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How Goal-Fulfillment Decreases Aggression

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Abstract

We suggest that the goal to aggress increases accessibility of aggressive thoughts, and that after goal fulfillment, accessibility of aggressive content is reduced. Experiment 1 showed an increase in accessibility of aggression after imagining an aggression-eliciting situation compared to non-aggressive content. After goal fulfillment the accessibility of aggression was reduced, regardless of whether fulfillment was achieved by imagining physical or symbolic revenge. Experiment 2 showed similar effects for a non-aggressive conflict-resolution and, in addition, demonstrated a post-fulfillment reduction in actual aggressive behavior. Experiment 3 demonstrated that aggressive acts that do not constitute goal-fulfillment instead increase accessibility of aggression. Relations between our model and previous views on catharsis of aggression are discussed.

KEYWORDS: aggression, accessibility, automatic goal activation, priming, catharsis

Motivation and accompanying thoughts are decreased after goal fulfillment.

In a classic experiment, Bluma Zeigarnik (1927) demonstrated that people remembered interrupted tasks better than completed tasks (for reviews see Butterfield, 1964; Heckhausen, 1991; Wicklund & Gollwitzer, 1982). Presumably, this occurred because interruption preserved the goal to complete the task and maintained the goal-related tension, whereas task completion released the tension and reduced memory for the task (Lewin, 1951). Because goal-related concepts help to prepare action, people may keep them in mind until they reach the goal and inhibit them after goal fulfillment in order to go on with other important goals (Liberman & Förster, 2005). Recent research in Cognitive Psychology demonstrated Zeigarnik-effects on measures of accessibility. Most prominently, Marsh and colleagues (Marsh, Hicks, & Bink, 1998; Marsh, Hicks, & Bryan, 1999) used a lexical decision task to demonstrate an enhanced accessibility of intended actions prior to completion and reduced accessibility after completion, relative to non-intended (i.e., to-be observed) actions (see also Förster, Liberman, & Higgins, 2005; Liberman, Förster, & Higgins, 2007; for a review see Förster, Liberman, & Friedman, 2007). Interestingly, these findings seem to be at odds with research on the cathartic effects of aggression. Our paper will try to shed some light on this discrepancy.

Catharsis of Aggression

Does venting out aggressively help to reduce aggression? The notion of catharsis of aggression refers to a possibility that when one experiences an aggression-related negative state (e.g., anger) and then performs an aggressive act (real or symbolic, whether or not related to the initial cause of aggression is irrelevant), this would reduce that negative state and thereby also reduce further aggression (see Krahé, 2001). Depending on the theory, anger arousal can either be produced by conflicts between

thanatos and eros (Freud, 1920), can be due to an innate "fighting instinct", which causes them to continuously build up aggressive energy and which needs to be released (see Lorenz, 1974) or can be caused by the blocking of a goal-directed behavior leading to frustration, with aggressive behavior then reducing frustration (Dollard, Doob, Miller, Mowrer, & Sears, 1939; Miller, 1941). It is important to note that according to these theories of catharsis, release of aggression can be achieved via aggressing against objects and persons not at fault.

Social psychological literature lends no support for the catharsis hypothesis (Bushman, 2002; Bushman & Baumeister, 1998; Bushman, Baumeister, & Phillips, 2001; Bushman, Baumeister, & Stack, 1999). To illustrate, Bushman (2002) provoked participants and then made them hit a punching bag. While hitting the punching bag, some participants thought of becoming physically fit while others saw a picture of the provocateur and were instructed to think about him. A control group did not hit the punching bag after provocation. Later on, all participants could aggress against the provocateur. Those in the punching bag condition aggressed more than those in the control condition. Furthermore, participants who thought of the provocateur while hitting the punching bag were more aggressive than provoked participants who thought about becoming physically fit. Thus, contrary to the logic of catharsis, hitting the punching bag *increased* aggressive behavior, especially when thinking about the provocateur.

The commonly observed *increase* of aggression following aggressive acts may be predicted by social learning theory (Bandura, 1973), script theory (Huesmann, 1998), and semantic priming (Berkowitz & LePage, 1967; Anderson, Benjamin, & Bartholow, 1998). These approaches suggest that aggressive acts increase the likelihood of further aggression by either positive reinforcement (social learning theory), by

acquiring aggressive scripts that guide further behavior (script theory), or by lowering the threshold for activating aggression-related constructs or behavioral scripts (semantic priming principles).

We do not wish to argue against these theories. Rather, based on recent models of accessibility from active and fulfilled goals, we would like to suggest that decrease of accessibility of goal-related thought and behavior *may be obtained* under specific conditions.

Accessibility from Priming and from Active and Fulfilled Goals

As mentioned before, extant psychological literature suggests that accessibility of goal related constructs is reduced after goal fulfillment (see Marsh et al., 1998; 1999). To give a recent example, Förster et al. (2005) presented participants with numerous words on a computer screen. In the goal condition participants were assigned the goal of searching for the term "aggression" among the presented words and were instructed to report to the experimenter when they find it; in the control condition no goal was assigned. The presentation of words was separated into several blocks and each block was followed by a lexical decision task (LDT) which gauged the accessibility of aggression-related words and words unrelated to aggression. Participants in the goal condition showed enhanced accessibility of aggression-related words (but not words unrelated to aggression) before goal fulfillment compared to the control, no-goal condition. Importantly, when accessibility of aggression-related constructs was assessed after participants had found the target word in the goal condition, accessibility was inhibited compared to a group that searched for the same target word but did not find it, and to the control, no-goal condition. Notably, accessibility of aggression-related constructs after goal fulfillment was lower than during the pre-fulfillment phase in the goal condition and lower than in the unfulfilled goal or no-goal condition.

Importantly, the post fulfillment inhibition effect draws a line between semantic priming effects and accessibility due to active goals (e.g., Förster & Denzler, 2006; Förster et al., 2005; Förster & Liberman, 2007; Liberman & Förster, 2000; Marsh et al., 1998; Marsh et al., 1999). Semantic priming refers to the well-known phenomenon in social cognition research that activating a concept (e.g., aggression) increases accessibility (for a review see Förster & Liberman, 2007). Accessibility can further influence judgments (e.g., an ambiguously aggressive target will be judged to be more aggressive; Srull & Wyer, 1979) or behavior (e.g., participants act more aggressively after having been exposed to aggression concepts; Bargh, Chen, & Burrows, 1996; Berkowitz & LePage, 1976). Whereas accessibility from semantic priming depends on frequency and recency of priming and decreases over time (Higgins, 1996), it seems that goal related accessibility is actively inhibited upon goal fulfillment (Förster et al., 2007). To illustrate the distinction, by the logic of semantic priming in the experiments by Förster et al. (2005), mentioning the word aggression to the experimenter should increase the accessibility of this concept because of recent activation. However, it appears that when an active goal to find the word was present then accessibility decreased after goal fulfillment. How would this logic apply to aggression?

Accessibility of Aggression prior and after Goal Fulfillment

On the basis of the aforementioned priming literature, we suggest that both activation of a concept of aggression and activation of a goal to aggress would increase the accessibility of aggression-related constructs. Only in the latter case, however, performing an aggressive act that fulfills the goal would reduce such accessibility. Inasmuch as accessibility is a basis for judgment and behavior, this should also influence further aggressive action.

