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The weapons priming effect

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In many societies, weapons are plentiful and highly visible. This review examines recent trends in research on the weapons priming effect, which is the finding that the mere presence of weapons can prime people to behave aggressively. The General Aggression Model provides a theoretical framework to explain why the weapons priming effect occurs. This model postulates that exposure to weapons increases aggressive thoughts and hostile appraisals, thus explaining why weapons facilitate aggressive behavior. Data from meta-analytic reviews are consistent with the General Aggression Model. These findings have important practical as well as theoretical implications. They suggest that the link between weapons and aggression is very strong in semantic memory, and that merely seeing a weapon can make people more aggressive.

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“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

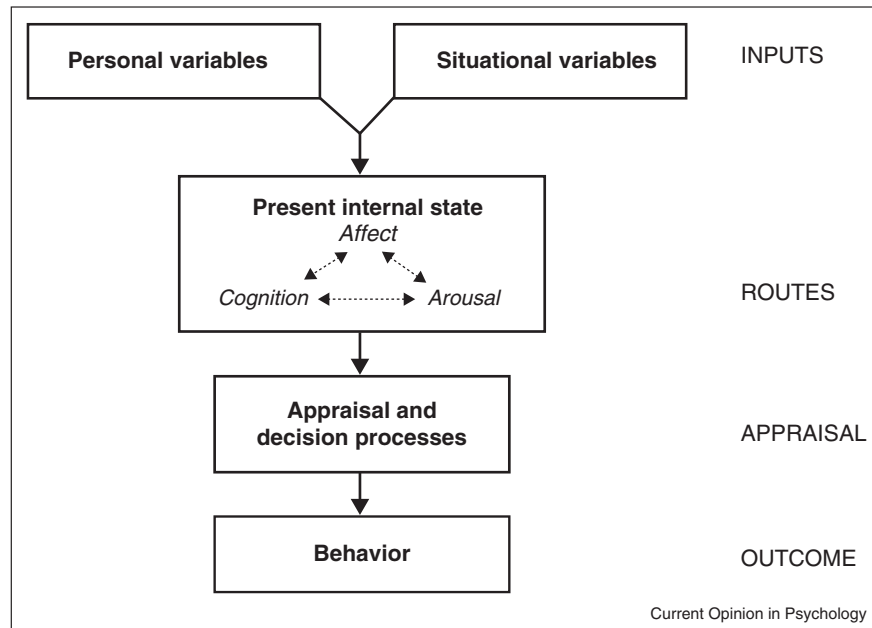
It has been nearly fifty years since Berkowitz and LePage published their initial findings in support of a weapons effect—the finding that mere exposure to weapons increases aggressive behavior [1]. In that original experiment, male college students were tested in pairs, but one of them was actually an accomplice of the experimenter who was pretending to be a participant (called a ‘confederate’). The two students evaluated each other’s performance on a

task (e.g., listing ideas a used car salesperson might use to sell more cars). The ‘evaluations’ were the number of stressful electrical shocks given. First, the confederate evaluated the participant’s performance by using either one shock (low anger condition) or seven shocks (high anger condition). Next, the participant ‘evaluated’ the confederate’s performance. The number of electrical shocks the participant chose for the confederate was used to measure aggression. The participant was seated at a table that had a shotgun and a revolver on it, or badminton rackets and shuttlecocks. 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.

Since that initial experiment, numerous attempts to replicate it have been reported, including samples of adults [2], adolescents [3], and children [4]. Although Berkowitz and LePage used electric shock to measure aggression, other laboratory experiments have found similar results using blasts of noxious noise delivered through headphones [5] or the amount of hot sauce delivered to a victim who hated spicy foods [6*]. At this point the weapons effect is considered statistically reliable [7,8]. Nevertheless, researchers were unclear about why it occurred. In the 1990s, attention turned to the underlying cognitive processes believed to be responsible for the weapons effect—the priming of aggressive thoughts. The first article published on this topic describes the results from two experiments [9]. In Experiment 1, participants saw stimulus words paired with target words. The stimulus words were either weapons (e.g., *shotgun*, *machete*) or animals (e.g., *rabbit*, *bird*), and the target words were either aggressive (e.g., *attack*, *shoot*) or nonaggressive (e.g., *listen*, *rent*). Participants read each target word aloud into a microphone. Results showed that reaction times to the aggressive target words were significantly faster when the aggressive target words were paired with weapon-related words than when they were paired with animal-related words. Experiment 2 replicated the findings of Experiment 1, except that pictures of weapons (guns, swords, or clubs) or neutral objects (trees, flowers, or fruits) were used as primes instead of words. These initial experiments have been replicated [5,10].

In this article, we describe cognitive priming research on the weapons effect. The General Aggression Model provides the theoretical basis of this research [11]. According

Figure 1



The General Aggression Model [11,22].

to the General Aggression Model, personal and situational factors influence one's internal state, which can include aggressive thoughts, angry feelings, and physiological arousal levels (see Figure 1). Thus, there are three possible routes to aggression — through aggressive thoughts, angry feelings, and physiological arousal. However, these routes are not mutually exclusive or even independent, as indicated by the dashed lines in Figure 1. For example, someone who has aggressive ideas might also feel angry and have elevated blood pressure. These internal states, in turn, can influence appraisal and decision processes. First, there is an immediate initial appraisal of whether the situation is dangerous, threatening, or warrants aggression. This initial appraisal might lead directly to an automatic or impulsive behavior, or it might lead to a reappraisal. If the initial appraisal is judged to be unsatisfactory and if the person has sufficient time and cognitive resources, secondary appraisal or reappraisal occurs [12]. These appraisal and decision processes can influence subsequent behavior. In the following, we focus on how weapons can prime aggressive cognition and appraisals, which can lead to aggressive behavior.

