

## Are Young Children's Emotional and Behavioral Risk Factors Associated with Household Firearm Ownership and Storage?

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### Abstract

This study describes firearm ownership and storage practices among families with young children with emotional and behavioral risk factors. Data were cross-sectional and included families with young children (2 months to 6 years) from Arizona ( $N=4501$ ). Parents reported if firearms were present in the home and how firearms were stored, locked or unlocked. Parents also reported if their child displayed behavioral or emotional problems. Results indicate that having a young child with emotional and behavioral risk factors was not significantly related to firearm ownership or storage practices. Among firearm-owning households, 29% reported storing firearms unlocked with a child having a history of emotional and behavioral risk factors, compared to 26% with a child absent of such factors. Findings suggest that unsecure firearm storage practices in the presence of children with emotional and behavioral risk factors warrant increased parental education and awareness creating a pivotal role for educators and health professionals in firearm injury prevention.

**Keywords:** Firearm injury prevention; emotional and behavioral risk factors; firearm storage

### 1. Introduction

Despite significant state-to-state variation in rates of firearm ownership in U.S. households, ranging from 12.2% in Hawaii to 72.8% in Wyoming (Siegel & Rothman, 2016), firearms are ubiquitous in the U.S. About 43% of all U.S. households own at least one firearm, and as of 2013, more firearms than people exist in the country—357,000,000 firearms; 317,000,000 people, respectively (Bureau of Alcohol, Tobacco, Firearms and Explosives, 2017). This is concerning because research on firearm availability suggests a positive relationship between the number of available guns, firearm-related homicides, and total overall homicides among U.S. residents (Siegel, Ross, & King, 2014). Similarly, a positive relationship has been found between the availability of firearms and suicide (Anglemyer, Horvath, & Rutherford, 2014; Siegel & Rothman, 2016).

Considering that 41.4% of U.S. households include children under 18 (Statista, 2018), it is possible that children could have unintended access to firearms. In support of this notion, there is a positive relationship between firearm availability and unintentional firearm death, suicide, and homicide among children in families where firearms are accessible (Miller, Azrael, & Hemenway, 2002). Moreover, Fowler et al. (2017) found that 229 young children age 12 and under died of firearm injuries between 2012 and 2014 in the U.S.; 24 of whom died from suicide. An additional 684 nonfatal firearm-related injuries occurred among children in this age group during this timeframe, with 382 (56%) resulting from unintentional firearm accidents. In one study of pediatric trauma patients, 89% of unintentional firearm related injuries happened in the home (Li et al., 1996). Further, Hemenway and Solnick's (2015) report of unintentional firearms deaths between 2005 and 2012 in 16 states showed that the majority of children were shot by themselves or by other children; 39% of deaths of youth ages 11-14 happened at the home of friends. If a child is injured or killed by a firearm, it is likely to occur in a home environment with a family-owned weapon.

#### 1.1 Firearm Storage Practices in the U. S.

Safe firearm storage practices (i.e., storing guns in a locked location) are associated with lower rates of injury, suicide, and unintentional shootings (Grossman et al., 2005). Yet, research on household firearm storage practices in the U.S. suggests a reason for concern.

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According to a recent study of U.S. firearm owners, respondents reported that less than half (46%) of all firearms in homes are stored in locked cabinets or in other secure locations (Crifasi, Doucette, McGinty, Webster, & Barry, 2018). Therefore, despite guidelines by the American Academy of Pediatrics that recommend firearms be stored unloaded in locked locations and separate from ammunition (Dowd et al., 2012), current storage practices of millions of U.S. households are in stark contrast.

### 1.2 Firearm Access and Children at Risk for Emotional and Behavioral Issues

Given concerns about unintentional firearm injury in home settings and the high prevalence of non-safe home-storage practices, reducing the potential for injury includes identifying risk and protective factors associated with firearm injury (CDC, 2014). Risk factors include youth emotional and behavioral health. Fifty-one percent of suicides among youth are committed with firearms (Fontanella et al., 2015) and among youth ages 13-24 making a serious suicide attempt, 89% met criteria for a mental disorder (Beutrais, Joyce & Mulder, 1996). More generally, a variety of emotional and behavioral disorders (e.g. attention deficit/hyperactivity disorder) and child characteristics (e.g. high impulsivity, sensation-seeking, low inhibitory-control) are associated with injury risk (Morrongiello, Corbett, McCourt & Johnston, 2005).