The accessibility of goals framework we propose allows us to make the following predictions: first, unlike catharsis theories, we do not predict effects that are driven by anger-based arousal; second, we predict inhibition after aggressive acts only when they fulfill a goal. We think that in most cases aggressive goals are specific (e.g., to harm a specific person) and therefore only a limited range of behaviors would constitute goal fulfillment. Thus, unlike some catharsis models that predict that venting anger against any object or person would reduce aggression, we suggest that only aggression that fulfills a goal reduces accessibility of aggressive constructs. To illustrate, in Bushman's (2002) study, hitting the punching bag did not fulfill a goal to aggress against the provocateur and thus could have enhanced the accessibility of aggressive concepts. According to our model, harming the provocateur would have fulfilled the aggressive goal and reduced accessibility of aggressive constructs as well as further aggressive behavior. Our account allows for a possibility of displaced aggression, in that people may start aggressing against people that are close or similar to the provocateur. We will discuss this notion later since it is not the main focus of our current research.

Many times, aggressive goals are subordinated to more general goals, such as the restoration of justice, equity or self-esteem (cf., Donnerstein & Hatfield, 1982; Hammock, Rosen, Richardson, & Bernstein, 1989). A third prediction that follows from our model is that fulfilling the superordiante goal of aggression (e.g., restoring justice, equity or self-esteem), possibly by non-aggressive means, would deactivate the aggressive goal. Indeed, the literature suggests that sometimes employing non-violent methods can reduce aggression: for example, providing provoked participants with alternatives to acting aggressively reduced aggression (McCloskey, Berman, & Coccaro, 2005).

Overview of Present Research

In the present research, we used a vignette to induce a goal to aggress against another person. Participants imagined their romantic partner cheating with their best friend, and pondered upon what they would feel towards that friend. We examined whether having the goal to aggress increases accessibility of aggression-related constructs and whether goal fulfillment would reduce it (Experiments 1-3); whether a non-aggressive conflict solution also reduces accessibility of aggression-related constructs (Experiment 2) and whether an aggressive act that is not directed towards the target of aggression would reduce accessibility of aggression-related constructs (Experiment 3). Experiment 2 also examined consequences for aggressive behavior.

Experiment 1

In this study we investigated whether aggression that fulfills a goal leads to reduction of aggressive thoughts. In Phase 1, we asked some participants to take the perspective of a person who sees his or her lover cheating with his or her best friend, and thus activated the goal to aggress towards the best friend. Participants in a control group were asked to take the perspective of a person whose friends prepared a surprise birthday party for him. In Phase 2, for some participants in the experimental group this scenario continued with the protagonist taking revenge against the best friend, whereas other participants received a scenario in which taking revenge was thwarted. For the control group the scenario of the surprise party continued.

Recently, Cesario, Plaks and Higgins (2006) demonstrated that accessibility of goal-related constructs decreases even after symbolic goal fulfillment. Therefore, in Phase 3 participants in the experimental group were asked to either stab a Voodoo doll representing the former best friend, thereby symbolically fulfilling the goal of harming him or her, or to simply look at the Voodoo doll without stabbing it. The control group also had the chance to either stab the voodoo doll or to look at it. We introduced stab-

bing the Voodoo doll in the control group (in which aggressive goals were not primed) in order to see whether mere stabbing, without fulfilling the goal to aggress, activates aggressive thoughts (e.g., a semantic priming mechanism).

To measure accessibility of aggressive knowledge, we administered lexical decision tasks (LDT) for words related to aggression and words unrelated to aggression after each phase. Faster lexical decisions on words semantically associated with a construct indicate a higher accessibility of this construct (Neely, 1991). We will use the term Block 1 for measurement after Phase 1, Block 2 for the measurement after Phase 2 and Block 3 for measurement after Phase 3. The design is summarized in Table 1.

Predictions for Block 1. We expected stronger accessibility of aggression-related constructs compared to unrelated constructs for the cheating scenario condition, compared to the control birthday party condition.

Predictions for Block 2. We assume that taking revenge fulfills the aggressive goal and hence reduces accessibility of aggression-related constructs relative to Block 1. We do not predict such reduction in the thwarted revenge condition and in the control (birthday party) condition.

Predictions for Block 3. After the third phase, we expected a decrease in accessibility of aggression-related constructs compared to unrelated constructs for participants in the experimental (aggression eliciting) condition who stabbed the doll (whether or not they imagined taking revenge in Phase 2) compared to participants in the experimental condition who only looked at the doll. For participants in the control (i.e., birthday party) condition we expected an increase in accessibility of aggression-related constructs compared to unrelated constructs in the stabbing condition relative to the no-stabbing condition. This is because for these participants stabbing does not fulfill a goal, but rather semantically primes aggression.

Method

Participants. 91 participants (51 women, 40 men) from University of Würzburg participated in a series of studies and received €12 (at the time approximately US$14) as compensation. There were no gender differences in any of the results reported below.

Materials and Procedure. All participants first filled out the same questionnaires unrelated to the present experiment for about 15 minutes. The present study was introduced as a study on perspective taking, which for economic reasons was added to an allegedly unrelated study on reaction times and verbal comprehension. The alleged perspective-taking study instructed participants to try to experience the feelings and thoughts of the protagonist of the story as if the events were happening to them. The protagonist was always the same gender as the participant.

In Phase 1 of this perspective-taking task, in the aggressive goal condition, the story told of a situation in which the protagonist's partner was caught cheating with his or her best friend. This details of the story varied slightly by gender, because pretests revealed gender differences in typical verbal expressions (e.g., gender specific curses) as well as in emotional experiences. The story tells of a person coming back home to spend a night with her partner, who she thinks is perfect for her.[1] However, when she opened the door to his bedroom she saw him naked in bed with her best friend. He was telling her best friend that he loved her. Whereas the two obviously did not even notice her, she ran away. She remembers how close she had been to her best friend and how she had discussed the most intimate details and problems of her relationship. She describes her anger towards the best friend in detail.

For the control, no aggressive goal condition, we used a story similar in structure that does not activate aggressive constructs. In this case, upon coming home, the

protagonist finds her roommate putting up a happy birthday banner. She then realizes that her friends had wanted to surprise her with a birthday party. Thus, in the control condition, as in the experimental condition, an unexpected event happened that, this time, elicited a positive surprise reaction.

Participants then performed the LDT. They were told that letter strings would appear at the center of the screen and were instructed to press as accurately and as quickly as they could the "X"-key if the string was a word and the "."-key if the string was a non-word (key assignment was counterbalanced across participants and had no effect). Participants were instructed to put their right and left index fingers on the response keys before starting, and to keep them there throughout the trials. In each trial, an uppercase letter string (font size 16, Times New Roman) was presented at the center of the computer screen, and remained until the response. The next letter string appeared immediately after the response.

