

Effects of Exposure to Rocket Attacks on Adolescent Distress and Violence: A 4-Year Longitudinal Study

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Objective: The effects of Israeli adolescents' exposure to rocket attacks over time were examined, focusing on anxiety, depression, aggression, and violence commission. **Method:** A sample of 362 adolescents from southern Israel was followed from 2008 through 2011 with four annual assessments. Measures included exposure to rocket attacks (gauging whether children were affected by rocket attacks, both directly and indirectly, through friends and family), anxiety (items from the State Anxiety Inventory), depression (the Center for Epidemiological Studies Child Depression Scale), aggression (the Orpinas Aggression Scale), and violence commission (from the Social and Health Assessment). **Results:** Concurrent and longitudinal findings differed. Wave 1 exposure to rockets attacks was associated with Wave 1 anxiety, depression, and aggression. Longitudinal results evinced only modest effects of exposure on anxiety and depression, no effects on aggression, but robust effects on violence commission. Exposure to terror attacks before the study predicted increased odds of violence commission at the fourth and final wave, controlling for violence commission at the first, second, and third wave. Exposure to rocket attacks in the second wave predicted increased odds of violence commission at the third wave. **Conclusion:** This is the first longitudinal study attesting to the prospective longitudinal effect of exposure to terrorism on adolescent violence. Findings should serve as a red flag for health care practitioners working in civil areas afflicted by terrorism and political violence. *J. Am. Acad. Child Adolesc. Psychiatry*, 2013;52(6):619–627. **Key Words:** aggression, anxiety, depression, terrorism, violence

Exposure to terrorism and political violence is traumatic, precipitating serious physical and mental health problems.¹⁻⁵ However, the effects of terrorism and political violence on youth violent behavior are relatively understudied. Adolescent violence—from bullying to weapon use—is a serious public health problem. It is implicated in school absenteeism, increases in health care costs, decreased property values, disrupted social services, poor mental health outcomes, physical injuries, and murder.⁶⁻⁸ The problem is felt worldwide.^{6,9} For example, between 1990 and 2000, the number of juvenile delinquents caught by Israeli police grew by 38.5% (from 6,910 to 9,570), and the number of criminal files opened for minors (age 12–18 years) in 1998 was 10 times higher than in 1988 (11,060 versus 1,030).¹⁰

Studies explicitly examining the effects of exposure to terrorism and political violence on adolescent violence are scarce.^{11,12} This dearth is puzzling. Research shows that stress has an impact on neurobiological circuitry involved in executive control,¹³ which, in adolescence, is maturing and plays a role in externalizing problems, including violence.¹⁴ Furthermore, social cognitive theory focuses on violence begetting violence through its impact on children's social cognitions, such as hostile attributions and beliefs about the efficacy of aggression to solve problems.¹⁵ Theory is backed by empirical evidence whereby exposure to community or family violence predicts future violent behavior.^{16,17} However, extant studies on exposure to terrorism and political violence are "one shot" cross-sectional designs, including a single concurrent assessment of exposure and adolescent violence.

This is the first report from a 4-year longitudinal study examining the effects of exposure to



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terrorism on Israeli adolescents' mental health. It builds from pilot research on adolescents from the Israeli Negev, documenting cross-sectional associations between exposure to rocket attacks and adolescent violence,¹² and small-scale longitudinal effects of different forms of terrorism on adolescent distress and depression.¹⁸⁻²⁰ Addressing previously mentioned limitations of terrorism-health research, this study prospectively examined the effects of exposure to rocket attacks launched from the Gaza Strip on four outcomes: depression, anxiety, aggression, and violence commission. Including these outcomes allows for a longitudinal examination of the mental health consequences of terrorism previously addressed in cross-sectional and short-term studies, in addition to expanding the focus on terrorism-related outcomes to aggression and violence. We hypothesized that greater exposure to rocket attacks and prior exposure to terrorism would be prospectively associated with increased distress and violence.

METHOD

Study Sample

The Development Under Duress study was conducted in Southern Israel. Four annual assessment waves were used: May to June 2008, February 2009, March 2010, and February to March 2011. Participants were 362 Israeli adolescents from the seventh through tenth grade at the start of study (median grade = 8; median age = 14 years; age range = 12–16 years) who participated in at least one of the four assessment waves. Recruitments were made from a school in the towns of Sderot (36% of the sample) and one in Sha'ar-Hanegev (64%), two communities near the Gaza Strip, experiencing thousands of rocket attacks over the past decade.²¹ A letter explaining the study was sent by homeroom teachers to all parents with a consent form. Students whose parents signed consent forms were briefed on the study and were asked if they wanted to take part in it. Those who agreed signed assent forms before filling out the surveys. The sample was 54% female, and 93% were Israeli-born. The demographics of the sample mirrored those of the overall student bodies of the two schools.

Attrition resulted in part from students moving away or being absent during survey administrations, but primarily from older students graduating and entering the military, and from security concerns that prevented data collection at one of the schools in the last year/wave of the study. The sample sizes with complete data were $n = 315$ at Wave 1, $n = 305$ at Wave 2 (including 31 students who had not participated in Wave 1), $n = 263$ at Wave 3, and $n = 173$ at Wave 4. Analyses conducted on the likelihood of attrition indicated that boys, older students, and participants who lived in Sderot were more likely to

be lost to attrition. These variables were included as covariates in the analyses.

Ethics Approval

This study was approved by the Ethical Committee of the Department of Behavioral Sciences at Ben-Gurion University, as well as by the Chief Scientist of the Ministry of Education in Israel. Active consent from participants' parents and written assent from participants were secured before the beginning of the study. No adverse events were documented. Institutional review board approval was also obtained from Georgia State University.

Measures

Participants completed an assessment battery at each wave during school. Protocols were group administered by trained research assistants. The measures that were included in these analyses, all self-report questionnaires, were administered in Hebrew. Those that had not been previously translated from English by other researchers (aggression and violence commission) were translated and back-translated. For this process, a bilingual research assistant translated the measures to Hebrew, and a second bilingual research assistant translated the Hebrew back to English. The authors then compared the original to the back-translation to make sure that they were similar.

Exposure to Rocket Attack. A scale adapted from previous research in Israel and used successfully in the population sampled for this study was used.²² At each wave, participants were asked 6 yes/no questions about whether, in the past several months, they had been physically hurt in a rocket attack, experienced property damage from a rocket attack, had friends or family physically or mentally hurt by a rocket attack, or had property damage from a rocket attack. Answers were summed to create an exposure index (range = 0–6).

Prior Exposure to Terror Attacks. At the onset of the study, participants were asked whether they had ever been present during "a terror/rocket" attack, been injured in an attack, had close family injured in an attack, had close friends injured in an attack, or had acquaintances injured in an attack. Answers were summed to create an index of exposure to prior terror attacks ranging from 0 to 5 (mean = 1.82, SD = 1.21, median = 2).

Depression. Depression was assessed each wave with the Center for Epidemiological Studies–Child Depression Scale (CES-CD²³), a 20-item measure of depressive symptoms with a widely used Israeli translation. Items (on a 0–3 scale) are summed to create the depression score ($\alpha = 0.85$ – 0.89).

Anxiety. Anxiety was assessed each wave using seven items, averaged to form a composite scale, from the Hebrew version of the extensively used State Anxiety Inventory (SAI^{24,25}). These items adequately represent the entire scales' content and construct validity (e.g., "I am anxious"; $\alpha = 0.62$ – 0.65).

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