Anger sometimes provides a justification for aggressive retaliation; it is part of the decision rule in the aggression script. However, anger may also sometimes interfere with higher-level cognitive processes, including those normally used in moral reasoning and judgment, which are part of the reappraisal process. Second, anger allows a person to maintain an aggressive intention over time. Anger increases attention to the provoking events, increases the depth of processing of those events, and therefore improves recall of

[1] The difference in the correlations was analyzed using a back transformed average Fisher's Z procedure.[46,47]

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those events. Thus, anger allows one to reinstate the state that was present in the originally provoking situation. Third, anger (like other emotions) is used as an information cue. It informs people about causes, culpability, and possible ways of responding (e.g., retaliation). If anger is triggered in an ambiguous social situation, the anger experience itself helps resolve the ambiguities and does so in the direction of hostile interpretations. Fourth, anger primes aggressive thoughts, scripts, and associated expressive motor behaviors. Such anger-related knowledge structures are used to interpret the situation and to provide aggressive responses to the situation. One related consequence of the many links between anger and various knowledge structures is that people frequently pay more attention to anger-related stimuli than to similar neutral stimuli. Fifth, anger energizes behavior by increasing arousal levels. Given that aggression-related knowledge structures are also primed by anger, aggressive behavior is one likely form of behavior that is energized by anger.[4] Finally, anger also plays a key role in human co-operation.[52] In contrast to the common view that negative emotions lead necessarily to pessimism, the emotion of anger might also lead to optimism. Those who experience anger are more optimistic about the future, less likely to take precautionary actions, and more likely to favor aggressive policy responses than those who experience fear. The fact that those subjects with a non-defined personality obtained intermediate scores in all the tests also suggests that they are aware that their personality does not match either with the violent or with the non-violent one.

The use of these and similar self-rating personality measures, therefore, may help to clearly differentiate aggressive subjects from 'normal' samples. They seem to be good indicators for the diagnosis of how the eventual violent or non-violent personality arises and develops. This has a consequent interest from a medical perspective because it helps to predict eventual future violent outcomes. A better knowledge about certain risk and protective factors would help to correct them, such as feasible interventions.[4]

The social perspective of aggression cannot be left aside. An individual's learning history determines to a great extent what kinds of behaviors will be linked to various threats. Nonetheless, it is striking how often aggression is the dominant response to such threats. We suggest two sources for this commonality. First, aggression frequently works in the short run, especially for more powerful people who wish to control the behavior of those with presumably less power (e.g., parents punishing children; male-on-female aggression). Second, there seems to be a "preparedness"[51,53] to emit aggressive behaviors when faced with either physical or psychological pain. Perhaps, the anger-aggression linkage is one that humans are evolutionarily prepared to learn.

Peer-group influence is well established on adolescents, which also extends to bullying and physical fighting behavior.[27] Even when individual students engaged in little or no bullying, they appeared to largely accept it as part of the culture or climate, as "just how things are." We really need to consider this tendency of children to go along with the group, even when they know it is very hurtful behavior. Moreover, children who might not have been aggressive otherwise will often become aggressive after they have been rejected by their peers. The social exclusion and rejection by peers may also lead to violent behavior. These findings fit with what researchers call the "homophile hypothesis" which suggests that individual behavior is influenced by the groups to which they belong.[28]

The perception of more violence within the family in violent children and adolescents found in our study fits with our hypothesis. This influence is not limited to those who regularly receive harsh punishment, becoming direct real victims, but the vicarious experience produced by mere exposure to violence between parents is also a risk factor that seems to predict later violence.[25] A history of physical abuse by a caretaker thus appears to increase the odds of using similar tactics of conflict resolution in adult close relationships.

We also found that the perception and justification of aggression in others depends on their physical or psychological closeness to the subject. The more violent one perceives oneself, the more aggression is perceived in closer and more familiar environments. Violent subjects perceived that there is higher aggression among their friends, peers, and family than non-violent subjects did. A possible explanation could be that living in a violent home or having aggressive friends might be the main social breeding ground for having a violent personality. These variables might have more influence than others like the aggressivity perceived within the neighborhood and school, and even more than the ones in the city or the world.

Finally, just a few comments related to the higher justification of aggression observed among violent people. Most people do not commit extreme acts of violence even if they could do so with little chance of discovery or punishment because the aggression inhibitions normally operate in them. Such self-regulation is due, in large part, to the fact that people cannot easily escape the moral standards that they apply to themselves. Self-image, self-standards, and sense of self-worth are used in normal self-regulation of behavior.[38]

It has already been mentioned that psychopathic murderers fail to see violence as unpleasant, and consequently they have no moral dilemma.[16] They are often portrayed as cold-blooded, emotionless and lacking in remorse, but they are also adept at lying and at feigning the emotions in which they are deficient. Our group has also observed how aggression elicited a higher pleasure in preventive and long-term inmates,[12,18,19] and can even bring pleasure to people with apparently normal moral standards.[20] It could be argued, therefore, that the criminal mind has abnormal cognitive associations regarding violence, which may underpin their actions.

Sometimes criminals may behave reprehensibly to-

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wards others, by committing such actions as murder, torture, and even genocide. Several research groups have independently identified and discussed how these inhibitions can be overridden.[54-57] Several factors influencing aggression may also operate by reducing inhibitions; for instance, the already mentioned pleasure. Extreme anger or agitation may also increase aggression by reducing inhibitions; similarly, some drugs can reduce aggression inhibitions. Two particularly important mechanisms that allow people to disengage their normal moral standards involve moral justification and victim dehumanization.[4]

Some arguments, which lead to an instrumental justification for extreme and mass violence, include: "it is for the person's own good,";"it is for the good of the society"; it brings pleasure or popularity; or personal honor demands the violent action.[58] These common justifications can be applied at multiple levels, from a parent's abuse of a child to bullying, a behavior which may be getting youth what they want, which is to be popular, even when they know it is very hurtful behavior.[59]

Dehumanizing the victim operates by making sure that one's moral standards are simply not applicable. War propaganda obviously fits this mechanism, but people also use it at an individual level. Potential victims are placed in the ultimate outgroup, as if they would not have enough human qualities, such as the "us" *vs.* "them" dilemma clearly shows. In essence, new knowledge structures are created that explicitly move the target group into a category for which aggression is not only acceptable but also a part of the script.

Perception and justification of aggression thus is not a context free, biology free, random process, nor the result of parental training during the first years of life. Even within the individual differences there are human universals.[60,61]

Our results appear to match quite well with the central "knowledge structures" suggested in the General Aggression Model (GAM) for guiding people's interpretations and behavioral responses to their environment: Three of which are considered important: 1) perceptual schemata, which identify phenomena including social events (e.g., personal insults); 2) person schemata, such as beliefs about a particular person or group of people; and 3) behavioral scripts, which comprise information about how people behave under certain circumstances.[3,62] Its application for the assessment of violence in people would also be promising in relation to a positive prevention and treatment of violence. The most successful interventions appear to be those that address multiple sources of potentially maladaptive learning environments, and do so at a relatively young age.[63] This can have a significant beneficial impact on violent juvenile offenders. An intervention should include a multisystemic therapy,[64,65] which is a family-based approach that first identifies the wide range of factors contributing to the development and maintenance of violent behavior: psychobiological (e.g., age, sex, personality characteristics) and social (e.g., peer-group, family, school, work, neighborhood and cultural factors). Intervention is then tailored to fit the individual constellation of major contributing factors to the violent behaviors of the individual undergoing treatment.

CONCLUDING REMARKS

The prediction of psychobiological and environmental risk factors concerning violence is central to understanding its genesis and prevention because we are social animals. From an evolutionary standpoint, our species requires not only food and shelter to survive, but also an ability and propensity to work co-operatively in social groups. Several common social needs appear repeatedly in the writings of scholars across many areas of psychology.[66] One such list might include the needs to (a) view oneself positively (self-esteem); (b) believe that others view the self positively (social esteem); (c) perceive the world or the hereafter as a just place; (d) belong to a social group; and (e) view one's group positively (group esteem). Threats to these needs are often the source of aggressive behavior. Consequently, aggression and violence should be analyzed from a wide perspective, such as the result of a multiple interaction of several variables. These factors include: 1) violent personalities; 2) high degrees of impulsivity; 3) physiological arousal related to anger and hostility; 4) a belief system or aggressive script, that excuses or justifies violence; and 5) a model or suggested course of action that may be derived from observing similar scenarios in the media or in real life,[38] especially among closer social groups, such as peers and family.

Although the exposition to those social risks as well as to stressful and conflictive situations and their interaction with some personal circumstances, such as age, sex, values, beliefs or any other psychobiological characteristic, may foment a violent personality,[4] obviously it does not mean that the subject has to be necessarily aggressive or violent, or predestined to become a delinquent, as the Seville Statement on Violence clearly stated quite a few years ago.[67]

Further research needs to be performed examining not only the change of the attitudes toward aggression throughout adult life, but also the specific characteristics of both sexes, in order to identify certain risk and protective predictors of behavioral outcomes in high-risk patients with aggression and serious emotional disturbance.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. Uexküll J, Kriszat G. *Streifzugedurch die Umwelten von Tierenund Menschen: Ein Bilderbuchunsichtbarer Welten. Sammlung: Verständliche Wissenschaft* [In German]. Berlin, Germany: J Springer; 1934.

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-113

2. Mountcastle VB. *Perceptual Neuroscience: The Cerebral Cortex*. Cambridge, Massachusetts, USA and London, England: Harvard University Press; 1998.

3. Anderson CA, Bushman BJ. Human aggression. *Annu Rev Psychol.* 2002; 53: 27-51. doi: 10.1146/annurev.psych.53.100901.135231

4. Vance JE, Bowen NK, Fernandez G, Thompson S. Risk and protective factors as predictors of outcome in adolescents with psychiatric disorder and aggression. *J Am Acad Child Adolesc Psychiatry*. 2002; 41(1): 36-43. doi: 10.1097/00004583-200201000-00009

5. Ramirez JM, Andreu JM. Aggression's typologies. *International Review of Social Psychology*. 2003; 16: 145-161.

6. Ramirez JM, Santisteban C, Fujihara T, Van Goozen S. Differences between experiences of anger and readiness to angry action: A study of Japanese and Spanish students. *Aggressive Behavior.* 2002; 23(6): 429-438. doi: 10.1002/ab.80014

7. Crick NR, Dodge KH. A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychol Bull.* 1994; 115(1): 74. Web site. http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=1994-20990-001. Accessed April 12, 2016

8. Dill KE, Anderson CA, Anderson KB, Deuser WE. Effects of aggressive personality on social expectations and social perceptions. *J Res Pers.* 1997; 31(2): 272-292.

9. Baumeister RF. The self. In: Baumeister RF, Finkel EJ, eds. *Advanced Social Psychology: The State of the Science*. Newyork, USA: Oxford University Press; 2010: 139-175.

10. Baumeister RF, Smart L, Boden JM. Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review*. 1996; 103: 5-33. doi: 10.1037/0033-295X.103.1.5

11. Bushman BJ, Baumeister RF. Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *J Pers Soc Psychol*. 1998; 75(1): 219-229. doi: 10.1037/0022-3514.75.1.219

12. Kernis MH. Toward a conceptualization of optimal self-esteem. *Psychological Inquiry: An International Journal for the Advancement of Psychological Theory.* 2003; 14(1): 1-26. doi: 10.1207/S15327965PLI1401_01

13. Kernis MH, Grannemann BD, Barclay LC. Stability and level of self-esteem as predictors of anger arousal and hostility. *J Pers Soc Psychol*. 1989; 56(6): 1013-1022. doi: 10.1037/0022-3514.56.6.1013

14. Kim EJ, Namkoon K, Ku T, Kim SJ. The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *Eur Psychiatry.* 2008; 23(3): 212-218. doi: 10.1016/j.eurpsy.2007.10.010

15. Webster DW, Gainer PS, Champion HR. Weapon carrying among inner-city junior high school students: Defensive behavior vs aggressive delinquency. *Am J Public Health*. 1993; 83(119): 1604-1608. doi: 10.2105/AJPH.83.11.1604

16. Gray NS, Macculloch MJ, Smith J, Morris M, Snowden RJ. Forensic psychology: Violence viewed by psychopathic murderers. *Nature.* 2003; 423: 497-498. Web site. http://www.nature.com/nature/journal/v423/n6939/full/423497a.html. Accessed April 12, 2016

17. Millana LC, Cabanac M, Toldos-Romero MP, Bonniot-Cabanac MC, Ramírez JM. Placer asociado con la conducta agresiva en una muestra de reclusos españoles en prisión preventiva [In Spanish]. *Psicopatología Clínica, Legal y Forense*. 2006; 5: 119-132. Web site. http://eprints.ucm.es/8421/1/PPCLF-PLacer-Agrersio%CC%81n_en_reclusos.pdf. Accessed April 12, 2016

18. Cabanac M, Ramírez JM, Millana LC, Toldos-Romero MP, Bonniot-Cabanac MC. The pleasure of aggressiveness among inmates in preventive and longterm detention. *The Open Criminology Journal.* 2008; 1(2): 19-26. Web site. http://eprints.ucm.es/8409/. Accessed April 12, 2016

19. Ramírez JM, Millana L, Toldos-Romero MP, Bonniot-Cabanac M-C, Cabanac M. The pleasure of being aggressive in male incarcerated criminals. *The Open Criminology Journal.* 2009; 2(2): 1-9. Web site. http://eprints.sim.ucm.es/9992/1/336_JMR-final_TOCRIJ.pdf. Accessed April 12, 2016

20. Ramírez JM, Bonniot-Cabanac MC, Cabanac M. Can aggression provide pleasure? *European Psychologist*. 2005; 10(2): 449-472. doi: 10.1027/1016-9040.10.2.xxx

21. Ramirez JM, Andreu JM. Usefulness of categorizing functional aggression. *Behavioral Sciences of Terrorism and Political Aggression*. 2008; 1(3): 232-233.

22. Garbarino J. *Lost Boys: How Our Sons Become Violent and What we Can do to Save Them.* New York, USA: The Free Press; 1999a.

23. Raine A, Brennan PA, Farrington DF, Mednik SA. *Biosocial Bases of Violence*. Rhodes, Greece: Springer Science; 1997.

24. Farrington DF. Early predictors of adolescent aggression and adult violence. *Violence Vict*. 1989; 4(2): 79-100. Web site. http://www.ncbi.nlm.nih.gov/pubmed/2487131. Accessed April 12, 2016

25. Ehrensaft MK, Cohen P, Brown J, Smailes E, Chen H, John-

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-113

son JG. Intergenerational transmission of partner violence: A 20-year prospective study. *J Consult Clin Psychol.* 2004; 71(4): 741-753. doi: 10.1037/0022-006X.71.4.741

26. Moffitt TE. *Life-Course-Persistent and Adolescence-Limited Antisocial Behavior: A 10-Year Research Review and A Research Agenda.* New York, USA: Guilford Press; 2003.

