The Power In Your Hand: Gender Differences In Bodily Feedback From Making a Fist

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Men and women differ in the meaning they attribute to physical coercion and bodily force. Men associate bodily force with gaining power, whereas women associate bodily force with expressing loss of power. It is hypothesized that because of these associations, performing bodily forceful behavior feeds back on appraisals of one's power and that bodily feedback effects will mirror the gender differences in associations. Supporting these hypotheses, it was found that unobtrusively inducing behavior related to bodily force (making a fist) activated the concept of power in a Stroop task for both genders but that it increased hope for power and positive judgments of an assertively acting target for men, whereas it decreased hope for power and led to negative judgments of an assertively acting target for women.

Keywords: *embodiment; bodily feedback; power; aggression*

Imagine the following three persons: a boy watching his favorite (male) soccer player shooting a penalty, the soccer player after he scores the goal, and a politician when he explains to his opponents that he will reach his goals. What behavior will these three men probably share? Probably, all three of them will clench their hands to fists, embodying their will to have power. However, women or girls would less likely show this behavior in the same situations. In the present research, this difference and the consequences of this behavior on appraisals of one's power are investigated.

Making a fist indicates the potential to use bodily force. Demonstrating bodily force in this way implies the potential willingness to perform the implied action. As exemplified above, such behaviors are shown in negotiations of power and status, are associated with assertiveness (Gitin, 1970), and may lead to others' submission (Tiedens & Fragale, 2003). But the impact of performing such behavior may go further—it also may influence the person performing it. Following literature on bodily feedback (for a review, see Neumann, Förster, & Strack, 2003), the current research investigates the possibility that there is a bodily feedback of performing gestures of bodily force on power-related thinking. The first question is: Does making a fist influence how powerful a person thinks he or she is?

It is important, however, to acknowledge gender differences in the realm of bodily force or physical aggression, which persist even in modern societies. Men and women differ in how they understand and use bodily means for coercive actions. Campbell and her colleagues (Campbell & Muncer, 1994; Campbell, Muncer, & Coyle, 1992; see Geen, 1998) argued that if men hit someone, it is likely that they want the other to comply. In contrast, if women hit someone, it is likely that they feel powerless and want to express emotional distress. Consequently, the second question addressed by the current research is: If there is a bodily feedback of power from bodily force, does this feedback mirror the gender difference in the meaning and use of physical coercion?

GENDER DIFFERENCES IN PHYSICAL COERCION

Gender is an important moderator for power and coercion processes. On average, women describe them-

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selves as less dominant and assertive than do men (Feingold, 1994) and differ from men in how they exert power (McClelland, 1975). Gender differences are especially large in bodily coercion, which can be seen as a form of social influence with the goal to control others (Tedeschi & Felson, 1994). Because women are, on average, less strong than men, their chances to gain influence by applying bodily force are less good. Cultural norms of Western societies still discourage boys and men less than girls and women from using bodily force as a means of social influence. Consequently, frequency and meaning of physical aggression differ between the genders.

The relation between gender and frequency of coercive behavior is moderated by response mode (White, 2001). Boys are more aggressive than girls in the bodily domain (but not in the relational domain; Crick & Grotepeter, 1995). Men are more aggressive than women when the response mode is bodily rather than verbal (Bettencourt & Miller, 1996). Men commit more violent crimes than women, especially toward strangers (Felson, 2002). Thus, it seems that "men are especially likely to be more aggressive than women when the aggression is physical and assaultive" (Geen, 1998, p. 331).

Campbell and her associates (Campbell et al., 1992; Campbell & Muncer, 1994; Muncer & Campbell, 2000) found that men conceptualize their own use of bodily force in a more instrumental manner than do women: Men tend to understand bodily force more than women as a means to reach goals by controlling others or as a useful way to gain power. Women hold a more expressive conceptualization of their own use of bodily force than do men. For them, using bodily force is a sign of losing (or lost) power and of expressing this loss toward others. Women understand bodily force more than men as emotional behavior and react with guilt and repression. Women, Campbell et al. argue, associate their own use of bodily force with abandonment rather than being in control or gaining power.

Consequently, men and women differ concerning associations between bodily force and experiences of power. Men are culturally less discouraged to use bodily force, which will frequently be associated with success and power gain, and they understand their own bodily force as a means to gain control. Therefore, men are more likely to develop an association between bodily force and being in control, or having power. Women are culturally discouraged from using bodily force, it will frequently be associated with power loss, and they understand their use of it as loss of control. Therefore, women are more likely to develop an association between bodily force and powerlessness, or losing power.

BODILY FEEDBACK

To answer the question of how behavior related to bodily force can influence a person who is performing it, the relation between behavior and cognition has to be analyzed. Cognition is in many ways embodied, that is, bodily behavior and cognition are closely interconnected and interdependent (Barsalou, 1999; Barsalou, Niedenthal, Barbey, & Ruppert, in press; Glenberg, 1997). Because of this interdependence, bodily behavior can influence cognitive processing. Evidence for such influences exists at several levels, such as effects of behavior on language comprehension, on basic motivational processes, and on the experience of feelings.

At a very basic level, comprehension of phrases can be facilitated or inhibited by compatible or incompatible movements, respectively (Glenberg & Kaschak, 2003; Klatzky, Pellegrino, McCloskey, & Doherty, 1998). The same applies for basic motivational processes such as approach and avoidance. Some motor programs such as flexing or extending the arm are so closely associated with mental processes of approach and avoidance that their performance influences evaluative processes (Cacioppo, Priester, & Berntson, 1993; Chen & Bargh, 1999; Friedman & Förster, 2000; Neumann & Strack, 2000a). On an even higher level, feelings can be facilitated or inhibited by compatible or incompatible facial expressions, even in the absence of self-perception processes and inferences (Neumann & Strack, 2000b). Strack, Martin, and Stepper (1988) showed that feelings of amusement were facilitated by compatible facial behavior (unobtrusively induced smiling) but inhibited by incompatible facial behavior. Other feelings can be influenced in a similar way. In a study by Strack and Neumann (2000), participants who were led to furrow a brow judged persons as less famous because the muscle contracting facilitated the feeling of mental effort, on which the judgment was then based.

It is likely that such effects rest to a large extent on a facilitation of cognitive processes by compatible bodily actions. Förster and Strack (1996) and Förster and Stepper (2000) provided evidence that performing bodily behaviors facilitated cognitive processing of compatible stimuli by analyzing the effects on mental capacity. They found that the compatibility between motor behavior and cognition facilitates processing, thereby freeing mental capacity, whereas incompatibility of motor behavior and cognition leads to mental load.