Each block of lexical decisions presented in random order 7 words related to aggression (e.g., FAUST [fist]), 7 words unrelated to aggression (e.g., HERD [stove]), and 14 non-words (e.g., WIRDK)[2]. We used some of the words used by Mussweiler and Förster (2000) and we selected additional stimuli based on a pretest with 20 participants from the same population as the participants of the actual experiment. In the pretest, participants rated extent of relation to aggression of 130 preselected words, on a scale ranging from 1 (*not at all*) to 9 (*strongly*). For the LDTs, we selected 15 aggression related words (mean ratings above 6), and 15 words unrelated to aggression (mean ratings below 3). We made sure that aggression-related and -unrelated words did not differ in word frequency.

After each LDT participants were administered a questionnaire with 13 items assessing their current mood. In addition, participants answered some questions on

perspective taking, which were not analyzed but just served to lend credibility to the cover story.

Participants then continued with the second perspective taking task. Participants in the aggressive goal conditions either imagined revenge (goal fulfillment condition) or imagined a thwarted attempt to take revenge (goal-thwarting condition). This part of the story was also slightly different for men and women, because men and women differ in their preferred ways of expressing aggression (cf., Eagly & Steffen, 1986; Evers, Fischer, Rodriguez Mosquera, & Manstead, 2005). In the male revenge version, the protagonist is waiting for his former best friend in front of his house at night. When the best friend arrives, the protagonist hits him in the face and stomach and calls him a bastard[3]. In the female revenge version, the protagonist stabs the tires of her former best friend's bike in front of a lecture hall and stomps on it, then spots her observing the attack and smacks her in the face calling her a "bitch". In the end, both male and female protagonists feel satisfied.

In the goal-thwarting condition, the protagonist intends to harm the best friend but is interrupted. Whereas in the male story the best friend does not show up, in the female story, a teacher leaves the building together with the best friend earlier than expected. For the control conditions Phase 2 continued into the second part of the birthday party, with descriptions of drinks and dancing. After this, the second LDT (Block 2) was administered, followed by the same questionnaires as after Block 1.

Participants then proceeded to Phase 3. A voodoo doll was handed to all participants: they were told that they would need it for the next part of the study. The dolls were 30 cm tall and had five red spots distributed over the body. After a written reminder to take the perspective of the protagonist, the story continued with the protagonist visiting another friend who just returned from a trip to the Caribbean, where she

had bought this voodoo doll. She tells the protagonist that one could hurt somebody if one pokes needles into one of the red dots. She then leaves the room and the protagonist is alone with the doll. Participants in the aggressive goal condition read that the protagonist stabs the doll while thinking of the former best friend. We reasoned that in this condition, the goal of harming the best friend would be symbolically fulfilled. At this point, participants in the stabbing condition received three needles and were asked to stab the doll. In the no-stabbing condition, participants did not receive any needles and were just asked to look at the doll. Thus, only in the stabbing condition was symbolic goal fulfillment possible. Participants in the control conditions were also told that the protagonist is visiting a friend who brought a Voodoo doll. Like in the aggressive goal condition, participants in the control condition were instructed to either stab the doll or look at it. However, in this case the doll did not represent a specific person. Participants then completed the third LDT (Block 3), followed by the same questions as in Blocks 1 and 2. After the experiment, participants were thanked, fully debriefed, paid and dismissed.

Results and Discussion

We examined speed of lexical decision after excluding incorrect responses (1.2 % of the responses). Here and also in the following studies incorrect responses did not differ across conditions, and hence are not further addressed. Following Fazio (1990), we performed natural logarithmic transformations (ln) of the reaction times to reduce the skewness of the distribution: these transformed reaction times were used for the analyses. For the ease of interpretation we will report non-transformed reactions times throughout this paper. The transformed means for all the studies can be found in the supplementary online materials.

A 3 (Condition: Aggression-goal fulfillment vs. Aggression-goal-thwarting vs. No aggression) x 2 (Stabbing: Stabbing vs. no-stabbing) x 2 (Word Type: Related to aggression vs. Unrelated to aggression) x 3 (Block: Blocks 1 to 3) mixed model ANOVA on the reaction times was conducted. The analysis yielded the following significant interactions and main effects: a four-way interaction, $F(4,172) = 9.08$, $p < .001$, $\eta^2 = .17$[4], a Condition x Stabbing x Block interaction, $F(4, 172) = 8.48$, $p < .001$, $\eta^2 = .17$, a Condition x Word Type x Block interaction, $F(4, 172) = 7.91$, $p < .001$, $\eta^2 = .16$, a Stabbing x Wordy Type x Block interaction, $F(2, 172) = 9.77$, $p < .001$, $\eta^2 = .10$, a Condition x Word Type interaction, $F(2, 86) = 18.70$, $p < .001$, $\eta^2 = .30$, a Condition x Block interaction, $F(4, 172) = 8.10$, $p < .001$, $\eta^2 = .16$, a Block x Stabbing interaction, $F(2, 172) = 8.66$, $p < .001$, $\eta^2 = .09$, a Word Type x Block interaction, $F(2,172) = 5.38$, $p < .005$, $\eta^2 = .06$, a main effect for Word Type, $F(1,172) = 35.62$, $p < .001$ $\eta^2 = .29$, and a main effect for Block, $F(2,172) = 6.49$, $p < .002$ $\eta^2 = .07$. No other interaction or main effect was significant.

In this and the following studies, we computed an index of the relative accessibility of aggression related words. This was the difference between the mean reaction times to words unrelated to aggression and the mean reaction times to words related to aggression for each Block. A higher score on that index indicates that words related to aggression were more accessible than words unrelated to aggression. A series of analyses used this index as a dependent measure to separately test our hypotheses (see all means in Table 2).

Accessibility from Goals. We first tested whether the cheating scenario made aggression-related words more accessible compared to the control birthday party scenario. Therefore, we combined the four cheating scenario conditions (Experimental group 1 to 4, see Table 1) and compared them to the combined birthday party scenario

conditions (Control group 1 and 2, see Table 1). In Block 1, after reading the first part of the scenario, the mean difference of reaction times between words related and unrelated to aggression was indeed larger in the cheating scenario conditions (M = 83 ms, SD = 151 ms) compared to the control birthday party scenario conditions (M = -8 ms, SD = 84 ms), $F(1,90)= 12.59$, $p < .001$, $\eta^2 = .12$. Thus, our aggression induction was effective[5]. Notably, by comparing an aggression provoking event with a positive one, one cannot rule out the possibility that other negative events would not render aggressive concepts accessible as well. For example, it is possible that a disappointing event can increase accessibility of negative thoughts and anger-related thoughts as well. This, however, may be an effect of semantic priming and might not in itself activate the goal to aggress against somebody. Future research should also compare experimental conditions with control conditions that induce negative surprise that is not related to aggression. The main focus of the present work, however, is on the dynamics of goal activation and goal fulfillment and not, for example, on whether other negative events could also increase negative thoughts.