27. Espelage DL. Ecological theory: Preventing youth bullying, aggression, and victimization**.** *Theory Pract*. 2014; 53(4): 257-262. doi: 10.1080/00405841.2014.947216

28. Twenge JM, Zhang L, Im C. Rejection by peers may lead to violent behavior. *Personality and Social Psychology*. 2004; 8(3): 308-319.

29. Rose AJ, Swenson LP, Waller EM. Overt and relational aggression and perceived popularity: Developmental differences in concurrent and prospective relations. *Developmental Psychology*. 2004; 40(3): 378-387. doi: 10.1037/0012-1649.40.3.378

30. Blum K, Braverman ER, Holder JM, et al. The reward deficiency syndrome: A biogenetic model for the diagnosis and treatment of impulsive, addictive and compulsive behaviors. *J Psychoactive Drugs.* 2000; 32(1): 1-112.

31. Maugin E, Loeber R. Academic performance and delinquency. *Crime and Justice*. 1996; 20: 145-264.

32. Santisteban C, Alvarado JM, Recio P. Evaluation of a Spanish version of the buss and perry aggression questionnaire: Some personal and situational factors related to the aggression scores of young subjects. *Pers Individ Dif.* 2007; 42(8): 1453-1465.

33. Ramirez JM, Alvarado JM, Santisteban C. Individual differences in anger reaction to noise. *Individual Differences Research*. 2004; 2(2): 125-136. Web site. http://eprints.ucm.es/8508/. Accessed April 12, 2016

34. Duberwitz H. *Neglected Children: Research, Practice, and Policy*. Thousand Oaks, California, USA: SAGE. 1999b; 1-23.

35. Buss AH, Perry M. The aggression questionnaire. *J Pers Soc Psychol*. 1992; 63(3): 452-459. doi: 10.1037/0022-3514.63.3.452

36. Meesters C, Muris P, Bosma H, Schouten E, Beuving S. Psychometric evaluation of the Dutch version of the aggression questionnaire. *Behav Res Ther.*. 1996; 34(10): 839-843. Web site. http://www.ncbi.nlm.nih.gov/pubmed/8952127. Accessed April 12, 2016

37. Lovas L, Trenkova S. Aggression and perception of an incident. *Studia Psychologica*. 1996; 38(4): 265. Web site. http://search.proquest.com/openview/3015ca55c0f72869ccf140c0e8ae2a0c/1?pq-origsite=gscholar&cbl=1817340. Accessed April 12, 2016

38. Ramirez JM. Andreu JM, Fujihara T. Attitudes toward aggression. A cross-cultural comparison of Japanese and Spanish students. In: Rodao F, López Santos A, eds. *El Japón Contemporáneo* [In Spanish]. Salamanca, Spain: Ediciones Universidad de Salamanca, 1998; 185-193.

39. Santisteban C, Alvarado JM. The aggression questionnaire for Spanish preadolescents and adolescents: AQ-PA. *Span J Psychol.* 2009; 12(01): 320-326. doi: 10.1017/S1138741600001712

40. Stanford MS, Mathias CW, Dougherty DM, Lake SL, Anderson JH, Patton JH. Fifty years of the Barratt Impulsiveness Scale: An update and review. *Pers Individ Dif.* 2009; 47(5): 385-395. Web site. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3805371/. Accessed April 12, 2016

41. Steinberg L, Sharp C, Stanford MS, Tharp S, Teten A. New tricks for an old measure: The development of the barratt impulsiveness. *Psychological Assessment*. 2013; 25(1): 216-226. doi: 10.1037/a0030550

42. Recio P, Santisteban C, Alvarado J. *Estructura factorial de una adaptación española del test de impulsividad de Barratt* [In Spanish]. *Metodología de las ciencias del comportamiento.* 2004; 515-519.

43. Spielberger CD. *Manual for the State-Trait Anger Expression Inventory (STAXI)*. Odessa, FL, USA: Psychological Assessment Resources; 1988.

44. Spielberger CD, Sydeman SJ. State-Trait anger inventory and state-trait anger expression inventory. In: Maurish ME, ed. *The Use of Psychological Testing for Treatment Planning and Outcomes Assessment.* New Jersey, USA: Lawrence Erlbaum Associates; 1994: 300-321.

45. Deffenbacher JL. Trait anger: Theory, findings, and implications. In: Spielberger CD, Butcher JN, eds. *Advances in Personality Assessment*. Hillsdale, NJ, USA: Lawrence Erlbaum Associates. 1992: 9: 177-201.

46. Steiger JH. Tests for comparing elements of a correlation matrix. *Psychol Bull.* 1980; 87: 245-251. doi: 10.1037/0033-2909.87.2.245

47. Hittner JB, May K, Silver NC. A Monte Carlo evaluation of tests for comparing dependent correlations. *J Gen Psychol.* 2003; 130: 149-168. doi: 10.1080/00221300309601282

48. Ramirez JM, Andreu JM. Aggression, and some other psychological constructs (anger, hostility, and impulsivity); Some comments from a research project. *Neuroscience and Biobehavioural Reviews*. 2006; 30(3): 276-291.

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-113

49. Ramirez JM, Andreu JM. The main symptoms of the AHA-syndrome: Relationships between anger, hostility, and aggression in a normal population. In: Bhave SY, Saini S, eds. *The AHA-Syndrome and Cardiovascular Diseases.* New Delhi, India: Anamaya Publishers; 2009: 16-29.

50. Averill JR. *Anger and Aggression: An Essay on Emotions*. New York, USA: Springer; 1982.

51. Berkowitz L. *Causes and Consequences of Feelings Studies in Emotion and Social Interaction.* New York, USA: Cambridge University Press; 2000.

52. Ananthaswamy A. Anger plays key role in human cooperation. *New Scientist.* 2002; 2002. Web site. https://www.newscientist.com/article/dn1766-anger-plays-key-role-in-human-cooperation/. Accessed April 12, 2016

53. Seligman ME. On the generality of the laws of learning. *Psychological Review*. 1970; 77(5): 406-418. doi: 10.1037/h0029790

54. Bandura A. Social cognitive theory: An agentic perspective. *Annu Rev Psychol.* 2001; 52: 1-26. doi: 10.1146/annurev.psych.52.1.1

55. Keltner D, Robinson RJ. Extremism, power, and the imagined basis of social conflict. *Curr Dir Psychol Sci.* 1996; 5(4): 101-105. Web site. http://greatergood.berkeley.edu/dacherkeltner/docs/keltner.robinson.currentdirections.1996.pdf. Accessed April 12, 2016

56. Staub E. Individual and societal (group) values in a motivational perspective and their role in benevolence and harmdoing. In: Eisenberg N, Reykowski J, Staub E, eds. *Social and Moral Values: Individual and Societal Perspectives*. Hillsdale, NJ, USA: Lawrence Erlbaum Associates; 1989: 45-61.

57. Staub E. Notes on cultures of violence, cultures of caring and peace, and the fulfillment of basic human needs. *Political Psychology.* 2003; 24(1): 1-21. Web site. http://people.umass.edu/estaub/9386996.pdf. Accessed April 12, 2016

58. Ramírez JM. Causes and functions of aggression. *Hiroshima Forum for Psychology*. 1996; 17: 21-37.

59. Espelage D, Holt M, Henkel R. Examination of peer-group contextual effects on aggression during early adolescence. *Child Development.* 2003; 74(1): 205-220. doi: 10.1111/1467-8624.00531

60. Ramírez JM. Justification of aggression in several Asian and European countries with different religious and cultural background. *Int J Behav Dev.* 2007; 31(1): 51: 9-15. Web site. http://eprints.ucm.es/8417/. Accessed April 12, 2016

61. Ramírez JM, Fung AL, Alvarado JM, Millana L. Justification of interpersonal aggression in Hong Kong and Spain. *Open Psychol J.* 2011; 4(Suppl 1-M1): 64-72. Web site. http://eprints.ucm.es/13357/. Accessed April 12, 2016

62. Gilbert F, Daffern M, Anderson CA, Gilbert F, Daffern M, Anderson CA. The general aggression model and its application to violent offender assessment and treatment. In: Stumey P, ed. *The Wiley Handbook of Violence and Aggression*. New Jersey, USA: John Wiley & Sons, Limited; 2015.

63. Zigler E, Taussig C, Black K. Early childhood intervention: A promising preventative for juvenile delinquency. *Am Psychol*. 1992; 47(8): 997-1006. doi: 10.1037/0003-066X.47.8.997

64. Borduin CM. Multisystemic treatment of criminality and violence in adolescents. *J Am Acad Child Adolesc Psychiatry.* 38(3): 242-249. doi: 10.1097/00004583-199903000-00009

65. Randall J, Cunningham P-B. Multisystemic therapy: A treatment for violent substance-abusing and substance-dependent juvenile offenders. *Addictive Behaviors.* 2003; 28(9): 1731-1739. Web site. http://www.ncbi.nlm.nih.gov/pubmed/14656556. Accessed April 12, 2016

66. Baumeister RF, Leary MR. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychol Bull.* 1995; 117(3): 497. doi: 10.1037/0033-2909.117.3.497

67. Adams D, Barnett SA, Bechtereva NP, et al. The seville statement on violence. *Cahiers du Mouvement Universel de la Responsabilité Scientifique*. 1986; 5: 51. Web site. http://en.wikipedia.org/wiki/Seville_Statement_on_Violence. Accessed April 12, 2016

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Review

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Evolutionary Roots of the Sex Difference in the Prevalence of Severe Anti-social Behavior: A Literature Review

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ABSTRACT

It has been well-established that males exceed females in the most severe manifestations of anti-social behavior. The biological and environmental causes of this sex difference has received considerable attention. However, the evolutionary roots of this behavior has received far less attention. This review presented the evolutionary perspective on the reasons for the sex difference in severe anti-social behavior utilizing a life-history framework approach which is a branch of evolutionary theory that addresses the way organisms allocate time and resources to the various activities that comprise their life cycle.

KEYWORDS: Evolutionary theory; Anti-social behavior; Life-history framework.

ABBREVIATIONS: EDP: Evolutionary Developmental Psychopathology; LHS: Life-History Theory.

INTRODUCTION

Tremblay[1] observed that of all the risk factors for the development of anti-social behavior, the sex of the child (i.e., maleness) is by far the most robust predictor. Indeed, the most pernicious forms of anti-social behavior such as chronic physical aggression, violence, and life-course persistent anti-social behavior are engaged in almost exclusively by males.[2] The explanation of this massive sex difference from the perspective of evolutionary developmental psychopathology (EDP) takes two forms: *proximate* and *ultimate.*[3] EDP is a branch of evolutionary psychology which is commonly defined as the application of the principles of Darwinian evolution to explain contemporary human behaviors and psychological traits.[3] *Proximate* explanations focus on present processes/causes of how a behavior or organism functions. *Ultimate* explanations focus on the past evolutionary forces that helped shape the proximate processes.[4,5] For example, take a behavior such as the cry of a human infant. The *ultimate* explanation of this behavior is that it was selected by evolution because it elicited maternal care and thus increased the likelihood that the infant would survive. A *proximate* explanation is that circumstances such as cold, hunger, physical separation from the mother triggers this behavior. In other words, *ultimate* evolutionary explanations are concerned with *why* a behavior exists. Present *proximate* explanations are concerned with *how* a behavior works.

Until recently this evolutionary perspective has received relatively little attention.[6] Therefore there is a need to look beyond the proximal biologically-based mechanisms explanations for the massive sex difference in the severest forms of anti-social behavior, which was recently and comprehensively reviewed,[2] and to consider their distal ultimate mechanisms.[7] There are of course environmentally-based learning processes that contribute to the sex difference. For a recent discussion of these processes the interested reader should consult the work of Russell and colleagues.[8]

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The paper will begin by briefly presenting the two cornerstone concepts of Darwinian evolution, *natural selection* and *adaptation*, that are essential for understanding the application of evolutionary theory to the study of psychopathology.[3] It will then draw upon Del Giudice's life-history framework for explaining the ultimate causes of the massive sex difference in the severest forms of anti-social behavior.[3,9-11]

NATURAL SELECTION

Natural selection is the cornerstone concept that explains why evolution occurs. Its occurrence is governed by three mechanisms. First, individuals in a population must differ from one another in their physical or behavioral traits. Second, some of these difference traits must affect an individual's ability to successfully reproduce. Third, the traits must be heritable, i.e., capable of being transmitted to the next generation. This combination of heritable variation and differential reproduction based on this variation results in traits becoming more common in a population (i.e. they are *selected* for because of their positive effects on reproductive success or *fitness*). A special case of natural selection is *sexual selection* which posits that differences between the sexes in physical and behavioral traits can occur because these traits facilitate reproductive success either by making individuals compete more effectively with rivals or by making individuals more attractive to potential mates.[12,13]

ADAPTATION

Natural and sexual selection produce incremental modifications in various traits that enhance survival and reproductive success. These traits, which can be both physical and psychological, are termed *adaptations*. Psychological adaptations, which govern mental and behavioral processes are termed *psychological mechanisms*. Each mechanism has been designed by natural/sexual selection to address adaptation to specific domains of the physical and social world since what is adaptive can differ markedly depending upon the domain. Importantly, all adaptations have costs as well as benefits. Hence for a trait to be adaptive it does not have to be cost free, but it only needs to have an overall positive result for enhancing fitness. Also, although specific adaptations have proven successful in the past, they may not be as successful in the current environment.

Lastly, it is important to note that although evolutionary explanations of behaviors such as violence are sometimes thought to be at odds, or in competition with learning explanations involving environmental and cultural explanations, evolutionarily-based psychological mechanisms are quite sensitive to learning, environmental and learning contexts as they interact with and are shaped by such factors.[14,15]

LIFE-HISTORY STRATEGIES THEORY

Life-history strategies theory (LHS) is a branch of evolutionary theory that addresses the way organisms allocate time and resources to the various activities that comprise their life cycle. Because all organisms live in a world of limited resources, all the activities that contribute to an organism's evolutionary fitness will typically involve both benefits and cost and thus inevitably engender trade-offs between different choices. Natural selection favors organisms that organize activities that optimize resource allocation. Different allocation decisions result in different life-history *strategies.* Strategy in the context of LHS refers to an organism's phenotype, resulting from the integration of a suite of morphological, physiological, and behavioral traits that have enhanced fitness. Note therefore that *strategy* used in the evolutionary sense does *not* refer to conscious planning in pursuit of a goal, but to the suite of traits that evolved to maximize *fitness*.[4] Thus in the evolutionary sense, for example, unconscious organisms such plants are understood to have evolved strategies in the same sense as humans have. These different strategies can be described at the broadest level of analysis by a single dimension from *fast* to *slow*. Because the fast-slow continuum applies to differences not only between species but also to individual differences within a species, individual differences in various behaviors and traits can be understood as reflecting variation on the fast-slow continuum.