In sum, bodily actions facilitate compatible mental processes (for alternative explanations, see Adelmann & Zajonc, 1989; Laird, 1974; Zajonc & Markus, 1984). To learn more about the influence of bodily force on power, it is therefore necessary to look more closely on mental representations of power.

MENTAL REPRESENTATIONS OF POWER AND THEIR RELATION TO BODILY FORCE

Even if power is typically defined in an objective manner, as the actual control a person has over another person's outcomes, for most effects of power it will be decisive whether a person mentally represents himself or herself as powerful or powerless (Keltner, Gruenfeld, & Anderson, 2003). Representing oneself as powerful results from an appraisal of a situation as an opportunity to have impact on others. Conversely, representing oneself as powerless results from seeing the risk of being dominated by others. In the following, the term *appraisal* will therefore be used to refer to such representations. Objective power will have some effects even when it is not accompanied by appraising oneself as powerful, but most theorists agree that power appraisals are often the true source of psychological effects of objective power (Haidt & Rodin, 1999; Skinner, 1996). This becomes especially clear when objective power and the subjective appraisal diverge. If nominally powerful persons perceive themselves as powerless, they are likely to act defensively and show intrusive concerns with domination when they are challenged (Bugental & Lewis, 1999). Anderson and Berdahl (2002) recently provided evidence that manipulations of objective power were mediated by subjective appraisal of power; in the same manner, effects of trait personality dominance also were mediated by subjective appraisal of power. Thus, the appraisal of one's power is not only an epiphenomenon of objective power, but it plays a mediating role for some effects of objective power and it can sometimes even override objective power.

Combining the insight that power is mentally represented with the findings on bodily feedback and meanings of bodily force, it can be hypothesized that behaviors related to bodily force will have effects on power appraisals. More specifically, I predict that behavior that is compatible with powerfulness will facilitate appraisals of situations as affording influence on others. Likewise, behavior that is compatible with powerlessness will facilitate appraisals of situations as threatening dominance by others. As seen above, bodily force is compatible with powerfulness for men but with powerlessness for women. Consequently, it can be expected that bodily force will feed back powerfulness to men but powerlessness to women. Of importance, women are expected to associate bodily force with powerlessness, not because they are more frequently forced in this way but because their own application of bodily force is associated with power loss. Finally, it is important to note that these effects of bodily feedback from bodily force are expected to occur unconsciously, without inferences or self-perception.

OVERVIEW OF PRESENT RESEARCH

In the following three studies, these ideas will be tested by looking at how judgments of situations and others are influenced by bodily feedback from bodily force. The hypothesis is that bodily feedback from bodily force leads men to have more hope for power, and judge others accordingly, whereas it leads women to have less hope for power and judge others from the perspective of a victim. But before these hypotheses are tested in Studies 2 and 3, Study 1 establishes that the concept of power is activated by performing a behavior associated with bodily force. As a manipulation of bodily feedback, all three studies use making a fist in the experimental conditions. Making a fist is the abbreviation of hitting someone or something; it implies the ability and determination that one will use bodily force (Gitin, 1970).

Bodily force also may be associated with emotions and mood. It might be that performing such behavior induces a negative mood in women, or a positive mood in men, or increases arousal. If this was the case, one could argue that these variables mediate the effects of the manipulation. Therefore, mood and arousal are assessed in all three studies to check whether making a fist has any effect on these variables.

STUDY 1: WHEN YOUR BODY TELLS YOU THAT POWER IS AT STAKE

I argued that bodily feedback from bodily force will be moderated by gender. However, this implies that bodily force will activate the concept of power itself for both genders. Study 1 tested whether making a fist increases accessibility of power-related words independent of gender. To rule out that the effects hinge on inferential processes and self-perception, making a fist was induced such that participants were not aware of its relation to bodily force (Strack et al., 1988) and participants were thoroughly questioned for awareness of this association. In addition, it was tested whether bodily force also activates the concept of aggression itself. If making a fist would activate aggression, one could argue that any effects on power would be mediated by this effect.

Method

OVERVIEW

At the same time, as participants performed either behavior related to bodily force or neutral behavior, the accessibility of words associated with power, with aggression, and of neutral words was assessed in a Stroop task. The Stroop task measures how long it takes participants to name the color of the presented word. It is assumed that the higher the accessibility of a word, the more it interferes with color-naming, resulting in longer reaction times (MacLeod, 1991). The study had a 2 (hand posi-

tion: fist vs. neutral) × 2 (gender) × 2 (word type: power vs. aggression) factorial design with the first two factors being varied between and the third factor within participants. Reaction times to neutral words were later used as a covariate to control for interindividual differences in speed.

PARTICIPANTS

Fourteen women and 11 men took part in the study (ages 20 to 27, $M = 22.4$, $SD = 2.1$). When asked for goals of the study and possible influences of their hand position on reaction times, none of them guessed the true purpose of the experiment.

MATERIALS

The Stroop task presented nine words related to power (*rule*, *win*, *achieve*, *influence*, *mighty*, *authority*, *powerful*, *strong*, *influential*) and nine words related to aggression (*attack*, *hate*, *violence*, *murder*, *brutal*, *hit*, *aggressive*, *argument*, *fight*; some of them taken from Mussweiler & Förster, 2000).[1] Note that the power words do not imply a direction. Instead, they can refer both to the self (*I am influential*) and to others (*They are influential*). Thus, processing of these words should be facilitated both when powerfulness and powerlessness is activated. Three lists with five, nine, and nine neutral words (e.g., *antenna*, *bicycle*, *read*) were assembled and used for practice trials, general speed assessment, and concept trials.

