Engineering the firearm ecosystem: research on media coverage and firearm acquisition in the aftermath of a mass shooting

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ABSTRACT

We are experiencing an unprecedented surge of mass shooting events in the U.S. These events often elicit heated discussion among the public, polarizing opinions on firearm control, as seen and amplified in the media. Previous studies have demonstrated a strong, positive correlation between the frequency of mass shootings and increased firearm prevalence in the U.S. We present an information-theoretic framework, which goes beyond correlational analysis to unravel causal links between mass shootings, media coverage on firearm control, and firearm prevalence. Using empirical data from the last two decades, we demonstrate directional information transfer between the time-series of media coverage and the number of background checks, suggesting that media coverage may increase public fear of more stringent firearm control and, in turn, drive firearm prevalence. In other words, people might rush to buy guns because they fear that new regulations may come into effect and their right to acquire a weapon be challenged. Interestingly, this tendency is mediated by the legal environment of the State, whereby permissive States experience the strongest rush toward firearm acquisition. Disentangling causation from correlation is critical in firearm research toward empowering policy-makers with strong, objective support for effective policy solutions. This research constitutes the basis of a new initiative supported by the National Science Foundation to elucidate and engineer the firearm ecosystem in the U.S., of which (if time allows) we will present some more recent findings in a synoptic way.

Bio of the speaker: Dr. Maurizio Porfiri is an Institute Professor at New York University Tandon School of Engineering, with tenured appointments in the Departments of Mechanical and Aerospace Engineering and Biomedical Engineering, and the Director of the Center for Urban Science and Progress of New York University. He received M.Sc. and Ph.D. degrees in Engineering Mechanics from Virginia Tech, in 2000 and 2006; a "Laurea" in Electrical Engineering (with honors) and a Ph.D. in Theoretical and Applied Mechanics from Sapienza University of Rome and the University of Toulon (dual degree program), in 2001 and 2005, respectively. He has been on the faculty of the Mechanical and Aerospace Engineering Department since 2006, when he founded the Dynamical Systems Laboratory. Dr. Porfiri is a Fellow of the American Society of Mechanical Engineers (ASME) and the Institute of Electrical and Electronic Engineers (IEEE). He has served in the Editorial Board of ASME Journal of Dynamics systems, Measurements and Control, ASME Journal of Vibrations and Acoustics, Flow: Applications of Fluid Mechanics, IEEE Control Systems Letters, IEEE Transactions on Circuits and Systems I, IEEE Transactions on Network Science and Engineering, Mathematics in Engineering, and Mechatronics. Dr. Porfiri is engaged in conducting and supervising research on complex systems, with applications from mechanics to behavior, public health, and robotics. He is the author of approximately 400 journal publications, including papers in Nature, Nature Human Behaviour, Patterns, Proceedings of the National Academy of Sciences, Physical Review Letters, and eLife. He was included in the "Brilliant 10" list of Popular Science in 2010 and his research featured in major media outlets, such as CNN, NPR, Scientific American, and Discovery Channel. Other significant recognitions include National Science Foundation CAREER award; invitations to the Frontiers of Engineering Symposium and the Japan-America Frontiers of Engineering Symposium organized by National Academy of Engineering; invitation to the third and fourth World Laureate Forums; the Outstanding Young Alumnus award by the college of Engineering of Virginia Tech; the ASME Gary Anderson Early Achievement Award; the ASME DSCD Young Investigator Award; the ASME C.D. Mote, Jr. Early Career Award; and the Research Excellence Award from New York University Tandon School of Engineering.