



PG-13 Rated Movie Violence and Societal Violence: is there a Link?

Christopher J. Ferguson¹ · Patrick Markey²

Published online: 18 January 2019

© Springer Science+Business Media, LLC, part of Springer Nature 2018

Abstract

Recent scholarship has suggested that the frequency of violence in PG-13 rated movies has increased in recent years. Although some scholars have expressed concern that such an increase may have public health implications, this has remained untested. In the current article, trends in PG-13 movie violence are tested against trends in violence in society, including both homicides and youth violence. Raw correlations suggest that PG-13 rated movie violence is *inversely* related to actual violence in society. However, controlling for autocorrelations suggests that the best interpretation is that PG-13 rated movie violence is unrelated to violence in society. Caution is advised for scholars to avoid implying that PG-13 rated movie violence may have a causal effect on crime in society.

Keywords Movies · Mass media · Violence · Crime

Introduction

In 2018, Romer and colleagues [1] released an article claiming that some parents could become desensitized to violence in PG-13 rated movies and, if so, were more likely to bring their children to see such movies, particularly when gun violence appeared to be justified. The article achieved this conclusion by subjecting participating parents to multiple clips from movies, and repeatedly asking them their attitudes toward the violence in the clips and at what age the clips would be appropriate. However, evidence for emotional desensitization was not found in the study. The authors expressed that “...this raises the concern that movie depictions of harmful behavior that omit the consequences, such as of smoking and alcohol use, can increase imitation in adolescents” and “The increasing presence of comic book heroes in PG-13 films in recent years may also make their use of gun violence appear acceptable.

✉ Christopher J. Ferguson
CJFerguson1111@aol.com

¹ Department of Psychology, Stetson University, 421 N. Woodland Blvd, DeLand, FL 32723, USA

² Villanova University, Villanova, PA, USA

Unfortunately, the approval of gun use in films with justified violence may teach the lesson that gun use is acceptable when responding to threats from others.”

The worry that violence in films cause horrific acts of violence is certainly not new. For example, media scholars previously argued that violent portrayals in cinema seem to encourage “copycat killings” [2] and even that the apparent rise in school shootings coincides with increases in violent films [3]. One prominent scholar even claimed that “...10% % of violence in society can be attributed to the impact of violent media.” [4] Perhaps not surprising is politicians, the media, and laypersons often grasp onto such statements and assume researchers have actually found a link between violent films and horrific acts of violence. For example, following the Parkland shooting President Donald Trump directly criticized violent films noting that “We have to do something about what [kids are] seeing and how they’re seeing it” [5] and that “...movies [that] come out are so violent with the killing and everything else.” However, claims about the actual public health threat of violent movies may be difficult to substantiate. Research on the hypothesized imitative effects of media violence have generally been inconsistent, with diminish returns the closer studies approach criminal violence [6, 7]. Furthermore, epidemiological evidence suggests that movie violence is either associated with reduced crime [8] or has little impact on crime [9]. Likewise, longer trends related to movie violence and violence in society across the twentieth century have been difficult to substantiate [10].

However, little research has examined PG-13 rated movies specifically. Evidence suggests that patterns in PG-13 movies can mostly be explained by ticket sales [11]...in other words, that PG-13 rated movies with violent content are particularly marketable. This may be because they are considered action-oriented fun but without the graphicness that parents may view as inappropriate for younger children. Evidence also suggests that edgier content may increase in PG-13 (and PG) movies over time, often called a “ratings creep” which may reflect changing societal mores regarding what content is appropriate [12]. Such assessments may, in turn, be generational in nature [13].

But whether the “ratings creep” is an actual problem for public health or merely reflects changing societal attitudes is unknown. Little research has examined PG-13 rated movie violence specifically as a potential public health issue.

Current Study

The current study sought to fill this research void by examining the relations among violence and gun use trends in films and gun related homicides, homicides, and aggravated assaults. Specifically, three sets of analyses were conducted in order to provide the best possibility of detecting links between violent films and severe forms of violent behavior. In the first analyses, simple correlations were computed between annual ratings of violence in films and annual reports of homicide and aggravated assault rates in the United States. These analyses supply information concerning the overall amount of covariation between violent films and violent crime.

