


# Guns Automatically Prime Aggressive Thoughts, Regardless of Whether a “Good Guy” or “Bad Guy” Holds the Gun

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## Abstract

The mere presence of weapons can increase aggression—called the “weapons effect.” Weapons are theorized to increase aggression by priming aggressive thoughts. This research tested the robustness of the weapons effect using two large representative samples of American adults (total  $N = 1,097$ ). Participants saw photos of criminals, soldiers, police in military gear, or police in regular gear with guns. Experiment 2 also included a condition with photos of Olympians with guns used to shoot inanimate targets. The control group was police in plainclothes without guns. The accessibility of aggressive thoughts was measured using a word fragment task (e.g., KI\_ \_ can be completed as KILL or KISS). Photos of individuals with guns used to shoot human targets primed aggressive thoughts, regardless of whether a “good guy” (soldier, police) or “bad guy” (criminal) held the gun. Photos of Olympians with guns used to shoot inanimate targets did not prime aggressive thoughts.

## Keywords

aggression, violence, social cognition

Guns not only permit violence, they can stimulate it as well. The finger pulls the trigger, but the trigger may also be pulling the finger.  
—Leonard Berkowitz

Obviously, using a gun can increase aggression, but what about just seeing a gun? In 1967, Leonard Berkowitz and Anthony LePage conducted an experiment to find out (Berkowitz & LePage, 1967). Male college students were tested in pairs, but one of them was actually an accomplice. They evaluated each other’s performance on a task using electric shocks ranging from 1 shock (very positive evaluation) to 10 shocks (very negative evaluation). By random assignment, the accomplice evaluated the participant’s performance using either one shock (low anger condition) or seven shocks (high anger condition). Next, the participant “evaluated” the accomplice’s performance via electric shocks, which was the aggression measure. The participant was seated at a table that had a shotgun and a revolver on it or badminton racquets and shuttles. The items on the table were described as part of another study that another experimenter had supposedly forgotten to put away. There was also a control condition with no items on the table. The experimenter told participants to ignore the items on the table, but apparently they could not. Angered participants who saw the guns were more aggressive than the other participants. Berkowitz and LePage called this finding the *weapons effect*. In other words, the mere presence of weapons can increase aggression. In later experiments, similar results were obtained when pictures of guns were used instead

of actual guns (Leyens & Parke, 1975). The weapons effect has been replicated many times, both inside and outside the lab (Benjamin, Kepes, & Bushman, in press).

## Theoretical Foundations

The most common theoretical explanation for the weapons effect is that weapons such as guns and knives automatically prime or activate aggressive thoughts in memory (e.g., Anderson, Benjamin, & Bartholow, 1998). This explanation follows from cognitive neoassociation theory (Berkowitz, 1990), which proposes that aggressive thoughts are linked together in memory, forming an associative network. Once an aggressive thought is processed or stimulated, activation spreads through the network and primes associated thoughts as well. Thus, seeing a weapon can prime or activate other aggressive thoughts in memory because weapons are frequently associated with aggression. Having aggressive thoughts accessible in memory can increase the likelihood of aggressive behavior.

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More generally, this explanation follows from social priming theory (e.g., Strack & Schwarz, 2016), which proposes that ambiguous information is interpreted in terms of the applicable concept that is most accessible at the time. In a seminal study (Higgins, Rholes, & Jones, 1977), participants read about a person named Donald, who had climbed mountains, kayaked in rapids, driven in a demolition derby, and piloted a jet-powered boat. Donald was in search of new excitement and was considering skydiving and crossing the Atlantic Ocean in a sailboat. Participants who had previously learned a word list that included the applicable positive concept “adventurous” formed a more positive impression of Donald than did participants who had previously learned a word list that included the applicable negative concept “reckless.”

### Contextual Factors in the Weapons Effect

Previous research has largely neglected the role of contextual factors on the weapons effect. By manipulating who is holding the gun, one can test whether contextual factors influence the weapons effect. For example, the individual holding the gun could be a “good guy” (e.g., police officer, soldier) or a “bad guy” (e.g., criminal). Wayne LaPierre, executive vice president of the National Rifle Association, said: “The only way to stop a bad guy with a gun is with a good guy with a gun” (CBS News, 2012). In Experiments 1 and 2, I test whether guns prime aggressive thoughts, regardless of whether a “good guy” (i.e., police officer, soldier) or “bad guy” (i.e., criminal) is holding the gun.