FAST-SLOW CONTINUUM

As previously indicated, all life-history strategies involve trade-offs. Thus, in the fast-slow continuum of life-history variation, there is the *slow* strategy of slow growth and late reproduction that correlates with long life span, low juvenile mortality, higher parental investment but with fewer offspring of higher quality. In contrast, the *fast* strategy of fast growth and early reproduction correlates with larger numbers of offspring, reduced parental investment in each but shorter life-span and increased juvenile mortality. Fast life-history strategies tend to be high risk as they focus on maximizing mating opportunities and thus typically involve more risky and aggressive behaviors than slow life-history strategies. Thus, these strategies make it optimal to discount future rewards and favor short-term gains over long term benefits that can be gained by engaging in risky behaviors. In contrast, the *slow* strategy that favors future reproduction must maximize the chances of survival and remaining healthy and thus is risk aversive. Furthermore, the difference in trade-offs in sexual reproduction for males and females in most species (which will subsequently be discussed) results in men pursuing a *fast* life strategy and women pursuing a *slow* life strategy. This difference in strategies in turn helps explain the sex difference in the severest forms of anti-social behavior.

SEX DIFFERENCES IN LIFE-HISTORY TRADE-OFFS

First, by way of prologue, recall that the evolutionary goal of reproductive success is measured in terms of the number of offspring who survive to adulthood and who themselves reproduce.[16] Therefore, the fundamental asymmetries in sexual reproduction will dictate the different strategies the sexes use to achieve this goal. These asymmetries involve the long period

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of gestation for women, the larger investment in pregnancy and lactation, and the shorter window for reproductive success that ends with menopause. In contrast, men can potentially sire many offspring in a very short time and for a more extended period of time. For example, it is estimated that Moulay Ismail the Bloodthirsty (1672-1727) of Morocco fathered 888 children.[17] This fundamental asymmetry dictates the trade-offs that both sexes make between mating and parenting investment to maximize reproductive fitness. Namely, males with the higher potential rate of reproduction tend to invest more in competing for mates than in parenting, and females with the lower rate of reproduction tend to invest more in parenting than in competing. This occurs because members of the sex with the higher reproduction rate can rejoin the mating pool more quickly than can members of the opposite sex and thus can have more offspring if they compete for mates rather than parent. For women however, who can usually have one only one child at a time, there is far less benefit from mating with multiple partners and much more from parental investment in their more limited number of offspring. This is especially true because women (historically and thus evolutionarily) have been more necessary for the survival of their children than men. Since males on average have benefited more from greater efforts in mating than parenting compared to females, this increased the intensity of the mating effort which in turn increased sexual selection for physical and psychological traits involved in male-male competition that enhanced reproductive success. The physical traits which enhanced reproductive success include the sex difference in physical size, upper-body musculature, and higher metabolic rates and the psychological traits include risk taking, dominance seeking, and physical aggression.[6,12-14,18,19] Thus men have competed intensely for top rank in a dominance hierarchy, as the payoff in a high mating effort eclipses the risks involved in competitions that can involve serious injury and death.[9]

For females, intrasex competition for mates also occurs, taking the form of relational aggression such as gossip or other strategies for disrupting the social networks of competitors.[20] However, it does not typically take the form of engaging in risky behaviors (unless it would be necessary for protecting offspring from harm) because the costs of engaging in these behaviors outweigh the benefits of increased reproductive success.[20] Thus, it is vital that she stays alive. If she dies the offspring in whom she has already invested will likely die with her. It is the critical dependence of the young on her for their survival that means that she must stay away from danger and the possibility of injury or death.[17]

In summary, although an outcome of death or severe injury as a result of violent intrasex competition is not appealing to either sex, the trade-off in reproductive success measured in terms of surviving offspring favors males.[20] For the male, although severe injury or death obviously markedly diminishes or removes the possibility of reproductive success, the reproductive success he has achieved to date remains uncompromised as he can rely on the offspring's mother to insure their survival.[20] For the female however, severe injury or death has consequences that are much more dire for reproductive success. Not only is the possibility of future offspring precluded, but the survival of existing offspring is placed in much greater jeopardy. In short, for a child "the consequences of losing a mother very early in life are catastrophic".[20]

This sex difference in life-history trade-offs in reproduction has set the stage for explaining the sex difference in anti-social behavior.

ULTIMATE EVOLUTIONARY EXPLANATION FOR THE SEX DIFFERENCE IN THE SEVEREST FORMS OF ANTI-SOCIAL BEHAVIOR

A crucial understanding of the evolutionary developmental psychopathological perspective (EDP) on anti-social behavior involves the recognition that the core concept of *adaptation* has different meanings for EDP and developmental psychopathology.[9] In EDP, as previously discussed, *adaptation* refers to traits that evolved because of their effects on survival and reproductive success. In contrast, in developmental psychopathology, *adaptive* refers to traits/behaviors that enhance an individual's well being, cooperation, social integration. Hence, given these different notions of adaptation, the result can be that evolutionarily adaptive behaviors (i.e., fitness enhancing) can result in *maladaptive* outcomes from the perspective of developmental psychopathology. In other words, evolutionarily adaptive *psychological mechanisms* may yield *maladaptive* outcomes (i.e., mental disorder) at an individual level even when the mechanisms are functioning "normally" from an evolutionary perspective.[3,9]

This is theorized to happen in four ways.[3,9] First, evolutionarily adaptive traits may increase vulnerability to dysfunction. All evolutionarily adaptive traits, no matter how well designed, are vulnerable malfunctions, breakdowns, and failures. For example, some configurations of personality traits within the adaptive range (e.g., schizotypy or autistic-like personality) may become especially vulnerable to mental disorder when coupled with deleterious genetic mutations or brain-damaging infections. Second, traits that were adaptive in ancestral environments may result in a mental disorder in current environments. For example, it has been hypothesized that some forms of psychopathy were adaptive in ancestral environments because they allowed psychopaths to increase their reproductive success by exploiting others. However, in the current environment, the anti-social behavior characteristic of psychopathy is correctly regarded as a mental disorder. Third, evolutionarily adaptive traits may yield individually maladaptive outcomes. This can occur because a trait that is evolutionarily adaptive when averaged across *all* individuals may be maladaptive in a *particular* individual. For example, defense mechanisms, which of necessity have been designed by natural selection to yield a high rate of false positives (mistakenly activated when no threat is present) in order to avoid catastrophic false negatives (failure to activate when

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perhaps lethal threat is present), can become mental disorders in current environments when they take the form of panic attacks, excessive anxiety, and phobias. Fourth, traits that were adaptive in ancestral environments may be expressed at maladaptive levels in current environments. For example, impulsivity involving a quick response to danger may have increased chances for survival. However, in the current environment, the extreme expression of impulsivity characteristic of Attention-Deficit/Hyperactivity Disorder is correctly regarded as a mental disorder. This last theory provides the most cogent explanation for the sex difference in the severest form of anti-social behavior, as the following discussion will delineate.

SEX DIFFERENCE IN THE SEVEREST FORMS OF ANTI-SOCIAL BEHAVIOR

Even though fast life-history traits involving risky behaviors have been evolutionarily adaptive for males within a certain range as they facilitate success in male-male competition for mates, these traits may become maladaptive in an individual if they exceed the limits of that range. Indeed, an extreme expression of an otherwise adaptive trait, is the definition of psychopathology from the perspective the discipline of *Developmental Psychopathology,* the dominant paradigm in the study of the origins and maintenance of psychopathology.[21] There is a robust consensus that almost no forms of mental disorder constitute clearly demarcated, qualitatively distinct categories. Virtually all disorders are conceptualized as representing an extreme expression of a normally distributed trait or traits. Fast life-history strategies characterized by impulsive, exploitative, or aggressive tendencies which have been evolutionarily adaptive for males can become maladaptive when they are expressed at an extreme level as adaptations to current environments that are *hostile* and *unpredictable* and then generalized to more benign contexts.[3,22]

Evolutionary developmental psychopathology posits a developmental calibration of slow *versus* fast life-history strategies as a response to various environmental factors.[3] *Hostile* environments characterized by violence, harsh parenting, death of other individuals within the environment, etc., tend to trigger fast life-history risky strategies emphasizing present gain and discounting future goals since the very nature of the environment suggests that a future orientation is irrelevant. Similarly, *unpredictable* environments characterized by erratic neighborhood conditions, fluctuating economic conditions, changes in family composition, etc., also tend to elicit fast life-history risky strategies for the same reasons as those cited for a *hostile* environment. Namely, since in environments that fluctuate unpredictably and randomly there can be no reliable forecast of the future, short-term risky strategies are more adaptive.

SUMMARY

In sum, there is a large sex difference favoring males in fast life-history evolutionary strategies involving risky, aggressive behaviors. The sex difference in these strategies continues to the present time since the human species has only recently (in evolutionary time) emerged from the ancestral environment in which these strategies were adaptive. Therefore, these strategies, even though it is possible that they are becoming less adaptive (e.g., see previous discussion on psychopathy), by and large tend to be conserved.[23] Furthermore, since males are much more likely to engage in a fast life-history strategy for evolutionary reasons, they are much more likely to engage in risky, aggressive behaviors in hostile and unpredictable environments for which they continue to be somewhat adaptive. These behaviors become maladaptive when they are expressed in an extreme form in other less pathological environments. Therefore, the large sex difference in the severest forms of anti-social behavior represents the continuation into the present of the large sex difference of fast life-history strategies since it is precisely these aggressive, risky strategies that are triggered by hostile, unpredictable environments that are important determinants of anti-social behavior.

REFERENCES

1. Tremblay R. Developmental origins of disruptive behavior problems: The 'original sin' hypothesis, epigenetics and their consequences for prevention. *J Child Psychol Psychiatry*. 2010; 51: 341-367. doi: 10.1111/j.1469-7610.2010.02211.x

2. Eme R. Sex differences in the prevalence and expression of externalizing spectrum disorders. In: Beauchaine T, Hinshaw S, eds. *Oxford Handbook of Externalizing Spectrum Disorders*. New York, USA: Oxford University Press; 2016: 239-266.

3. Del Giudice M, Ellis B. Evolutionary foundations of developmental psychopathology. In: Cicchetti D, ed. *Developmental Psychopathology*. 3rd ed. New York, USA: Wiley; 2016: 1-58.

4. Daly M. Interpersonal conflict and violence. In: Buss D, ed. *The Handbook of Evolutionary Psychology.* 2nd ed. Hoboken, NJ, USA: Wiley; 2016: 669-683.

5. Eisner M, Malti T. Aggressive and violent behavior. In: Lamb M, Lerner R, eds. *Handbook of Child Psychology and Developmental Science*. 7th ed. New York, USA: Wiley; 2016: 795-841.

6. Byrd-Craven J, Geary D. An evolutionary understanding of sex differences. In: Ryan M, Branscombe N, eds. *The Sage Handbook of Gender and Psychology.* New York, USA: Sage Publications; 2013: 100-114.

7. Leckman J. Understanding developmental psychopathology: How useful are evolutionary perspectives. In: Cicchetti D, ed. *Developmental Psychopathology.* 3rd ed. New York, USA: Wiley; 2016: 138-165.

8. Russell M, Robins S, Odgers C. Developmental perspectives: Sex difference in anti-social behavior from childhood to adulthood. In: Gartner R, McCarthy B, eds. *The Oxford Handbook of Gender, Sex, and Crime*. New York, USA: Oxford University

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-114

Press; 2014.

9. Frankenhuis W, Del Giudice M. When do adaptive developmental mechanisms yield maladaptive outcomes? *Dev Psychol.* 2012; 48: 628-642. doi: 10.1037/a0025629

10. Del Giudice M. An evolutionary life-history framework for psychopathology. *Psychol Inq*. 2014; 25: 261-300. doi: 10.1080/1047840X.2014.884918

11. Del Giudice M. A tower unto heaven: Toward an expanded framework for psychopathology. *Psychol Inq.* 2014; 25: 393-413. doi: 10.1080/1047840X.2014.925339

12. Geary D. *Male, Female: The Evolution of Human Sex Differences*. 2nd ed. Washington, DC, USA: American Psychological Association; 2010.

13. Geary D. Evolution of vulnerability. New York, USA: Academic Press; 2016.

14. Martel M. Sexual selection and sex differences in the prevalence of childhood externalizing and adolescent internalizing disorder. *Psychol Bull.* 2013; 139: 1221-1259. doi: 10.1037/a0032247

15. Martel M. Application of an integrated evolutionary psychological framework to psychopathology. *Psychol Inq.* 2014; 25: 352-354. doi: 10.1080/1047840X.2014.897199

16. Campbell A. The evolutionary psychology of women's aggression. *Philos Trans R Soc Lond B Biol Sci.* 2013; 368(1631): 20130078. doi: 10.1098/rstb.2013.0078

17. Campbell A, Cross C. Women and aggression. In: Shackelford T, Weekes-Shackelford V, eds. *The Oxford Handbook of Evolutionary Perspectives on Violence, Homicide, and War.* New York, USA: Oxford University Press; 2012: 197-216.

18. Archer J. Does sexual selection explain human sex differences in aggression? *Behav Brain Sci.* 2009; 32: 249-231. doi: 10.1017/S0140525X09990951

19. Kruger D, Fitzgerald C. Evolutionary perspectives on male-male competition, violence, and homicide. In: Shackelford T, Weekes-Shackelford V, eds. *The Oxford Handbook of Evolutionary Perspective on Violence, Homicide, and War*. New York, USA: Oxford University Press; 2012: 153-172.

20. Campbell A. Women's competition and aggression. In: Buss D, ed. *The Handbook of Evolutionary Psychology*. 2nd ed. Hoboken, NJ, USA: Wiley; 2016: 684-703.

21. Hinshaw S. Developmental psychopathology as a scientific discipline. In: Beauchaine T, Hinshaw S, eds. *Child and Adolescent Psychopathology*. 2nd ed. Hoboken, NJ, USA: Wiley; 2013: 3-28.

22. Da Silva D, Rijo D, Salekin R. The evolutionary roots of psychopathy. *Aggress Violent Behav.* 2015; 21: 85-96. doi: 10.1016/j.avb.2015.01.006

23. Leckman J. Understanding developmental psychopathology: How useful are evolutionary perspectives. In: Cicchetti D, ed. *Developmental Psychopathology*. 3rd ed. New York, USA: Wiley; 2016: 138-165.

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Mindfulness, Sustained Attention and Post-traumatic Stress in Tsunami Survivors

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ABSTRACT

Mindfulness involves various attention skills, including the ability to sustain and focus attention. We investigated the association between trait mindfulness and errors of omission and commission in a sustained attention task in individuals who had been exposed to the trauma of a natural disaster. A positive association between mindfulness and sustained attention was hypothesized. A disaster-exposed group (n=25) consisting of Norwegian tourists who survived the 2004 Southeast Asian tsunami in a location with high mortality rates was recruited. A control group (n=24) matched for gender, age and educational level was included in the study. Trait mindfulness and sustained attention were measured with the Five-Facet Mindfulness Questionnaire (FFMQ) and the Conner's Continuous Performance Test (CPT II) respectively. In the disaster-exposed group but not in the control group, there was a significant negative association between mindfulness and number of commission errors that was observed with linear regression after adjustment for gender, age, years of education, depression, anxiety, intelligence quotient (IQ), and amount of post-traumatic stress symptoms. To examine the associations between the five factors of mindfulness: observing, describing, acting with awareness, non-judging and non-reacting, and the number of CPT II omission and commission errors, linear regressions with adjustment for gender, age and years of education were applied. There was a significant negative association between number of commission errors and the describing factor of mindfulness in the disaster-exposed group, but not in the control group. There was a strong negative association between the factor of non-reacting and number of omission errors in the control group, and a weaker but still significant negative association between the factor of non-judging and number of omission errors in the control group. There was also a strong positive association between number of commission errors and the observing factor of mindfulness in the control group. The study shows that the association between sustained attention and mindfulness and its different aspects may be affected by disaster exposure.