Scott, Azrael, and Miller (2018) investigated the role of “self-harm” risk factors including depression, ADHD and mental health conditions other than depression, and firearm storage practices in the home homes of children ages birth-17. Findings suggest that there is no significant relationship between firearm presence in the home and adult reports of child self-harm risk factors or firearm storage practices. Essentially, emotional and behavioral problems that have been linked to risk for self-harm among children did not influence caregivers’ ownership of weapons or storage practices. Furthermore, children with emotional and behavioral concerns might be at an increased risk for violent behavior directed toward themselves or others or to engage in self-harm to themselves. Results from a meta-analysis by Jones et al. (2012) indicate that 27% of children with intellectual or mental health disabilities are victims of physical violence, which places them at increased risk.

### 1.3 Household Safety and Young Children—Some Contradictions

Only 7% of the children in the Scott et al. (2018) study were below six-years-old. In general, compared to families with older youth, caregivers in families with young children are reported to be more attune to safety risks for children and more scrupulous about ensuring safe of homes (Gärling, & Gärling, 1993; Wortel, de Geus, Kok, & van Woerkum, 1994). However, although research suggests that caregivers often are aware of safety risks to children at home, they tend not to act on these risks in their interactions with their children (Morrongiello & Kiriakou, 2004). Moreover, caregivers tend not believe that many safety risks at home are preventable, yet they also report that they can adequately keep children safe (Eichelberger, Gotschall, Feely, Harstad, & Bowman, 1990; Morrongiello & Kiriakou, 2004). Considering these findings, additional research is needed on caregivers’ safety practices in the home environment, particularly concerning young children who could have access to firearms and may be at risk for suicide or unintentional firearm injury due to associated emotional or behavioral risk factors or characteristics that may place them at risk.

The purpose of this study is to investigate firearm ownership and storage practices in families with young children (birth-age six) with emotional and behavioral risk factors. The children in the homes studied by Scott et al. (2018) ranged from 0-5 (7%), 6-12 (36.3%), and 13-17 (56.8%). Thus, the vast majority of the children were of school age. Given the particular vulnerabilities of very young and preschool children, we examined the firearm ownership and storage practices of households with young children in Arizona, and the relationship of ownership and storage practices for children identified at risk for emotional and behavioral issues. We address the question: Are young children’s emotional and behavioral risk factors associated with household firearm ownership and storage?

## 2. Methods

### 2.1 Participants

The data used were drawn from a sample of 4,501 families with young children participating in The Longitudinal Child Study of Arizona (LCSA; Marx et al., 2011). The LCSA employed nonprobability sampling (purposive and convenience) that included 7,396 children (age  $\bar{X}$ =40.3 months, SD=17.3 months, range=2 months to 78 months) who had not yet entered kindergarten. Families could have multiple children participate in the LCSA. To accurately assess gun ownership and storage practices, siblings were grouped by family and the oldest sibling was included in the present study for the possible identification of emotional and behavioral risk factors. Inclusion in this study required that the primary caregiver answer the gun ownership/gun storage

question, resulting in a sample of 4,501 families. The LCSA data were collected from participants in all regions across the state in community and child care settings.

The purpose of the LCSA was to examine precursors to children's school readiness, to document families' experiences with child care, preschool, and health and family support services, and to inform the efforts of Arizona's First Things First, a state-wide early childhood initiative. Baseline data were collected from the summer of 2010 to the summer 2011. Consent for study participation was obtained in accordance with procedures approved by the university institutional review board.

## 2.2 Measures

A face-to-face primary caregiver interview and self-administered questionnaire provided information about family life and routines, parenting practices, health and support services use, child health and early childcare experiences. Demographic data, firearm ownership, firearm storage practices, socio-emotional index and emotional and behavioral risk factors were derived from these measures. Descriptions of these variables follow below.

**2.2A. Demographic characteristics.** Household income was reported by a primary caregiver via interview. Original response options ranged from making less than \$4,999 to \$200,000 or more annually. In the current study, household income was dichotomized into households earning less or more than \$50,000 based on median family income for AZ in 2010 and 2011, which was \$48,108 and \$46,709, respectively (U.S. Census Bureau, 2012).

Urbanicity was coded based on the location of the family zip code. Urban was coded based on the U.S. Census Bureau (2016) definition of an urban area having a population equal to or greater than 50,000. Zip codes with a population less than 50,000 people and/or not located within a densely populated metropolitan area (i.e., Tucson or Phoenix) were coded as rural.

Marital status was reported by parents as single/never married, separated, divorced, married, or widowed. The responses were dichotomized as: (0) "married" or a (1) "single" (comprised of single/never married, separated, divorced or widowed). The region in which participants resided was based on the LCSA data collection methods, for which responsibilities were distributed among the three state universities located in the northern, central and southern parts of the state (see Marx et al., 2011). Table 1 displays demographic data for the sample.