In addition, the person holding the gun could be shooting human targets or nonhuman targets. For example, hunters shoot animals with guns. Previous research has shown that hunting rifles do not prime aggressive thoughts in hunters (Bartholow, Anderson, Carnagey, & Benjamin, 2005). Hunters know that hunting rifles are intended to shoot nonhuman targets, whereas nonhunters might not make this distinction. Experiment 2 extends this line of research by including a condition in which Olympic athletes are shown holding guns used to shoot targets that are not humans or animals. Rather, the Olympians shoot inanimate objects (e.g., bull’s-eye targets, traps, and skeets).

To increase the generalizability of findings, both experiments used large, nationally representative samples of American adults.

## Experiment 1

In Experiment 1, participants were exposed to photos of “good guys” (i.e., police officers, soldiers) or “bad guys” (i.e., criminals) with guns. In recent years, the U.S. military has been giving larger and more lethal guns to police officers. For example, police officers wore military gear in riots in Ferguson, MO, and Baltimore, MD. Thus, we compared photos of soldiers versus police officers in military gear. As a comparison, we also included photos of police officers in nonmilitary gear carrying guns. As a control, we included photos of plainclothes police officers carrying no guns. Because of the automatic link between guns and aggression, we predicted that participants exposed to photos of individuals carrying guns—regardless

of whether they were soldiers, police officers, or criminals—would have more aggressive thoughts than individuals exposed to photos of individuals not carrying guns.

## Method

### Participants and Design

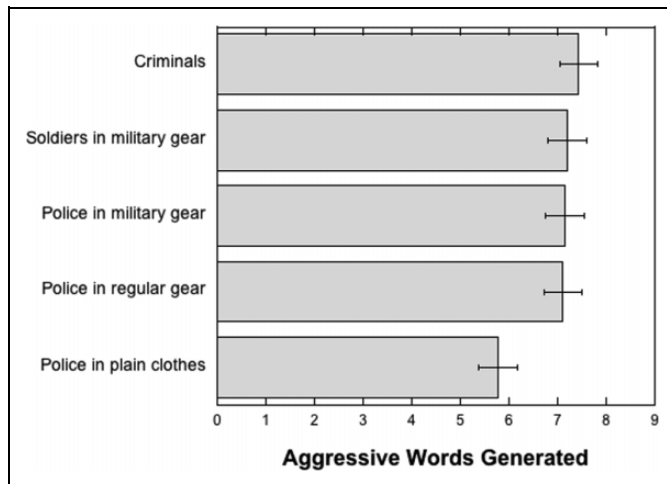
Experiment 1 was an online experiment involving a nationally representative sample of American adults in terms of age and race. Participants were 470 U.S. adults aged 18–82 years old ( $M_{\text{age}} = 45.9$ ,  $SD = 16.5$ ; 50.6% female). The racial composition of the sample was 62.6% Caucasian, 16.0% Hispanic American, 13.2% African American, 5.3% Asian American, 1.3% Native American, 0.9% Pacific Islander, and 0.9% multiracial or Other. The national norms based on the 2010 U.S. Census Data are  $M_{\text{age}} = 36.8$ , 51% female; 65.1% Caucasian, 15.8% Hispanic American, 12.3% African American, 4.5% Asian American, and 2.3% multiracial or Other. Thus, there were some minor deviations between our sample and national norms, but these differences did not influence the results. Participants were recruited and paid by Qualtrics Panel, an online survey software company. Experiment 1 received institutional review board (IRB) approval from The Ohio State University (protocol #2014B0071).

The design was between-subjects and involved five groups: (1) criminals carrying guns, (2) soldiers in military gear carrying guns, (3) police officers in military gear carrying guns, (4) police officers in regular gear carrying guns, or (5) police officers in plainclothes carrying no guns. There were 94 participants (47 women and 47 men) in each condition. The number of participants per group was determined using a power analysis (Cohen, 1988), with power = .80, two-sided significance level = .05, and a standardized mean of  $d = 0.44$ , which is the difference between the median and ( $d = 0.50$ ) and mean ( $d = 0.38$ ) effect found in a previous meta-analysis on the weapons effect (Carlson, Marcus-Newhall, & Miller, 1990).