KEYWORDS: Mindfulness; Attention; Disaster; Trauma; Commission errors; Post Traumatic Stress Disorder (PTSD).

ABBREVIATIONS: MBSR: Mindfulness-Based Stress Reduction; CPT II: Conner's Continuous Performance Test; FFMQ: Five-Facet Mindfulness Questionnaire; PTSD: Post Traumatic Stress Disorder; MINI: Mini International Neuropsychiatric Interview; WSAS: Work and Social Adjustment Scale; GAF-F: Global Assessment of Functioning function score; SCID-1: Structured Clinical Interview for DSM-IV; REC: Regional Ethics Committee; ADHD: Attention Deficit and Hyperactivity Disorder; BDI-II: Beck Depression Inventory II; BAI: Beck Anxiety Inventory; WASI: Wechsler Adult Short Intelligence Test; IQ: Intelligence Quotient.

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INTRODUCTION

Mindfulness embodies present moment awareness and emotional acceptance.[1] As defined by Kabat-Zinn,[2] mindfulness is paying attention in a particular way: on purpose, in the present moment, and non-judgmentally. Mindfulness can encompass different meditation practices and cognitive skills, including skills involving attention regulation and response inhibition.[3]

Mac Coon et al[4] have described mindfulness meditation as a form of attention control training by which individuals first develop the ability to direct and maintain attention towards a chosen object, requiring skills involved in monitoring the focus of attention and in detecting distraction, disengaging attention from the source of distraction, and redirecting and engaging attention to the intended object. In addition, mindfulness meditation cultivates the skill to maintain a non-judgmental, open presence to the present moment, a meta-awareness consisting of non-reactively monitoring the content of experience from moment-to-moment without being carried away by thoughts, emotions, or perceptions.[4]

The potential regulatory functions of meditative practices on attention and emotion processes have been suggested to have long-term brain and behaviour effects.[5] Attention is a cognitive system necessary for managing cognitive demands and regulating emotions. Attentional performance is positively related to levels of mindfulness and to meditation practice.[6] A review of 23 meditation studies revealed mixed effects of mindfulness training on different aspects of attention.[7] Mindfulness practice appears to positively affect attentional functioning by improving the resource allocation processes.[8] Individuals who practice meditation have been shown to have fewer commission errors than control subjects in attention tasks.[9] Commission errors indicate the number of times responses are made with no target present. A fast reaction time and high commission error rate points to difficulties with impulsivity. Omission errors indicate the number of times a target is presented, but no response is made. High omission rates indicate difficulties with paying attention to stimuli or a sluggish response.

Mindfulness-based practices involve attentional skills, including the ability to sustain and focus attention. Sustained attention has been found to be associated with meditation practice.[10,11] Three months of vipassana meditation led to reductions in trial-by-trial variability in reaction times in a sustained attention task.[10] Meditation-related improvements on sustained attention have been found on a continuous performance task.[11] In a sustained visual attention task, performance and the number of commission errors was related to self-reported mindfulness.[12] In a recent longitudinal randomized study by McCoon et al,[4] no differences in sustained attention were found between participants in a mindfulness-based stress reduction (MBSR) course compared to active controls. As seen above, studies targeting the association between mindfulness and sustained attention in non-clinical populations show varied and even somewhat contradictory results. There is a need to investigate factors that might affect these results, and this is where our study makes a contribution to this unexplored scene. We assume that mindfulness capability improves sustained attention. The relation between sustained attention and trait mindfulness is probably bi-directional. Well-developed functions of sustained attention may positively contribute to mindfulness ability. In our study which is correlational, we look at the association between sustained attention measured by amount of errors of commission and omission, and total trait mindfulness and the different factors thereof.

Improvement in attentional performance is central to proposed mechanisms for stress reduction in mindfulness meditation practices.[13] Mindfulness training might protect against attentional impairments associated with stressful periods[14] and improve attention-related behavioural responses by enhancing the functioning of specific subcomponents of attention.[15,16] Persistent and intensive demands, such as those experienced during high stress, might deplete attention, resulting in cognitive failures, emotional disturbances, and impulsive behavior.[14]

The neuropsychological findings in the area of attention related to post-traumatic stress are inconsistent. Golier and Yehuda[17] have summarized the types of attention deficits that have been found in trauma survivors with post-traumatic stress disorder (PTSD) and discussed the extent to which these deficits may be risk factors for or consequences of trauma. Horner and Hamner[18] reviewed the literature on performance on neuropsychological tests among individuals with PTSD. Although 16 of 19 studies reported impairment of attention, most of these studies included PTSD patients with significant psychiatric comorbidity. Other potential confounds were medical illness, substance abuse and motivational factors. We face the "chicken-egg" dilemma of what comes first, trauma or attention deficits. Crowell et al[19] addressed methodological limitations of research in this area, concluding with that cognitive difficulties linked to PTSD may actually have been secondary to pre-existing individual differences or other clinical conditions coexisting with PTSD. Samuelson et al[20] showed that when controlling for depression and alcohol abuse, attention deficits were associated with PTSD. Koso and Hansen[21] discussed the possibility of PTSD being associated with dysfunction of a higher-level attentional resource which in turn affects other cognitive functioning such as memory and thought. Lagarde et al[22] found attentional deficits in a group with a diagnosis of acute PTSD only, and not among trauma-exposed individuals without acute PTSD or among individuals not exposed to trauma. PTSD patients have been found to be impaired relative to individuals without psychiatric diagnoses on a measure of focused attention.[23] A study by Golier et al[24] did not find attention deficits associated with PTSD on a continuous performance test. In a study by Neylan et al,[25] healthy, well-educated males with combat-related PTSD without current depression or recent alcohol/drug abuse, did not perform differently on tests of attention compared to normal comparison participants. Neuropsychological research findings in the area of trauma-exposure and attention do not answer the "chicken-

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egg" question. Post-traumatic stress in survivors of a major disaster has been linked to attentional dysfunction 2-3 years post-disaster.[26] Deficiencies in sustained attention have been shown in veterans and in rape survivors with symptoms of post-traumatic stress.[27,28] Errors of commission during visuospatial maze learning have been found to discriminate between post-traumatic stress disorder (PTSD) and non-PTSD.[29]

Moore et al[30] suggested that in mindfulness practice, sustained attention is required to maintain focus on the breath, whereas cognitive control is required to detect mind wandering. We expand this hypothesis by reasoning that sustained attention, in addition to maintaining focus on the breath, also contributes to the detection of mind wandering and to trait mindfulness. Our rationale behind this reasoning is that we see mindfulness as a meta-cognitive function that includes attentional control and awareness of one's own attention. As we see it, mindfulness can be conceptualized as a meta-attentional process. Attentional control has been suggested to be a buffering mechanism against prolonged attentional engagement with threat-related stimuli among those with high levels of post-traumatic stress symptoms.[31]

Whether there is an association between mindfulness and sustained attention in disaster survivors with increased levels of post-traumatic stress symptoms is of interest. To the best of our knowledge, no studies have investigated the association between mindfulness and sustained attention in disaster survivors or in any population with symptoms of post-traumatic stress. Our subjects are non-clinical but disaster-exposed. We hypothesized that trait mindfulness, the capacity to deliberately attend to present experience without judgment, involves sustained attention, and we aimed to investigate the association between trait mindfulness and errors of omission and commission in disaster survivors with a sustained attention task. We hypothesized that there would be a positive association between mindfulness and sustained attention, and we expected negative associations between mindfulness and omission or commission errors.

Participants

The participants for our study were recruited from an earlier interview study of Norwegian disaster survivors who experienced the 2004 Southasian tsunami in Khao Lak, Thailand.[32] Norwegian tourists in Khao Lak were severely affected by the tsunami,[33] and of the 84 Norwegians who perished in the disaster, 68 were in Khao Lak. The Norwegian police registry reported that 82 Norwegian adults survived in Khao Lak. After submitting an application to the Norwegian Data Inspectorate, names were made available for the earlier interview study. Persons over the age of 18 years at the time of the disaster were invited to participate in the study and 63 agreed to being interviewed in person 2.5 years after the disaster. The examination included the Mini International Neuropsychiatric Interview (MINI), the PTSD module of the Structured Clinical Interview for DSM-IV (SCID-1) Axis I disorders, the Work and Social Adjustment Scale (WSAS), the Global Assessment of Functioning function score (GAF-F), and questions covering background characteristics and disaster exposure.[32]

For this study, the identical participants were contacted over the phone to inquire whether they would be willing to participate in our study. Of these 63 individuals, 3 could not be reached, 2 had died, and 25 agreed to participate. Of these 25 disaster survivors, 13 had been caught by the waves, 6 had been touched or chased by the waves, and 6 reported no direct exposure to the waves. Most of the participants, including all the participants who had not been directly exposed to the waves, reported strong witness experiences, including observing seriously injured individuals, corpses, or abandoned children. Five participants reported that a close family member had perished in the tsunami; three participants had lost their husbands; and three participants had lost one or more of their children. Exclusion criteria in our study included a serious medical or neurological illness and non-functional Norwegian language skills. The same exclusion criteria applied for the disaster-exposed group and the control group.

A control group consisting of 24 individuals was recruited *via* written advertisements seeking individuals interested in participating in the study. The recruitment of the control group was conducted such that there were no significant differences between the disaster-exposed and the control group with respect to gender, age, and years of education. *T*-tests did not show any significant differences between the two groups in in relation to depression, anxiety and IQ. The disaster-exposed group had significantly higher amount of post-traumatic stress symptoms than the control group.

PROCEDURE

In accordance with regional and international ethical standards, written informed consent was obtained from all the participants. Information on the study and the option of withdrawing was provided verbally and in writing. The testing of all the participants was performed by the identical test administrator in a one-on-one setting. The instruments used were administered in the order of the questionnaires measuring trait mindfulness, post-traumatic stress, depression and anxiety presented first, after which sustained attention was measured followed by measuring intelligence. The study was approved by the Regional Ethics Committee (REC) and the relevant committees for patient integrity, in accordance with the 1964 Declaration of Helsinki ethical standards.

MEASURES

Conner's Continuous Performance Test (CPT II)

Conner's Continuous Performance Test (CPT II),[34] is a test that measures sustained attention. Administration and scoring of the test is computerized. Alphabet letters are displayed, and

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the respondent is asked to press the space key when any letter except the letter X appears on the screen. Pressing letter X is a commission error, and not pressing for any of the other letters is an omission error. The administration procedure requires approximately 15 minutes. The split-half reliability is .94 for omission errors and .83 for commission errors. The test-retest correlation coefficients for omission and commission errors are .84 and .65, respectively. Validity studies have shown the ability of the test to differ between non-clinical and clinical subjects in relation to attention deficit and hyperactivity disorder (ADHD).[34] In regards to the validity of the test administration, response style is discussed in the CPT II manual, in the form of a Beta statistic.[34] This statistic allows for evaluation of the speed/accuracy trade-off. Some individuals are cautious and choose not to respond very often. Conceptually, such individuals want to make sure they are correct when they give a response. The emphasis is on avoiding commission errors. Higher values of Beta reflect this response style. Other individuals respond more freely to make sure they respond to most or all targets, and they tend to be less concerned about mistakenly responding to a non-target. This response style might give less omission errors and more commission errors. Lower values of Beta are produced by this response style. In this study, there was no significant difference in Beta between the disaster-exposed group and the controls (t=1.371, p=0.177).

The Five-Facet Mindfulness Questionnaire (FFMQ)

The Five-Facet Mindfulness Questionnaire (FFMQ)[35] was used to measure trait mindfulness. The questionnaire was developed by a factor analysis of a combined pool of items from five mindfulness questionnaires. The FMMQ consists of 39 items that examine overall trait mindfulness and the mindfulness factors of observing, describing, and acting with awareness, non-judging, and non-reacting. Respondents rate each item on a five-point Liker scale that ranges from "*never or very rarely true*" to "*always or almost always true*". The observing aspect of mindfulness indicates the tendency by which an individual observes his/her inner life and surroundings. The describing aspect indicates the ability of an individual to describe his/her feelings. The acting with awareness aspect indicates the tendency of an individual to act with awareness rather than distraction. The non-judging aspect refers to the tendency of an individual to refrain from judgment of his/her experience and relate to that experience with acceptance. The non-reacting aspect indicates the tendency of an individual to avoid reacting excessively to his/her inner experience. The total score on the FFMQ is attained by adding up the scores for the five mindfulness aspects. Baer et al[35] reported adequate to good internal consistencies (ranging from .72 to .92) for each of the scales. The FFMQ has been validated in several countries,[35-40] including Norway[41] In this study Cronbach's alpha was .81 for the disaster-exposed group, .66 for the control group, and .75 for the total group.

The Impact of Event Scale-Revised Version (IES-R)

The Impact of Event Scale-Revised (IES-R)[42] version was used to measure the degree of post-traumatic stress. The scale consists of 22 items with the following three subcategories of PTSD symptoms: re-experiencing (intrusion), avoidance, and arousal. It is a self-report measure that assesses subjective distress caused by traumatic events. Items correspond directly to 14 of the 17 DSM-IV symptoms of PTSD. Respondents are asked to identify a specific stressful life event and then indicate how much they were distressed or bothered during the past seven days by each "difficulty" listed. Items are rated on a 5-point scale ranging from 0 ("not at all") to 4 ("extremely"). The IES-R yields a total score (ranging from 0 to 88). The instrument has been translated into many languages; it has internal consistency coefficients ranging from .80 to .91 and test-retest reliabilities ranging from .52 to .86.[43] In this study, Cranach's alpha was .95 for the disaster-exposed group, .96 for the control group, and .95 for the total group.

Beck Depression Inventory II (BDI-II)

Symptoms of depression were assessed with the Beck Depression Inventory-II (BDI-II).[44] The BDI-II is a 21-item self-report inventory that assesses the cardinal features of depression, each answer being scored on a scale value of 0 to 3. Higher total scores indicate more severe depressive symptoms. Scores 0-13 indicate minimal depression, scores 14-19 indicate mild depression, scores 20-28 indicate moderate depression and scores 29-63 indicate severe depression. Beck et al[44] reported a test-retest correlation of .93 in a sample of 26 out-clinic patients. Cranach's alpha in this study was .87 for the disaster-exposed group, .79 for the control group, and .83 for the total group.