**2.2B. Firearm ownership and storage.** The primary caregiver self-administered questionnaire contained one question regarding firearm ownership and storage practices: "Currently in or at your home, do you keep all guns in a locked cabinet?" Response options included: "Don't own a gun," "Yes," or "No." Since the question is worded to ask about gun storage in the home, responses of "Yes" and "No" were used to identify households with guns. A response of "No" (not keeping all guns locked in a cabinet) identified a subset of households with firearms that did not have safe firearm storage practices. We did not collect information regarding the type of guns owned, what type of locked cabinet was used for storage, if guns were stored loaded or unloaded, or if ammunition was stored separately.

**2.2 C. Emotional and behavioral risk factors.** Emotional and behavioral risk factors were based on children's overall mental health rating, their social emotional development on the Devereux Early Childhood Assessment (DECA; LeBuffe & Naglieri, 1999), and having a behavioral or mental health condition. Primary caregivers reported via interview if they had ever been told by a licensed health or mental health professional that their child had Attention Deficit Disorder (ADD) or Attention Deficit/Hyperactive Disorder (AD/HD), depression, or externalizing emotional and behavioral psychiatric disorders such as Oppositional Defiant Disorder (ODD) or Conduct Disorder (CD). Primary caregivers also rated the current overall mental health of their child as poor, fair, good, very good, or excellent.

Regarding child emotional and behavioral risks, psychiatric diagnosis for most childhood disorders typically does not occur in early childhood (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). Further, child psychiatric disorders such as Major Depressive Disorder, ADD/AD/HD, ODD, and CD typically are diagnosed after a child starts schooling and displays disruptions in academic and social-emotional functioning (Muris & Ollendick, 2015). Thus, because the children in our study have not yet started kindergarten, reports of psychiatric diagnoses were low. Considering this, parent ratings of current overall mental health and of behavioral concerns on the DECA were used to estimate children with emotional and behavioral risk factors. Table 1 displays the number of children with each emotional and behavioral risk factor for the non-firearm owners and firearm owners.

Table 1  
*Emotional and Behavioral Risk Factors for the Total Sample and Firearm Owning Sample.*

Emotional and Behavioral Risk Factors	Non-Firearm Owning N=324 <sup>a</sup>	Firearm Owning N=1209 <sup>b</sup>
	n	n
ADD/ADHD (Ever)	29	13
Depression (Ever)	11	2
Behavioral/Conduct Disorders (Ever)	45	13
Poor/Fair Overall Mental Health (Current)	79	21
DECA Behavioral Concern (Current)	971	388

Note. <sup>a</sup> missing emotional and behavioral risk factor data for 32 children, <sup>b</sup> missing emotional and behavioral risk factor data for 17 children.

To assess the social-emotional functioning of children, caregivers completed the DECA, which is a rating scale assessing behavior concerns and protective factors (e.g., self-control, initiative and attachment), to determine social-emotional development. Age-based norms were used to classify ratings of behavior concerns. The behavior concerns score was dichotomized as: (0) “typical” or a (1) “concern.” If a child had any mental health conditions (depression, ADD/ADHD, behavioral or conduct problems), a poor or fair overall mental health rating, or scored in the “concern” category of the DECA (Behavioral Concerns Assessment) he or she was categorized as having a history of emotional and behavioral risk factors.

### 2.3 Data Analysis

The percentage of missing data ranged from 0% to 3.9% for all variable in the analyses except income. For the income variable, 9.8% of data was missing. Based on guidelines for handling missing data, case wise deletion was used to handle missing data for each analysis (Bennett, 2001; Schafer, 1999). Descriptive analyses for the demographic, gun ownership, and gun storage variables were conducted on the total participant sample, gun-owning subsample, and unlocked gun storage reporting subsample. Independent sample chi-square analyses were performed to determine if differences existed between the non-firearm owning versus the firearm owning subsamples and the locked firearm storage verses unlocked firearm storage subsamples. For the gun-owning subsample, descriptive analyses compared households having children with a history of emotional and behavioral risk factors to households having children without a history of emotional and behavioral risk factors. Independent sample chi-square analyses determined if differences existed in gun-ownership practices between households that have children with or without emotional and behavioral risk factors. These analyses were repeated for the subsample of households that reported having an unlocked gun in the home to determine if differences in gun storage practices exist between households having children with or without emotional and behavioral risk factors. All analyses were conducted using IBM SPSS 24.

## 3. Results

The characteristics of the total sample, firearm owning sample, and sample with unlocked firearm storage practices appear in Table 2. The first column reports the descriptive statistics for the total sample. The second and third columns compare the total sample by non-firearm owners to firearm owners. The fourth and fifth columns compare the firearm owning families who did and did not store their firearms securely.