Goal fulfillment. We predicted that imaginary fulfilling of an aggressive goal would reduce the accessibility of aggression-related constructs. We permitted goal fulfillment in two different ways: first, some participants in the aggressive goal condition imagined taking revenge by aggressing towards the best friend (in Phase 2). Second, some participants in the aggressive goal condition could stab the voodoo doll that represented the best friend (in Phase 3). We first tested whether accessibility of aggression-related constructs was reduced after imagining a direct aggressive act (after Phase 2). For that end, we combined the two aggressive goal conditions in which participants imagined an aggressive act (Goal-fulfillment: Experimental group 1 and 2, see Table 1) and compared them to the two aggressive goal conditions in which revenge was

thwarted (Goal-thwarting: Experimental group 3 and 4, see Table 1). A 2 (Condition: Goal-fulfillment vs. Goal-thwarting) x 2 (Block: Block 1 vs. Block 2) mixed-model ANOVA on the mean reaction time differences yielded a significant two-way interaction, $F(1, 59) = 16.91$, $p < .001$, $\eta^2 = .23$; a main effect for Condition, $F(1, 59) = 10.72$, $p < 002$, $\eta^2 = .15$; and no main effect for Block, $F < 1$, $\eta^2 = .02$. We performed pairwise comparisons of the differences between Block 1 and Block 2. Here and in all subsequent analyses we use the Bonferroni adjustment for multiple comparisons. For the goal-fulfillment condition the *decrease* in the relative accessibility of aggression-related words between Block 1 and Block 2 was significant ($M = -73$ ms, $SD = 146$ ms; $F(1, 59) = 9.97$, $p < .003$, $\eta^2 = .15$), whereas for the goal-thwarting condition the *increase* was significant ($M = 47$ ms, $SD = 146$ ms; $F(1,59) = 7.09$, $p < .01$, $\eta^2 = .11$). Thus, consistent with our predictions, taking imagined revenge decreased the relative accessibility of aggression-related constructs. Not taking revenge, which kept the goal to aggress active, increased the relative accessibility of aggression-related constructs.

We also predicted that stabbing the voodoo doll would reduce accessibility of aggression-related constructs for participants in the aggressive goal condition. We therefore looked at the two aggressive goal conditions that proceeded with stabbing the voodoo doll in Phase 3 (Experimental group 1 and 3, see Table 1) and compared them to the two aggressive goal conditions in which participants looked at the voodoo doll without stabbing it (Experimental group 2 and 4, see Table 1). A 2 (Symbolic revenge: Stabbing vs. Watching the doll) x 2 (Block: Block 2 vs. Block 3) mixed-model ANOVA on the relative accessibility of aggression related words yielded a significant two-way interaction, $F(1, 59) = 15.61$; $p < .001$, $\eta^2 = .21$, a main effect for Block, $F(1, 59) = 10.32$; $p < .001$, $\eta^2 = .15$ and no main effect for symbolic revenge, $F(1,59)=2.99$; $p > .089$, $\eta^2 = .05$. We also conducted pairwise comparisons between Block 2 and

Block 3. For the stabbing condition, the decrease in the relative accessibility of aggression-related words between Block 2 and Block 3 was significant (M = -193 ms, SD = 229 ms; $F(1, 59) = 25.25$, $p < .001$, $\eta^2 = .30$). For the watching condition the increase between Blocks 2 and 3 was not significant (M = 12 ms, SD = 222 ms; $F < 1$, $\eta^2 = .05$). Thus, stabbing the voodoo doll significantly reduced the accessibility of aggression-related constructs[6].

We also predicted that stabbing a voodoo doll without having the goal of aggressing against the protagonist would increase aggression due to semantic priming (cf., Förster & Liberman, 2006). Thus, stabbing the voodoo doll, compared to merely looking at it in the control (birthday party scenario) condition, should increase the accessibility of aggression-related constructs. A 2 (Stabbing vs. Watching the doll) x 2 (Block: Block 2 vs. Block 3) mixed-model ANOVA on the relative accessibility of aggression-related words yielded a marginal interaction $F(1,29) = 3.62$, $p = .067$, $\eta^2 = .11$, and no significant main effects. Pairwise comparisons of the differences between Block 2 and 3 showed that in the stabbing condition, the relative accessibility of aggression related words increased between Block 2 and Block 3, (M = 70 ms, SD = 116 ms; $F(1, 29) = 6.42$, $p < .017$, $\eta^2 = .18$), whereas for the watching condition the difference was not significant (M = -5 ms, SD = 116 ms; $F < 1$, $\eta^2 = .00$). Thus, as predicted, mere stabbing of the voodoo doll without goal-fulfillment increases the accessibility of aggression-related constructs.

Mood. We first calculated an overall mood score for each Block (Alpha ranged from .86 to .93). We did not find any differences between the conditions (all ps > .649). We nevertheless added mood as measured after the relevant block as covariates to all the above-reported analyses (e.g., for analyses of Block 1 we used mood that was assessed after Block 1). Mood was not a significant covariate in any of these analyses,

indicating that our findings were independent from mood or anger-arousal. A similar procedure of measuring and controlling for possible effects of mood was applied in subsequent studies and did not yield any effects. The lack of moods effects may be attributed to the fact that we measured mood only after the lexical decision task, which was approximately 4 minutes after the scenario task. It is known that certain priming effects usually decay after some minutes (see Förster & Liberman, 2007) and since accessibility was the main measure in our research, we did not want to take the risk of possible decays due to mood measurement. However, this decision could have been at the expense of discovering mood effects. Nevertheless, the fact that we did not find any mediation by mood might point to an important departure of the present results from classic catharsis theories, which assume that reduction of anger is a key component in the cathartic effect.

In sum, Experiment 1 demonstrated that imagined revenge and symbolic revenge (stabbing a voodoo doll) reduce accessibility of aggression-related constructs. A symbolic aggressive act that does not fulfill a goal actually increases accessibility of aggressive constructs.

Experiment 2

Many models suggest that accessibility is a necessary condition for behavior, and some models even suggest that sometimes it is even sufficient to produce corresponding behavior (e.g., Bargh, 1997; Gollwitzer, 1999, Strack & Deutsch, 2004). Would our effects emerge with aggressive behavior and not only with accessibility as a dependent measure? Experiment 2 addressed this question. In addition, it examined whether non-aggressive means of goal-fulfillment would reduce accessibility of aggressive constructs.

Method

Participants. 52 participants (25 women, 27 men) from Bremen University participated in a battery study and received €12 (at the time approximately US$14) as compensation. One participant had to be excluded because he was not a native German speaker. There were no gender differences in any of the results reported below.

Procedure. The study was in many aspects similar to Experiment 1 but with two major differences. First, no control (birthday party) story and no voodoo doll were used. Second, we used only two LDTs; one after Phase 1 (i.e., the aggression-eliciting, cheating story) and one after Phase 2 (i.e., after the goal-fulfillment or goal-thwarting stories). At Phase 3 we measured behavioral aggression.

All participants first filled out the same questionnaires unrelated to the present experiment for about 15 minutes. They received the same instructions and aggression-eliciting cheating story as in Experiment 1. In addition, however, they were asked, after reading each part of the story, to write down their thoughts.

In Phase 2, the second part of the story was presented. There were three versions to the second part of the story: the revenge (i.e., goal-fulfillment) and the no-revenge (i.e., goal-thwarted) version were like the ones used in Experiment 1. In the third, non-aggressive version, the protagonist calls her best friend and tells her that she knows about the affair, tells her about her disappointment and that she does not want to see or meet her anymore. The friend first tries to seek a way to restore the friendship but cannot find it, and then both friends say good-bye to each other. The protagonist feels better and is glad of having solved the conflict in a peaceful way. As before, male participants received the same scenario with a male protagonist. Pretests revealed that this way of dealing with the situation was perceived as much less aggressive and much

more constructive than the aggressive revenge of the first version. Afterwards, participants proceeded with the second LDT (Block 2).

