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Beyond the trigger: The mental health consequences of in-home firearm access among children of gun owners

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ABSTRACT

Rationale: The high prevalence of household firearms in the U.S. has ignited a growing body of research seeking to understand its health consequences. While a large number of studies examine the impact of firearm availability on health risks of gun owners in the household, relatively little attention is given to whether and how in-home firearm access may shape psychological outcomes among children of gun owners.

Objective: This study examined whether and how in-home firearm access is associated with adolescents' depressive symptoms. Given a strong social/cultural association between masculinity and gun possession as well as stark gender differences in perceptions of safety and attitudes toward firearms, this study also investigated whether this association differs for male and female adolescents.

Methods: Participants were drawn from the National Longitudinal Study of Adolescent to Adult Health (Add Health) ($n = 14,013$). This study used random- and fixed-effects regression analyses as well as propensity-score matching models in order to reduce the chances of bias due to individual-level heterogeneity.

Results: The present study showed that gaining access to guns at home was significantly related to increased depressive symptoms among children of gun owners, even after accounting for both observed and unobserved individual characteristics. Both fixed-effects and propensity-score matching models yielded consistent results. In addition, the observed association between in-home firearm access and depression was more pronounced for female adolescents. Finally, this study found suggestive evidence that the perceptions of safety, especially about school (but not neighborhood), are an important mechanism linking in-home firearm access to adolescent depression.

Conclusion: As a substantial proportion of U.S. adolescents reported in-home firearm access, the findings of this study suggest that scholars and policymakers must seriously consider mental as well as physical health consequences related to household access to firearms among children of gun owners.

1. Introduction

In-home firearm access among children and adolescents has become widespread in the United States (Anglemyer et al., 2014; Grossman et al., 2005; Simonetti et al., 2015). American adolescents in recent years, having grown up with the highest gun ownership rate in the world (Small Arms Survey, 2007), are more likely to have access to firearms at home compared to adolescents in any other country. One third of U.S. households with children under the age of 18 was reported to have firearms (Johnson et al., 2004), and about 40 percent of adolescents living in a household with a firearm reported easy access to guns at home (Simonetti et al., 2015). Strikingly, one fifth of gun owners with children under 18 store a gun loaded, more than one third store one unlocked, and nearly 1 in 10 store a gun loaded and unlocked (Johnson et al., 2006, 2004).

With the highest rates of private firearm ownership in the U.S, a

burgeoning literature has sought to understand the health-related consequences of firearm availability (e.g., Hemenway, 2011). Literature consistently shows that firearm ownership increases the risk of homicide (Hepburn and Hemenway, 2004; Miller et al., 2007) and suicide (Florentine and Crane, 2010; Miller et al., 2013; Rivara, 2015), as well as firearm-related accidents (Miller et al., 2005). While prior research examines physical health consequences of firearm availability, scholars have given little attention to whether firearm availability has psychological effects, especially on children of gun owners. Although the vast majority of gun owners say that the main reason they own a gun is to protect their homes and families (Azrael et al., 2017; Hemenway, 2011), and that having a gun makes them feel safer (Pew Research Center, 2013), prior research on perceptions of safety and attitudes toward firearms among adolescents rather suggest that in-home firearm access may be detrimental to adolescent mental health. In this study, I examine whether and how in-home firearm access affects the

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psychological well-being of the children of gun owners.

Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), this study examines whether in-home firearm access is related to depressive symptoms among children of gun owners. In order to assess the causal nature of these associations, this study relies on fixed-effects models to estimate change in depressive symptoms as a function of change in in-home firearm access over the course of approximately 1 year. The fixed effects models exploit the longitudinal nature of the data to control for preexisting, stable individual differences, for example, temperament/disposition or parenting styles that may influence both in-home firearm access and adolescent depression. As an alternative way of minimizing selection, propensity score matching analyses that create experiment-like conditions are also conducted. Given a strong social/cultural association between masculinity and gun possession (Hill et al., 1985; Stroud, 2012) as well as stark gender differences in perceptions of safety and attitudes toward firearms (Miller et al., 2000; Patten et al., 2013; Pew Research Center, 2013), I argue that psychological health consequences related to in-home gun access among children of gun owners may differ by gender. Finally, this study considers shifts in perceptions of safety among children of gun owners as a plausible mechanism that links in-home firearm access to depressive symptoms.

2. Background

2.1. Gun ownership and health

The United States is the most heavily armed society in the world, with about 90 guns for every 100 residents (Karp, 2011). As of 2015, there were approximately 265 million guns in the U.S. civilian gun stock, an increase of about seventy million guns since the mid-1990s (Azrael et al., 2017). Several surveys including the 2015 National Firearms Survey (NFS) and the General Social Survey (GSS) survey have reported that in 2015 about 22 percent of U.S. adults personally owned a gun, and they tend to have more guns than in 1994 (the average number of guns increased from four to five) (Azrael et al., 2017; Smith and Son, 2015). According to the General Social Surveys (GSS) data, despite declining rates of household ownership of firearms, about 31 percent of households reported having a gun in 2010–2014 (Smith and Son, 2015). Men are far more likely to personally own a gun compared to women, though the gender gap has narrowed due to a reduction in personal gun ownership among men: In 2014, 35.1 percent of men and 11.7 percent of women reported that they personally own firearms. There are also racial/ethnic differences in firearm ownership. More households with white respondents (39.0 percent) own guns than those with black respondents (18.1 percent), and similarly, household firearms ownership is higher among non-Hispanics (36.0 percent) than among Hispanics (15.2 percent).