### 3.1 Characteristics of Arizona Gun Owners and Their Storage Practices

Table 2 reports the characteristics of the total sample, firearm owning subsample, and subsample with unlocked firearm storage practices. Firearm owners (Table 2, column 3) were more likely than those not owning firearms (column 2) to be between the ages 30-44, live in married households, be non-Hispanic, English-speaking, more educated, and have incomes higher than the median Arizona household income (>\$50,000). In addition, nearly twice as many families living in rural areas were likely to own firearms (15%) than not (8.2%). Differences were also found by region with 27.5% of families living in northern Arizona owning firearms compared to 14.1% not owning a firearm in that part of the state.

Table 2  
*Sample Characteristics for the Total Sample and by Firearm Ownership and Storage Practices.*

	Total Sample n (%)	Firearm Ownership		Firearm Storage	
		No n (%)	Yes n (%)	Locked n (%)	Unlocked n (%)
Sample	4501 (100)	3275 (72.8)	1226 (27.2)	892 (72.8)	334 (27.2)
Parent Gender*					
Male	273 (6.2)	178 (5.6)	95 (7.9)	70 (8.0)	25 (7.7)
Female	4130 (93.8)	3026 (94.4)	1104 (92.1) <sup>a</sup>	804 (92.0)	300 (92.3)
Parent Age*					
<18	8 (0.2)	6 (0.2)	2 (0.2)	2 (0.2)	0 (0.0)
18-29	1571 (36.2)	1209 (38.3)	362 (30.7) <sup>a</sup>	258 (29.9)	104 (32.6)
30-44	2563 (59.1)	1809 (57.4)	754 (63.8) <sup>a</sup>	555 (64.4)	199 (62.4)
45-59	179 (4.2)	120 (3.8)	59 (5.0)	43 (5.0)	16 (5.0)
60+	15 (0.3)	11 (0.3)	4 (0.3)	4 (0.5)	0 (0.0)
Region of Arizona*					
Northern	798 (17.7)	461 (14.1)	337 (27.5) <sup>a</sup>	275 (30.9)	62 (18.6) <sup>b</sup>
Central	1892 (42.1)	1468 (44.8)	424 (34.6) <sup>a</sup>	288 (32.3)	136 (40.7)
Southern	1811 (40.2)	1346 (41.1)	465 (37.9)	329 (36.8)	136 (40.7)
Urbanicity*					
Urban	3981 (90.0)	2961 (91.8)	1020 (85.0) <sup>a</sup>	733 (84.2)	287 (87.2)
Rural	443 (10.0)	263 (8.2)	180 (15.0) <sup>a</sup>	138 (15.8)	42 (12.8)
Ethnicity*					
Non-Hispanic	2397 (54.7)	1582 (49.6)	815 (68.3) <sup>a</sup>	632 (72.6)	183 (56.5) <sup>b</sup>
Hispanic	1988 (45.3)	1609 (50.4)	379 (31.7) <sup>a</sup>	238 (27.4)	141 (43.5) <sup>b</sup>
Income*					
< 50,000	2525 (62.2)	2001 (68.0)	524 (47.0) <sup>a</sup>	355 (43.7)	169 (56.0) <sup>b</sup>
≥ 50,000	1533 (37.8)	943 (32.0)	590 (53.0) <sup>a</sup>	457 (56.3)	133 (44.0) <sup>b</sup>
Education*					
<12 <sup>th</sup> grade	763 (17.4)	633 (19.8)	130 (10.8) <sup>a</sup>	64 (7.3)	66 (20.3) <sup>b</sup>
HS graduate	677 (15.4)	525 (16.5)	152 (12.7)	104 (11.9)	48 (14.8)
>HS	2949 (67.2)	2032 (63.7)	917 (76.5) <sup>a</sup>	706 (80.8)	211 (64.9) <sup>b</sup>
Marital Status*					
Married	2757 (63.7)	1889 (60.1)	868 (73.4) <sup>a</sup>	652 (75.5)	216 (67.9) <sup>b</sup>
Single	1568 (36.3)	1254 (39.9)	314 (26.6) <sup>a</sup>	212 (24.5)	102 (32.1)
Home Language*					
English	3131 (72.4)	2103 (67.2)	1028 (86.0) <sup>a</sup>	793 (90.6)	235 (73.4) <sup>b</sup>
Spanish/Other	1194 (27.6)	1027 (32.8)	167 (14.0) <sup>a</sup>	82 (9.4)	85 (26.6) <sup>b</sup>
Emotional/Behavioral Risk Factors					
Yes	1411 (31.7)	1016 (31.3)	395 (32.7)	280 (31.8)	115 (35.1)
No	3041 (68.3)	2227 (68.7)	814 (67.3)	601 (68.2)	213 (64.9)
Guns in the Home					
Yes	1226 (27.2)	--	--	--	--
No	3275 (72.8)	--	--	--	--
Gun Storage					
Unlocked	334 (27.2)	--	--	--	--
Locked	892 (72.8)	--	--	--	--

\* Chi-squared test  $p < 0.05$ ; <sup>a</sup> significantly different from non-firearm owners ( $p < .05$ ), <sup>b</sup> significantly different from locked firearm owners ( $p < .05$ ); -- no data available.