Phase 3 introduced the measure of behavioral aggression: Participants were asked to help the experimenter by selecting pictures for an unrelated study, during which the chosen pictures would be evaluated by another participant. The participant was told that since the experimenter knew the pictures too well, she wanted somebody else to make the selection. They received a folder with 30 photographs, always in the same random order. The experimenter asked participants to choose 10 of these pictures and put them in an envelope she handed them. The pictures were 30 photographs from the International Affective Picture System (IAPS; Center for the Study of Emotion and Attention, 1995), which has been widely used in research on affect (e.g., Ito, Cacioppo, & Lang, 1998; Lang, Greenwald, Bradley, & Hamm, 1993; Mussweiler & Förster, 2000) and extensively pretested with respect to their valence (e.g., Ito et al., 1998; Lang, Bradley, & Cuthbert, 1995). The picture sample in our study was the same as in Mussweiler and Förster (2000), who showed that selecting more negative pictures reflects more aggression: by selecting a negative picture, a person makes the viewer uncomfortable. The paradigm is conceptually equivalent to classic measures of behavioral aggression that typically involve the delivery of noxious or aversive stimuli such as an electric shock (e.g., Geen, 1990), except that the discomfort in our case is psychological rather than physical[7]. Ten of the pictures were negative (ratings below 4 on a 9-point rating scale [1= *negative*, 9= *positive*]; e.g., a picture of a rotting animal corpse), ten were neutral (ratings between 4 and 6; e.g., an umbrella), and ten were positive (ratings above 6; e.g., puppies). After selecting the pictures, participants were thanked, fully debriefed, paid and dismissed.

The design is summarized in Table 3. We expected no difference in the relative accessibility of aggression-related words between the three conditions in Block 1, because no differences were introduced at this stage. We expected a decrease from Block 1 to Block 2 in the relative accessibility of aggression-related constructs in the aggressive and in the non-aggressive goal-fulfillment conditions but not for the thwarted goal condition, in which an active goal continues to exist. For the picture selection task, we expected more negative pictures to be selected for the thwarted goal condition compared to the other two conditions, which should not differ from each other. Note that aggressing towards the other participant in our study by selecting negative pictures for him or her represents displaced aggression, namely, aggression towards a person who is not the provocateur. In our model, displaced aggression may be caused by an enhanced accessibility of aggressive constructs but does not necessarily fulfill the goal to aggress. We think, in line with previous research (Marcus-Newhall, Pedersen, Carlson, & Miller, 2000), that aggression may be displaced towards unrelated targets – here towards another participant. For example, Bargh et al. (1996) could show that exposure to aggression-related cues increased aggression against the experimenter. Thus, it is possible that rendering aggressive constructs accessible can increase aggressive behavior by mere semantic priming mechanism that does not include a specific goal.

Results and Discussion

Reaction times. We excluded incorrect responses (2.3 % of the responses) and transformed the reaction times as in Experiment 1. A 3 (Goal Fulfillment: aggressive fulfillment vs. Goal-thwarting vs. Non-Aggressive solution) x 2 (Block: Blocks 1 to 2) x 2 (Word Type: Related to aggression vs. Unrelated to aggression) mixed model ANOVA on the mean reaction times was conducted, with goal fulfillment as a between-subjects factor and Block and Word Type as within-subjects factors. The analy-

sis yielded a significant three-way interaction, $F(2, 48) = 10.45$, $p < .001$, $\eta^2 = .30$, a Word type x Block interaction, $F(1, 48) = 29.18$, $p < .001$, $\eta^2 = .38$, a Goal fulfillment x Word Type interaction, $F(2, 48) = 7.28$; $p < .002$, $\eta^2 = .23$, a Goal fulfillment x Block interaction, $F(2, 48) = 3.90$; $p < .027$, $\eta^2 = .14$, and a main effect for Word Type, $F(1, 48) = 8.56$, $p < .005$. No other effect reached significance (see all means in Table 4).

We examined whether an imagined aggressive goal fulfillment and the imagined non-aggressive solution managed to reduce the relative accessibility of aggression-related constructs. A 3 (Goal fulfillment: Aggressive Goal-Fulfillment vs. Non-Aggressive Goal-Fulfillment vs. Goal-thwarting) x 2 (Block: Block 1 vs. Block 2) mixed model ANOVA on the relative advantage of aggression-related words, with goal fulfillment as a between-subjects factor and Block as a within-subjects factor, yielded a significant interaction, $F(2, 48) = 10.45$, $p < .001$, $\eta^2 = .30$, a main effect for Block, $F(1, 48) = 29.18$, $p < .001$, $\eta^2 = .38$, and a main effect for Condition, $F(2, 48) = 7.28$, $p < .002$, $\eta^2 = .23$. Pairwise comparisons of the differences between Block 1 and Block 2 showed a decrease of the relative accessibility of aggression-related constructs in the aggressive goal-fulfillment condition (M = -199 ms, SD = 167 ms; $F(1, 48) = 42.65$, $p < .001$, $\eta^2 = .47$), as well as in the non-aggressive goal-fulfillment condition (M = -80 ms, SD = 167 ms; $F(1, 48) = 5.82$, $p < .020$, $\eta^2 = .11$), but not in the thwarted goal condition (M = -18 ms, SD = 167 ms; $F < 1$, $\eta^2 = .01$). Thus, imagined aggressive revenge as well as an imagined non-aggressive conflict solution reduced accessibility of aggression-related constructs, whereas a thwarted goal to aggress did not have a similar effect. Note that, unlike Experiment 1, in this study we did not find an increase in the relative accessibility of words related to aggression in the goal-thwarted condition. Theoretically, we predict that accessibility would not be reduced

after thwarted goals, and may either be preserved or increase. Whether accessibility increases or stays the same may depend on such factors as the degree of frustration caused by the interruption or the expectancy of success (see Liberman & Förster, in press).

Behavioral aggression (picture selection). It is possible that the heightened accessibility of aggressive constructs activates aggressive behaviors against even unrelated persons. Accessibility of these constructs may bring aggressive strategies and scripts to people's minds and they may use them in subsequent behavior. We used the average valence of the selected pictures as a measure of behavioral aggression (Mussweiler & Förster, 2000). Participants in the thwarted goal condition selected more negative pictures (M = 4.13; SD = .57) than participants in the aggressive goal fulfillment condition (M = 4.61; SD = .75) and the most positive pictures were selected by participants in the non-aggressive goal fulfillment condition (M = 5.11; SD = .50), $F(2, 48) = 11.29$; $p < .001$, $\eta^2 = .32$. Contrast analyses showed that all the groups were significantly different from each other, $t(48) > 2.25$, $p < .05$, $\eta^2 > .10$.

