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Shocking news and cognitive performance

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ABSTRACT

We study how shocking news affects cognitive performance. Identifying these effects makes societies more resilient by helping to adjust policy responses to reduce indirect costs of future atrocities. Our analysis is based on a school shooting that coincided with national matriculation exams, allowing a difference-in-differences analysis. We find a substantial negative effect on males: their average performance dropped by seven percent. The average performance of females was unaffected. Our findings suggest that a shocking event may call for psychological support for young people even in communities that are not directly affected.

1. Introduction

In recent years, the United States and several European countries have suffered from a number of terrorist attacks and school shootings. In addition to the tragic direct consequences for the victims and their families, such shocking events may dominate the news for days, having a traumatic effect on millions of other people. [Addington \(2003\)](#) uses National Crime Victimization Survey data to explore the effects of the Columbine High School shooting on students' fear levels, finding that students were slightly more fearful afterwards.¹ [Galea et al. \(2002\)](#) document that the 9/11 terrorist attack resulted in thousands of New York City residents developing posttraumatic stress disorder, and [Schlenger et al. \(2002\)](#) show that this was also the case in other parts of the United States. [Blanchard et al. \(2005\)](#) find that the college-age population in the United States was still suffering from the 9/11 attacks in the fall of 2002, with a larger effect in cities closer to New York City.

We analyze the indirect effects of shocking events, with focus on how the news of a shocking event affects cognitive performance. Finland has witnessed two school shootings in recent years, both of which received wide media coverage.² The first one took place in

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¹ The Columbine High School shooting was the biggest U.S. news story in 1999 as measured by Cable News Network (CNN) ratings. [Muschert \(2009\)](#) explored the subsequent media dynamics, finding that the news coverage first focused on what happened in Columbine, and then moved to repercussions across the country.

² There was a large number of stories about both Jokela and Kauhajoki school shootings in the newspapers in the immediate aftermath of these tragedies: Jokela shooting was followed by 901 stories and Kauhajoki shooting by 465 stories in the print media within the next 48 hours. In addition, TV channels provided the breaking news coverage related to the shootings almost all day long immediately after the shootings. ([Hakala \(2009\)](#): Koulusurmat verkostoyhteiskunnassa: Analyysi Jokelan ja Kauhajoen kriisin viestinnästä (School shootings in a networked society: An analysis of news following the crises in Jokela and Kauhajoki). In Finnish; available at: <http://www.helsinki.fi/crc/Julkaisut/>)

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November 2007 in Jokela in southern Finland, and the second one in September 2008 in Kauhajoki in western Finland. We focus on the second shooting as it coincided with national high-school matriculation exams, taken typically when students are aged 18 or 19.³ There were exams both before and after the shooting took place, allowing us to compare performance in exams that took place after the shooting with performance in exams that took place before it. To account for the fact that the average performance may differ between exams and student cohorts, we form a treatment group of exams that took place after the shooting in 2008 and a control group of exams that took place before the shooting in that year. Then we perform a difference-in-differences (DID) analysis to see how the average performance in the treatment group changed between 2007 and 2008, relative to the change in the average performance in the control group. (Note that treatment and control group are based on exams; any difference in student cohorts between 2007 and 2008 should be captured in how the average performance in the control group exams changed.) We study separately the effects of the school shooting in the region in which it occurred, in the region in which the first school shooting had taken place, and in the rest of the country. The effects of the shocking news can be best observed in the rest of the country. In the Kauhajoki region, pinpointing the effects is more complicated, as many students knew some of the victims or the perpetrator. In the Jokela region, the results could be driven by reactivation of painful memories among those who had lost a relative or a friend in the previous shooting.