The last two columns of Table 2 compare the firearm storage practices of firearm owners. Differences by education existed between firearm owners storing their firearms locked versus unlocked with a 13% difference existing in firearm storage patterns among parents with less than a high school education (7.3% locked; 20.3% unlocked;  $X^2(1,130) = 4.6, p = .033$ ).

For parents with more than a high school education (some college or college degree), there was a 15.9% difference in firearm storage with lower percentage of these parents storing their firearms unlocked,  $X^2(1,917) = 23.3, p < .001$ . Families with a primary home language other than English had a 17.2% difference in storage with a higher percentage of unlocked firearms in the home,  $X^2(1,167) = 8.3, p = .004$ . Families with English as the primary home language had a 17.2% difference with a lower percentage having an unlocked firearm in the home,  $X^2(1,1028) = 46.4, p < .001$ . Families with incomes less than \$50,000 had a 12.3% difference in firearm storage practices with a higher percentage having unlocked firearms in the home,  $X^2(1,524) = 6.9, p = .009$ . Families with incomes of \$50,000 or greater had a 12.3% difference in firearm storage practices with a lower percentage having unlocked firearms in the home,  $X^2(1,590) = 6.3, p = .012$ . There was a 16.1% difference in the way Hispanic firearm owners stored their guns, with a higher percentage storing their firearms unlocked,  $X^2(1,379) = 10.3, p = .001$ . A 16.1% difference also existed for Non-Hispanic firearm owners with a lower percentage storing their firearms unlocked,  $X^2(1,815) = 17.2, p < .001$ .

### 3.2 Firearm Storage Practices in Households with Children with Emotional and Behavioral Risk Factors

Figure 1 presents characteristics regarding firearm ownership and storage practices for families having children with and without emotional and behavioral risk factors. Overall, 27.2% of the families in the study owned firearms. Notably, unsecured firearm storage practices (unlocked guns) were slightly higher (29.1%) for families having children with a history of emotional and behavioral risk factors than those (26.2%) having children with no emotional and behavioral risk factors. Table 2 shows the percentage of households having a child with emotional and behavioral risk factors was not significantly different across all subgroups: non-gun owners (31.3%), gun owners (32.7%), gun owners with locked storage practices (31.8%), and gun owners with unlocked guns (35.1%).