In sum, Experiment 2 replicates Experiment 1 by showing decreased accessibility of aggression-related constructs after goal-fulfillment compared to when the goal was thwarted. In addition, it shows that a non-aggressive solution of the conflict also reduced the accessibility of aggression-related constructs. Furthermore, this study demonstrated effects on aggressive behavior: participants in the thwarted goal condition were more aggressive than those in either the aggressive goal fulfillment condition or in the peaceful goal-fulfillment condition. The present findings are in line with other demonstrations of displaced aggression (e.g., Marcus-Newhall et al., 2000): our model predicts that displaced aggression would not necessarily fulfill a goal, and thus may

not reduce accessibility of aggressive constructs and subsequent aggressive behavior. We come back to that point in the general discussion.

Note the dissociation between the accessibility and the behavioral results: the aggressive goal-fulfillment condition made aggression less accessible but at the same time produced more behavioral aggression than the non-aggressive goal-fulfillment condition. More research is needed to further investigate this dissociation. Future studies should also replicate the previous findings with methods that assess physical harm, like for example the hot-sauce paradigm (Lieberman, Solomon, Greenberg, & McGregor, 1999) or also the prisoner's dilemma (see Hargreaves-Heap & Varoufakis, 2004)[8].

Experiment 3

Classic approaches to catharsis assume that any release of aggressive energy reduces subsequent aggression (e.g., Lorenz, 1974). Thus, aggressing against an inanimate object (e.g., a punching bag) or against an unrelated person should decrease aggression. Our model, in contrast to this notion, predicts that only aggressive acts that constitute goal-fulfillment reduce accessibility of aggression-related constructs. Therefore, unspecific aggression, be it against inanimate objects or against unrelated persons, would not decrease aggression. In fact, it may even increase aggression through activation of aggressive constructs. In this Experiment we include a condition in which participants aggress towards an unrelated person or object, similar to catharsis research (see Bushman, 2002). We expect to replicate with our accessibility measure former studies, which found increased aggression after aggressive acts that did not fulfill an aggressive goal[9].

Method

Participants. 85 (44 women, 41 men) participants from Bremen University were recruited for a battery study and received €12 (at the time approximately US$14)

as compensation. Because not all reaction times were recorded for two participants due to computer problems, we excluded them from the analyses. There were no gender differences in any of the results reported below.

Procedure. The study was in many aspects similar to Experiments 1 and 2. In Phase 1, all participants received the aggression-eliciting story and all the subsequent measures (LDT and questionnaires) as in Experiment 1. In Phase 2, participants were exposed to either the aggressive goal-fulfillment story, the thwarted goal story (which were similar to the previous two experiments) or to two novel endings of the story. In the punching bag condition the protagonist goes home and reminds herself of a recently installed punching bag in the basement of her house. She goes straight to the basement. In a blind fury she hits the punching bag again and again to vent her anger. After a while she goes to her apartment and takes a shower. In the wrong target condition, the protagonist goes to the university, where she expects her best friend to be. On the way she is thinking of a similar situation she experienced with another friend. She suspected this friend of having cheated on her with her boyfriend previously. When she arrives at the university the other friend whom she suspected a time ago leaves the lecture hall. It seems as if her best friend did not attend the lecture today. The scenario then continues like the revenge-taking scenario we described earlier with physically harming this 'innocent' person after the lecture. This act of aggression does not constitute goal-fulfillment, because the goal is to harm the current best friend. Participants then proceeded to the second LDT (Block 2).

The design is summarized in Table 5. In Block 1, we predicted no differences between the conditions. In Block 2 we predicted a decrease in the relative accessibility of aggression-related constructs, in the aggressive goal-fulfillment condition. For the inanimate object condition and the wrong target condition we expected that the relative

accessibility of aggression-related constructs would be preserved and may even increase from Block 1 to Block 2.

Results and Discussion

We excluded incorrect responses (2.8% of the responses) and transformed the reaction times as described for Experiment 1. A 4 (Condition: Goal-Fulfillment vs. Goal-thwarting vs. Punching Bag vs. Wrong Target) x 2 (Word Type: Related to aggression vs. Unrelated to aggression) x 2 (Block: Blocks 1 to 2) mixed model ANOVA on the mean reaction times was conducted, with Condition as a between-subjects factor and Word Type and Block as within-subjects factors. The analysis yielded a significant three-way interaction, $F(3,79) = 4.00$, $p < .010$, $\eta^2 = .13$, a Condition x Word Type interaction, $F(3, 79) = 4.73$; $p < .004$ $\eta^2 = .15$, a marginally significant Block x Word Type interaction, $F(1, 79) = 3.83$; $p < .054$ $\eta^2 = .05$, a main effect for Block, $F(1, 79) = 7.34$, $p < .008$, $\eta^2 = .09$, and a main effect for Condition, $F(3, 79) = 3.80$; $p < .013$, $\eta^2 = .13$. No other effect reached significance (see all means in Table 6).

We conducted a 4 (Condition: Goal-Fulfillment vs. Goal-Thwarting vs. Punching Bag vs. Wrong Target) x 2 (Block: Blocks 1 to 2) mixed model ANOVA on the relative accessibility of aggression-related words. The analysis yielded a significant interaction, $F(3, 79) = 3.97$, $p < .011$, $\eta^2 = .13$, a marginal main effect for Block, $F(1, 79) = 3.81$, $p < .055$, $\eta^2 = .05$, and a main effect for Condition, $F(3,79) = 4.80$, $p < .004$, $\eta^2 = .15$.

Pairwise comparisons replicated the decrease of the relative accessibility of aggression-related constructs after goal-fulfillment between Block 1 and Block 2 ($M = -73$ ms, $SD = 175$ ms; $F(1, 79) = 4.05$, $p < .048$, $\eta^2 = .05$) and the increase of the relative accessibility of aggressive constructs after goal-thwarting from Experiment 1 ($M = 73$ ms, $SD = 175$ ms; $F(1, 79) = 4.06$, $p < .047$, $\eta^2 = .05$). We expected that ag-

gressing towards an inanimate object or an unrelated target should maintain or even increase accessibility of aggression-related constructs between Block 1 and Block 2. Indeed, hitting the punching bag (M = 78 ms, SD = 175 ms; $F(1, 79) = 4.12$, $p < .046$, $\eta^2 = .05$) and aggressing towards an unrelated target (M = 82 ms, SD = 175 ms; $F(1, 79) = 4.21$, $p < .044$, $\eta^2 = .05$) increased accessibility of aggression-related constructs. This indicates that even when people are motivated to aggress, aggression that does not constitute goal-fulfillment does not decrease but rather increases the accessibility of aggression.

One might wonder why stabbing a voodoo doll decreases aggression (Experiment 1) while imagining hitting a punching bag does not. Note that in Experiment 1 the context was such that stabbing a voodoo doll constituted goal-fulfillment: The protagonist is told that the person one thinks of while stabbing the doll gets hurt and the protagonist then does this while thinking of the provocateur. In this context stabbing the doll presumably harmed the provocateur and hence constitutes goal-fulfillment. Imaginary hitting of a punching bag as in Experiment 3 or really hitting a punching bag as in the study by Bushman (2002) does not in itself constitute goal-fulfillment, because the provocateur does not get harmed neither in reality nor in the participant's imagination[10]. Notably, in our study, aggressing against a friend whom one has suspected of having cheated before does not reduce aggression-related accessibility. It seems that a rather target-specific goal is activated that needs to be fulfilled: if one wants to aggress against a certain person, only aggressing against this specific person may lead to inhibition effects.

