



A Case of Unintended Cognitive Consequences: Guns Prohibited Images Prime Aggressive Thoughts

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Article Details

Article Type: Research Article

Received date: 29th April, 2019

Accepted date: 26th July, 2019

Published date: 29th July, 2019

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Citation: Benjamin, A. J., & Crosby, M (2019). A Case of Unintended Cognitive Consequences: Guns Prohibited Images Prime Aggressive Thoughts. *J Ment Health Soc Behav* 1(1): 103. <https://doi.org/10.33790/jmhsb1100103>

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Abstract

We conducted an experiment to discover if guns-prohibited images prime aggressive thoughts as has already been demonstrated with gun images in other experiments. Ninety-three university students were randomly assigned to one of three prime conditions (gun, gun with a strikeout, and a flower) and then were given an aggressive word completion task. The results showed that participants in both the guns-prohibited image and gun image conditions completed a higher proportion of aggressive words than those in the neutral image condition, thus replicating and extending the weapons priming effect. The findings suggest that even weapon images intended to serve some prosocial purpose may have unintended cognitive consequences, especially given how ubiquitous these images are in many public places.

Key words: Weapons, Weapons Priming Effect, Aggression, Social Priming

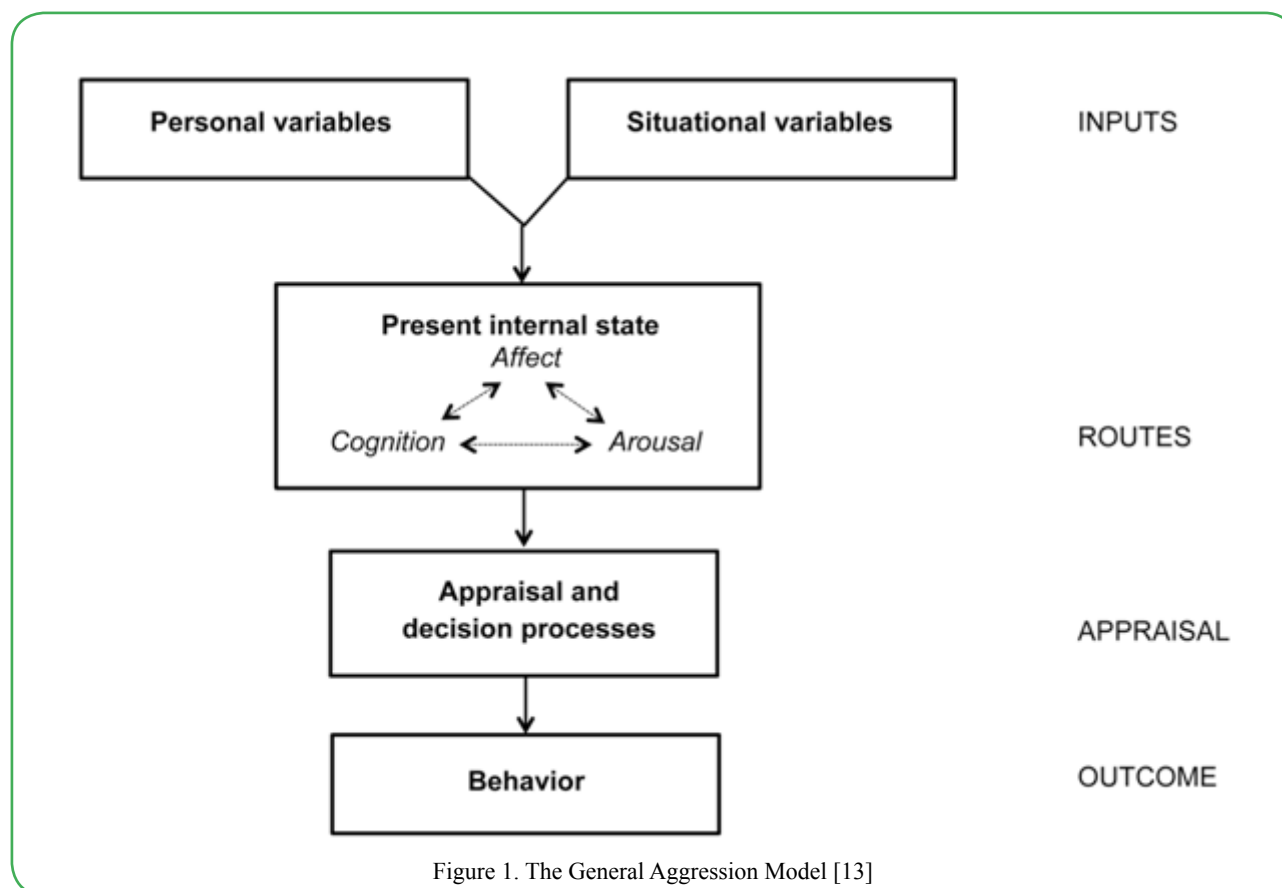
Introduction

Although the potential for weapons to influence aggressive behavioral outcomes has been tested considerably since Berkowitz and LePage published their initial findings in the late 1960s [1], the mechanisms underlying the weapons effect were primarily the topic of speculation throughout the 1970s and 1980s. It was not until the 1990s, however, as new methods for assessing cognition became available, that researchers began focusing their attention on whether or not weapons might prime aggressive cognitive processes. Most of this more recent research is based on the General Aggression Model (GAM) [2] or the Cognitive Neoassociation Model [3]. These models postulate that stimuli such as weapons instigate changes in one's internal state, such as accessibility of aggressive cognitions, elevated levels of anger, and elevated levels of physiological arousal. In other words, to use the terminology of GAM, there are three possible routes to aggression: cognitive, affective, and arousal. It is worth noting that these routes are not mutually exclusive or independent, (see Figure 1). For example, a person can concurrently hold aggressive thoughts, feel angry, and show elevated blood pressure. These internal states may subsequently influence appraisal processes. First, there is an automatic primary appraisal in which the individual assesses if the situation is threatening or dangerous. This initial primary appraisal may result in an automatic aggressive behavioral response, or it