Economists have started to analyze the psychological effects of shocking events, like terrorist attacks or school shootings, only recently. Based on comparisons between interviews before and after 9/11, [Metcalf et al. \(2011\)](#) show that these attacks reduced subjective well-being also in the United Kingdom. [Montalvo \(2011\)](#) shows that the terrorist attack in Madrid on March 11, 2004 significantly reduced support for the incumbent government in elections three days later. [Bozzoli and Müller \(2011\)](#) show that the terrorist attacks in London on July 7, 2005 considerably increased public support for security measures at the cost of civil liberties, with the willingness to trade off security for liberties being driven by threat perceptions. [Abouk and Adams \(2013\)](#) find that school shootings in the United States are followed by a 10 to 12% increase in enrollment in private high schools, and a decline in public school enrollment. Our paper is the first to study the effects of shocking news on cognitive performance. Identifying the effects of shocking news helps societies to plan policy responses to reduce indirect costs of future atrocities, thereby making societies more resilient.

We study the effects of shocking news on the cognitive performance by using register data on the examination results. We have the test results for all students in a random sample of schools and therefore avoid the problems related to sample selection, as well as under- or overreporting of symptoms that might occur in survey data. In addition to reporting error and commensurability issues, collecting survey data includes ethical issues as well, because collecting such data could trigger traumatic memories, especially among those who reacted to the events most strongly.⁴

We study the reactions of men and women separately, as previous research has documented various gender differences with respect to reaction to stressful events. Females are found to suffer more often from acute and posttraumatic stress disorders (see [Schlenger et al., 2002](#); [Silver et al., 2002](#); [Marshall et al., 2007](#)). This suggests that females would also respond to the school shooting more strongly. On the other hand, there is a vast literature (see [Grant et al., 2006](#)) showing that social support protects young people from the negative effects of stressors (known as the buffering effect). [Kendler et al. \(2005\)](#) find that females have, on average, wider social networks than males. This suggests an opposite gender pattern: wider social networks could give females more protection against the adverse effects of shocking news. There is extensive evidence on gender differences also in other contexts, both in psychological and economic literature ([Eagly, 1995](#); [Blau and Kahn, 2000](#); [Croson and Gneezy, 2009](#)).

Using DID analyses, we find that young men's average test score dropped by 4.3 percentage points, which is about a fifth of a standard deviation and therefore a relatively large effect. The effect on young women is small and statistically insignificant. Our findings suggest that self-reported symptoms may underestimate how severely males are affected by traumatic events relative to females. This result can be interpreted applying the model of limited attention by [Banerjee and Mullainathan \(2008\)](#). They argued that attention is a scarce resource that can be divided between detecting problems at home and problems at work. Having to spend more time on problems at home reduces productivity at work. If teenage women have more attention capital than teenage men, then shocking news would have less harmful effects on women's test performance.

Matriculation exams play an important role in admission to universities in many countries. Our findings suggest that a shocking event may have serious repercussions on the lifetime career paths of a large number of young men. One policy implication of our findings is that in countries in which matriculation exams play a major role in university admissions, policy makers should consider allowing young people to resit exams the following year if a shocking event, like a death of a family member, occurs just before exams. Another policy implication is that a shocking event may increase the need for psychological support more widely than is commonly understood.⁵ While it is natural for health care services to prioritize survivors and bereaved families, a national shocking event may call for extra resources, even in communities that were not directly affected. Furthermore, our results highlight that high-stakes exams are vulnerable to random shocks that cause fluctuation in cognitive performance. This may result in an inefficient allocation of talent when such exams are used in university admissions; see [Lavy et al. \(2014\)](#) for a related discussion in the context of air pollution and national exams in Israel.

³ We do not analyze the effects of the 2007 school shooting, as it took place after that year's examinations.

⁴ As our study uses register data, the risk of burdening the victims is minimal, and meets the guidelines set in the meeting entitled "Ethical Issues Pertaining to Research in the Aftermath of Disaster" that was sponsored by the New York Academy of Medicine and the National Institute of Mental Health (see [Collogan et al., 2004](#)). [Silver \(2004\)](#) provides an excellent overview of the challenges associated with conducting methodologically rigorous studies of responses to traumatic experiences.

⁵ These should be interpreted as tentative suggestions. We hope that these suggestions stimulate additional psychological research to evaluate their validity.

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