Beck Anxiety Inventory (BAI)

Symptoms of anxiety were measured with the Beck Anxiety Inventory (BAI).[45] The questionnaire is designed for individuals 17 years of age or older and takes between five and ten minutes to complete. The BAI consists of 21 items that are rated on a scale from 0 to 3. Each item describes a subjective, somatic, or panic-related symptom of anxiety asking about how bothersome a symptom has been over the past month. 0 points means "not at all", 1 point means mildly "it did not bother me much", 2 points means moderately "it wasn't pleasant at times" and 3 points severely "it bothered me a lot". The BAI has a maximum score of 63, 0-9 indicating minimal anxiety, 10-16 mild anxiety, 17-29 moderate anxiety and 30-63 severe anxiety. The BAI was designed as "an inventory for measuring clinical anxiety" that minimizes the overlap between depression and anxiety scales.[46] The BAI has been shown to have high internal consistency (i.e., an alpha coefficient of .92) and a test-retest correlation of .75.[45] In this study, Cranach's alpha was .92 for the disaster-exposed group, .78 for the control group, and .90 for the total group.

Wechsler Adult Short Intelligence Test (WASI)

Intelligence was measured with the Wechsler Adult Short Intelligence Test (WASI).[47] The WASI is a standardised test that yields the three traditional verbal, performance, and full scale

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IQ scores. The verbal IQ score is assessed with two measures; specifically, the vocabulary subtest measures word knowledge, verbal concept formation, and the fund of knowledge, and the Similarities subtest measures verbal reasoning and concept formation. The performance IQ score is based on the following two different types of performance measures: the matrix reasoning test measures visual information processing and abstract reasoning skills, and the Block Design test measures the ability to analyse and synthesise abstract visual stimuli, non-verbal concept formation, visual perception and organisation, simultaneous processing, visual-motor coordination, learning, and the ability to separate figures and grounds in visual stimuli. The average reliability coefficients are .96, .96, and .98 for the verbal IQ, the performance IQ and the full scale IQ, respectively.[47] The construct validity of the WASI is supported by the intercorrelations of the WASI subtests and IQ scales, and by the results of factor analysis.[47]

DATA ANALYSIS

There was no missing data and no corrections or transformation of data. Correlations between omission and commission errors were calculated. Linear regressions with adjustments for gender, age, years of education, depression, anxiety, IQ and amount of post-traumatic stress symptoms, were applied to examine the associations between the FFMQ scores and the number of CPT II omission and commission errors. These analysis showed none of the above listed factors to be confounders for the results. To examine the associations between the five factors of mindfulness: observing, describing, acting with awareness, non-judging and non-reacting, and the number of CPT II omission and commission errors, linear regressions with adjustment for gender, age and years of education were applied. In examining the associations between the factors of mindfulness and the number of omission and commission errors, we opted for not adding the factors of depression, anxiety, IQ and amount of post-traumatic stress symptoms as adjustments, since these variables did not show significant contributions to the overall assessment of mindfulness and therefore were not considered for the sub-aspects of mindfulness.

RESULTS

Preliminary analysis did not show any significant differences between the disaster-exposed and the control group with respect to gender, age, educational level, depression, anxiety and IQ (Table 1). There was a significant difference in the amount of post-traumatic stress symptoms, measured by the IES-R, between the two groups (Table 1). Statistical analysis showed that the correlation between omission and commission errors for the total group was .573, for the disaster-exposed group .625 and for the control group .626. In the disaster-exposed group, there was no significant association between mindfulness and number of omission errors, and there was a significant association between mindfulness and number of commission errors (Table 2). This result was observed with unadjusted linear regression and after adjusting for gender, age, years of education, depression, anxiety and IQ applying hierarchical linear regression. The same result was observed when adjusting for gender, age, years of education and amount of post-traumatic stress symptoms applying hierarchical linear regression. In the control group there was neither a significant association between mindfulness and number of omission errors, nor between mindfulness and number of commission errors, unadjusted or adjusted applying hierarchical linear regression.

Linear regressions adjusted for gender, age and years of education, did not show any significant associations between the five factors of mindfulness and number of omission errors in the disaster-exposed group, but a strong negative association between the factor of non-reacting and number of omission errors in the control group, and a weaker but still significant negative association between the factor of non-judging and number of omission errors in the control group (Table 3). Linear regression adjusted for gender, age and years of education, showed a strong negative association between number of commission errors and the describing factor of mindfulness in the disaster-exposed group, but not in the control group (Table 4). In addition, linear regression adjusted for gender, age and years of education, showed a strong positive association between number of commission errors and the observing factor of mindfulness in the control group but not in the disaster-exposed group (Table 4).

DISCUSSION

To our knowledge, this study is the first to examine the association between mindfulness and sustained attention in a disaster-exposed group. As discussed in the introduction section, studies targeting the association between mindfulness and sustained attention show contradictory results. There is a need

	Disaster-exposed (n=25)	Controls (n=24)	t(df)	*p*
Age	47.96 (10.76)	40.54 (15.80)	1.928 (47)	0.060
Years of education	15.30 (1.98)	16.13 (2.42)	-1.309 (47)	0.197
BDI	4.24 (4.81)	3.46 (3.44)	0.652 (47)	0.517
BAI	5.68 (7.81)	2.88 (3.37)	1.621 (47)	0.112
WASI	114.72 (8.82)	118.33 (10.61)	-1.299 (47)	0.200
IES-R	12.88 (12.90)	4.38 (9.60)	2.609 (47)	0.012

BDI: Beck Depression Inventory; BAI: Beck Anxiety Inventory; WASI: Wechsler Abbrevated Intelligence Scale; IES-R: Impact of Event Scale-Revised.

Table 1: Participant characteristics expressed as the means (standard deviations).

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	Disaster-exposed			Controls		
	Omission errors					
	B	95% CI	*p*-value	B	95% CI	*p*-value
FFMQ unadjusted	-.062	-.166 - .042	.233	-.176	-.410 - .059	.135
FFMQ adjusted for gender, age, years of education	-.024	-.158 - .110	.718	-.232	-.506 - .042	.093
FFMQ adjusted for gender, age, years of education, depression	-.030	-.173 - .114	.670	-.267	-.551 - .018	.064
FFMQ adjusted for gender, age, years of education, depression, anxiety	-.028	-.175 - .119	.692	-.241	-.534 - .052	.101
FFMQ adjusted for gender, age, years of education, depression, anxiety, intelligence	-.036	-.191 - .120	.633	-.160	-.530 - .209	.371
FFMQ adjusted for gender, age, years of education, amount of post-traumatic stress symptoms	-.023	-.166 - .120	.744	-.232	-.516 - .051	.102
	Commission errors					
	B	95% CI	*p*-value	B	95% CI	*p*-value
FFMQ unadjusted	-.288	-.494 - -.082	.008	-.072	-.343 - .200	.589
FFMQ adjusted for gender, age, years of education,	-.258	-.485 - -.031	.028	-.090	-.426 - .245	.579
FFMQ adjusted for gender, age, years of education, depression	-.281	-.516 - -.046	.022	-.175	-.490 - .140	.258
FFMQ adjusted for gender, age, years of education, depression, anxiety	-.278	-.519 - -.038	.026	-.132	-.446 - .183	.390
FFMQ adjusted for gender, age, years of education, depression, anxiety, intelligence	-.270	-.526 - -.013	.040	-.066	-.373 - .241	.656
FFMQ adjusted for gender, age, years of education, amount of post-traumatic stress symptoms	-.240	-.475 - -.004	.046	-.095	-.436 - .246	.566

Table 2: Association between mindfulness and omission errors, and mindfulness and commission errors in a sustained attention task (CPT II) in disaster-exposed individuals (n=25) and in controls (n=24). The unadjusted results and the results after adjustment for gender, age, years of education, depression (BDI), anxiety (BAI), IQ (WASI) and after gender, age, years of education and amount of post-traumatic stress symptoms (IES-R) are shown.

	Disaster-exposed group			Controls		
	B	**95% CI**	***p*-value**	**B**	**95% CI**	***p*-value**
Observe						
Unadjusted	-.046	-.279 - .188	.690	.317	-.091 - .726	.121
Adjusted	.060	-.239 - .359	.680	.394	-.032 - .819	.068
Describe						
Unadjusted	-.349	-.607 - -.090	.010	.135	-.337 - .606	.560
Adjusted	-.327	-.685 - .031	.072	.115	-.429 - .659	.663
Acting with awareness						
Unadjusted	-.057	-.322 - .207	.658	-.345	-.896 - .206	.208
Adjusted	-.029	-.312 - .253	.830	-.373	-.967 - .222	.205
Non-judging						
Unadjusted	.088	-.289 - .465	.635	-.422	-.863 - .020	.060
Adjusted	.045	-.359 - .449	.819	-.499	-.981 - -.017	.043
Non-reacting						
Unadjusted	-.098	-.582 - .387	.680	-.678	-1.134 - -.223	.005
Adjusted	.085	-.473 - .643	.754	-.743	-1.208 - -.278	.003

Table 3: Association between factors of mindfulness and omission errors in a sustained attention task (CPT II) in disaster-exposed individuals (n=25) and in controls (n=24). The unadjusted results and the results after adjustment for gender, age, and years of education, are shown.

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	Disaster-exposed group			Controls		
FFMQ factors	**B**	**95% CI**	***p*-value**	**B**	**95% CI**	***p*-value**
Observe						
Unadjusted	-.382	-.880 - .115	.126	.573	.169 - .977	.008
Adjusted	-.062	-.635 - .512	.824	.660	.233 - 1.087	.004
Describe						
Unadjusted	-.956	-1.484 - -.429	.001	-.024	-.549 - .501	.924
Adjusted	-.826	-1.462 - -.190	.014	-.053	-.677 - .570	.860
Acting with awareness						
Unadjusted	-.237	-.823 - .349	.411	-.358	-.969 - .253	.237
Adjusted	-.321	-.841 - .199	.212	-.371	-1.057 - .315	.272
Non-judging						
Unadjusted	.135	-.711 - .982	.744	-.339	-.847 - .168	.179
Adjusted	-.235	-1.000 - .530	.529	-.431	-1.010 - .148	.136
Non-reacting						
Unadjusted	-1.153	-2.122 - - .184	.022	-.465	-1.031 - .101	.102
Adjusted	-.841	-1.836 - .153	.093	-.499	-1.124 - .126	.111

Table 4: Association between factors of mindfulness and commission errors in a sustained attention task (CPT II) in disaster-exposed individuals (n=25) and in controls (n=24). The unadjusted results and the results after adjustment for gender, age, and years of education, are shown.

to investigate factors that might affect these results, and this is where our study makes a contribution to this rather unexplored scene. We found a significant association between mindfulness and number of commission errors on the CPT II in our disaster-exposed group. We did not find this association in our control group matched for gender, age and level of education.

The negative association found between mindfulness and commission errors in the disaster-exposed group but not in the control group, might highlight previous findings by Teper and Inzlicht, with individuals who meditate having fewer commission errors than control subjects in a sustained attention task.[9] Additionally, our results are related to those of the Jensen et al[13] study, in which improvements in attentional performance were central to the proposed mechanisms for stress reduction in mindfulness meditation practices, and to the Leonard et al[14] study, in which mindfulness training was seen as protection against functional attentional impairments associated with periods of high stress.

The result of our study might support the hypothesis of mindfulness altering the efficiency of allocating cognitive resources, leading to improved self-regulation of attention.[15,30] Because our mindfulness measurement was in the form of self-reported mindfulness, it could be related to the Moore and Malinowski[6] study, in which attentional performance was found to be positively related to meditation practice and levels of mindfulness, with self-reported mindfulness being higher in individuals who meditate than in those who do not meditate. Although the participants in a study by Rosenberg et al[12] had not been disaster-exposed, our study supports the findings of that study, which showed that the fluctuations in sustained attention and the number of commission errors were related to self-reported mindfulness.

The hypothesis of post-traumatic stress being associated with a reduced capacity for top-down attentional control of a bottom-up or stimulus-driven effect[48] could be related to our findings. Sustained attention is an executive function conceptualized as part of top-down attentional control. Our findings of a significant negative association between number of commission errors and trait mindfulness in the disaster-exposed group, but not in the control group, can be related to the suggestion that attentional control is a buffering mechanism against prolonged attentional engagement with threat-related stimuli among those with high levels of post-traumatic stress symptoms.[31] Disaster-exposure is likely to increase alertness to threat-related stimuli and even neutral stimuli may be provocative. We see mindfulness as a meta-cognitive function that includes attentional control which may buffer against stimuli-related arousal, improving attentional performance and thus also decreasing number of commission errors.

Our finding of a strong negative association between number of commission errors and the describing factor of mindfulness in the disaster-exposed group, but not in the control group, could be conceptualized as related to narrative style of the disaster-exposed individual. There are different ways to relate to exposure to disaster, different ways to create meaningfulness or meaninglessness from such an experience and different ways to describe what happened then and what happens now. Describing involves elements of externalization, of top-down (prefrontal) activation as opposed to bottom-up (amygdala) activation. Symptoms of hyper-arousal such as hyper-vigilance refer to increased arousal and sympathetic nervous system hyperactivity that were not present before the trauma.[49] Hyper-arousal is likely to contribute to overreacting and to reacting to neutral stimuli as if they were trauma-related. This is likely to affect the narrative of the individual, in regards to the time of the disaster occurring, and also in relation to the present, making sense of and reacting to current experience. Commission errors (as opposed to omission errors) on a continuous performance task such as the CPT II, are

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intuitively more likely to occur when there is more of hyper-arousal and less of the emotionally more neutral, describing aspect of mindfulness.

The strong negative association between the non-reacting aspect of mindfulness and number of omission errors found in the control group but not in the disaster-exposed group is interesting. There was also a weaker negative association between the non-judging aspect of mindfulness and number of omission errors found in the control group but not in the disaster-exposed group. The non-judging aspect refers to the tendency of an individual to refrain from judgment of his/her experience and relate to that experience with acceptance. From a trauma theory aspect, there is less need for reacting to and judging neutral stimuli when there has not been disaster-exposure. Reacting to and judging neutral stimuli might affect allocation of cognitive resources and likelihood of making mistakes such as omission errors. This may be one of several plausible explanations of the group difference found related to association between the non-reacting and non-judging aspect of mindfulness and number of omission errors. The strong positive association between the observing aspect of mindfulness and number of commission errors found in the control group but not in the disaster-exposed group is more difficult to speculate about.

We propose that sustained attention in mindfulness contributes to breath awareness and facilitates detection of mind wandering. The association between mindfulness and sustained attention might be highly relevant in disaster survivors vulnerable to symptoms of post-traumatic stress, and the describing facet of mindfulness might be an important factor in this association. Our study shows that the association between sustained attention and mindfulness and its different aspects may be affected by disaster exposure. This study had limitations, including the small sample size as well the cross-sectional design, which precludes causal interpretations. The results of the study imply that the possible associations between different aspects of sustained attention and post-traumatic stress symptoms should be examined further. This study should be replicated in larger samples of trauma-exposed clinical and non-clinical populations. Qualitative studies, focusing on how the disaster event is described and conceptualized in the life cycle of the individual, may be useful in furthering understanding of the association between sustained attention and mindfulness in disaster-exposed individuals. The types of trauma (e.g., single, complex, extensive, or ongoing trauma) as well as the resources (e.g., coping abilities, cognitive functioning and self-regulatory strategies) and possible meditation practices of the individuals should be accounted for in future studies.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

ETHICAL STANDARDS

This study was approved by the Regional Ethics Committee (REC) and the relevant committees for patient integrity, in accordance with the 1964 Declaration of Helsinki ethical standards. All persons included in the study gave their informed consent prior to their inclusion in the study.