General Discussion

Three studies demonstrate specific conditions under which aggressive goal fulfillment decreases accessibility of aggressive constructs and aggressive behavior. We

found that activation of an aggressive goal increases accessibility of aggression-related constructs (Experiment 1). More importantly, we found that fulfilling the goal to aggress against a specific provocateur reduced accessibility of aggression (Experiments 1-3). This was true for both imagined physical aggression and imagined symbolic aggression (e.g. the Voodoo doll, Experiment 1). Replicating studies from the catharsis literature (Bushman, 2002), we found that the aggressive act of merely stabbing a doll (without provocation) increased accessibility of aggression. Furthermore, Experiment 3 showed that even when a goal to aggress is activated, engaging in aggression that does not fulfill a goal (e.g., hitting a punching bag or aggressing towards an unrelated target) does not reduce but rather increases aggression. Our results also demonstrated that accessibility of aggression was reduced after a constructive conflict solution (Experiment 2). Moreover, a non-aggressive solution led to less aggressive behavior compared to aggressive revenge-taking, although both reduced aggression compared to a pre-fulfillment stage and relative to the thwarted revenge condition.

Future research should not only replicate these findings with real instigations rather than scenarios, but also address potential boundary conditions of the present effects. For example, Geen and Quanty (1977) concluded that when retaliation from the target of aggression is expected, aggression increases arousal more than with no expected retaliation. It would be interesting to discover whether expected retaliation would reduce the post fulfillment inhibition effect we observe in our studies

Accessibility and (triggered) displaced aggression

The present results have important implications for displaced aggression and triggered displaced aggression. Whereas displaced aggression describes aggression towards a target that was neither the source of aggression nor showed any provoking behavior (Marcus-Newhall et al., 2000; Miller, 1948), triggered displaced aggression

occurs when a provocation is followed by a milder one from a second person and the second person elicits a more aggressive reaction than he would have elicited without the first provocation (Miller, Pedersen, Earleywine, & Pollock, 2003). How does the logic of our model apply to these phenomena?

Research shows that displacement of aggression becomes more likely with increased similarity between the target and the provocateur (Marcus-Newhall et al., 2000). This finding is in line with our accessibility model, because accessible constructs are more likely to be used with increased applicability, and similarity of the two targets obviously increases applicability (Higgins, 1996; Förster & Liberman, 2007). We might predict, in addition, that substitutability of goals would further make displaced aggression more likely. Specifically, to the extent that by aggressing towards the second person one fulfills the initially activated aggressive goals or a superordinate goal, displaced aggression would become more likely. However, displaced aggression does not necessarily lead to goal fulfillment.

In Experiment 3, participants aggressed against a wrong target and no reduction in accessibility of aggression-related constructs was obtained. Presumably, this was the case because this act did not constitute fulfillment of a goal. Notably, in one condition the target was similar in that the protagonist suspected him/her of having cheated before. It seems that similarity on such a dimension, in this case, is not sufficient to substitute the goal to harm the actual protagonist. However, when would we predict that even displaced aggression constitutes goal-fulfillment? First, let us note that substitutability and similarity judgments are highly subjective, flexible, and malleable dimensions (see Förster, Liberman, & Friedman, in press; Medin, Goldstone, & Genter, 1993). To give an example, it is in the eye of the beholder whether an A in math can compensate for a B in history for a college student, or whether a brick is the same as a

hammer when one wants to hang a picture to the wall,. Similarly, it is rather subjective whether a person other than the provocateur would be a valuable substitute. However, some conditions may be mentioned. For example, if a superordinate goal of aggression is restoring self esteem, and if aggression towards minority group members serves that function more than aggression towards majority group members, then it would be much easier to aggress against the first and fulfill the goal thusly. It might also be the case that people who believe in catharsis (see Bushman et al., 2001) more readily displace aggression and that for those people such displaced aggressive acts also constitute goal fulfillment (e.g., when they have the goal to merely vent their anger)[11]. Further research is needed into the question of which targets and which aggressive acts may serve as substitutes of the original goal and, when performed, induce a sense of goal completion.

Long term versus short term effects of post-fulfillment inhibition

It has been argued that if cathartic acts were successful in reducing aggression, then the logic of the law of effect (Thorndike, 1911) or the logic of positive reinforcement (Skinner, 1953), would predict an increase of aggression in the long run.

On the basis of our experiments, which measured accessibility of aggression and aggressive behavior soon after goal fulfillment, we can only speculate about the longtime consequences of our effects. We think that post-fulfillment inhibition is functional because it allows the system to effectively engage in new tasks, but that long-term inhibition of goal-related terms is unlikely. Indeed, Förster et al. (2005) found a release of the post-fulfillment inhibition of goal-related constructs - a short time after goal fulfillment (approximately 5 minutes) accessibility returned to baseline. Accordingly, it is possible that aggressive goal-fulfillment (e.g., taking revenge) reduces accessibility of aggression-related constructs only in the short run and that accessibility

of goal-related constructs would resume its normal levels a short time afterwards. This process does not preclude learning in the long run, whereby successful aggression would reinforce further aggression and make it more likely. Similarly, *non-aggressive* goal-fulfillment could lead to a decrease of aggression in the long run. One may then conclude that non-aggressive conflict solutions, which are taught in social skills training to aggressive children, might actually reduce both short term and long term aggression (see Schneider, 1991; and Nangle, Erdley, Carpenter, & Newman, 2002).

Conclusion

Three studies show that fulfilling the goal to aggress reduces accessibility of aggressive constructs and the likelihood of aggressive behavior. Contrary to that, aggression that does not serve to fulfill a goal increases accessibility of aggressive constructs. Clearly, our data do not suggest that people feel better after aggressive acts. Nor do our results suggest anything that contradicts the extensive research that showed no catharsis effects. They only identify a specific, but we believe important, condition in which aggression does reduce further aggression, at least in the short run: when aggression serves to fulfill a goal. Importantly, by no means does our data justify violent media (see Anderson, Gentile, & Buckley, 2007). In fact, our model joins extant research and theories in social psychology in predicting that these are more likely to increase aggression than to reduce it. Our results may help to understand, however, why the notion of catharsis is so prevalent in laypeople's theories on aggression: it is possible that they subscribe to a naïve theory of goal activation and post fulfillment inhibition.