### Procedure

Participants were told the researchers were studying reactions to photographs. After giving their consent, participants were randomly assigned to see eight images of either criminals carrying guns, soldiers in military gear carrying guns, police officers in military gear carrying guns, police officers in regular gear carrying guns, or police officers in plainclothes carrying no guns (an example of each type of image is given in the Appendix). All photos were of men, and the race of men shown in the photos was balanced across conditions.

Next, participants completed 22-word fragments as quickly as possible (e.g., C \_ T; C H O \_ E; F I \_ \_ T; K I \_ \_; and M U \_ \_ E R). Each word fragment could be completed to form an aggressive word or a nonaggressive word. For example, the fragment M U \_ \_ E R can be completed to form the aggressive word MURDER or the nonaggressive word MUTTER. The number of aggressive words completed was used to measure the accessibility of aggressive thoughts. This task is a reliable and valid measure of aggressive cognition that has been used



**Figure 1.** Number of word fragments completed as aggressive words in each condition in Experiment 1. Capped vertical bars denote 1 standard error.

in numerous previous studies (e.g., Anderson, Carnagey, & Eubanks, 2003; Anderson et al., 2004). A debriefing followed.

## Results

Data were analyzed using one-way analysis of variance (ANOVA). Participant gender, age, and race did not significantly influence the results ( $ps > .51$ ). Thus, the data from males and females of all ages and races were combined for subsequent analyses.

As expected, the type of images participants saw had a significant effect on the number of aggressive word completions,  $F(4, 465) = 2.84, p = .024, \eta^2 = .024$  (see Figure 1).

Mutually orthogonal contrast codes were used to compare conditions. Because there are five conditions, there are four orthogonal contrasts. The first contrast tests the primary hypothesis—aggressive thoughts are higher in the gun conditions than in the no-gun condition using the respective codes 1, 1, 1, 1, and  $-4$  for criminals with guns, soldiers with guns, police officers in military gear with guns, police officers in regular gear with guns, and police officers in plainclothes without guns. The second contrast compares “bad guys” (criminals) with guns to “good guys” (soldiers, police officers) with guns using the codes 3,  $-1, -1, -1,$  and 0. The third contrast compares soldiers with guns to police officers with guns using the codes 0, 2,  $-1, -1,$  and 0. The fourth contrast compares police officers in military gear with guns to police officers in regular gear with guns using the codes 0, 0, 1,  $-1,$  and 0.

As expected, the first contrast was significant, indicating that participants who saw photos of individuals with guns had more aggressive thoughts ( $M = 7.22, SD = 3.89, n = 376$ ) than did participants who saw photos of individuals without guns ( $M = 5.78, SD = 3.31, n = 94$ ),  $t(465) = 3.31, p < .001, d = 0.38$  [.16, .61]. The second contrast was nonsignificant, indicating that it did not matter whether “bad guys” (i.e., criminals;  $M = 7.44, SD = 4.23, n = 94$ ) or “good guys” (i.e., soldiers, police officers;  $M = 7.15, SD = 3.77, n = 282$ ) were carrying

the guns,  $t(465) = 0.63, p = .530, d = 0.073$  [-.16, .31]. The third contrast was nonsignificant, indicating that it did not matter whether soldiers ( $M = 7.20, SD = 3.96, n = 94$ ) or police officers ( $M = 7.13, SD = 3.68, n = 188$ ) were carrying guns,  $t(465) = 0.16, p = .876, d = 0.019$  [-.23, .27]. The fourth contrast was nonsignificant, indicating that it did not matter whether police officers carrying guns wore military gear ( $M = 7.15, SD = 3.75, n = 94$ ) or regular gear ( $M = 7.11, SD = 3.64, n = 94$ ),  $t(465) = 0.077, p = .939, d = 0.011$  [-.28, .30].

## Discussion

As predicted by cognitive neoassociation theory (Berkowitz, 1990) and social priming theory (Strack & Schwarz, 2016), photos of individuals carrying guns primed aggressive thoughts in a large, representative sample of U.S. adults. Also, as predicted, it didn’t matter whether “good guys” (i.e., police officers, soldiers) or “bad guys” (i.e., criminals) were holding the guns. Nor did it matter whether police officers or soldiers were holding the guns or whether police officers were dressed in military gear or regular gear. These findings suggest a very strong link between guns and aggression in memory.