One potential issue with examining simple correlations between time series data is that the raw data often contain trends and considerable amounts of autocorrelation, indicating that an observation for a given time period is correlated with past time periods [14, 15]. This is problematic because autocorrelations within a time series often lead to spurious correlations between two time series [15]. Therefore, in the second set of analyses, trends and

autocorrelations were removed from each time series using the Box-Jenkins approach to fit time series data to an autoregressive integrated moving average (ARIMA) statistical model (a process called prewhitening [16]). Residuals from the resulting ARIMA models were correlated in order to examine the relation between violent films and violent crime after autocorrelations and trends had been removed from each time series.

The final set of analyses controlled for the effects of five extraneous variables that have previously been related to violent crime: age shifts, poverty, education, incarceration rates, and economic inequality [17]. Age shifts refers to the proportion of young individuals in a population (e.g., ages 15 to 24 [18]) and has been associated with violent crimes [19]. Poverty is linked to a weakening of social bonds and an increase in psychological strain, violent subcultures, and criminal motivation [20]. Education is thought to discourage crime by reducing criminal motivation and increasing social control [17, 21]. The incarceration of criminals serves as a deterrence and incapacitation of individuals likely to commit future criminal acts and has been linked to a reduction in violent crime [22]. Finally, economic inequality, the unequal distribution of income and resources across residents, has been found to predict violent crime [23]. In the final analyses the relation between violence in films, homicide, and aggravated assault were examined while controlling for autocorrelations, trends, and these five extraneous variables.

Based on predictions derived from the General Aggression Model, previous meta-analyses examining primarily minor forms of aggression [24–26], and speculation from media researchers, it was hypothesized that the above analyses would yield positive correlations indicating that years when films were more violent would also exhibit higher rates of violent crime. Additionally, given the dramatic rise found in gun violence depicted in PG-13 movies [27], and the emphasis that was placed on the provision of scripts for gun use, it was also hypothesized that changes in gun related homicides would be positively related to changes in films depicting gun violence.

Information on The Variables

PG-13 Rated Violence Data on PG-13 rated movie violence are those provided by Romer and colleagues [1, 28].

Violent Crime Data Homicide data was provided by examining Uniform Crime Reports Data provided by the Federal Bureau of Investigations. Youth violence data is sourced from the National Crime Victimization Survey data reported on the government website childstats.gov.

Extraneous Variables The U.S. Census Bureau provided data concerning age shifts, poverty, education and economic inequality for the years 1985 to 2015. Age shifts were the annual percentages of residents in the U.S. between 15 and 24 years of age. Annual poverty rates were represented by the percentage of residents who lived in poverty for a given year. Education was defined as the percentage of residents aged 25 and over who completed high school or college. Economic inequality was assessed via annual calculations of the Gini coefficient (a measurement of income inequality [24]). Finally, annual incarceration rates were obtained from the Bureau of Justice Statistics, which reflected the rate (per 100,000 residents) of sentenced prisoners under jurisdiction of State and Federal correlational authorities.

Results

PG-13 Movie Violence and Violent Crime: 1985–2015

Figure 1 displays the annual percentage growth rates (using the mean value for each time series as the base) for PG-13 movie violence and violent crime. These growth rates are linear transformations of the original time series data and are presented in order to allow all findings to be displayed in a single figure (all of the analyses were conducted using the original time series data). As can be seen in this figure, PG-13 movies have tended to become more violent over time, and in 2015 were 34% more violent than the mean. In contrast, violence (−210%) and homicides (−36%) were lower than the mean during this same time period. As seen in Fig. 2, simple correlations of the raw data revealed that violence in movies was negatively related to homicide rates and positively related to aggravated assault.

However, these results need to be interpreted with extreme caution as time series data often contain a considerable amount of autocorrelation [10, 11]. Autocorrelations were removed from each time series using the Box-Jenkins approach to fit time series data to an ARIMA statistical model [12] by identifying autocorrelations and trends in the data. These models were then used to estimate the parameters for a given time series. By applying resulting ARIMA models to each time series, a set of residuals for each series can be generated, which are free of trends and (a process called prewhitening [29]; for additional information about ARIMA models see [16]). Ljung-Box Q tests for white noise residuals revealed that when these models were applied to violent films (Ljung-Box Q at lag 5 = 9.32, $p = .11$), violence (Ljung-Box Q at