Why do people own guns? A national survey finds that nearly half of gun owners reported self-defense as the main reason for owning their gun; approximately 30 percent of respondents say they own a firearm for the purpose of hunting, and even fewer respondents cite other reasons such as target/sport shooting (7 percent) and gun collecting (2 percent) (Pew Research Center, 2013). While the possible health benefits of gun availability are potentially twofold: (1) deterring crime and (2) stopping crimes in progress, there is no credible evidence to support either (see Hemenway, 2011; for a review). Rather, a large amount of epidemiological evidence documents the health risks of in-home firearm availability.

Gun ownership is the strongest risk factor of homicide in the home, even after accounting for other potential confounding factors such as drug use, history of violence, criminal record, and so on (Cook and Ludwig, 2006; Hepburn and Hemenway, 2004). Moreover, a large body of research suggests that firearm availability plays a leading role in increasing suicide risk (Miller et al., 2013; Rivara, 2015). A recent meta-analysis found that firearm availability was associated with

higher odds of committing suicide, with odds ratios ranging from 1.38 to 10.38 (Anglemyer et al., 2014). One unintended cost of gun ownership is increased risk of accidents, including fatal ones (Miller et al., 2005). Each year in the U.S. there are about 19,000 gun accidents, and about 600 of these are fatal. From 2005 to 2010, almost 3800 people in the U.S. died from unintentional shootings (the deaths of 606 people in 2010), and more than a third of the victims were under 25 years of age (New Yorkers Against Gun Violence, 2013).

2.2. Psychological consequences of in-home firearm access

While far more today than in the past cite self-protection as the main reason they own guns and the vast majority of gun owners believe that having a gun makes them feel safer (Hemenway et al., 1995; Pew Research Center, 2013), little research establishes that gun ownership leads to reduced fear or concern over safety (e.g., Azrael and Hemenway, 2000). One of the main reasons for lack of evidence on the effects of gun ownership on psychological outcomes such as perceived safety and fear is due to methodological complexities in the relationship (e.g., endogeneity of gun ownership) (Hauser and Kleck, 2013). The correlation between gun ownership and psychological outcomes may be spurious, due to individual-level heterogeneity (attributes of individuals that select for both measures). Moreover, it is hard to establish the causal ordering of two measures since psychological characteristics can serve as both a cause and a consequence of gun ownership (the possibility of reverse causality). A recent work by Hauser and Kleck (2013) has attempted to address these methodological challenges by using a longitudinal model. The authors found that gun acquisition does not have an effect on reduction in fear of crime, but the loss of a household gun increases fear of crime. As acknowledged by the authors, however, due to the data limitations of a sizable attrition (46 percent attrition) and severe regional restrictions in the sample (a single state), the findings of the study should be interpreted cautiously.

Gun ownership may have psychological effects, not only for those possessing guns, but for those without guns as well (Patten et al., 2013; Pew Research Center, 2013). Studies suggest that gun ownership in one household reduces the perception of safety among members of other households (i.e., a perceived negative externality) (Hemenway, 2001; Miller et al., 2000). A survey of over 2500 randomly selected adults shows that half the respondents reported that they would feel less safe if more people in their community were to own guns; 14 percent reported they would feel more safe. Even in gun-owning households, the perceptions of safety and enjoyment from having a gun were much lower among those aged 18 years and over who do not personally own guns than gun owners (Pew Research Center, 2013).

To the author's knowledge, no research has examined the psychological consequences of in-home firearm access for children of gun owners. With widespread access to guns at home among American adolescents (Simonetti et al., 2015), it is critical to examine how firearm availability at home can influence children's psychological outcomes such as depression. Gaining access to household firearms may decrease children's psychological well-being through several mechanisms. One possible explanation may be that children with access to firearms in their home show lower levels of psychological well-being due to increased concerns about possible firearm-related accidents (Pew Research Center, 2013). This proposition can be corroborated by the fact that most accidental gun injuries to children happen in home, and most unintentional gun fatalities are other-inflicted, with the shooter overwhelmingly likely to be a friend or young family member, such as an older sibling (Hemenway et al., 2010; Papachristos et al., 2015).

Another plausible pathway that links in-home firearm access to psychological outcomes among children of gun owners is perceptions of safety. Children who gain access to firearms at home may feel less safe in their surroundings (e.g., neighborhood and school) because they may think that more people around them, such as neighbors and school

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