REFERENCES

1. Didonna F. *Clinical Handbook of Mindfulness*. New York, NY, USA: Springer, 2009.

2. Kabat-Zinn J. *Wherever you go, there you are: Mindfulness Meditation in Everyday Life*. New York, USA: Hyperion; 1994.

3. Williams JMG, Kabat-Zinn J. Mindfulness: Diverse perspectives on its meaning, origins, and multiple applications at the intersection of science and dharma. *Contemporary Buddhism*. 2011; 12(1): 1-18. doi: 10.1080/14639947.2011.564811

4. MacCoon DG, MacLean KA, Davidson RJ, Clifford D, Saron CD, Lutz A. No sustained attention differences in a longitudinal randomized trial comparing Mindfulness Based Stress Reduction versus active control. *PLoS One*. 2014; 9(6): e97551. doi: 10.1371/journal.pone.009755

5. Lutz A, Slagter HA, Dunne JD, Davidson RJ. Attention regulation and monitoring in meditation. *Trends Cogn Sci*. 2008; 12(4): 163-169. doi: 10.1016/j.tics.2008.01.005

6. Moore A, Malinowski P. Meditation, mindfulness and cognitive flexibility. *Conscious Cogn*. 2009; 18(1): 176-186. doi: 10.1016/j.concog.2008.12.008

7. Chiesa A, Calati R, Serretti A. Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review*. 2011; 31(3): 449-464. doi: 10.1016/j.cpr.2010.11.003

8. Malinowski P. Neural mechanisms of attentional control in mindfulness meditation. *Front Neurosci*. 2013; 7: 8. doi: 10.3389/fnins.2013.00008

9. Teper R, Inzlicht M. Meditation, mindfulness and executive control: The importance of emotional acceptance and brain-based performance monitoring. *Soc Cogn Affect Neurosci*. 2013; 8(1): 85-92. doi: 10.1093/scan/nss045

10. Lutz A, Slagter HA, Rawlings NB, Francis AD, Greischar LL, Davidson RJ. Mental training enhances attentional stabil-

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-115

ity: Neural and behavioral evidence. *J Neurosci*. 2009; 29(42): 13418-13427. doi: 10.1523/JNEUROSCI.1614-09.2009

11. MacLean KA, Ferrer E, Aichele SR, et al. Intensive meditation training improves perceptual discrimination and sustained attention. *Psychol Sci*. 2010; 21: 829-839. doi: 10.1177/0956797610371339

12. Rosenberg M, Noonan S, DeGutis J, Esterman M. Sustaining visual attention in the face of distraction: A novel gradual-onset continuous performance task. *Atten Percept Psychophys*. 2013; 75(3): 426-439. doi: 10.3758/s13414-012-0413-x

13. Jensen CG, Vangkilde S, Frokjaer V, Hasselbalch SG. Mindfulness training affects attention-or is it attentional effort? *J Exp Psychol Gen*. 2012; 141(1): 106-123. doi: 10.1037/a0024931

14. Leonard NR, Jha AP, Casarjian B, et al. Mindfulness training improves attentional task performance in incarcerated youth: A group randomized controlled intervention trial. *Front Psychol*. 2013; 4: 792. doi: 10.3389/fpsyg.2013.00792

15. Jha AP, Krompinger J, Baime MJ. Mindfulness training modifies subsystems of attention. *Cogn Affect Behav Neurosci*. 2007; 7(2): 109-119. doi: 10.3758/CABN.7.2.109

16. van den Hurk PA, Giommi F, Gielen SC, Speckens AE, Barendregt HP. Greater efficiency in attentional processing related to mindfulness meditation. *Q J Exp Psychol (Hove)*. 2010; 63(6): 1168-1180. doi: 10.1080/17470210903249365

17. Golier J, Yehuda R, Cornblatt B, Harvey P, Gerber D, Levengood R. Sustained attention in combat-related post-traumatic stress disorder. *Integr Physiol Behav Sci.* 1997; 32(1): 52-61. doi: 10.1007/BF02688613

18. Horner MD, Hamner MB. Neurocognitive functioning in post-traumatic stress disorder. *Neuropsychology Review*. 2002; 12(1): 15-30. doi: 10.1023/A:1015439106231

19. Crowell TA, Kieffer KM, Siders CA, Vanderploeg RD. Neuropsychological findings in combat-related post-traumatic stress disorder. *Clinical Neuropsychology*. 2002; 16(3): 310-321. Web site. http://www.tandfonline.com/doi/abs/10.1076/clin.16.3.310.13851. Accessed June 13, 2016

20. Samuelson KW, Neylan TC, Metzler TJ, et al. Neuropsychological functioning in post-traumatic stress disorder and alcohol abuse. *Neuropsychology*. 2006; 20(6): 716-726. doi: 10.1037/0894-4105.20.6.716

21. Koso M, Hansen S. Executive function and memory in post-traumatic stress disorder: A study of Bosnian war veterans. *Eur Psychiatry*. 2006; 21(3): 167-173. doi: 10.1016/j.eurpsy.2005.06.004

22. Lagarde G, Doyon J, Brunet A. Memory and executive dysfunctions associated with acute post-traumatic stress disorder. *Psychiatry Res*. 2010; 177(1-2): 144-149. doi: 10.1016/j.psychres.2009.02.002

23. Horner MD, Mintzer JE, Turner TH, Edmiston KR, Brawman-Mintzer O. Attentional functioning in patients with post-traumatic stress disorder: A preliminary study. *CNS Spectr*. 2013; 18(2): 90-94. doi: 10.1017/S1092852912000909

24. Golier J, Yehuda R. Neuropsychological processes in post-traumatic stress disorder. *Psychiatr Clin North Am*. 2002; 25(2): 295-315. doi: 10.1016/S0193-953X(01)00004-1

25. Neylan TC, Lenoci M, Rothlind J, et al. Attention, learning and memory in post-traumatic stress disorder. *J Trauma Stress*. 2004; 17(1): 41-46. doi: 10.1023/B:JOTS.0000014675.75686.ee

26. Meewisse ML, Nijdam MJ, de Vries GJ, et al. Disaster-related post-traumatic stress symptoms and sustained attention: evaluation of depressive symptomatology and sleep disturbances as mediators. *J Trauma Stress*. 2005; 18(4): 299-302. doi: 10.1002/jts.20037

27. Vasterling JJ, Brailey K, Constans JI, Sutker PB. Attention and memory dysfunction in post-traumatic stress disorder. *Neuropsychology*. 1998; 12(1): 125-133. doi: 10.1037/0894-4105.12.1.125

28. Jenkins MA, Langlais PJ, Delis DA, Cohen RA. Attentional dysfunction associated with post-traumatic stress disorder among rape survivors. *Clin Neuropsychol*. 2000; 14(1): 7-12. Web site. http://www.tandfonline.com/doi/abs/10.1076/1385-4046%28200002%2914%3A1%3B1-8%3BFT007?journalCode=ntcn20. Accessed June 13, 2016

29. Falconer E, Bryant R, Felmingham KL, et al. The neural networks of inhibitory control in post-traumatic stress disorder. *J Psychiatry Neurosci*. 2008; 33(5): 413-422. Web site. http://jpn.ca/vol33-issue5/33-5-413/. Accessed June 13, 2016

30. Moore A, Gruber T, Derose J, Malinowski P. Regular, brief mindfulness meditation practice improves electrophysiological markers of attentional control. *Front Hum Neurosci*. 2012; 6: 18. doi: 10.3389/fnhum.2012.00018

31. Bardeen JR, Orcutt HK. Attentional control as a moderator of the relationship between post-traumatic stress symptoms and attentional threat bias. *J Anxiety Disord*. 2011; 25(8): 1008-1018. doi: 10.1016/j.janxdis.2011.06.009

32. Hussain A, Weisaeth L, Heir T. Psychiatric disorders and functional impairment among disaster victims after exposure to a natural disaster: A population based study. *J Affect Disord*. 2011; 128(1-2): 135-141. doi: 10.1016/j.jad.2010.06.018

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-115

33. Heir T, Weisaeth L. Acute disaster exposure and mental health complaints of Norwegian tsunami survivors six months post disaster. *Psychiatry*. 2008; 71(3): 266-276. doi: 10.1521/psyc.2008.71.3.266

34. Conners CK. *Conner's CPT II, continuous performance test II.* North Tonawanda, NY, USA: MHS; 2009.

35. Baer RA, Smith GT, Lykins E, et al. Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*. 2008; 15(3): 329-342. doi: 10.1177/1073191107313003

36. Bohlmeijer E, Ten Klooster PM, Fledderus M, Veehof M, Baer R. Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. *Assessment*. 2011; 18(3): 308-320. doi: 10.1177/1073191111408231

37. de Bruin EI, Topper M, Muskens JG, Bögels SM, Kamphuis JH. Psychometric properties of the Five Facets Mindfulness Questionnaire (FFMQ) in a meditating and a non-meditating sample. *Assessment*. 2012; 19(2): 187-197. doi: 10.1177/1073191112446654

38. Hou J, Wong SY, Lo HH, Mak WW, Ma HS. Validation of a Chinese version of the Five Facet Mindfulness Questionnaire in Hong Kong and development of a short form. *Assessment*. 2013; 21(3): 363-371. doi: 10.1177/1073191113485121

39. Lilja JL, Frodi-Lundgren A, Hanse JJ, et al. Five facets Mindfulness Questionnaire-reliability and factor structure: A Swedish version. *Cogn Behav Ther*. 2011; 40: 291-303. doi: 10.1080/16506073.2011.580367

40. Veehof MM, Ten Klooster PM, Taal E, Westerhof GJ, Bohlmeijer ET. Psychometric properties of the Dutch Five Facet Mindfulness Questionnaire (FFMQ) in patients with fibromyalgia. *Clin Rheumatol*. 2011; 30(8): 1045-1054. doi: 10.1007/s10067-011-1690-9

41. Dundas I, Vøllestad J, Binder P-E, Sivertsen B. The five factor mindfulness questionnaire in Norway. *Scand J Psychol*. 2013; 54(3): 250-260. doi: 10.1111/sjop.12044

42. Horowitz M, Wilner N, Alvarez W. Impact of event scale: A measure of subjective stress. *Psychosom Med*. 1979; 41(3): 209-218. Web site. http://journals.lww.com/psychosomaticmedicine/Abstract/1979/05000/Impact_of_Event_Scale__A_Measure_of_Subjective.4.aspx. Accessed June 13, 2016

43. Weiss DS. The impact of event scale-revised. In: Wilson JP, Keane TM, eds. *Assessing Psychological Trauma and PTSD.* 2nd ed. New York, NY, USA: Guilford Press; 2004: 168-189.

44. Beck AT, Steer RA, Brown GK. *Manual for the Beck Depression Inventory-II.* San Antonio, TX, USA: Psychological Corporation; 1996.

45. Beck AT, Steer RA. *Beck Anxiety Inventory manual.* San Antonio, TX, USA: Harcourt Brace and Company; 1993.

46. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol*. 1998; 56(6): 893-897. doi: 10.1037//0022-006X.56.6.893

47. Wechsler D. *Wechsler Abbreviated Scale of Intelligence manual (WASI)*. San Antonio, TX, USA: Psychological Corporation; 1999.

48. Johnsen GE, Kanagaratnam P, Asbjørnsen AE. Patients with post-traumatic stress disorder show decreased cognitive control: Evidence from dichotic listening. *J Int Neuropsychol Soc*. 2011; 17(2): 344-353. doi: 10.1017/S1355617710001736

49. Pole N. The psychophysiology of post-traumatic stress disorder: A meta analysis. *Psychol Bull*. 2007; 133(5): 725-746. doi: 10.1037/0033-2909.133.5.725

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Research Letter

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Psychology and Family Caregiving

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The term in-home family caregiver is used to describe a person who provides care and assistance (without pay) to a family member or close friend who has a disability, chronic condition or illness and is in need of help with daily living (e.g. walking, eating, bathing) and nursing (e.g. taking medication, monitoring of overall health and attending medical appointments) whilst living at home.[1] Available research suggests that in-home family caregivers are reported to provide around 90% of long-term care[2] and the majority of adults who care for a disabled family member are at least initially employed in the paid labor force.[3]

National surveys have illustrated the high prevalence of caregiving in the community. Census data from the UK shows that around 6 million people were providing informal care over a 15 year period to 2001.[1] Similarly, survey data from the US has reported that at any 1 time, 14-16% of adults provide unpaid care to ill, disabled or elderly people. This equates to over 29 million adults of whom 17% are caregivers for more than 40 hours per week. Similar estimates have been reported for Canada and Australia[1] where census data on family caregiving is also collected.

Available published research suggests that the economic value of home-based family caregiving dramatically surpasses spending for institutional care or formal (paid) home care. For instance, it has been reported that the estimated cost of in-home family caregiving for individuals with dementia is over $56,290 annually[2] and such estimates exclude related financial costs to the caregiver, including loss of income and other costs.

The burdens on family caregivers go beyond financial loss, however, since in the process of caregiving, family caregivers often lose contact with friends, neighbors, relatives, work colleagues and their social support networks. Frequently, no-one is visiting and talking with the caregiver when they most need support and help, including help with shopping or minor home repairs, time-off to attend their own medical appointments, and in times when they need sympathy and encouragement or advice and support.[4] Further, adult caregivers who live with their care recipients are reported to face greater challenges, often because there is an expectation by others (including other family members) that by virtue of their willingness to live with the care recipient they have little choice in taking on the caregiving role (e.g. an adult child living with a parent who suddenly requires assistance). Family caregivers living with the care recipient are also less aware of the physical and emotional cost of caregiving and may be more vulnerable as adults because of their age and associated morbidities (e.g. middle aged adult children).[2,4]

Fundamental to family caregiving are 2 important considerations: first, the availability of potential family caregivers, and second, their willingness and capacity to provide in-home care. In terms of the first issue, research suggests that the supply of family caregivers is projected to diminish as demand outstrips supply. This is because our aging population (increasing proportions of older people in the community) is predicted to continue to rise and this in itself will increase the demand for such in-home care. As our aging population continues to rise, the number of people in the primary care giving years (45-64 years of age) is likely to remain flat, due in part to the changing family structure.[5] The increasing participation of women in the workforce over the past 5 decades will undoubtedly impact on the supply of family caregivers and the work and career development of women, since available research suggests that the majority of caregivers are women–mostly daughters caring for parents who are not in paid employment-most likely because of their caregiving.[6] Further research is needed to identify the

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circumstances under which caregivers undertake caregiving (i.e. how families decide who will undertake family caregiving and for how long?) and the extent to which caregivers need to forego work in order to provide family care.