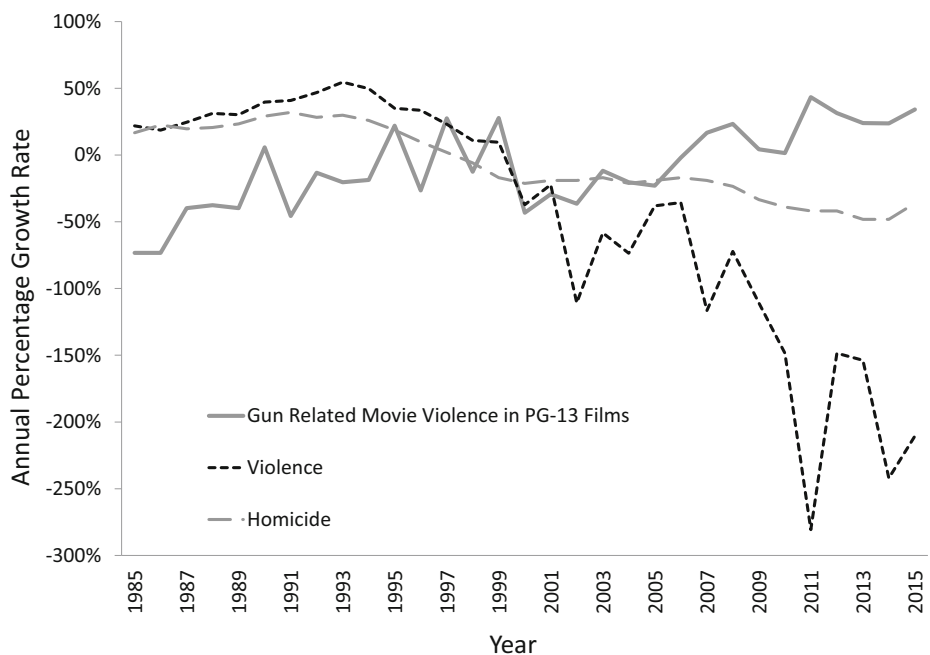


Fig. 1 Associations between PG-13 movie violence and societal violence

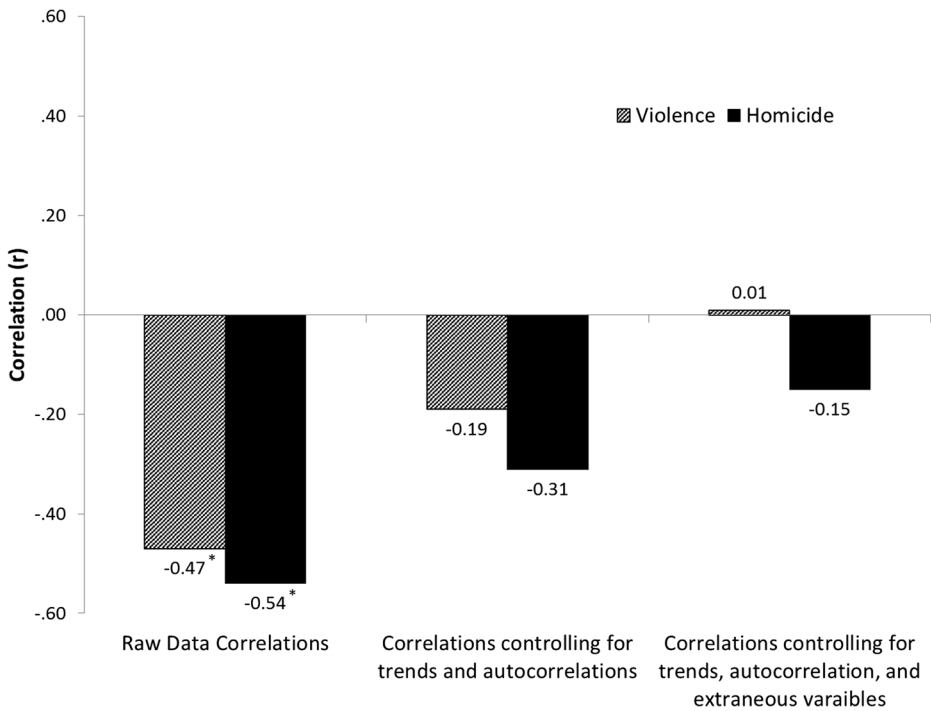


Fig. 2 Correlations, unadjusted and adjusted between PG-13 movie violence and societal violence

lag 5 = 4.19, $p = .52$), and homicide (Ljung-Box Q at lag 5 = 5.34, $p = .38$) there were nonsignificant autocorrelations among the residuals.

The removal of trends in a time series is especially important, otherwise a spurious relationship may be found between two time series simply because they share similar (or opposite) trends. Stronger evidence of the link between violent films and violent crimes would be provided if deviations from these trends were related to each other. To examine this possibility, the residuals from each of the time series were correlated with each other (see [15, 29], for additional information). As seen in Fig. 2, there tended to be *negative*, non-significant, relations between violence in PG-13 films, violence, and homicides.