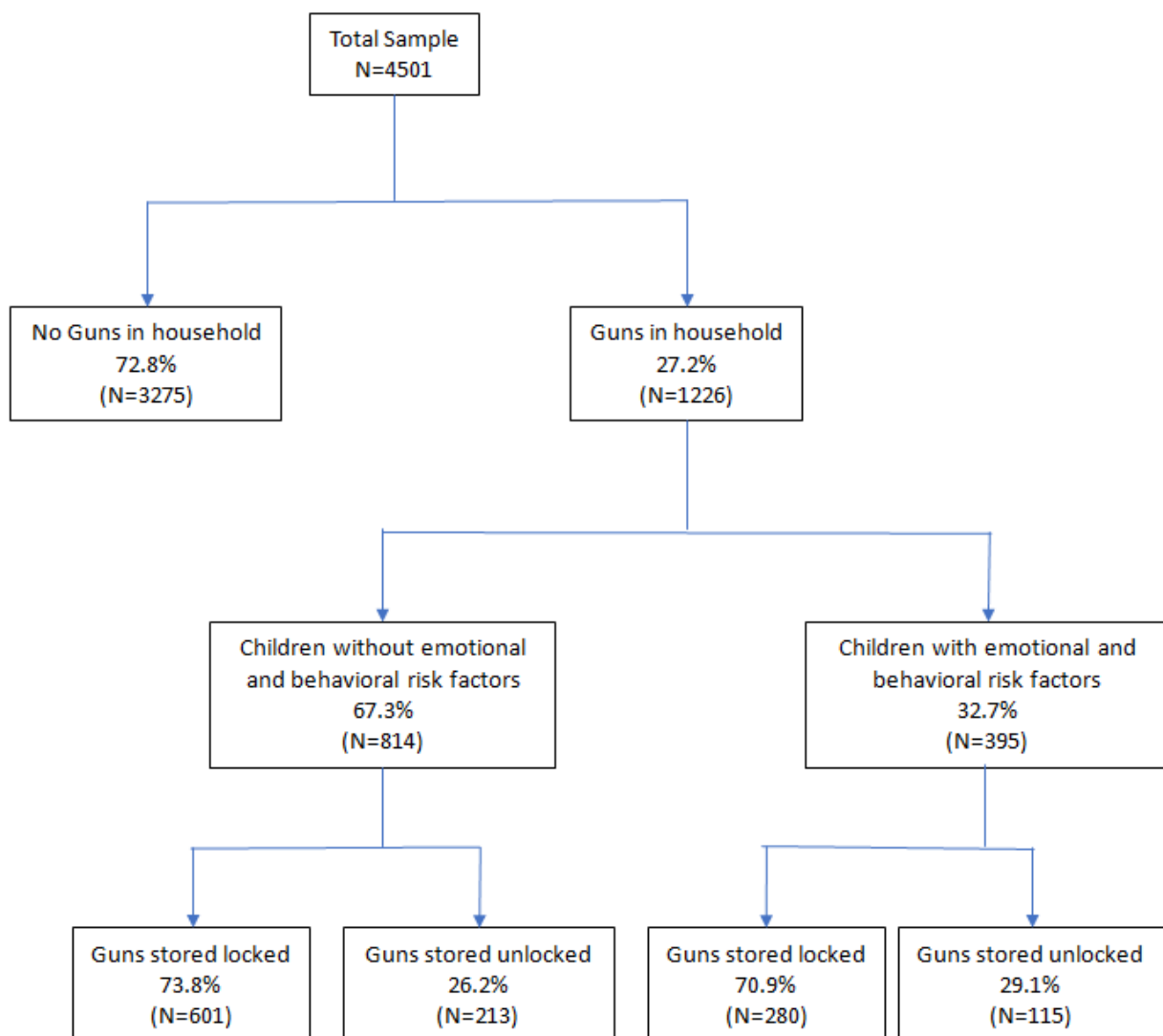


Figure 1. Flowchart depicting household firearm ownership and firearm storage practices among households with guns and children with and without emotional and behavioral risk factors.

Table 3 presents data for families owning firearms ( $N=1,209$ ). We compared households with a child who has a history of emotional and behavioral risk factors ( $N=395$ ) to those without a history of these risk factors ( $N=814$ ). Having a child with emotional and behavioral risk factors had little influence on the families' gun ownership decision. Caregiver education level was the only demographic characteristic for which gun ownership related to having a child with emotional and behavioral risk factors,  $X^2(2,1196) = 6.39, p = .041$ . Specifically, households with higher caregiver education were less likely to own a gun if their child had a history emotional and behavioral risk factors,  $X^2(1,915) = 4.7, p < .030$ .

Table 3

*Demographics Comparing Firearm Households Between Children Who Have Versus Do Not Have a History of Emotional and Behavioral Risk Factors.*

	Firearms in Home	
	Child with Emotional and Behavioral Risk Factors (N = 395) n (%)	Child without Emotional and Behavioral Risk Factors (N = 814) n (%)
Parent Gender		
Male	37 (9.5)	58 (7.2)
Female	351 (90.5)	750 (92.8)
Parent Age		
<18	--	2 (0.3)
18-29	116 (30.2)	246 (30.9)
30-44	240 (62.5)	513 (64.5)
45-59	25 (6.5)	33 (4.2)
60+	3 (0.8)	1 (0.1)
Region		
Northern Arizona	127 (32.2)	209 (25.7)
Central Arizona	129 (32.6)	283 (34.8)
Southern Arizona	139 (35.2)	322 (39.5)
Urbanicity		
Urban	336 (86.4)	669 (84.3)
Rural	53 (13.6)	125 (15.7)
Ethnicity		
Non-Hispanic	265 (68.5)	548 (68.2)
Hispanic	122 (31.5)	256 (31.8)
Income		
< 50,000	173 (47.4)	350 (46.9)
$\geq$ 50,000	192 (52.6)	397 (53.1)
Education*		
< 12 <sup>th</sup> grade	48 (12.4)	80 (9.9)
High school graduate	60 (15.5)	92 (11.4)
> High school	280 (72.1) <sup>a</sup>	636 (78.7)
Marital status		
Married	279 (72.7)	588 (73.9)
Single	105 (27.3)	208 (26.1)
Home Language		
English	329 (85.0)	689 (87.1)
Spanish/Other	58 (15.0)	102 (12.9)
Gun storage		
Unlocked	115 (29.1)	213 (26.2)
Locked	280 (70.9)	601 (73.8)

\* Chi-squared test  $p < 0.05$ ; <sup>a</sup> significantly different from households having children without emotional and behavioral risk factors ( $p < .05$ ); -- no data available.