might lead to a reappraisal. These appraisal processes can influence subsequent aggressive behavioral outcomes. For the purposes of our research, we focus on the cognitive route to aggression.

Two of the earliest experiments testing the weapons priming effect used stimulus prime and target word pairs. For example, in one experiment [4], weapon (e.g., shotgun, machete) or animal (e.g., rabbit, bird) stimulus words were paired with target words that were either aggressive (e.g., attack, shoot) or nonaggressive (e.g., listen, rent). Participants completed a reaction time task in which their responses to the target word were recorded in milliseconds. In that experiment, participants showed significantly quicker reaction times to aggressive target words when paired with weapon-related words than with animal-related words. A second experiment, using pictures instead of words as primes, replicated the initial findings [4]. These findings were subsequently replicated in several laboratory experiments [5,6,7]. In general the finding that weapons prime aggressive thoughts appears to be robust, even when the potential for publication bias and outlier effects is taken into consideration [8].

One intriguing question regarding the weapons priming effect is the extent to which contextual cues might facilitate or inhibit the accessibility of aggressive thoughts when individuals are exposed to weapons. For example, one replication of the earliest weapons priming experiments [4] tested the extent to which hunting and assault firearms primed aggressive thoughts in adult hunters and non-hunters [9]. Participants were shown picture-word pairs similar to the original experiment, except that some of the weapons were hunting firearms and other weapons were assault firearms. Although both hunting and assault firearms primed aggressive thoughts in the sample of non-hunters, only assault firearms primed aggressive thoughts in the sample of hunters. In another study, two experiments were conducted in order to examine if providing context about the individual holding the gun would influence its ability to prime aggressive thoughts [10]. In both experiments, not only was the original weapons priming effect replicated, but there was no evidence that it mattered whether “good guys” (e.g., police, military) or “bad guys” (i.e., criminals) were holding the gun. The weapons priming effect remained the same. In the second experiment an image of an Olympic target shooter holding a gun was added. Participants shown that image showed no increased accessibility of aggressive thoughts, indicating that participants distinguished between contexts in which



weapons were used to harm people and context in which weapons were used only on non-human targets.