Finally, the relations between violent films, violence, and homicides were examined while controlling for age shifts, poverty, education, incarceration rates, and economic inequality. ARIMA models were created for each control variable by identifying autocorrelations and trends in the data. As before, the resulting ARIMA models were applied to each time series in order to generate a set of residuals which are free of trends and autocorrelations. Ljung-Box Q tests for these prewhitened data revealed that age shifts (Ljung-Box Q at lag 5 = 3.51, $p = .62$), poverty (Ljung-Box Q at lag 5 = 2.30 $p = .82$), education (Ljung-Box Q at lag 5 = .13, $p = 1.00$), incarceration rates (Ljung-Box Q at lag 5 = .70, $p = .98$), and economic inequality (Ljung-Box Q at lag 5 = 2.68, $p = .75$) contained nonsignificant autocorrelations. Partial correlations between the prewhitened assessments of violent films, homicide, and aggravated assault were then computed while controlling for age shifts, poverty, education, incarceration rates, and economic inequality. As can be seen in Fig. 2, both violence and homicide rates were unrelated to PG-13 movie violence.

Discussion

Several recent articles have suggested that violence in PG-13 rated movies has been increasing over time and that parents are increasingly inured to allowing children to watch movies with significant gun violence. Such articles often imply that this phenomenon has important public health implications, however the potential for such public health issues has not been empirically documented. Given inconsistencies in both laboratory and longitudinal research on media violence [6, 30] it is important that any potential population-wide issues be empirically tested rather than assumed. The current analysis of population-level data linking PG-13 movie violence trends with youth violence and homicides in the United States provided no evidence for a public health concern. Raw data suggested that PG-13 movie violence is strongly associated with *declines* in actual violence in society. However, controlling for autocorrelations, evidence suggests that PG-13 movie violence may be associated with small declines in societal violence, but these declines did not reach the level of statistical significance.

Therefore, for policy makers concerned with violence in society, tackling the issue of PG-13 movie violence is unlikely to bear much fruit. Some scholars have claimed that tackling movie violence in society via policy may be easier than addressing other issues such as poverty, educational disparities, or mental health reform. For example, prominent media researchers have often claimed that while media violence is “neither the largest risk factor, nor the smallest, but falls somewhere in the middle in terms of its size” when predicting horrific acts of violence and that it costs parents “almost nothing” to reduce children and adolescents’ exposure to such media violence [31]. Results from our analysis suggest this perspective is mistaken. Indeed, PG-13 movie violence appears to be entirely unrelated to actual violence in society. This raises the potential that the “low hanging fruit” argument itself may cause more harm than good insofar as it falsely promises an easy solution to the problem of societal violence but is unlikely to be able to deliver on such a promise. By contrast, focusing society, parents and policy makers on an illusory simple fix, may distract society from the hard work of dealing with real, pressing problems.

This invites the question of why media violence generally and PG-13 movies specifically appear to have so little impact on societal violence. One possibility is that the theories of media violence effects may have relied too heavily on larger theories of social priming which have now proven difficult to replicate [32]. Specific examples, such as the weapons priming effect may have been overestimated due to statistical errors [33]. Given recent failures of media violence effects to demonstrate in preregistered studies [34, 35] as well as direct replications, it may be that media violence, like other priming effects, is part of psychology’s replication crisis.

The other issue worth considering is that media effects may simply be too distal to have appreciable impacts on behaviors as complex as violence. Evidence suggests that violent and antisocial behaviors result from a complicated interaction of genetic, cultural and family environment interactions [36]. However, media exposure does not appear to be one of these factors [37]. This may be because individuals perceive media exposure differently than they do real-life exposures to violence, resulting in a failure of far-transfer of learning. Indeed, recent brain imaging studies suggests that media violence exposure has little desensitizing impact on brain function [38, 39]. As such, it may be crucial, from a risk/resilience perspective, to separate those factors which are real risk and protective factors from those which may align with moral advocacy agendas but have little practical value. In a sense, risk/resilience needs to be evaluated carefully, not assumed that all have won and must have prizes.

The current study is not without limitations. First, epidemiological data is correlational in nature and causation cannot be inferred. Even were small correlations to exist between PG-13 movie violence and reduced societal crime, this does not mean PG-13 movies *cause* reduced crime. However, this does argue for caution in scholarly statements attempting to imply causality in the opposing direction. We argue that, although correlation does not indicate causation, correlation is a necessary precursor, particularly when scholars are arguing for population-level effects requiring policy intervention. Second, we have a limited number of years with which to work, given that the PG-13 rating was only implemented in the 1980s. With greater power it is possible that some of the small observed correlations may have been statistically significant.