Mood and arousal were measured by self-report. To measure current mood and arousal, participants were asked how they currently felt on scales from 0 (*very bad*) to 10 (*very good*) and 0 (*absolutely calm*) to 10 (*very aroused*; Neumann & Strack, 2000a). Further measures distinguished between tense and energetic arousal (Schultheiss & Brunstein, 1999). Participants rated on 11-point scales from 0 (*no, not at all*) to 10 (*yes, fully*) whether they felt *active*, *energetic*, and *lethargic* for energetic arousal and *nervous*, *restless*, and *calm* for tense arousal.[2]

PROCEDURE

One female and one male experimenter asked students at the campus to participate in an experiment on "Hemisphere activation" (adapted from Friedman & Förster, 2000) in exchange for a chocolate bar. Participants were run alone or two at a time. Instructions were given on the computer. The study was described as investigating how manual actions activate brain hemispheres and how this activation affects word comprehension. Before the actual manipulation, the Stroop task was explained. Participants were told to press the left cursor key for a blue word and the right cursor key for a green word with index and middle finger of the right hand; they practiced 10 trials. Words remained on the screen until an answer was given, but not more than 2,000 ms. Feedback on correct, wrong, or too slow answers was given during practice trials only. Next, participants read about the children's game "rock-paper-scissors" and saw a line drawing of each hand position. In the fist condition, participants were asked to make a "rock" with their left hand while holding the hand slightly above the table. In the neutral gesture condition, they were asked to make "scissors." It was stressed repeatedly that this hand position had to be held during the whole experiment. At no point was the word *fist* used to avoid additional activation of semantic knowledge structures associated with *fist*. While holding the assigned gesture, participants continued the Stroop task. First, 18 trials presented nine neutral words once in each color (general speed assessment). After a short break, the power, aggression, and remaining neutral words were presented in a random order, each word appearing once in each color, resulting in a total of 54 trials. Order of trials was randomized such that each word occurred once in the first half and once in the second half of the trials. The experiment was programmed in DMDX (Forster & Forster, 2003).

Following the Stroop task, and while still holding the assigned hand position, self-reports on mood and arousal were assessed. Afterward, participants gave demographic information and were then asked what they thought the purpose of the study was and whether they suspected any influence of the hand position on the speed of their reactions. Finally, they were debriefed and given their candy.

Results

REACTION TIMES

Initial analyses explored differences between the "blue" and "green" answers, which were assigned to the middle or the index finger, respectively. It was found that combining answers from both fingers led to the same results as analyzing only the responses given with the index finger but that middle finger answers showed no effects. Therefore, only index finger answers were analyzed. All wrong answers (4.6%) were discarded.

To account for interindividual differences in reaction speed, a general speed covariate was computed by averaging reaction times to all neutral words except practice trials. Reaction times to the power and the aggression words were averaged separately. First, these two scores were treated as repeated measures in a 2 (hand position) × 2 (gender) × 2 (word type) ANCOVA with the averaged reaction times on neutral words as a covariate. Besides a significant effect of the covariate, $F(1, 20) = 50.66$, $p < .001$, a main effect of hand position emerged, $F(1, 20) = 6.74$, $p = .017$, indicating that overall reactions were slower when participants made a fist, which was qualified by an interaction with word type, $F(1, 20) = 4.66$, $p = .043$, indicating that this difference was larger for power than

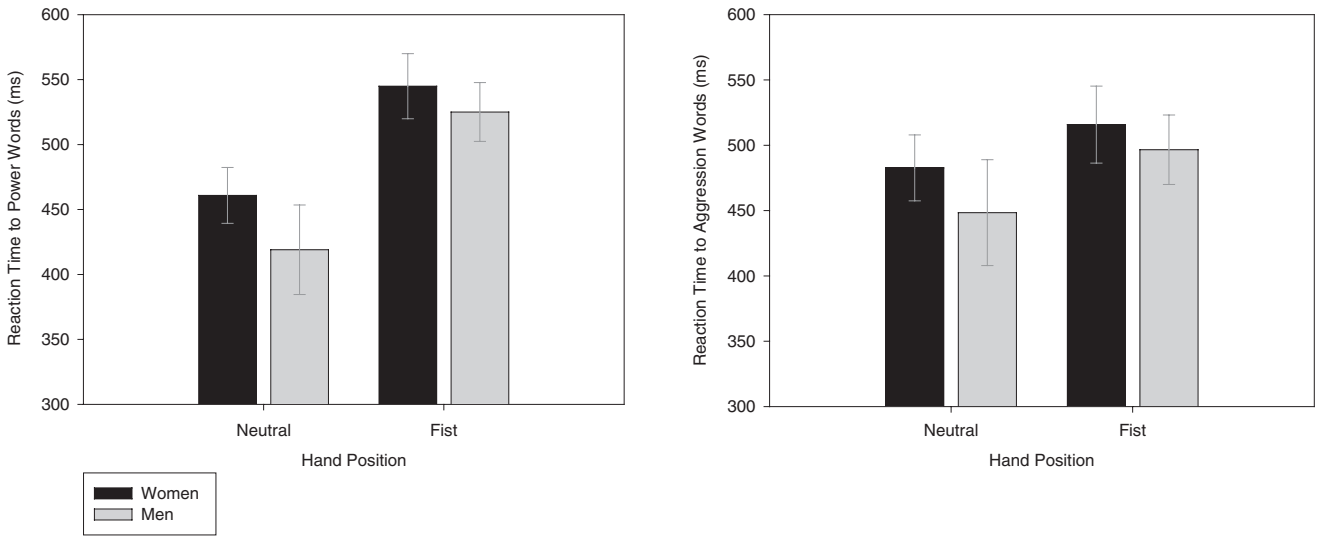

Figure 1 Mean reaction times in Stroop task (+ *SE*) for power-related words (left) and aggression-related words (right) as a function of participants' hand position and gender, Study 1.
NOTE: Means are controlled for reaction time to neutral words.

for aggression words (see Table 1). This interaction was further explored in two separate 2 (hand position) × 2 (gender) ANCOVAs for power-related and aggression-related words and the same covariate. The covariate was significant for both power and aggression words, $F(1, 20) = 58.17$ and $F(1, 20) = 29.33$, ps < .001. As Figure 1 shows, after controlling for the speed on neutral words, reactions to power-related words were as predicted significantly slower when participants made a fist (M = 534.98, SE = 16.93) than when they made a neutral gesture (M = 439.92, SE = 19.48), $F(1, 20) = 12.78$, $p = .002$, $\eta_p^2 = .39$.[3] This effect was not moderated by gender, $F < 1$, and there was no gender main effect, $F(1, 20) = 1.21$, p = .284. Although reactions to aggression-related words were also slightly slower when participants made a fist (M = 506.19, SE = 19.89) than when not (M = 465.55, SE = 22.89), this difference was not significant, $F(1, 20) = 1.69$, $p = .208$. None of the remaining effects was significant, Fs < 1.

MOOD AND AROUSAL

For both tense and energetic arousal, the respective scales were internally consistent, $\alpha = .82$ and $\alpha = .92$, respectively. Gender × Hand Position ANOVAs were conducted on their average scores, the general arousal measure, and on self-reported mood. No effect reached significance, all Fs < 1.6, ps > .20, η_p^2s < .07.