## Experiment 2

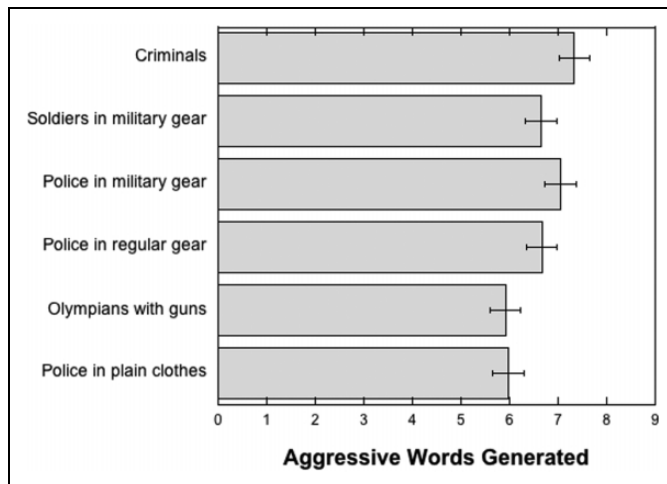
Experiment 2 was designed to replicate and extend Experiment 1. Regardless of the person carrying the gun (i.e., soldier, police, and criminal), all the guns depicted in the photos used in Experiment 1 were intended to shoot human targets. Experiment 2 included a sixth condition of Olympians holding guns intended to shoot inanimate targets (e.g., bull’s-eye target, trap, and skeet). Photos of soldiers, police officers, and criminals holding guns were expected to prime more aggressive thoughts than photos of Olympians holding guns (nonorthogonal Contrast 1). Photos of Olympians holding guns were not expected to prime more aggressive thoughts than photos of plainclothes police officers without guns (nonorthogonal Contrast 2).

## Method

### Participants and Design

Experiment 2 was online experiment involving a nationally representative sample of American adults in terms of age and race. Participants were 627 U.S. adults aged 18–80 years old ( $M_{\text{age}} = 46.2, SD = 16.4; 50.2\%$  female). The racial composition of the sample was 63.3% Caucasian, 15.2% Hispanic American, 12.9% African American, 5.1% Asian American, 1.3% Native American, 1.9% Pacific Islander, and 0.3% multiracial or Other. Thus, there were some minor deviations between our sample and national norms, but these differences did not influence the obtained results. Participants were recruited and paid by Qualtrics Panel. Experiment 2 received IRB approval from The Ohio State University (protocol #2016B0494).

The design was between-subjects and involved six groups. A power analysis (Cohen, 1988) revealed that 99 participants per group were needed to detect an effect of  $d = 0.4$  (the



**Figure 2.** Number of word fragments completed as aggressive words in each experimental condition in Experiment 2. Capped vertical bars denote 1 standard error.

rounded effect size obtained for Contrast 1 comparing guns vs. no guns in Experiment 1), with power = .80 and two-sided significance level = .05. A few extra participants were tested in case any participants dropped out (none did). The sample sizes in each of the six groups were (1) criminals carrying guns ( $N = 104$ ;  $n = 52$  men,  $n = 52$  women), (2) soldiers in military gear carrying guns ( $N = 105$ ;  $n = 52$ men,  $n = 53$  women), (3) police officers in military gear carrying guns ( $N = 104$ ;  $n = 52$ men,  $n = 52$  women), (4) police officers in regular gear carrying guns ( $N = 106$ ;  $n = 53$ men,  $n = 53$  women), (5) Olympians carrying guns ( $N = 106$ ;  $n = 53$ men,  $n = 53$  women), or (6) police officers in plainclothes carrying no guns ( $N = 102$ ;  $n = 50$ men,  $n = 52$  women).

## Procedure

The procedure was the same as for Experiment 1.

## Results

Data were analyzed using one-way ANOVA. Participant gender and race did not significantly influence the results ( $ps > .58$ ). Age was negatively related to aggressive thoughts ( $r = -.12$ ,  $p = .003$ ). Because the same pattern of results was obtained with and without age as a covariate, the simpler analyses that excluded age are reported here.