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Table 1

Overview of the Experimental Design from Experiment 1

	Phase 1	Block1	Phase 2	Block2	Phase 3	Block3
Experimental group 1	Cheating scenario	LDT	Taking revenge	LDT	Stabbing a Voodoo Doll	LDT
Experimental group 2	Cheating scenario	LDT	Taking revenge	LDT	Looking at a Voodoo Doll	LDT
Experimental group 3	Cheating scenario	LDT	Revenge failed	LDT	Stabbing a Voodoo Doll	LDT
Experimental group 4	Cheating scenario	LDT	Revenge failed	LDT	Looking at a Voodoo Doll	LDT
Control group 1	Birthday party scenario	LDT	Birthday party scenario continued	LDT	Stabbing a Voodoo Doll	LDT
Control group 2	Birthday party scenario	LDT	Birthday party scenario continued	LDT	Looking at a Voodoo Doll	LDT

Table 2

Reaction Times in ms on a Lexical Decision Task by Condition, Block and Word Type (Experiment 1, N=91)

	Block 1	*Block 2*	*Block 3*
Aggression-goal-fulfillment-stabbing			
1) Words related to aggression	648 (70)	719 (58)	790 (73)
2) Words unrelated to aggression	738 (67)	716 (62)	699 (84)
Mean difference between 2) and 1)	90 (95)	-3 (53)	-91(108)
Aggression-goal-fulfillment-no stabbing			
3) Words related to aggression	653 (73)	718 (46)	732 (180)
4) Words unrelated to aggression	704 (100)	715 (98)	709 (93)
Mean difference between 4) and 3)	52 (58)	-3 (92)	-22 (187)
Aggression-goal-thwarting-stabbing			
5) Words related to aggression	577 (59)	526 (79)	812 (107)
6) Words unrelated to aggression	738 (256)	725 (151)	713 (61)
Mean difference between 6) and 5)	162 (260)	200 (205)	-99 (132)
Aggression-goal-thwarting-no stabbing			
7) Words related to aggression	681 (107)	648 (137)	609 (84)
8) Words unrelated to aggression	711 (88)	734 (109)	740 (77)
Mean difference between 8) and 7)	30 (83)	86 (93)	131 (102)
No aggression-stabbing			
9) Words related to aggression	729 (132)	703 (78)	652 (90)
10) Words unrelated to aggression	718 (98)	704 (84)	723 (92)
Mean difference between 10) and 9)	-11 (76)	1 (103)	71 (64)
No aggression- no stabbing			
11) Words related to aggression	714 (101)	704 (84)	699 (71)
12) Words unrelated to aggression	710 (112)	720 (77)	709 (71)
Mean difference between 12) and 11)	-5 (96)	16 (71)	11 (69)

Note: Standard deviations are in parentheses. Higher values of the mean differences represent more accessible aggression related words compared to words unrelated to aggression.

Table 3

Overview of the Experimental Design from Experiment 2

	Phase 1	Block 1	Phase 2	Block 2	Phase 3
Goal-fulfillment	Cheating scenario	LDT	Revenge	LDT	Picture Selection Task
Goal-thwarting	Cheating scenario	LDT	No-Revenge	LDT	Picture Selection Task
Non-Aggressive Goal-fulfillment	Cheating scenario	LDT	Non-aggressive solution	LDT	Picture Selection Task

Table 4

Reaction Times in ms on a Lexical Decision Task by Condition, Word Type and Block (Experiment 2, N=51)

	Block 1	*Block 2*
Goal-fulfillment		
1) Words related to aggression	704 (145)	836 (86)
2) Words unrelated to aggression	787 (224)	720 (150)
Mean difference between 2) and 1)	83 (134)	-117 (122)
Goal-thwarting		
3) Words related to aggression	737 (119)	680 (109)
4) Words unrelated to aggression	844 (172)	769 (134)
Mean difference between 4) and 3)	108 (152)	90 (85)
Non-aggressive conflict solution		
5) Words related to aggression	753 (135)	773 (155)
6) Words unrelated to aggression	843 (169)	783 (191)
Mean difference between 6) and 5)	89 (160)	10 (96)

Note: Standard deviations are in parentheses. Higher values of the mean differences represent more accessible aggression related words compared to words unrelated to aggression.

Table 5

Overview of the Experimental Design from Experiment 3

	Phase 1	Block 1	Phase 2	Block 2
Goal-fulfillment	Cheating scenario	LDT	Revenge	LDT
Goal-thwarting	Cheating scenario	LDT	No-Revenge	LDT
Punching Bag	Cheating scenario	LDT	Aggression against a punching bag	LDT
Wrong Target	Cheating scenario	LDT	Aggression against another person	LDT

Table 6

Reaction Times in ms on a Lexical Decision Task by Condition, Word Type and Block (Experiment 3, N=83)

	Block 1	*Block 2*
Goal-fulfillment		
1) Words related to aggression	704 (158)	738 (232)
2) Words unrelated to aggression	705 (149)	666 (167)
Mean difference between 2) and 1)	2 (70)	-71 (93)
Goal-thwarting		
3) Words related to aggression	772 (205)	668 (112)
4) Words unrelated to aggression	709 (143)	677 (106)
Mean difference between 4) and 3)	-63 (149)	9 (54)
Punching bag		
5) Words related to aggression	695(156)	621 (90)
6) Words unrelated to aggression	683 (143)	687 (129)
Mean difference between 6) and 5)	-13 (87)	66 (62)
Wrong target		
7) Words related to aggression	627 (223)	577 (71)
8) Words unrelated to aggression	590 (98)	622 (97)
Mean difference between 8) and 7)	-37 (233)	45 (65)

Note: Standard deviations are in parentheses. Higher values of the mean differences represent more accessible aggression related words compared to words unrelated to aggression.

[1] For the sake of clarity we describe here the story from a female protagonist's perspective only. Only if the two stories for the genders differ will we describe both. An English translation of the vignettes for all studies can be found as supplementary material published online with this article.
[2] A complete list of words can be found in the supplementary online material.
[3] Note that due to translation problems, the curse words may seem awkward or old fashioned. In the German version we made sure that the curse words were commonly used by this sample to express intense aggression.
[4] All η^2 reported in this article were calculated as partial η^2.
[5] . Due to randomization failure, in the two stabbing conditions accessibility of aggression in Block 1 was higher (M= 126 ms, SD= 196 ms) compared to the two no-stabbing conditions (M= 41 ms, SD= 71 ms), $F(1,59) = 6.71$, $p < .012$, $\eta^2 = .10$. Therefore, we repeated the analyses below with Block 1 as a covariate. The results remained the same, suggesting that the difference in Block 1 cannot account for these results. Similar analyses with Block 1 as a covariate were conducted also in Experiment 2 and 3 and always yielded the same results.
[6] We obtained the same results when looking only at conditions that could not yet fulfil the goal (namely, when comparing the experimental conditions 3 and 4; see Table 1).
[7] We tested that participants understand that viewing negative pictures cause discomfort to the viewer. Participants (n = 20) indicated for each picture how unpleasant it would be for someone to view it on a scale form 1 (not at all unpleasant) to 9 (very unpleasant) scale. Across the 30 pictures, mean ratings of unpleasantness to view were highly correlated with negativity $r(28) = -.90$; $p<.001$, indicating that participants were well aware that it is unpleasant to view negative pictures.
[8] We are grateful to one anonymous reviewer who pointed out this alternative method.
[9] One might think that Experiment 1 tested this already when the control condition showed an increase of aggression after stabbing the voodoo doll. However, in this condition of Experiment 1 participants did not have a goal to aggress as in Experiment 3.
[10]Contrary to the previous studies, this time participants did not have aggressive constructs more accessible than unrelated constructs after reading the aggression-eliciting story (see Table 6). Because this study did not include a non-aggression control group, we do not know whether reading the story increased the accessibility of aggressive constructs. This experiment simply did not test this hypothesis.
[11] We thank again one reviewer for pointing to this possibility.