Discussion

To provide evidence that performing behavior of bodily force increases the accessibility of the power concept, it was assessed whether making such a gesture increases interferences by power-related words in a Stroop paradigm. It was found that making a forceful gesture slows down color naming for power-related words significantly. This indicates that power-related words were more accessible for participants who made a fist than for participants who did not make a fist. Of importance, this was true for both men and women, although it should be noted that the low sample size might have limited the chance to find gender differences. This result might be surprising at first given that all words were related to having power, but it has to be noted that the words did not denote who had the power, and therefore, both powerlessness and powerfulness should lead to increased accessibility.

Furthermore, the results show that the gesture had no effect on words that were related to aggression. Thus, making a fist does not directly activate aggression itself,

TABLE 1: Reaction Times for Power- and Aggression-Related Words in a Stroop Task, Depending on Participants' Hand Position and Gender, Study 1

		Gender			
		Female		*Male*	
Word Type	*Hand Position*	M	SE	M	SE
Power-related	Neutral	460.84	21.50	419.01	34.49
	Fist	544.91	25.07	525.06	22.62
Aggression-related	Neutral	482.68	25.26	448.42	40.52
	Fist	515.82	29.45	496.57	26.57

NOTE: *SE* instead of *SD* is reported because means are estimated controlling for reaction times to neutral words.

presumably because the population we drew from in this study is usually not involved in physical violence that would create such an association. At the same time, the effect on power words shows that such gestures are associated with having influence in general. Furthermore, the gesture did not affect mood or arousal, which is not surprising given that it was not held for a long time or accompanied by any positive or negative feedback on performance, which would probably be necessary to cause a change in mood or even emotion (Stepper & Strack, 1993).

STUDY 2: WHEN YOUR BODY TELLS YOU THAT THERE IS (NO) HOPE FOR POWER

Building on the finding that a bodily force gesture activates the power concept for both men and women, it is now possible to test the hypothesized divergence of feedback effects of bodily force on men and women. Above, it was argued that bodily force would facilitate situated conceptualizations of gaining power for men, whereas it would facilitate situated conceptualizations of losing power for women. To measure these effects, Study 2 uses a test developed for the study of need for power (McClelland, 1975), the Multi-Motive Grid (MMG; Sokolowski, Schmalt, Langens, & Puca, 2000). In the tradition of the TAT, but with the advantage of an easier assessment, it measures perceived applicability of motive-congruent thoughts to pictorial stimuli. The MMG items are pretested as indicating concerns with power, achievement, and affiliation. Because the items for achievement also have strong associations to control, power and achievement were combined into a single score of hope for control, following suggestions by Woike and colleagues (Woike, 1995; Woike, Lavezzary, & Barsky, 2001). Making a fist again served as a manipulation of bodily force. It is predicted that making a fist increases interpretations related to hope for control for men but decreases such interpretations for women.

Method

OVERVIEW

Participants answered the MMG while making either a fist or a neutral manual gesture. Thus, the study had a 2 (hand position: fist vs. neutral) × 2 (gender) between-subjects factorial design with two main dependent variables: hope for control and hope for affiliation.

PARTICIPANTS

In total, data from 42 women and 36 men were collected. Four men had to be excluded because they guessed the true purpose of the study. Mean age was 20.9 (SD = 3.9, ranging from 17 to 37).

MATERIALS

The MMG was slightly modified, rewording some items and excluding filler items. The shortened version measured hope for power, achievement, and affiliation. Fourteen drawings of persons in various situations were shown along with brief descriptive sentences (the items). For each item, participants indicated whether in their opinion this sentence applied to the picture by pressing the respective key.

The items are phrased such that they tap either the power, achievement, or affiliation motive. For instance, an item indicating hope of power is "Here one wants to have influence" and an item indicating hope of achievement is "Here one has trust in one's success." Furthermore, to make the test shorter, each picture measures only the motives it is sensitive to: only one, two, or all three. Because one motive is always assessed with two items for a picture, there can be either two, four, or six items for one picture. For each motive, 6 pictures applied and therefore 12 items had to be answered in total. Because the test simply counts yes answers (applies to the picture), the resulting score for each motive can range from 0 to 12.

Mood and arousal were measured in the same way as in Study 1. In addition, participants were asked for their current emotional state by asking them whether they were *proud*, *satisfied*, *relieved*, *annoyed*, *angry*, *frustrated*, or *anxious*. All items had to be answered on scales ranging from 1 (*not at all*) to 5 (*fully*).

PROCEDURE

Recruiting and gesture manipulation followed Study 1, with a slightly different cover story: Participants were told that we were interested in how distracting they would find a manual task in addition to their main task. Instructions and pictures were presented by a computer. After the hand position manipulation, pictures and items were shown. Each picture first appeared for 7 s without an item on the screen, with the instruction to take the perspective of one person in the picture. Then, the items were shown one by one underneath the picture and participants decided whether "this thought applied to this situation" by pressing the *yes* or the *no* key. Pictures and items were presented in the fixed order used in the original MMG. After finishing the MMG, participants rated their mood, arousal, and emotions and indicated age, gender, and ideas about the purpose of the study. At the end, participants received a full debriefing, a report of their average scores, and their candy.

Results

MOTIVE SCORES

Achievement and power affirmations were summed to a total hope for control score and divided by two to

TABLE 2: Perceived Applicability of Hope for Control and Hope for Affiliation Statements to Pictures, Depending on Participants' Hand Position and Gender, Study 2

		Gender			
		Female		Male	
Motive	*Hand Position*	M	SD	M	SD
Hope for control	Neutral	7.63	1.64	6.61	2.06
	Fist	6.67	1.63	7.44	1.62
Hope for affiliation	Neutral	5.38	1.58	5.36	1.82
	Fist	5.11	1.88	5.61	1.54

NOTE: Values reflect summed affirmations of respective items and can range from 0 to 12.

make them comparable to the number of affirmed hope for affiliation items. Table 2 displays the means. Hope for control and hope for affiliation scores were submitted to two 2 (hand position) × 2 (gender) ANOVAs. For hope for control, the expected interaction was significant, $F(1, 70) = 4.88$, $p = .030$, $\eta_p^2 = .07$. Figure 2 shows that the pattern was as predicted. Simple effects analyses confirmed that women expressed less hope for control when they made a fist ($M = 6.67$, $SD = 1.63$) compared to the neutral gesture, ($M = 7.63$, $SD = 1.64$), $F(1, 70) = 3.21$, $p = .039$ (one-tailed), $\eta p^2 = .04$. Men, however, expressed slightly more hope for control when they made a fist ($M = 7.44$, $SD = 1.62$) compared to the neutral gesture ($M = 6.61$, $SD = 2.06$), but this difference was only marginal, $F(1, 70) = 1.88$, $p = .088$ (one-tailed), $\eta p^2 = .03$. There were no main effects of hand position or gender on hope for control and no effects at all on hope for affiliation, all Fs < 1.