In conclusion, our analyses suggest that worrying claims about PG-13 movie violence are not consistent with available evidence. Even were PG-13 movies experiencing greater frequency of violence (and we do note that this claim is based on a single dataset which would require independent verification), evidence does not suggest that this phenomenon has resulted in population-level effects worthy of a public health intervention. Further, given that movies enjoy First Amendment protections that, among other issues, prohibit government involvement in ratings systems, it is unclear what policy efforts might be undertaken to address the issue even if it were real. Thus, contrary to the “low hanging fruit” argument, intervening in media effects is unlikely to be easy from a policy perspective, at least in the United States (free speech protections naturally vary across nationality). Given evidence that such policy efforts are unlikely to be helpful, we recommend that policy makers remain focused on issues demonstrate to impact criminality such as family environment, mental health reform, poverty and educational disparities.

Author’s Contribution Christopher J. Ferguson conceived of the study, obtained data on societal violence and assisted in the writing of the final manuscript.

Patrick Markey obtained the PG-13 movie violence data, conducted the analyses and assisted in the writing of the final manuscript.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Compliance with Ethical Standards

Conflicts of Interest None to declare.

Ethical Approval This article does not contain any studies with human participants performed by any of the authors.

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

1. Romer D, Jamieson P, Hall Jamieson K, Lull R, Adebimpe A. Parental desensitization to gun violence in PG-13 movies. *Pediatrics*. 2018;141(6):e20173491. <https://doi.org/10.1542/peds.2017-3491>.
2. Ohio State University (2013). Gun use in PG-13 movies has more than tripled since 1985. Press Release. Retrieved from <https://news.osu.edu/gun-use-in-pg-13-movies-has-more-than-tripled-since-1985/>. Accessed 1 Oct 18.
3. France-Presse, A. (2013). Gun violence in movies for teens has more than tripled since 1985. The raw story. Retrieved from <https://www.rawstory.com/2013/11/gun-violence-in-movies-for-teens-has-more-than-tripled-since-1985/>. Accessed 1 Oct 18.