Our experiment is intended to further examine the role of context with regard to the weapons priming effect. It is not uncommon to encounter images of a gun with a strikeout (intended to signify that guns are prohibited) in any number of public places locally and internationally, such as airports, schools, banks, and courts. Our question is whether these images, which are intended to serve a prosocial function of signifying that guns are not allowed, may have the unintended consequence of priming aggressive thoughts to the same extent as merely seeing a gun, or if there is indeed some difference in which the addition of a strikeout around the gun might lead to a potential decrease in accessibility of aggressive thoughts. Although, based on the existing weapons priming effect literature, we have ample reason to expect the original weapons priming effect to replicate [8], we make no prediction about the impact that including information prohibiting guns will have on either increasing or decreasing the extent to which a weapons priming effect is noticeably greater than zero.

Method

Participants

Participants were 93 undergraduate students (59% female, 72% White/Non-Hispanic, $M_{age} = 22.5$, $SD = 8.4$) recruited from a medium-sized university's introductory Psychology course. All participants received extra course credit.

Procedure

After informed consent was obtained, participants were told the researchers were studying image quality and speed of processing. First, they were given one minute to view one of three images: a gun, a gun with a strikeout, or a flower (see Figure 2). After viewing the image, they rated its overall quality (1=low to 7=high). Although this rating was used to maintain the cover story, we also treated it as a possible covariate in the analysis. Next, participants completed a 98 item aggressive word fragment completion task of the 98 word fragments,

50 can be completed to form aggressive words [11,12]. For example, the word fragment K I _ _ can be completed as an aggressive word (e.g., KILL, KICK) or as a nonaggressive word (e.g., KIND, KITE). Participants were given 3 minutes to complete as many word fragments as possible. The proportion of aggressive word fragments completed was our measure of accessibility of aggressive cognitions. A debriefing followed.

Results

Because quality ratings did not influence the number of aggressive word completions ($p = .23$), they were not used as a covariate in the analysis. A one-way ANOVA found a significant effect of condition on aggressive word completions, $F(2,90) = 3.44$, $p = .036$, $\eta_p^2 = .07$. There was a noticeable difference in the proportion of aggressive words completed in the gun condition ($M = .192$, $SD = .064$, $n = 31$), gun strikeout condition ($M = .186$, $SD = .094$, $n = 32$), and the flower condition ($M = .147$, $SD = .051$, $n = 30$). In order to better understand these mean differences, a series of planned contrasts were computed. These planned contrasts, assuming equal variances, found that the proportion of aggressive words completed was significantly higher for the gun image and the gun strikeout image than for the neutral image, $t(90) = 2.43$, $p = .017$, $d = 0.79$ and $t(90) = 2.10$, $p = .039$, $d = 0.52$, respectively. The proportion of aggressive words completed in the two gun image conditions did not differ, $t(90) = 0.35$, $p = .73$, $d = 0.08$.

Discussion

Our findings offer the first empirical evidence that the images found on guns prohibited signs (i.e., guns with strikeouts) prime aggressive thoughts similarly to images of guns alone. These results are consistent with other research demonstrating that weapons prime aggressive thoughts [4,5,7]. In a similar vein to Bushman's [10] recent experiments, additional contextual information did not decrease the extent to which weapons primed aggressive thoughts. It appears that the addition of the strikeout reinforced the perception of the gun as an aggression-inducing image, thus facilitating a search of aggression-related concepts in long-term memory [13].