To see if the findings of Experiment 2 replicated the findings of Experiment 1, the same planned contrasts were conducted as in Experiment 1. The additional orthogonal contrast compared Olympians with guns to with all other conditions. In addition, two nonorthogonal contrasts were conducted involving the Olympians with-guns condition: (1) Olympians with guns versus others with guns (i.e., criminals, soldiers, and police officers) and (2) Olympians with guns versus plainclothes police officers without guns. To control for Type I errors, a Bonferroni correction was used for the two nonorthogonal contrasts (i.e., the significance level was .025 rather than .05).

As expected, the type of images participants saw had a significant effect on the number of aggressive word completions,  $F(5, 621) = 3.11$ ,  $p = .009$ ,  $\eta^2 = .024$  (see Figure 2).

As expected, the first contrast was significant, indicating that participants who saw photos of criminals, soldiers, or police officers with guns had more aggressive thoughts ( $M = 6.92$ ,  $SD = 3.24$ ) than did participants who saw photos of plainclothes police officers without guns ( $M = 5.98$ ,  $SD = 3.66$ ),  $t(621) = 2.61$ ,  $p = .009$ ,  $d = 0.28$  [.066, .50]. The second contrast was nonsignificant, indicating that it did not matter whether “bad guys” (i.e., criminals;  $M = 7.34$ ,  $SD = 3.32$ ) or “good guys” (i.e., soldiers, police officers;  $M = 6.79$ ,  $SD = 3.21$ ) were carrying the guns,  $t(621) = 1.48$ ,  $p = .139$ ,  $d = 0.17$  [-.052, .39]. The third contrast was nonsignificant, indicating that it did not matter whether soldiers ( $M = 6.65$ ,  $SD = 3.34$ ) or police officers ( $M = 6.86$ ,  $SD = 3.15$ ) were carrying guns,  $t(621) = -0.54$ ,  $p = .589$ ,  $d = -0.065$  [-.30, .17]. The fourth contrast was nonsignificant, indicating that it did not matter whether the police officers carrying guns wore military gear ( $M = 7.05$ ,  $SD = 3.38$ ) or regular gear ( $M = 6.67$ ,  $SD = 2.90$ ),  $t(621) = 0.84$ ,  $p = .403$ ,  $d = 0.12$  [-.15, .39]. The fifth contrast was significant, indicating that participants who saw photos of Olympians with guns had fewer aggressive thoughts ( $M = 5.92$ ,  $SD = 3.01$ ) than participants who saw other photos ( $M = 6.74$ ,  $SD = 3.34$ ),  $t(621) = 2.35$ ,  $p = .019$ ,  $d = 0.25$  [.11, .36].

The first nonorthogonal contrast was significant, indicating that participants who saw photos of Olympians with guns had fewer aggressive thoughts than did participants who saw photos of criminals, soldiers, or police officers with guns ( $M = 6.92$ ,  $SD = 3.24$ ),  $t(625) = 2.82$ ,  $p < .005$ ,  $d = 0.31$  [.10, .53]. The second nonorthogonal contrast was nonsignificant, indicating that aggressive thoughts did not differ for participants who saw photos of Olympians with guns and participants who saw photos of plainclothes police officers without guns ( $M = 5.98$ ,  $SD = 3.66$ ),  $t(625) = -0.20$ ,  $p = .844$ ,  $d = 0.018$  [-.29, .25].

## Discussion

The findings of Experiment 2 replicate and extend those of Experiment 1. Olympians with guns did not prime aggressive thoughts. Shooting guns at inanimate targets is not associated with aggressive thoughts. This finding is consistent with findings from another study that showed hunting rifles do not prime aggressive thoughts in hunters (Bartholow et al., 2005). Of course, hunters know that hunting rifles are intended to shoot nonhuman targets. Thus, it appears that only guns intended to shoot human targets prime aggressive thoughts.