Table 4 shows that having a child with emotional and behavioral risk factors had little influence on gun storage practices. Region was the only demographic characteristic that resulted in a difference in gun storage practices.

Families with a child with emotional and behavioral risk factors residing in Northern Arizona were more likely to store their firearms unlocked compared to families with a child with a history of emotional and behavioral risk factors in the other two state regions,  $X^2(2,328) = 13.15, p = .001$ .

Table 4

*Demographics Comparing Households with Unsecured Firearms Between Children Who Have Versus Do Not Have a History of Emotional and Behavioral Risk Factors*

	Unlocked Storage of Firearms	
	Child with Emotional and Behavioral Risk Factors (N = 115) n (%)	Child without Emotional and Behavioral Risk Factors (N = 213) n (%)
Parent Gender		
Male	9 (7.9)	16 (7.6)
Female	105 (92.1)	195 (92.4)
Parent Age		
<18	--	--
18-29	34 (30.1)	70 (34.0)
30-44	71 (62.8)	128 (62.1)
45-59	8 (7.1)	8 (3.9)
60+	--	--
Region*		
Northern Arizona	34 (29.6)	28 (13.1)
Central Arizona	40 (34.7)	90 (42.3)
Southern Arizona	41 (35.7)	95 (44.6)
Urbanicity		
Urban	99 (87.6)	182 (86.7)
Rural	14 (12.4)	28 (13.3)
Ethnicity		
Non-Hispanic	70 (61.4)	113 (53.8)
Hispanic	44 (38.6)	97 (46.2)
Income		
< 50,000	57 (53.3)	112 (57.4)
≥ 50,000	50 (46.7)	83 (42.6)
Education		
< 12 <sup>th</sup> grade	24 (21.0)	42 (19.9)
High school graduate	23 (20.2)	25 (11.8)
> High school	67 (58.8)	144 (68.3)
Marital status		
Married	76 (67.3)	140 (68.3)
Single	37 (32.7)	65 (31.7)
Home Language		
English	81 (73.0)	152 (74.9)
Spanish/Other	30 (27.0)	51 (25.1)

\* Chi-squared test  $p < 0.05$ ; -- no data available.

#### 4. Discussion

Our findings in this study are consistent with previous research that found no relationship between family reports of children's emotional and behavioral risk factors and firearm ownership and storage practices (e.g., Scott et al., 2018; Simonetti, Theis, Rowhani-Rahbar, Ludman, & Grossman, 2017). However, as a novel contribution, our findings generalize this trend to apply to families with young children. Moreover, adult mental well-being risk factors did not influence firearm ownership and storage practices (Miller, Barber, Azrael, Hemenway, & Molnar, 2009; Sorenson & Vittes, 2008). Therefore, firearm ownership and storage practices appear to be robust to risk factors in U.S households with children.

In our sample, 27.2% of the households had a firearm. Of these homes, 26.2% had a child without emotional and behavioral risks and had unsecured firearms, whereas 29.1% of the homes that had firearms with a child who had emotional and behavioral risk factors left their firearms unsecured.



While the most effective way to remove risk of firearm injury is not having firearms present in households (Dowd et al., 2012), safe firearm storage practices can reduce the risk of accidental death or injury and suicide among youth (Grossman et al., 2005; Miller, Azrael, Hemenway, & Vrinotis, 2005; Rowhani-Rahbar, Simonetti, & Rivara, 2016). Such practices have been found to be robust regardless of the type of firearm or the motivation among youth for accessing a gun. Research also indicates that states requiring firearms to be stored safely have lower rates of firearm-related deaths among youth (Webster, Vernick, Zeoli, & Manganello, 2004). Moreover, given the strong endorsement of controlling access to firearms for adults with mental health problems (Barry et al., 2013), our data suggests further attention is needed to limiting access to firearms among youth that may have emotional and behavioral problems.

It is also important to note that firearm access in families with children may pose risks other than those that only result in death or serious injury. Kim (2018) found that having access to firearms at home was significantly related to increased depressive symptoms among children. Furthermore, this relationship was robust even after accounting for a range of demographic variables and individual differences in children. Kim (2018) argues that because an alarming number of gun owners in the U.S. possess these weapons for perceived family protection or safety, children becoming aware of firearms in the home environment might make them think that they are not safe and deleteriously impact their psychosocial functioning.