4. Strasburger VC. Go ahead punk, make my day: It's time for pediatricians to take action against media violence. *Pediatrics*. 2007;119:1398–9.
5. Machkovech, S. (2018). President trump: “we have to do something” about violent video games, movies. *Ars Technica*. Retrieved from: <https://arstechnica.com/gaming/2018/02/president-trump-we-have-to-do-something-about-violent-video-games-movies/>
6. Savage J, Yancey C. The effects of media violence exposure on criminal aggression: a meta-analysis. *Crim Justice Behav*. 2008;35(6):772–91.
7. Paik H, Comstock G. The effects of television violence on antisocial behavior: a meta-analysis. *Commun Res*. 1994;21(4):516–46.
8. Dahl G, DellaVigna S. Does movie violence increase violent crime? *Q J Econ*. 2009;May:677–733.
9. Markey P, French J, Markey C. Violent movies and severe acts of violence: sensationalism versus science. *Hum Commun Res*. 2015;41(2):155–73.
10. Ferguson C. Does media violence predict societal violence? It depends on what you look at and when. *J Commun*. 2015;65(1):E1–E22.
11. Barranco R, Rader N, Smith A. Violence at the box office: considering ratings, ticket sales, and content of movies. *Commun Res*. 2017;44(1):77–95.
12. Potts R, Belden A. Parental guidance: a content analysis of MPAA motion picture rating justifications 1993–2005. *Curr Psychol: A Journal For Diverse Perspectives On Diverse Psychological Issues*. 2009;28(4):266–83.
13. Simonton D, Graham J, Kaufman J. Consensus and contrasts in consumers' cinematic assessments: gender, age, and nationality in rating the top-250 films. *Psychol Pop Media Cult*. 2012;1(2):87–96.
14. Sadler P, Ethier N, Gunn GR, Duong D, Woody E. Are we on the same wavelength? Interpersonal complementarity as shared cyclical patterns during interactions. *J Pers Soc Psychol*. 2009;97:1005–20.
15. Warner RM. Spectral analysis of time-series data. New York: Guilford Press; 1998.
16. Box GE, Jenkins GM, Reinsel GC. Time series analysis: forecasting and control. Hoboken: Wiley; 2008.
17. LaFree G. Declining violent crime rates in the 1990s: predicting crime booms and busts. *Annu Rev Sociol*. 1999;25:145–68.
18. Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychol Rev*. 1993;100:674.
19. Anderson CA, Bushman BJ, Groom RW. Hot years and serious and deadly assault: empirical tests of the heat hypothesis. *J Pers Soc Psychol*. 1997;73:1213–23.
20. Flango VE, Sherbenou EL. Poverty, urbanization, and crime. *Criminology*. 1976;14:331–46.
21. Elliott DS, Voss H. Delinquency and dropout. Lexington: DC Heath; 1974.
22. Cantor D, Land KC. Unemployment and crime rates in the post-World War II United States: a theoretical and empirical analysis. *Am Sociol Rev*. 1985;50:317–32.
23. LaFree G, Drass KA. The effect of changes in intraracial income inequality and educational attainment on changes in arrest rates for African Americans and whites, 1957 to 1990. *Am Sociol Rev*. 1996;61:614–34.
24. Sherry J. The effects of violent video games on aggression: a meta-analysis. *Hum Commun Res*. 2001;27(3):409–31.
25. Anderson C, Bushman B. Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: a meta-analytic review of the scientific literature. *Psychol Sci*. 2001;12(5):353–9.
26. Ferguson C. The good, the bad and the ugly: a meta-analytic review of positive and negative effects of violent video games. *Psychiatry Q*. 2007;78(4):309–16.
27. Bushman BJ, Jamieson PE, Weitz I, Romer D. Gun violence trends in movies. *Pediatrics*. 2013;132(6):1014–8.
28. See: <http://cdn.annenbergpublicpolicycenter.org/wp-content/uploads/Trends-in-gun-violence-in-PG-13-vs.-R-rated-films-1985-2015.pdf>. Accessed 1 Oct 18.
29. West SG, Hepworth JT. Statistical issues in the study of temporal data: daily experiences. *J Pers*. 1991;59:609–62.
30. Lobel A, Engels R, Stone L, Granic I. Gaining a competitive edge: longitudinal associations between children's competitive video game playing, conduct problems, peer relations, and prosocial behavior. *Psychol Pop Media Cult*. In press.
31. Anderson, C. Guns, media violence and mass shootings: what psychological scientists know. *Des Moines Register*. 2018. Retrieved from: <https://www.desmoinesregister.com/story/opinion/columnists/iowa-view/2018/03/08/guns-media-violence-and-mass-shootings-what-psychological-scientists-know/407283002><https://www.news.iastate.edu/news/2012/07/09/bullying>. Accessed 1 Oct 18.
32. Pashler H, Rohrer D, Harris C. Can the goal of honesty be primed? *J Exp Soc Psychol* [serial online]. 2013;49(6):959–64.

33. Editors. Expression of Concern. *Personality and Social Psychology Review*. Retrieved from: <http://journals.sagepub.com/doi/abs/10.1177/1088868317741275>. Accessed 1 Oct 18.
34. McCarthy R, Coley S, Wagner M, Zengel B, Basham A. Does playing video games with violent content temporarily increase aggressive inclinations? A pre-registered experimental study. *J Exp Soc Psychol*. 2016;67:13–9.
35. Ferguson C, Colon-Motas K, Esser C, Lanie C, Purvis S, Williams M. The (not so) evil within? Agency in video game choice and the impact of violent content. *Simul Games*. 2017;48(3):329–37.
36. Beaver K, Barnes J, Boutwell B. Exploring the relationship between violent behavior and participation in football during adolescence: findings from a sample of sibling pairs. *Youth Soc*. 2016;48(6):786–809.
37. Schwartz J, Beaver K. Revisiting the association between television viewing in adolescence and contact with the criminal justice system in adulthood. *J Interpers Violence*. 2016;31(14):2387–411.
38. Kuhn S, Kugler D, Schmalen K, Weichenberger M, Witt C, Gallinat J. The myth of blunted gamers: no evidence for desensitization in empathy for pain after a violent video game intervention in a longitudinal fMRI study on non-gamers. *Neurosignals*. 2018;26:22–30.
39. Szyzik G, Mohammadi B, Wildt B, et al. Excessive users of violent video games do not show emotional desensitization: an fMRI study. *Brain Imaging Behav*. 2017;11(3):736–43.

Christopher J. Ferguson is professor of psychology at Stetson University. His main areas of research cover violent media and other media effects.

Patrick Markey is professor of psychology at Villanova University. His main areas of interest include media effects and personality.