Aggressive cognition

As described above, several experiments have demonstrated the robustness of the weapons priming effect on aggressive thoughts. We described the first experiments on this topic previously [9]. In this section, we give three additional examples, although there are many more. In one experiment, participants were exposed to picture-word pairs. The picture in each pair was an alcohol prime,

a weapon prime, or a neutral prime. The target word was an aggressive word, a nonaggressive word, or a non-word. Participants determined as quickly as possible if the second item in each pair was a real word or a non-word, called a lexical decision task. The researchers found that participants responded significantly faster to aggressive words than nonaggressive words when primed with weapon and alcohol pictures [13]. In a subsequent experiment conducted in France, participants were exposed to photo-word pairs. The photo in each pair was a weapon prime (e.g., gun, knife), an alcohol bottle prime (e.g., beer, whiskey), or a nonalcoholic bottle prime (e.g., sparkling water, orange juice). The target word was an aggressive word (e.g., *kill, assault*), a neutral word (e.g., *glide, suggest*), or a non-word (e.g., *sritter, marfle*). In the lexical decision task, participants determined as quickly as possible if the second item in each pair was a word or a non-word. The researchers found that reaction times to aggressive words were relative faster than reaction times to neutral words when primed with weapon-related photos and alcohol-related photos than when primed with neutral photos [14^{*}], thus replicating the findings of a previous experiment conducted in the US [13]. Finally, a recent experiment conducted in China found evidence of a weapons priming effect in a sample of children [15^{*}]. Children between the ages of 9 and 13 were exposed to photo-word pairs. The photos were weapon images (guns, knives) or neutral images (animals, plants). The target words in each pair were aggressive (e.g., *destroy, hurt*) or nonaggressive (e.g., *leave, listen*). Participants were instructed to look at each photo and then to determine if each target word was

aggressive or nonaggressive by pressing one of two keys on a keyboard. Participants responded significantly faster to aggressive words compared to nonaggressive words when primed with photos of weapons. The findings also suggested that the weapons effect was stronger for boys than for girls [15*].

Aggressive appraisal

Whether a person actually behaves aggressively in a given situation depends a great deal on how the person interprets that situation. Weapons can also influence these primary and secondary appraisal processes. Research on the potential of weapons to prime primary and secondary appraisal processes was nearly nonexistent until last decade, when several articles were published demonstrating that individuals respond as rapidly to ontogenetic threats, such as guns and knives, as they do to phylogenetic threats, such as venomous snakes and spiders [16]. Primary appraisals involved assessing whether objects are weapons. In one experiment [17], researchers measured reaction times to guns, food, flowers, and chairs. Participants responded more rapidly to guns than to either flowers or chairs, suggesting that they were paying attention to objects that they have associated as threats. In a second experiment, researchers measured reaction times to threatening stimuli (guns, snakes), pleasant stimuli (food, money), and neutral stimuli (trees, couches). Responses were fastest to the threatening stimuli, and participants responded as quickly to guns as they did to snakes [17].

In another study, researchers examined gender differences in immediate appraisals to weapons. Because men have historically engaged in more weapon-related activities than women, it was predicted that men should be able to recognize weapons faster. In one experiment, participants were presented with arrays of objects and instructed to search for guns, staplers, or knives, by pressing one key if they detected one of the objects and another key if they did not. Participants located the weapons more rapidly than they located nonthreatening gadgets (i.e., the stapler). Participants spent more time determining that the weapons were absent than they did for the nonthreatening gadgets, which the researchers argued indicated that participants were more cautious when it came to weapons. Both effects were significantly stronger for men than for women. A second experiment in which syringes and pens were added to the list of objects to be located replicated the original findings [18**].

Two recent experiments found that household tools that can be used as weapons influence secondary appraisal processes [19**]. In the first experiment, participants viewed a photo of a man described as someone who enjoyed cooking. The man was either holding or not holding a knife. Participants then rated how angry the man was. The man was rated as angrier when he was

holding a knife than when he was not holding a knife. In a second experiment, participants saw photos of a man who was described as either enjoying cooking or gardening, and who was holding a knife, garden shears, a watering can, or a spatula. As in the first experiment, participants rated how angry the man was. Participants rated the man as more angry when he was holding a dangerous object (kitchen knife, garden shears) than when he was holding a harmless object (spatula, watering can). These findings demonstrate that objects that can be used as weapons increase hostile secondary appraisals [19**].

Summary

Recent developments in research on the weapons effect continue to further our understanding of the processes by which the mere presence of weapons can influence aggressive thoughts, appraisals, and behavior. Priming plays a critical role in the weapons effect, as demonstrated by a number of experiments conducted across cultures on samples of children as well as adults.

Research on the weapons effect is not only theoretically significant, it is also practically significant. Weapons can even make people more aggressive when they are concealed rather than visible. For example, one study involving a nationally representative sample of adults found that motorists with a concealed weapon in their car were more prone to drive aggressively (e.g., tailgate, make obscene gestures), than motorists who drive without weapons in their car, even after controlling for many other factors related to aggressive driving (e.g., gender, age, urbanization, census region, driving frequency). [6*].

In many societies, weapons such as guns are highly visible and readily available. For example, the United States is the most heavily armed society in the world, with about 90 guns for every 100 citizens [20]. Although the U.S. has only about 4% of the world's population, U.S. citizens possess about 31% of the world's guns [21]. Guns are easily purchased in the U.S. with little oversight or regulation. With so many guns around, U.S. citizens are more likely to be primed to behave aggressively than citizens of most other countries.

Conflict of interest

Nothing declared.

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- of special interest
- of outstanding interest

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