Many calls for safer storage and limiting access to firearms for children raise the need for public education. Organizations as disparate as the Brady Center to Prevent Gun Violence (2014), the website *The Well-Armed Woman* (2018), and the National Rifle Association (Horman, 2016) argue that firearms should be kept away from children and that safe storage practices are vitally important. Pediatricians have also discussed their role in firearm injury prevention, pointing out their ability to focus on injury prevention and using the child's developmental stage and capacities to educate parents more effectively about sources of potential firearm-related injury (Dowd, 2016). Pediatricians also have advocated for more research to understand the needs and beliefs of parents in building more effective firearm safety educational materials and strategies. They have cautioned about the lack of effectiveness of child gun safety education programs and have promoted pediatrician-administered brief education programs that include gun safety devices such as gun-locks (Dowd, 2016; Dowd et al., 2012). Furthermore, the program, *Asking Saves Kids (ASK)*, works with pediatricians to help educate parents on better firearms storage practices; *Suicide Proof Your Home* is a public health intervention aimed at reducing suicide deaths by firearms. Wide-scale initiatives addressing families hold promise for preventing firearm injury or death among youth, which is critically important because firearm-related suicide attempts are far more successful than other methods (e.g., poison, cutting; Rivara, 2015).

Teachers, counselors, and school psychologists also can play a role in firearm injury prevention among youth if schools become places where educational programs about firearm safety takes place. Like pediatricians, educators know appropriate developmental expectations of children and youth and often have relationships with parents and caregivers. Obeng (2010) surveyed teachers in public and private preschools and elementary schools in the Midwest and found that 61% of the teachers supported gun safety instruction in their classrooms. This finding is promising, although more research is needed to identify what such forms of instruction might include.

Currently, gun safety programs that have been developed for children exist in some U.S. schools with *Eddie Eagle GunSafe®* and the *Straight Talk About Risks (STAR)* programs being the most commonly used (National Research Council, 2005). Both programs teach children to stay away from guns and include materials for teachers and parents to talk to children about gun safety. However, adequate evaluations of their effectiveness are lacking. The National Rifle Association (2020) developed *Eddie Eagle GunSafe®* program in 1988 for children from pre-kindergarten through grade 6 and released a revised program in 2015 to include Eddie the Eagle and his friends the *Wing Team* with the message of: "Stop! Don't touch. Run away. Tell an adult." To date, the NRA states that its program has reached 32 million children in the U.S., Canada, and Puerto Rico (2020).

The program is not without controversy though. Glick and Sugarmann (1997) referred to Eddie the Eagle as "Joe Camel in feathers" by glamorizing guns and depicting them as something for adults only, which can make them alluring to youth. Also, the program has been criticized for employing a "just say no" approach, which has been proven ineffective in gun safety programs (Hardy, Armstrong, Martin, & Strawn, 1996). The Center to Prevent Handgun Violence developed the *STAR* program in 1992 to be used with children from preschool through grade 12. The *STAR* program is designed as a "skill building program." It teaches younger children how to behave safely when a gun is encountered, resist peer pressure to play with or carry guns, and to distinguish real-life violence from television violence (Office of Juvenile Justice and Delinquency Prevention, 2015). The *STAR* program had been used by over 90 school districts in the U.S. since 1992.

However, there is little empirical evidence that the Eddie Eagle GunSafe® and STAR programs have a positive impact on children's knowledge, attitudes, and beliefs about guns (National Research Council, 2005). The idea of schools being involved in teaching safety is not new; schools are currently a place to teach fire safety, traffic safety, and substance abuse prevention. Although gun safety programs do exist and have been implemented in schools, we need empirical research to determine effective gun safety practices.

#### 4.1 Limitations

Limitations of the current study should be considered when interpreting findings. First, the sample was a nonprobability sample from families in Arizona. Findings may not generalize to dissimilar populations. Second, parents reported children's emotional and behavioral risk factors, which were not validated by medical or mental health professionals and instead indicate relative risks as opposed to clinical diagnoses. Third, the study design was cross-sectional, which prohibits drawing any causal relationships among variables. Fourth, the type of firearms that were owned among families was not measured, which might be an important covariate related to storage practices. Lastly, we did not assess how ammunition was stored, which might be related to implications about the risk of unlocked guns in the home.

#### 4.2 Conclusion

Several issues still warrant attention when discussing gun safety with young children (Erdman, 2018). Young children are developing self-control skills, so simply telling them to stay away from firearms may be insufficient. Moreover, youth naturally explore their environments and they might seek out and find firearms that parents believe are well-hidden. Moreover, once found, children may not understand the consequences of firing a firearm. They might not understand that a bullet can easily pass through furniture and walls and they are not likely to have fully grasped the finality and irreversibility of death. Thus, gun safety cannot rely solely on educating children about the dangers of guns. Instead, ways that children could be injured or killed by a firearm should be included in gun safety education that is provided by medical, public health, and educational professionals. Ultimately, stakeholders need to collaborate and engage in effective firearm safety initiatives for children.

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