Further research examining the prevalence of in-home family caregiving in our community along with research on the roles, responsibilities and needs of in-home family caregivers is needed.[7] Given that some studies[4,6] suggest that a large proportion of family caregivers maybe forgoing employment in order to provide full-time in-home family care and little is known about if and when such caregivers return to work, there is also a need for further research specifically examining the impact of caregiving on work.

Since now most of us will require care for several years in the last part of our lives, research designed to further contribute to our understanding of the work and support needs of in-home family caregivers and the extent to which government policies and programs are responding to these needs is urgently required.

REFERENCES

1. O'Reilly D, Connoly S, Rosato M, Patterson C. Is caring associated with an increased risk of mortality? A longitudinal study. *Social Science & Medicine.* 2008; 67: 1282-1290. doi: 10.1016/j.socscimed.2008.06.025

2. Adelman RD, Tmanova LL, Delgado D, Dion S. Caregiver burden: A clinical review. *JAMA.* 2014; 311: 1052-1058. doi: 10.1001/jama.2014.304

3. Scharlack AE, Gustavson K, Dal Santo TS. Assistance received by employed caregivers and their care recipients: Who helps care recipients when caregivers work full time? *Gerontologist.* 2007; 47(6): 752-762. doi: 10.1093/geront/47.6.752

4. Lynn J. Strategies to ease the burden of family caregivers. *JAMA.* 2014; 311(10): 1021-1022. doi: 10.1001/jama.2014.1769

5. Redfoot D, Feinberg L, Houser A. The aging of the baby boom and the growing care gap: A look at future declines in the availability of family caregivers. *Insight on the Issues.* 2013; 85. Web site. http://www.aarp.org/home-family/caregiving/info-08-2013/the-aging-of-the-baby-boom-and-the-growing-care-gap-AARP-ppi-ltc.html. Accessed August 24, 2016

6. Schofield HL, Herrman HE, Bloch S, Howe A, Singh B. A profile of Australian family caregivers: Diversity of roles and circumstances. *Aust N Z J Public Health.* 1997; 21: 59-66. doi: 10.1111/j.1467-842X.1997.tb01655.x

7. Kenny P, King MT, Hall J. The physical functioning and mental health of informal carers: Evidence of caregiving impacts from an Australian population based cohort. *Health Soc Care Community.* 2014; 22: 646-659. doi: 10.1111/hsc.12136

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Relationship between Trauma due to Winter Storm Alexa, Post-traumatic Stress Disorder and Other Mental Health Problems of Palestinian Children in Gaza Strip

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ABSTRACT

Aim: This study investigated the relationship between trauma due to winter storm Alexa, post-traumatic stress disorder (PTSD) and other mental health problems (MHPs) of Palestinian children in Gaza Strip.

Method: The sample consisted of 105 boys (50%) and 105 girls (50%) selected from 3 of the most affected areas by flooding in 2014 due to Alex storm in Gaza Strip. Participant's age ranged from 9 to 18 with a mean age of 13.05 years. Mental health status was assessed by a socio-demographic scale, the Trauma due to Flood Scale, the Revised Impact of Events Scale (IES-R), and the Strengths and Difficulties Questionnaire (SDQ)-parent form.

Results: Overall, there were no statistically significant differences between boys and girls in total traumatic events (5.98 *vs.* 6.41). Mean PTSD symptoms was 28.82, intrusion symptoms was 7.4, avoidance symptoms was 10.08, and arousal symptoms was 11.33, 47.6% of children were considered as PTSD. Girls reported significantly more PTSD symptoms and avoidance symptoms compared to boys. Total traumatic events were significantly correlated to post-traumatic stress reaction symptoms and with intrusion symptoms.

Using the SDQ-parent form, 40% of children were rated by parents as caseness, 24.3% as hyperactive, 51.9% as having emotional problems, 46.2% had conduct problems, 55.7% had peer problems, and 2.9% had abnormal prosocial behavior. Post-traumatic stress reaction symptoms were correlated only with emotional problems rated by parents.

Conclusion and Implications: This study has important implications for need of establishing and implementing psychosocial intervention programs for school-aged children in the Gaza Strip not only for those victims of political violence but also for children exposed to other types of traumatic events such as natural disasters.

KEYWORDS: Children; Flood; Gaza Strip; Post-traumatic stress disorder (PTSD); Strengths and Difficulties Questionnaire (SDQ); Trauma.

ABBREVIATIONS: PTSD: Post-Traumatic Stress Disorder; IES-R: Revised Impact of Events Scale; SDQ: Strengths and Difficulties Questionnaire; ANOVA: Analysis of variance.

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INTRODUCTION

Winter Storm Alexa hits the West Bank and Gaza Strip from 11 to 14 December 2013. Precipitation levels reached up to 270 mm, which in some regions accounted for 60% of yearly average rainfall in a time span of merely 4 to 5 days. Due to the storm, 41% of the West Bank got covered with snow, and Gaza Strip was confronted with heavy flooding (www.apis.ps/up/1391593368.pdf Accessed August January 21, 2016)[1] Thousands of people evacuated from their homes were sheltered in schools as the Gaza health ministry declared a state of "extreme emergency".

Gaza had been unable to pump sewage for more than a month, as power plants have shut down for lack of fuel. The fuel shortages—which caused daily power outages lasting 12-16 hours were not uncommon even before the devastations caused by winter storm Alexa. Ground floors in hundreds of apartment buildings across miles of city blocks remain damaged by the flood. The heavy, icy rains, amounting to about 85% of annual rainfall, also drowned large swaths of Northern Gaza's fertile areas, destroying or degrading rich farmland and the greenhouses on which families rely for subsistence. In the hardest-hit areas, citizens used makeshift boats—some navigating the sewage using gondola-like oars—to rescue families from rooftops and transport them to overcrowded shelters in adjoining neighborhoods.[1]

Natural disasters, such as earthquakes, floods, cyclones or tsunami, have substantial impact on the mental health of children and adolescents. Children who have lived through a natural disaster may develop distressing symptoms, such as sleep or behavioral disturbance or severe emotional disturbance,[2] or specific disorders, such as depression[3] or anxiety.[4] Many post-disaster emotional, cognitive and behavioral effects manifest on a spectrum of stress responses, from individuals who report some post-disaster PTSD symptoms[3] to others who report limited-symptom PTSD symptoms to full presentation of PTSD symptoms.[3] Similarly, in a study of over 7,000 children from 4 parishes in Louisiana heavily affected by Hurricane Katrina.[5] Based on a screening tool measuring symptoms of PTSD and depression, they found that 49% of fourth through twelfth graders exceeded the cut-off for a mental health referral in the year following the disaster and 41.6% of youth exceeded the cut-off the following year.[6] Previous article regarding children in North Queensland, Australia, who experienced a category 5 cyclone, showed that, 3 months after exposure, 11.3% of children reported PTSD symptoms in the severe to very severe PTSD category.[7] Also, in study of 71 children and 191 adolescents who were screened three months after a Category 5 Cyclone were rescreened 18 months post-disaster. Approximately 1-in-5 children and 1-in-12 adolescents endorsed cyclone-related PTSD symptoms at the moderate to severe level 18 months post-disaster. Of these approximately one-half (44.8%) of children were in the 'high-persisted' group at 18-month follow-up. Persistence of low symptoms was very common (97.6%) while late-onset PTSD was a rare phenomenon. This pattern was similar in adolescents: 25.0% were in the 'high-persister' group and few students experienced late-onset PTSD.[8] The aims of this was to study 1) types of traumatic events due to winter storm Alexa, 2) To investigate the prevalence of post-traumatic stress disorder and other MHPs in children, 3) to find the relationship between trauma due to winter storm Alexa, PTSD and other mental health problems of Palestinian children in Gaza Strip.

METHOD

Subjects

This study was conducted in 3 of the most affected areas by flooding due to Alex storm in 2014 in the Gaza Strip. The sample consisted of 105 boys (50%) and 105 girls (50%) (Table 1). According to the selection criteria, the age range was 9-19 years, with a mean age of 13.05 years (SD=2.9). Children were approached until 210 agreed to participate, which was a convenience sample. The study was approved by the local ethical committee (Helsinki Research Committee), part of Ministry of Health in the Gaza Strip. Parents gave informed consent before children were approached. Data collection was carried out by 4 trained mental health professionals of clinical psychology background (4 psychologists with BA in psychology), under the supervision of the first author. The data was collected during January of 2014.

	No.	%
Gender		
Male	105	50.0
Female	105	50.0
Age Mean=13.08 y (SD=2.9)		
9-12 years	103	49.0
13-15 years	51	24.3
16-18 years	56	26.7
Place of residence		
West Gaza city	70	33.3
East Gaza city	72	33.8
North Gaza	69	32.9
No of siblings		
Four and less	72	34.3
Five to seven siblings	91	43.3
Eight and more siblings	47	22.4
Family monthly income in US dollar		
Less than $ 450	190	90.5
$451-600	16	7.6
More than $601	4	1.9

Table 1: Demographic characteristics of the study sample (N=210).

Measures

The traumatic events due to flood checklist: This checklist describing the most common traumatic experiences families could have faced in the Gaza Strip during the last storm and flood. The

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checklist consisted of 11 items with "Yes" and "No" answer. In this study, the reliability and validity of the scale was calculated using Cronbach's alpha was 0.62

Revised child impact of event scale[9]: Post-traumatic stress disorder (PTSD) symptoms were assessed by using the 13-item Children's Revised Impact of Event Scale (CRIES-13). The CRIES-13 includes 4 items measuring intrusion, 4 items measuring avoidance and 5 new items measuring arousal.[9] Items are scored on a non-linear scale as follows: 0 (not at all), 1 (rarely), 3 (sometimes) and 5 (often). Scores range from 0 to 65, and higher scores indicate more PTSD symptoms. The Arabic versions of CRIES-13 was used and showed high reliability.[10] For this study, internal consistency for this scale using Cronbach's alpha was 0.73.

Strengths and difficulties questionnaire (teachers, parents, self-report forms)[11]: The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioral screening questionnaire about 3-16 year olds. It exists in several versions to meet the needs of researchers, clinicians and educationalists. SDQ consists of 25 items, 14 describe perceived difficulties, 10 perceived strengths and one is neutral ('gets on better with adults than with other children'). Each perceived difficulties item is scored on a 0-2 scale (not true, somewhat true, certainly true). Each perceived strengths item is scored in the reverse manner, i.e. 2: not true, 1: somewhat true, 0: certainly true. The 25 SDQ items are divided into scales of hyperactivity, hmotional problems, conduct problems, peer problems and prosocial scale (five items per scale). A score is calculated for each scale (range 0-10) and a total difficulties score for the four scales (excluding prosocial behavior, which was considered different from psychological difficulties), i.e. a range of 0-40. The SDQ has been previously used in 322 Arab children living in the Gaza Strip and was very promising as screening measure or rating scale in different cultural populations.[12] For this study, internal consistency for this scale using Cronbach's alpha was 0.71.

STATISTICAL ANALYSIS

In this study, we used SPSS version 20 for data entry and analysis. Frequencies and percentages of trauma items and MHPs were calculated. Chi-Square for categorical variables was used, T-independent test, Analysis of variance (ANOVA) tests for between-group comparison of continuous variables. Pearson's correlation coefficient tested the association between numbers of trauma scores, and mental health problems by children scores. Linear regression investigated the association between independent (traumatic events) and psychological problems as dependent variable. Pearson correlation coefficient test was conducted to investigate the relationship between trauma, PTSD, and other mental health problems.

RESULTS

Demographic Characteristics of the Study Sample

As shown in Table 1, the sample consisted of 210 children. The ages ranged from 9 to 18 years, with a mean of 13.05 years (SD=2.9). Regarding area of residence, 33.3% of children lived in west Gaza city, 33.8% of children live in East Gaza city and 32.9% of children live in North Gaza. Regarding family monthly income, 90.5% of families had income less than $450, 7.6% of family income between $451-600, 1.9% had a monthly income more than $601.

Traumatic Events due to Winter Storm Experienced by Children

As shown in Table 2, children commonly reported traumatic event was complete destruction of home due to flood waters (94.8%).

Overall, children reported 0 to 11 traumatic events, with a mean=6.2 (*SD*=2.70). Mean traumatic experiences by boys was 5.98 (*SD*=2.79) and mean trauma for girls was 6.41

Traumatic event	Yes		No	
	No.	%	No.	%
1. Complete destruction of home due to flood waters	199	94.8	11	5.2
2. Family member/someone close injured	127	60.5	83	39.5
3. Partial Home destruction due to due to flood waters	77	36.7	133	63.3
4. Shortage of medicine due to inability of leaving home due to flood waters	72	34.3	138	65.7
5. Had to get out by boat	66	31.4	144	68.6
6. Forced to leave home and stayed in the superdome/convention center	61	29	149	71
7. Unable to get food and clean water due to flood waters	41	19.5	169	80.5
8. Lost the main source of income	39	18.6	171	81.4
9. Losing the properties due to flood waters	33	15.7	177	84.3
10. Trapped in house after the storm	21	10	189	90
11. Stopped going to school due to flood waters	1	0.5	209	99.5

Table 2: Reported traumatic event due to storm and flood waters (N=210).

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(*SD*=2.61). No statistically significant differences between boys and girls in total traumatic events ($t(208)=1.76$, $p=0.10$).

One-way ANOVA was performed to examine the difference in traumatic experiences and socio-demographic variables, in which the total traumatic events was entered as independent variable and other socio-demographic variables such as age, place of residence, and family monthly income, as dependent variables. Post-Hoc Tukey test showed that there were statistically significant differences in total traumatic events due to flood toward children living in East Gaza city area than children live in North Gaza and west Gaza city ($F(9,209)=3.57$, $p=0.02$). No statistically significant differences in reporting traumatic events and family monthly income or age of children.

Prevalence of PTSD

Using IES, the mean post-traumatic stress disorder was 28.82 (*SD*=9.59), mean intrusion symptoms was 7.4 (*SD*=2.56), mean avoidance symptoms was 10.08 (*SD*=4.75) and mean arousal symptoms was 11.33 (*SD*=4.46). Considering the previous cut-off point of 30 and above for IES-13, 47.6% of children were considered as PTSD.

In order to find differences in PTSD and subscales according to sex of children, Independent *t* test was done. Girls reported significantly more PTSD than boys (30.63 *vs.* 26.99) ($t(208)$ w=2.82, $p=0.01$). Avoidance symptoms were significantly more in girls than boys (11.11 *vs.* 9.05) ($t(208)=3.22$, $p=0.001$). There no sex differences in reporting arousal and intrusion symptoms.

A one-way ANOVA was performed in which the total PTSD and subscales (intrusion, avoidance, and arousal) were entered as the independent variable as well as other socio-demographic variables such as age, and family monthly income as dependent variables. Post-Hoc test showed that there were statistically significant differences in total PTSD due to flood toward children with family income $450 and less than the other groups ($F(9, 209)=9.48$, $p=0.001$).

Prevalence of General Mental Health Problems Using SDQ by Parents

Using SDQ for parents, 40% of children were rated as being caseness (cut-off point=16-40), 18.6% (14-16) were borderline, and 41.4 (0-13) were normal, 24.3% of them were hyperactive (7-10), 51.9% had emotional problems (6-10), 46.2% had conduct problems (4-10), 55.7% had peer problems (5-10), and 2.9% had abnormal prosocial behavior (0-4) (Table 3).