Because the scores combined very different pictures, additional analyses explored which pictures contributed most to the effect on hope for control. For these analyses, affirmations for control motives were averaged per picture. Two out of the eight power-relevant pictures contributed particularly to the interaction, $\eta_p^2 = .05$ and .09. The first showed dancing couples in a bar and the second showed a beach scene, with several persons sunbathing and one person playing ball by himself. Although for the first picture a connection to control and power is plausible, such an association is not obvious for the second picture, for which nevertheless a significant crossover interaction was found, $F(1, 70) = 6.54$, $p = .013$; men expressed more and women less hope for control when they made a fist.

MOOD, AROUSAL, AND EMOTIONS

For both tense and energetic arousal, the respective 3-item scales were internally consistent, $\alpha = .73$ and $\alpha = .89$, respectively. To determine whether mood, arousal, tense or energetic arousal, or any of the specific emotions mediated the obtained interaction effect, Gender × Hand Position ANOVAs were conducted on these variables. For none of them, a significant interaction effect emerged, all Fs < 1. The only significant main effect of hand position emerging from these analyses indicated that tense arousal was lower in the fist condition ($M = 1.69$, $SD = .84$) than in the neutral gesture condition ($M = 2.27$, $SD = 1.13$), $F(1, 70) = 6.08$, $p = .016$, $\eta_p^2 = .08$.

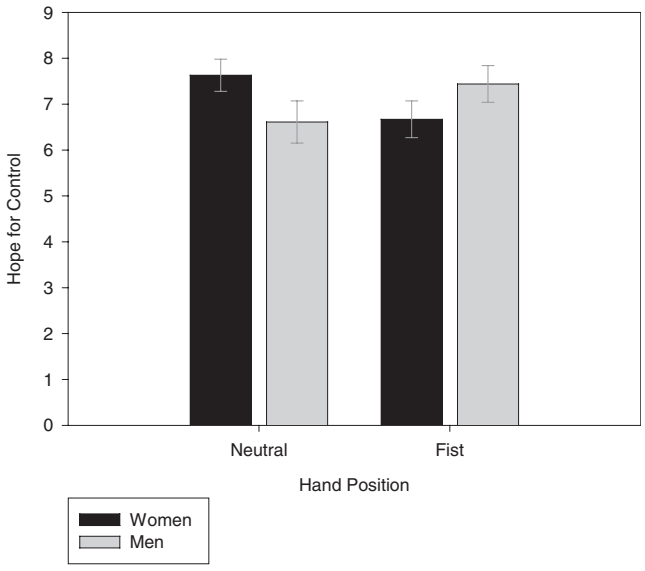

Figure 2 Mean number of expressed hope for control (+ *SE*) as a function of participants' hand position and gender, Study 2.
NOTE: Scores can range from 0 to 12.

Discussion

Bodily feedback from making a gesture of bodily force results in activation of the concept of power but the direction of these effects differs between men and women, as the significant interaction of the manipulation and gender in Study 2 showed: Women who made a fist perceived less hope for control in the pictures than women who did not make a fist. In contrast, men who made a fist saw marginally more hope for control than those men who made a neutral gesture. A more detailed exploratory analysis suggests that strong effects were not only due to clearly power-related pictures but also to rather ambiguous and not clearly power-related pictures. A detailed view on the underlying process is postponed to the General Discussion.

These effects are not attributable to simple influences of mood: No interaction was found for mood, arousal, or any of the self-reported emotions. Because the cover story obscured the fact that the gesture was related to bodily force and because the word *fist* was never used, it seems safe to conclude that the obtained effects are due to bodily feedback and not to a process in which participants observed and categorized themselves as

making a fist, as a self-perception account would suggest (Laird, 1974). In other words, effects were not driven by priming the word *fist* through instruction or through self-perception.

STUDY 3: WHEN YOUR BODY TELLS YOU WHETHER DONALD IS HOSTILE OR KIND

Experiences of power are central to how we relate to other persons, and therefore, changing power appraisals through bodily feedback also should affect judgments of other persons. Study 3 investigates the effects of bodily force on judgments that are influenced by power relations, namely, judgments of hostility of others. How are appraisals of powerfulness (in men) and powerlessness (in women) going to influence perceptions of others?

Whether we judge the actions of another person as aggressive depends on a complex attribution process that hinges on assumptions about the other's intentions (Crick & Dodge, 1996; Löschper, Mummendey, Linneweber, & Bornewasser, 1984). Power may influence attribution because it focuses attention on possible environmental threats or chances (Keltner et al., 2003; Schwartz, Dodge, & Coie, 1993). Powerless individuals are more likely to think about hostility and aggressiveness of others and perceive others in this light. Powerful individuals are more likely to think about chances and their own assertiveness. Support for this hypothesis comes from a study by Dodge and Coie (1987). They investigated boys' attributions of hostility to ambiguous acts and distinguished between boys who were either habitually proactively aggressive or reactively aggressive. Proactive and reactive aggression roughly correspond to the concepts of instrumental and expressive aggression described earlier. Dodge and Coie found that boys only high in reactive aggression, but not boys only high in proactive aggression, showed a bias toward interpreting a provocateur's intentions as hostile.

To investigate the idea that bodily feedback influences attributions of hostility, Study 3 used the classic Donald paradigm introduced by Higgins, Rholes, and Jones (1977) and Srull and Wyer (1979). Again, making a fist served as a manipulation of bodily force. Participants had to judge whether an ambiguously acting target was hostile. As explained above, bodily force has more expressive functions in women, whereas it is instrumental for men. This means that women tend to activate these behavior programs in situations where they see others as behaving aggressively. Thus, when activating these motor programs, they should tend to see another person as behaving more aggressively. Men, on the other hand, should activate these motor programs in situations where they are dominating. They should thus see another person as behaving less aggressively.