## General Discussion

The findings from these experiments have both practical and theoretical implications. Theoretically, these findings are consistent with cognitive neoassociation theory (Berkowitz, 1990). More generally, these findings are consistent with social priming theory (e.g., Strack & Schwarz, 2016). However, context matters when it comes to the weapons effect. Weapons used

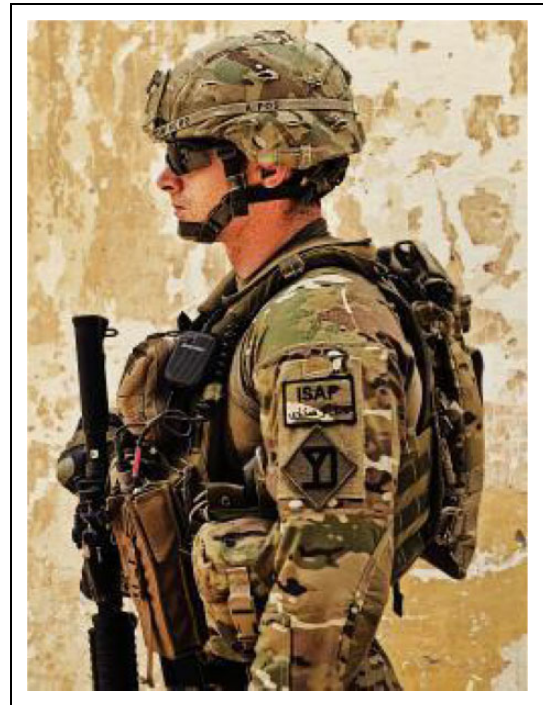
on human targets prime aggressive thoughts, whereas weapons used on inanimate targets do not prime aggressive thoughts.

This research also has practical implications. There are plenty of guns in the world, both in the real world and in the virtual world. In the United States, for example, there are about 90 guns for every 100 citizens (MacInnis, 2007). Although the United States is only about 4% of the world's population, U.S. civilians possess about 31% of the world's guns. Guns are even more common in the mass media. For example, acts of gun violence in PG-13 films (for ages 13+) has more than doubled since the rating was introduced in 1985 (Bushman, Jamieson, Weitz, & Romer, 2013), and this upward trend continues in more recent years (Romer, Jamieson, & Jamieson, 2017). Frequent exposure to guns in the real world and virtual world can produce a weapons effect.

The primary limitation of the present research is that neither experiment included a measure of aggressive behavior, which is difficult to measure in online experiments. Future research should test whether the findings obtained in these online experiments replicate in field and laboratory experiments.

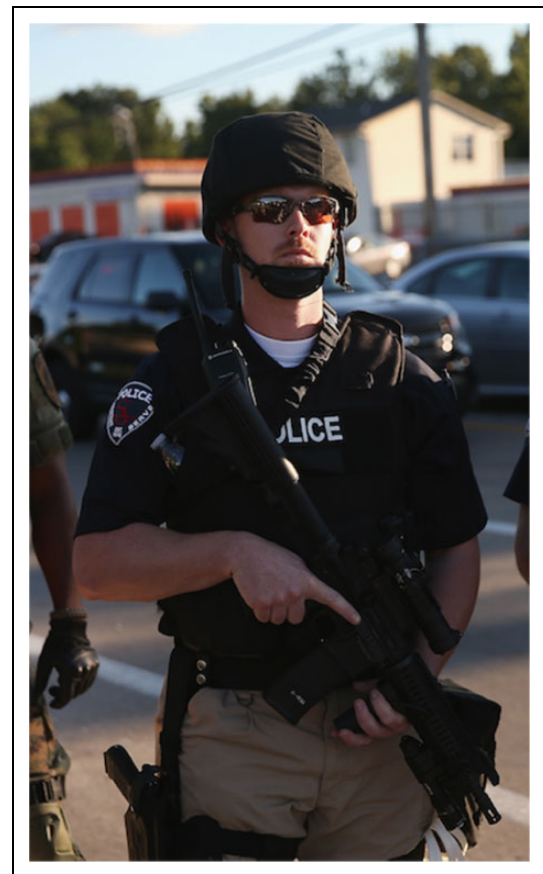
In discussions of gun violence, the weapons effect is often overlooked. As Leonard Berkowitz noted, the trigger of a gun can also pull the finger, producing a weapons effect. Theoretically, weapons increase aggression because they prime aggressive thoughts in memory. This research shows that the mere presence of a gun can prime or activate aggressive thoughts in memory, even if a "good guy" is holding the gun.

without guns, respectively. To enhance generalizability, there were eight photos for each type of image in each experiment.



## Appendix

One sample image for each type of image—criminals with guns, soldiers in military gear with guns, police officers in military gear with guns, police officers in regular gear with guns, Olympians carrying guns, and police officers in plainclothes







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