Figure 2: Images used in Experiment 1

One potential limitation of our findings is that the sample consists entirely of undergraduate university students. Furthermore, the university from which the sample was obtained is one serving a substantial proportion of first-generation and non-traditional students [14] from a mixture of urban and rural areas in its service area. Although we did not collect specific information about traditional/nontraditional status nor first-generation status, other demographic information we did collect (age, gender, and ethnicity) was consistent with overall university demographic data [14]. How similar or different the population of students from which this sample was obtained shares similarities or differences with equivalent regional universities or the communities these institutions serve is unknown. Although some psychologists have argued that university student samples are unrepresentative of the populations to which they are supposed to generalize [15,16], there is evidence that at least when it comes to the priming effect of weapons on aggressive thoughts, findings discovered initially from testing university students are subsequently successfully replicated in non-student samples [7,8,10].

A more serious concern is that of sample size. The sample used for this experiment was considerably smaller than what would ordinarily be recommended in order to achieve .80 power, assuming an effect size of .28 [8, 17]. Positive findings from underpowered studies tend to be less replicable [18], hence caution in interpreting these findings is recommended. Although the overall weapons priming effect finding obtained in this experiment was in line with other larger sample experiments [7,10], the findings from this experiment should be treated as preliminary pending independent replication with a properly powered sample.

In addition it is crucial to note another important limitation. The AWCT as a measure of aggressive cognition has not, to our knowledge, been sufficiently validated [16]. Support for the validity of the AWCT is based on two articles that essentially cite each other [2,3]. Although each of these two articles appears to show some positive relationship between an aggressive-inducing stimulus and accessibility of aggressive cognition as measured by the AWCT, they should not in themselves be considered evidence of validity. Zende and colleagues [19] recommend the validation approach advocated by Koopman, Howe, Johnson, Tan, and Chang [20]. Unless or until such validation is conducted and made publicly available, we recommend treating our findings as potentially interesting and consistent with prior weapons priming research, but tentative.

Although our choice of neutral object may also be criticized, we will note that other similar experiments have utilized similar images [4,6,9], and that the body of research on the priming effect of weapons on a variety of outcomes (cognitive, appraisal, and behavioral) suggest that the type of neutral object itself appears to

have no impact on the size of the effect of weapon primes [8].

It is also worth bearing in mind that simply because a stimulus primes aggressive thoughts, there is no guarantee that the same stimulus will prime aggressive behaviors. To the extent that weapon images (including those intended to convey that weapons are prohibited) prime aggressive behavioral outcomes, the priming effects are likely to be relatively mild, which would be consistent with the literature on other aggression-inducing primes [21]. In addition, contextual factors beyond the presence of a strikeout around a gun image are likely to impact whether or not aggressive behavior is facilitated, including the extent to which an individual is provoked [8, 22], any arousal caused by provocation is attributed to the provoking stimulus and not the gun image [23], and the presence or absence of reinforcing or punishing stimuli in the individual's environment [24]. That said, there is a theoretical basis [2] and empirical evidence to support the assertion that cognitive priming effects of aggression-inducing stimuli, such as guns, may under some circumstances facilitate some incremental increase in aggressive behavior. In summary, although our experiment was not designed to address potential behavioral outcomes of gun strikeout images directly, our findings provide a foundation upon which such outcomes may be predicted and tested.

Furthermore, in various contexts even an incremental increase in aggressive behavior can have potentially harmful social consequences [25,26]. Given the potential for guns prohibited images to activate aggressive cognitions, further study of this particular class of signs and images is warranted in order to better understand the extent to which threat appraisal and aggressive behavioral outcomes are also triggered. Finally, given that other weapons (such as knives) appear to prime aggressive thoughts similarly to guns [8], replications of this experiment using, for example, images of knives, would also be warranted. Knives, like guns, are also prohibited in many public places, and images signifying that knives are prohibited should prime aggressive thoughts similarly to what we demonstrated regarding images signifying that guns are prohibited. Although the intention behind guns prohibited signs is essentially prosocial and may alert individuals about potential threats in their social environment, the images on these signs appear to have some potentially unintended cognitive consequences. Whether or not those consequences include an increase in aggressive behavioral outcomes remains to be seen, of course, pending further study.

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