Method

OVERVIEW

While participants either made a fist or a neutral gesture, they read the description of an ambiguously acting male person called Frank, judged Frank on positive and negative adjectives that were either related or unrelated to hostility, and rated their mood and arousal. Thus, the full design was a 2 (hand position: fist vs. neutral) × 2 (gender) × 2 (trait valence: positive vs. negative) × 2 (trait hostility: hostility related vs. not hostility) factorial design with the first two factors varied between and the last two factors varied within subjects. We expected effects on traits related to hostility but not on traits unrelated to hostility (Srull & Wyer, 1979).

PARTICIPANTS

Nineteen women and 18 men took part in the study, mean age was 21.3 (SD = 2.2, ranging from 19 to 27). None of them suspected an effect of the hand position on their judgments.

MATERIALS

The Donald paragraph from Srull and Wyer (1979) was translated into German and Donald was called *Frank*. The text described a day in Frank's life and mentioned several behaviors that could be interpreted as either aggressive or assertive, for instance, that he refuses to pay his rent until his apartment is renovated, that he first buys a tool and then tries to give it back immediately, and that he refuses to donate blood. As the dependent measure, participants rated Frank on 12 adjectives, using scales from 0 (*not at all*) to 10 (*extremely so*). There were three negative and three positive adjectives related to hostility, measuring Frank's hostility (negative, hostility-related) and friendliness (positive, hostility-related), respectively. Hostility adjectives were *unpleasant*, *hostile*, and *unfriendly*; friendliness adjectives were *kind*, *friendly*, and *considerate*. In addition, three negative and three positive adjectives unrelated to hostility were used: *boring*, *narrow-minded*, and *vain* and *intelligent*, *reliable*, and *interesting*.[4] Adjectives were randomized and presented in fixed order. Mood and general arousal were assessed as in previous studies.

PROCEDURE

Recruiting, procedure, and cover story followed Study 2. While holding the nondominant hand in the assigned position, participants read the story about Frank with the instruction to form an impression of him, rated him on the 12 adjectives, and rated their own mood and arousal thereafter. After giving information on gender and age and what they thought the actual purpose of the study was, they were debriefed and given their chocolate.

TABLE 3: Judgments of Ambiguously Acting Male Person, Depending on Participants' Hand Position and Gender, and Trait Valence and Trait Hostility, Study 3

			Gender			
			Female		Male	
Trait Hostility	*Trait Valence*	*Hand Position*	M	SD	M	SD
Hostility-related	Positive (friendliness)	Neutral	3.37	1.84	1.52	1.31
		Fist	2.08	1.31	3.17	0.95
	Negative (hostility)	Neutral	5.93	1.39	6.41	2.30
		Fist	7.17	2.19	5.97	1.07
Nonhostility-related	Positive	Neutral	5.47	1.91	3.82	2.37
		Fist	5.13	1.78	4.83	1.73
	Negative	Neutral	6.60	1.97	5.00	1.94
		Fist	5.33	1.32	5.40	1.43

NOTE: Scores range from 0 to 10.

Results

JUDGMENTS OF FRANK

The scales for hostility ($\alpha = .69$), friendliness ($\alpha = .74$), and unrelated positivity ($\alpha = .60$) displayed satisfactory internal consistencies, but the unrelated negativity scale was not internally consistent ($\alpha = .34$). Apparently, the German translation of narrow-minded was rather associated with hostility, which was not intended. However, because this works rather against the current hypothesis and because exploratory analyses revealed no changes in the results when the item was removed, the scale was used as originally planned. For each category, ratings were averaged to one score.

We predicted that hand position would affect ratings of Frank on hostility-related, but not on nonhostility-related adjectives, and that when making a fist, men would rate Frank as less hostile and more friendly, whereas women would rate Frank as more hostile and less friendly. In a 2 (hand position) × 2 (gender) × 2 (trait valence) × 2 (trait hostility) mixed-model ANOVA, this prediction translates into a four-way interaction, which was significant, $F(1, 33) = 7.97$, $p = .008$, $\eta_p^2 = .20$.[5] Means are displayed in Table 3.

To explore this interaction, two separate 2 (hand position) × 2 (gender) × 2 (trait valence) mixed-model ANOVAs with repeated measures on the last factor were computed for hostility-related and nonhostility-related adjectives. For hostility-related adjectives, only a main effect of trait valence, $F(1, 33) = 73.03$, $p < .001$, and the expected three-way interaction, $F(1, 33) = 6.58$, $p = .015$, $\eta_p^2 = .17$, emerged, all other effects Fs < 1.9, ps > .10, η_p^2s < 0.53. Figure 3 shows that the pattern was as predicted. Simple effects analyses showed that men judged Frank as more friendly when they made a fist ($M = 3.17$, $SD = .95$) than when they made a neutral gesture ($M = 1.52$, $SD = 1.31$), $F(1, 33) = 6.62$, $p = .008$ (one-tailed), $\eta_p^2 = .17$. For women, this effect was reversed—they judged Frank as less friendly when they made a fist ($M = 2.08$, $SD = 1.31$) than when they made a neutral gesture ($M = 3.37$, $p = 2.08$), $F(1, 33) = 3.77$, $p = .030$ (one-tailed), $\eta_p^2 = .10$. The equivalent (reversed) pattern was apparent for hostility, but here the simple effects did not reach significance: Figure 3 shows that women judged Donald as slightly more hostile when they made a fist ($M = 7.17$, $SD = 2.19$) compared to a neutral gesture ($M = 5.93$, $SD = 1.39$), $F(1, 33) = 2.15$, $p = .076$ (one-tailed), $\eta_p^2 = .06$, although there was no difference for men on this dimension, $F < 1$.

The second 2 × 2 × 2 ANOVA was conducted on nonhostility-related adjectives. Besides a nonsignificant main effect of trait valence, $F(1, 33) = 2.76$, $p = .106$, a significant gender effect was found, $F(1, 33) = 5.01$, $p = .032$, which was qualified by an unexpected marginal Hand Position × Gender interaction, $F(1, 33) = 3.80$, $p = .060$, $\eta_p^2 = .10$; all other Fs < 1 (see Table 3). This interaction indicated that irrespective of trait valence, men gave lower ratings when they made a fist, whereas women gave higher ratings when they made a fist. Because this interaction was unexpected, we explored it and the involved simple main effects further, although the three-way interaction was not significant ($F < 1$). It seemed that the interaction was mainly caused by an unexpected simple main effect: Women judged Frank somewhat lower on nonhostile negative adjectives when they made a fist ($M = 5.33$, $SD = 1.32$) than when they did not ($M = 6.60$, $SD = 1.97$), $F(1, 33) = 2.46$, $p = .126$, $\eta_p^2 = .07$. This unexpected pattern will be explained in the Discussion.