Socio-Demographic Variables and SDQ-Rated by Parents

In order to find differences in total strengths and difficulties questionnaire and subscales (emotional, conduct, hyperactivity, prosocial behavior, and peer relationship) according to sex of children, Independent *t* test was done. No significant sex differences were found in mental health problems of children rated by parents.

One-way ANOVA was performed in which the total SDQ and subscales (emotional, conduct, hyperactivity, prosocial behavior, and peer relationship) was entered as dependent variable and other sociodemographic variables such as age, and family monthly income, and number of siblings. Post-Hoc test showed that there were no statistically significant differences in total SDQ and subscales and age, place of residence, and number of siblings.

Relationship between Trauma, PTSD, and Mental Health Problems

In order to find the relationships between the dependent and independent variables, Pearson correlation coefficient test was done. Total traumatic events were significantly correlated to post-traumatic stress reaction symptoms rated by Impact of events scale ($r=.12$, $p=0.01$), and correlated with intrusion symptoms ($r=.14$, $p=0.01$). No correlation between traumatic events and other mental health problems rated by SDQ. Post-traumatic stress reaction symptoms were correlated only with emotional problems rated by parents ($r=.16$, $p=0.01$) (Table 4).

Prediction of PTSD by Traumatic Events due to Storm

In a univariate linear regression analysis, each traumatic event of Alex storm was entered as an independent variable in a multiple regression model, with total PTSD scores as the dependent variable, 2 events were significantly associated with PTSD: had to get out by boat ($B=3.49$, $p=0.001$), and unable to get food and clean water due to flood waters boat ($B=3.96$, $p=0.002$) ($F=9.03$

Parents-report	Normal	Borderline	Abnormal
SDQ caseness parents	41.4 (0-13)	18.6 (14-16)	40.0 (17-40)
Conduct Problems	34.3(0-2)	19.5 (3)	46.2 (4-10)
Peer Problems	26.2 (0-2)	18.1 (3)	55.7 (4-10)
Prosocial behaviour	89.5 (6-10)	7.6 (5)	2.9 (0-4)
Emotional Problems	31.9(0-3)	16.2(4)	51.9 (5-10)
Hyperactivity	63.3 (0-5)	12.4 (6)	24.3 (7-10)

Table 3: Prevalence of general mental health problems using SDQ by parents.

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	1	2	3	4	5	6	7	8	9	10
1.Total trauma										
2.Total PTSD	.12*									
3.Intrusion	.14*	.88**								
4. Avoidance	.05	.72**	.30**							
5. Arousal	.13	.88**	.99**	.30**						
6. Total Difficulties	-.10-	.13	.13	.06	.14*					
7. Emotional problems	-.12-	.16*	.14*	.11	.15*	.77**				
8. Conduct Problems	-.10-	.09	.09	.03	.11	.75**	.33**			
9. Hyperactivity	-.02-	.10	.10	.04	.10	.83**	.57**	.51**		
10. Prosocial behaviour	.08	.07	.03	.09	.03	-.45**	-.21**	-.38**	-.36**	
11. Peer problems	-.03-	.01	.02	-.01-	.03	.62**	.24**	.46**	.33**	-.45**

*p≤.05, **p≤.01, ***p≤.001

Table 4: Correlations between Trauma Exposure-Related to storm, PTSD Symptoms and Strengths and Difficulties.

$p<0.001$, $R^2=0.06$).

Prediction of Children Mental Health by Traumatic Events

In a univariate linear regression analysis, each traumatic event of Alexa storm was entered as an independent variable in a multiple regression model, with total SDQ scores as the dependent variable, 2 events were significantly associated with SDQ: shortage of medicine due to inability of leaving home due to flood waters ($B=3.49$, $p=0.03$), and Family member/someone close injured ($B=3.96$, $p<0.04$) ($F=5.2$ $p<0.001$, $R^2=0.006$).

DISCUSSION

The purpose of this study was to investigate the impact of winter Storm Alex on Palestinian children and adolescent's mental health. Palestinian children reported common storm related traumatic events such as: complete destruction of home due to flood waters (94.8%), family member/someone close were injured (60.5%), partial home destruction due to flood waters (36.7%), mean traumatic events was 6.2 events. Our study showed that there were no significant differences in exposure to traumatic events and other sociodemographic variables of children such as sex, number of siblings, and family monthly income. Disaster researchers considered exposure to loss and destruction in the immediate aftermath of the disaster to be an essential part of the traumatic experience.[13] Loss of one's possessions or the destruction of one's community has the potential to seriously challenge a child's basic sense of safety and elicit the state of panic typically associated with traumatic exposure.[13] In fact, existing research conceptualizes exposure to disasters as a multidimensional experience that involves both life threat and experiences of loss and destruction.[14,15] Regardless of whether studies examine exposure as a composite measure that combines life threat, loss, and exposure to destruction[16,17] or whether studies examine these dimensions of exposure separately[18] findings across studies indicate a clear dose-response relationship: As exposure across these dimensions increases, emotional distress increases. This study showed that 47.6% of Palestinian children were considered as PTSD. This study rate of PTSD was higher than a study of children examined the prevalence and predictors of PTSD symptoms in a sample of 533 students (aged 11 to 21), 28 months after the 1997 Flood in Southwestern Poland. The results showed that 18% of the participants met all diagnostic criteria for PTSD. PTSD criteria symptoms were positively correlated with the degree of exposure to trauma experienced during the disaster.[16] Similarly, in study the prevalence of PTSD 436 students in the 4th-9th grade students in an affected school 23 months after tsunami showed that prevalence of PTSD was 15.1%.[19]

In this study, girls reported significantly more PTSD and avoidance symptoms than boys. Our finding were consistent with the study carried out one year after an earthquake in Taiwan showed a distinct division by age and gender in the prevalence of PTSD symptoms. Elementary school girls had more severe symptoms than junior high school boys.[20]

Our study showed that mean scores of total difficulties score of the Strength and Difficulties was 15.07, while 40% of children fall in the abnormal Strength and Difficulties Questionnaire (SDQ)-Total Difficulties. Such results were consistent with previous studies using same instrument which showed that 42.7% of Palestinian children exposed to shelling in the Gaza Strip fall in the abnormal Strength and Difficulties Questionnaire.[10] Rate of mental health problems using SDQ in this study were higher than found in study comparing the impact of a natural disaster *versus* a spate of communal riots that occurred in Gujarat, India. Children aged 8-15 years from highly exposed earthquake sites (n=128) and riot sites (n=171) were approached for participation. The study showed that the riots sample showed greater difficulties than the earthquake sample. Only 7.6% of the earthquake sample seemed to fall in the abnormal Strength and Difficulties Questionnaire (SDQ)-Total Difficulties score band in comparison to the 38.7% of riots group and significant differences between the 2 groups were detected.[21] Such rate of MHPs in children was than rate found in another study using the SDQ, which showed that 59.9% of children rated themselves having psychiatric morbidity compared to 61.5% according to parents

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report.[22] Our study was inconsistent with Agampodi et al[23] study of mental health problems (MHPs) among adolescent schoolchildren in Sri Lanka 8 months after the tsunami disaster found that of the total study sample, 11.0% (65) had abnormal scores and 21.2% (126) had borderline scores for the SDQ.[23] Our study showed no sex differences in total difficulties or subscales. This was inconsistent with study of children in the region of Antwerp (Belgium) which showed that girls scored higher than boys on the emotional scale according to parent ratings and self-report ratings, as well as on the prosocial behavior scale according to caregiver ratings. Girls scored lower than boys on the hyperactivity/inattention scale according to parent and caregiver ratings.[24]

STUDY LIMITATIONS

The limited sample size of highly exposed groups and the use of a non-probabilistic sampling strategy both constitute major limitations to the present study. Also, in this study there no control group, due to continuous trauma in Gaza, it was difficult to have control groups with previous political trauma. Also another limitation was not knowing the premorbid conditions of the study sample.

IMPLICATIONS OF THE CURRENT STUDY

In summary, this study showed the effect of traumatic events due to natural disasters on children mental health. This study informs the need for policy initiatives that would allow for the treatment of individuals at risk of PTSD and other mental health problems. The intervention programs should incorporate personnel from both the mental health and education sectors of the society. Specifically, the collaborative effort of Ministry of Health combined with the mental health unit at the Ministry of Education should offer professional cognitive behavioral therapy interventions at the group and individual levels to at-risk adolescents as well as their families. From a community perspective, parents and teachers need to be sensitized in recognizing the symptoms associated with psychological trauma so that early intervention can be accessed.

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DISCLOSURE

No potential conflicts of interest were reported by the authors.

CONSENT

The patient has provided written permission for publication of the case details.

REFERENCES

1. UNRWA. Gaza Strip Emergency. 2013. Web site. http://www.unrwa.org/what-we-do/gaza-strip-emergency. Accessed August 11, 2016

2. McLaughlin KA, Fairbank JA, Gruber MJ, et al. Serious emotional disturbance among youths exposed to Hurricane Katrina 2 years post-disaster. *J Am Acad Child Adolesc Psychiatry.* 2009; 48: 1069-1078. doi: 10.1097/CHI.0b013e3181b76697

3. McDermott BM, Palmer LJ. Post-disaster emotional distress, depression and event-related variables: Findings across child and adolescent developmental stages. *Aust N Z J Psychiatry.* 2002; 36: 754-757. doi: 10.1046/j.1440-1614.2002.01090.x

4. Hoven CW, Duarte CS, Lucas CP, et al. Psychopathology among New York City public school children 6 months after September 11. *Arch Gen Psychiatry.* 2005; 62: 545-552. doi: 10.1001/archpsyc.62.5.545

5. Osofsky HJ, Osofsky JD, Kronenberg M, Brennan A, Hansel TC. Posttraumatic stress symptoms in children after Hurricane Katrina: Predicting the need for mental health services. *Am J Orthopsychiatry.* 2009; 79: 212-220. doi: 10.1037/a0016179

6. Cook A, Spinazzola J, Julian Ford J. Complex Trauma in Children and Adolescents. *White Paper of the National Child Traumatic Stress Network (NCTSN) Workgroup on Complex Trauma*. Web site. http://www.nctsnet.org/nctsn_assets/pdfs/edu_materials/ComplexTrauma_All.pdf. Accessed August 5, 2016

7. McDermott B, Berry H, Cobham V. Social connectedness: A potential aetiological factor in the development of child posttraumatic stress disorder. *Aust N Z J Psychiatry.* 2012; 46(2): 109-117. doi: 10.1177/0004867411433950

8. McDermott B, Cobham V, Berry H, Kim B. Correlates of persisting posttraumatic symptoms in children and adolescents 18 months after a cyclone disaster. *Aust N Z J Psychiatry.* 2014; 48(1): 80-86. doi: 10.1177/0004867413500349

9. Smith P, Perrin S, Dyregrov A, Yule W. Principal components analysis of the impact of event scale with children in war. *Personality and Individual Differences*. 2003; 34(2): 315-322.

10. Thabet AA, Abu Tawahina AA, Sarraj E, Vostanis P. Exposure to war trauma and PTSD among parents and children in the Gaza Strip. *Eur Child Adolesc Psychiatry.* 2008; 17(4): 191-199. doi: 10.1007/s00787-007-0653-9

11. Goodman R. Psychometric properties of the Strengths and Difficulties Questionnaire. *J Am Acad Child Adol Psychiatry*. 2001; 40: 1337-1345. doi: 10.1097/00004583-200111000-00015

12. Thabet AA, Stretch D, Vostanis P. Child mental health prob-

ISSN 2380-727X Open Journal http://dx.doi.org/10.17140/PCSOJ-2-117

lems in Arab children: Application of the Strengths and Difficulties Questionnaire. *Int J Soc Psychiatry.* 2004; 46: 266-280. doi: 10.1177/002076400004600404

13. Scheeringa MS, Zeanah CH. Reconsideration of harm's way: Onsets and comorbidity patterns of disorders in preschool children and their caregivers following Hurricane Katrina. *J Clin Child Adolesc Psychol.*. 2008; 37(3): 509-518. doi: 10.1080/15374410802148178

14. Norris FH, Friedman MJ, Watson PJ. 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research. *Psychiatry.* 2002; 65: 240-260. Web site. http://www.tandfonline.com/doi/abs/10.1521/psyc.65.3.240.20169. Accessed August 5, 2016

15. Silverman WK, La Greca AM. Children experiencing disasters: Definitions, reactions, and predictors of outcomes. In: La Greca AM, Silverman WK, Vernberg EM, Roberts MC, eds. *Helping Children Cope with Disasters and Terrorism*. Washington, DC, USA: American Psychological Association; 2002: 11-24.

16. Bokszczanin A. PTSD symptoms in children and adolescents 28 months after a flood: Age and gender differences. *J Trauma Stress*. 2007; 20(3): 347-351.

17. Hensley L, Varela RE. PTSD symptoms and somatic complaints following Hurricane Katrina: The roles of trait anxiety and anxiety sensitivity. *J Clin Child Adolesc Psychol.* 2008; 37: 542-552. doi: 10.1080/15374410802148186

18. Thienkrua W, Cardozo BL, Chakkraband ML, et al. Symptoms of posttraumatic stress disorder and depression among children in tsunami-affected areas in southern Thailand. *JAMA.* 2006; 296(5): 549-559. doi: 10.1001/jama.296.5.549

19. Ketumarn P, Sitdhiraksa N, Pithayaratsathien N, et al. Prevalence of post-traumatic stress disorder in students 23 months after tsunami. *Asian Journal of Psychiatry.* 2009; 2: 144-148.

20. Chen SH, Lin YH, Tseng HM, et al. Post-traumatic stress reactions in children and adolescents one year afterthe 1999 Taiwan Chi-Chi Earthquake. *Journal of the Chinese Institute of Engineers*. 2002; 25: 597-608. doi: 10.1080/02533839.2002.9670734

21. Kumar M, Fonagy P. Differential effects of exposure to social violence and natural disaster on children's mental health. *J Trauma Stress*. 2013; 26(6): 695-702. doi: 10.1002/jts.21874

22. Thabet AA, Abu Tawahina AA, Vostanis P. Effect of war on Palestinian children behavioural and emotional problems. *Arabpsynet E Journal*. 2009; 24: 26-30. Web site. http://arabpsynet.com/Archives/OP/TOPJ24Thabet3.pdf. Accessed August 5, 2016

23. Agampodi T, Agampodi S, Fonseka P. Prevalence of mental health problems in adolescent school children in Galle District, Sri Lanka: Eight months after Tsunami. *Asia Pac J Public Health*. 2011; 23(4): 588-600. doi: 10.1177/1010539509349866

24. Janssens A, Deboutte D. Screening for psychopathology in child welfare: the Strengths and Difficulties Questionnaire (SDQ) compared with the Achenbach System of Empirically Based Assessment (ASEBA). *Eur Child Adolesc Psychiatry.* 2009; 18(11): 691-700. doi: 10.1007/s00787-009-0030-y