MOOD AND AROUSAL

Mood and arousal scores were submitted to 2 (hand position) × 2 (gender) ANOVAs. None of the effects reached significance, all Fs < 1.10, ps > .310.

Discussion

In Study 3, bodily feedback from making a gesture related to bodily force influenced impressions of a target whose actions could be interpreted as either hostile or assertive. Of importance, as in the previous study, gender moderated the bodily feedback effect. Women who made a fist judged the target as less kind than women who made a neutral gesture. Men who made a fist judged Frank as kinder than men who made a neutral gesture. Thus, the bodily feedback of power had effects on social information processing. Making a gesture related to bodily force elicited in women a hostile attribution bias (Crick & Dodge, 1996), presumably because the behavior facilitated cognitions on threats and dangers (Keltner et al., 2003). This result is compatible with our basic hypothesis that performing acts of bodily force implies for women a loss of control over the environment.

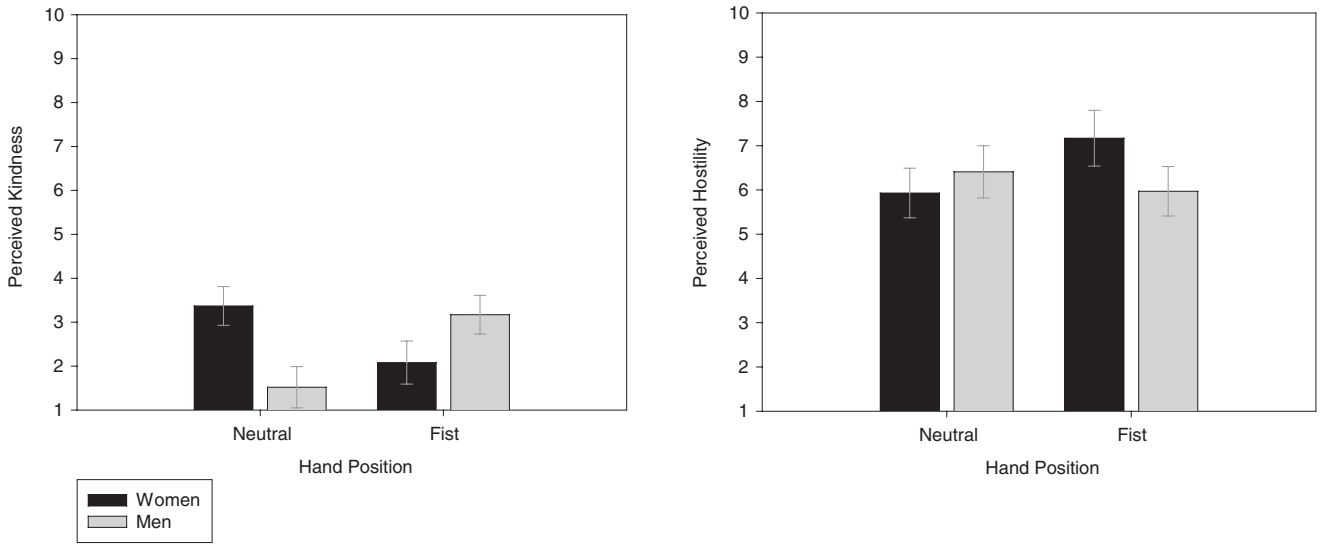

Figure 3 Mean (+ *SE*) perceived kindness (left) and hostility (right) of an ambiguously acting male target as a function of participants' hand position and gender, Study 3.
NOTE: Scores can range from 1 to 10.

For men, however, making a gesture related to bodily force actually increased ratings of kindness of the ambiguously acting target. This fits the contention that for men, bodily force facilitates thoughts about being assertive and in power.

The effects were stronger for friendliness than for hostility. In this regard, it is interesting to note that ratings on hostility were in total rather high, and much higher than ratings on kindness. Apparently, Frank's actions were seen as rather hostile. This could be the reason that the effects turned out to be stronger on the positive traits: Increased thinking about (positive) control in men might not have allowed denial of Frank's meanness but caused the addition of positive traits. For women, there was in fact a marginal increase in hostility ratings for Frank when they made a fist, but in addition, women who made a fist judged him as clearly less friendly than those who made a neutral gesture.

An unexpected difference emerged on the negative traits that were unrelated to hostility. Women showed slightly, although not significantly, lower ratings on these traits, which resulted in a marginal interaction. At first glance, this seems to indicate that they rated Frank as less negative when they made a fist, which would contradict the above findings. However, this effect seems to hinge on the precise negative, nonhostile traits used. On two out of the three traits, women showed decreasing ratings when they made a fist: *vain* and *boring*. For *boring*, this simple effect was even significant, $F(1, 31) = 7.24$, $p = .011$. But it seems clear that this drop does not indicate a more positive attitude toward Frank; in contrast, it probably indicates stress and annoyance. (Or is a mean dog barking at you boring?)

GENERAL DISCUSSION

We asked whether and how the performance of a gesture related to bodily force influences power-related cognitions. Study 1 established that bodily feedback from making a gesture of bodily force indeed activated the concept of power, as evidenced by the fact that it took both men and women longer to name the color of words related to power when they made a fist. Furthermore, it was hypothesized that given the gender differences in use and meaning of bodily force, bodily feedback effects of such a gesture would be moderated by gender; this was found in Studies 2 and 3. When women made a fist under the disguise of a cover story that obscured the relation to bodily force, they perceived less hope for control in hypothetical situations and judged an ambiguously acting male target as less kind and more hostile. In contrast, when men made a fist, they perceived marginally more hope for control in hypothetical situations and they judged an ambiguously acting male target as kinder. This evidence demonstrates that the different meanings men and women attribute to performing acts of bodily force implicate differential effects of performing these behaviors on social information processing. Merely making the gesture, without noticing its relation to bodily force at all, is sufficient to change perceptions of situations and others in line with the conceptions one's gender has about physical aggression.

The conclusion that bodily force facilitates the understanding of the world for men in terms of having power and for women in terms of powerlessness is disturbing when its consequences in interactions between men and women are concerned. Men's potential to associate bodily force with having power may lead them to spontaneously initiate such behavior, sustain its performance once it is initiated, or actually use bodily force in arguments, resulting in violence. When for women their own use of bodily force facilitates thoughts about powerlessness, this then creates a compatibility that strengthens the dominance of male actors and weakens opposition by women.

However, it needs to be added that although we found general differences between the genders, it is very likely that there is a large within-gender variance, that is, for some women, bodily force might activate having power instead of powerlessness, whereas for some men, bodily force might activate powerlessness instead of having power. Of interest, such differences within the genders also have been found for instrumental and expressive views of aggression. Campbell and Muncer (1994) found that both male and female nurses had a more expressive view of their own aggression than both male and female soldiers, although the total gender difference prevailed. The same differences may be observable for bodily feedback from behaviors related to bodily force; this hypothesis awaits empirical testing.

Processes Mediating Effects of Bodily Feedback

Concerning the precise mediator of these effects, at least two mechanisms discussed in the literature may apply. First, it may be that bodily force is part of the mental representation of powerful or powerless situations and thereby facilitates the construction of such a representation. In terms of Barsalou et al. (in press), forceful behavior activates a situated conceptualization and facilitates a conceptualization in terms of powerfulness or powerlessness. As cited above, evidence for effects of bodily feedback on mental capacity supports this account (Förster & Stepper, 2000; Förster & Strack, 1996). It could be that in the present studies, bodily force facilitated (a) processing of those elements of the stimuli (pictures and story) that indicated compatible conceptualizations of one's power and (b) completion of the stimuli with compatible ideation of one's power.

A second possible mechanism is that the bodily feedback created feelings of power or powerlessness, similar to affective feeling of amusement created by a smile in conjunction with comics (Strack et al., 1988), or the nonaffective feeling of mental effort created by furrowing the brow in conjunction with memory recall (Strack & Neumann, 2000). When the participants then judged whether a thought would apply to a given picture in Study 2, or whether Frank was acting hostile or kind in Study 3, this feeling would then have been used as a cue in a heuristic (Strack & Neumann, 2000).

The two accounts differ in that feelings of powerfulness or powerlessness can be an (additional) outcome in the first account, whereas they are expected to mediate the effects in the second account. Two arguments speak for the first account. It is more parsimonious because it also can explain the development of feelings, whereas the second account cannot easily explain effects on mental capacity. Second, and more important, the second account is unlikely because it assumes that either the bodily feedback can directly instigate feelings, for which there is not much evidence in the literature (Adelmann & Zajonc, 1989), or that the conditions of Studies 2 and 3 were such that feelings of power or powerlessness would be provoked and then increased by the bodily feedback (Stepper & Strack, 1993). However, this was not the case. The studies did not create situations in which the participants' power would have mattered, there was no possible influence on others, and there was no influence by others. In sum, it seems more likely that the effects of performing a forceful gesture were not mediated by a feeling of power but that they facilitated situated conceptualizations of power or powerlessness.

The facial feedback literature offers another mediator of bodily feedback effects, namely, a direct neurological or visceral feedback that is not mediated by cognitive processes. Laird (1974) used the analogy of depth perception that receives input from the angular relation of the eyes. Similarly, one might speculate whether such a feedback is also provided by bodily behavior. However, this account seems unlikely for the present effects because (a) it is not clear why there should be a gender difference in such a biological variable and (b) the evolution of such mechanisms is only likely for such frequently used and basic bodily feedback as eye parallax, but not clenched fists.

Power, Pride, and Anger

All three studies also investigated mood and arousal as possible mediators of the present effects, and in none of the studies was there evidence for such processes. Study 2 also assessed whether participants felt several emotions, among them pride and anger, and found no effects either. This failure of the procedure to instigate emotions may be attributable to the same causes that were just discussed for feelings of power. Bodily feedback probably only in rare cases causes feelings or emotions by itself, although it is a powerful modulator of feelings and emotions that are caused by external stimuli (Adelmann & Zajonc, 1989; Neumann & Strack, 2000c). The present studies did not provide such external stimuli, and therefore, emotions did not arise.

Nevertheless, it is interesting to note that making a fist is used not only as a gesture accompanying thoughts and claims of power but is also a common expression of both pride and anger (Darwin, 1872; Eibl-Eibesfeldt, 1989), which is observable in many sporting events. Pride and anger are associated with the need for power: fulfillment of this need instigates pride, whereas blocking of a power goal instigates anger (Zurbriggen & Sturman, 2002). Although I know of no systematic investigation, it seems that men express pride in sportive achievements more often by showing a fist than women (this difference, however, seems attenuated in some sports, e.g., tennis). Thus, it may be the case that the different meanings of bodily force also stretch to which expressions are used when the associated motive is frustrated or fulfilled. To display the achievement of power (i.e., pride), bodily forceful behavior may only be used by those who see it as a valid instrument to reach it.

The Embodiment of Power

On a more general level, the current research adds a new perspective to the research on embodiment of power. This long tradition of research has mainly investigated how dominance or submission is expressed and communicated to others and how those others react. Dimensions used for inferring power are, among others, elevation and erectness of posture, facial expressions and eye contact, relaxation, and how much space a person occupies (Argyle, 1988; Ellyson & Dovidio, 1985). Tiedens and Fragale (2003) demonstrated the effects of spatial behavior. In a dyad interaction, the more space a confederate occupied (sitting in an expansive manner instead of sitting in a constricted manner), the more dominant the confederate was judged. Furthermore, interaction partners reacted to these power signals by taking complementary positions without being aware of doing so. But although the reactions to the display of power and dominance have always been understood as at least partly automatic and unconscious, it has to my knowledge not been suggested that such displays of power also feed back to the actor. It may be that power moves have as much influence on those who perform them as on observers, whether they create feelings of power or influence conceptualization of situations as in the present research.

NOTES

1. In German, *beherrschen*, *gewinnen*, *erreichen*, *Einfluss*, *mächtig*, *Autorität*, *kraftvoll*, *stark*, *einflussreich*; *Angriff*, *Haß*, *Gewalt*, *Mord*, *brutal*, *schlagen*, *aggressiv*, *Streit*, *Kampf*.

2. In German, *aktiv*, *energetisch*, and *träge* for energetic and *nervös*, *unruhig*, and *ruhig* for tense arousal.

3. η_p^2 denotes partial Eta squared computed by SPSS 11.0.

4. In German, *unangenehm*, *feindselig*, *unfreundlich*; *liebenswürdig*, *freundlich*, *fürsorglich*; *langweilig*, *engstirnig*, *eitel*; *intelligent*, *verlässlich*, *interessant*.

5. Less relevant to the central hypothesis was a significant trait valence effect, $F(1, 33) = 32.85$, $p < .001$, a significant trait hostility effect, $F(1, 33) = 7.72$, $p = .009$, and an interaction of these two factors, $F(1, 33) = 48.54$, $p < .001$.

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