The Sex → Aggression Link: A Perception–Behavior Dissociation

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Four studies suggest that priming may yield directionally different effects on social perception and behavior if perceptual and behavioral experiences with the stimulus diverge. This seems true for sex and aggression: Men are more likely to behave aggressively than women, whereas women are more likely to perceive aggressive behavior than men. Using a sequential priming paradigm, Study 1 demonstrates that a basic semantic link between sex and aggression exists for both genders. This link, however, has opposing behavioral and perceptual consequences for men and women. Studies 2 and 3 demonstrate that sex priming facilitates aggressive behavior only for men. Study 4 shows that only women perceive the ambiguously aggressive behavior of a male target person as more aggressive after sex priming. Thus, the perceptual and behavioral responses to sex priming are consistent with the experiences men and women typically have with sex and aggression.

Ever since the seminal study by Higgins, Rholes, and Jones (1977), the notion that social perception is influenced by previous activation of relevant knowledge structures has been of paramount importance to social psychological research. In line with this notion, it has been demonstrated that an ambiguously described target person (e.g., Donald) is judged on the basis of previously activated or "primed" trait constructs (for recent reviews, see Higgins, 1996; Wyer & Srull, 1989). For example, refusing to pay one's rent may be seen as more hostile if this trait category has been previously primed (Srull & Wyer, 1979). Importantly, such priming effects do not depend on conscious processing of the priming event. Rather, they may occur automatically when the relevant trait category is primed subliminally, outside of judges' awareness (Bargh & Pietromonaco, 1982).

Social psychologists have typically investigated the effects of priming on social perception (e.g., Banaji, Hardin, & Rothman, 1993; Srull & Wyer, 1979, 1980; Strack, Schwarz, Bless, Kübler, & Wänke, 1993). However, there is growing evidence (for a review, see Bargh, 1997) demonstrating that priming effects are not limited to perception. Rather, they extend to other psychological responses and may directly influence evaluation (Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, Sanbonmatsu, Powell, & Kardes, 1986), motivation, and behavior (Bargh, Chen, & Burrows, 1996; Bargh, Gollwitzer, Lee-Chai, & Barndollar, 1999; Carver, Ganellen, Froming, & Chambers, 1983; Chartrand & Bargh, 1996; Chen & Bargh, 1997; Dijksterhuis et al., 1998; Dijksterhuis & van Knippenberg, 1998; Macrae & Johnston, 1998).

In fact, these different effects may be produced by the very same priming techniques. For example, unscrambling sentences containing hostile content (Srull & Wyer, 1979) induces participants to perceive an ambiguously described target person as more hostile (e.g., Srull & Wyer, 1979, 1980) and to behave in a more hostile way themselves (Carver et al., 1983). Notably, these divergent effects appear to occur simultaneously, as was demonstrated by Bargh et al. (1999). These authors primed participants with achievement-related words and had some of them judge an ambiguously described target person, while others performed a word-search task. In line with a plethora of other findings, the earlier participants rated the target person as more achievement oriented than did control participants. More importantly, however, the latter group also behaved in a more achievement-oriented way themselves (i.e., found more words in the word-search puzzle). Thus, the same priming technique influenced social perception and behavior in parallel. As is true for social perception, these behavioral effects may also occur automatically. For example, subliminal priming of the African American stereotype induced participants to act more hostile (i.e., behave consistent with the African American stereotype) even though they did not have the conscious intention to do so (Bargh et al., 1996).

To explain these automatic effects on social perception and behavior, it is important to examine the processes that underlie automatization. As Bargh (1996, 1997) has pointed out, the critical principle here is contiguous activation (Hebb, 1948): Associations between environmental features and psychological responses develop when both occur frequently and consistently together. Thus, to the extent that the same behavior (e.g., hostility) is repeatedly...
enacted when a specific triggering event is present (e.g., an African American face), both will become associated, so that the behavior will unfold automatically whenever the critical environmental features are present. By the same token, specific social judgments may become associated with environmental features and may be automatically triggered by their presence (Smith, Branscombe, & Borman, 1988; Smith & Lerner, 1986). Consequently, the very same stimulating event may yield parallel effects on different psychological systems (e.g., perception and behavior) if each of the different responses is associated with the same stimulus. For example, the parallel perceptual and behavioral effects described above (Bargh et al., 1999) may have resulted because achievement-related environmental features are at the same time associated with (a) perceiving others’ behavior as more achievement oriented and (b) behaving in a more achievement-oriented way oneself.

The Perception–Behavior Dissociation

To date, research investigating the perceptual, motivational, evaluative, and behavioral consequences of priming (for a recent review, see Bargh, 1997) has typically obtained such parallel effects for these different responses (e.g., Bargh et al., 1996, 1999; Carver et al., 1983). However, theoretical formulations that try to integrate different psychological systems (e.g., Bargh, 1997; Carlston, 1994) do acknowledge—at least implicitly—that influences on each system may diverge. For example, Bargh (1997) has argued that the perceptual, the motivational, and the evaluative system are at the same time closely intertwined and clearly dissociable (for a similar point, see Carlston, 1994).

In recent years, evidence for the dissociation of these different systems has accumulated. For example, research in perception and neuropsychology (for a review, see Milner & Goodale, 1995) has found a clear functional distinction between perception and action. Specifically, perception and visuomotor control appear to be dissociated in that they correspond to different brain systems (i.e., the ventral and dorsal streams of visual processing). As a consequence of this distinction, visual perception and motoric action that are based on visual input (e.g., grasping) may react differently to visual stimuli. For instance, it has been demonstrated that a manual aiming movement may compensate for a change in the position of an object even if this movement is not consciously perceived (e.g., because it was carried out during a saccadic eye movement; Goodale, Pélisson, & Prablanc, 1986). These findings indicate that the very same visual input may have different effects on perception and simple motoric action.

Notably, this fundamental dissociation also appears to exist for the more complex forms of perception and action involved in the social realm. Initial evidence supporting this assumption stems from the above cited research by Bargh et al. (1999). These authors demonstrated that the behavioral and perceptual effects of priming show divergent decay functions over time. Whereas the influence on social perception diminished after a 5-min delay, the influence on behavior increased. Thus, participants primed with achievement-related words judged the behavior of a target person to be less achievement oriented after the delay, whereas participants’ own behavior became more achievement oriented. This difference suggests that both effects are mediated by different psychological mechanisms and thus points at a fundamental dissociation of social perception and behavior.

If, however, perceptual and behavioral responses to environmental features are dissociable, then the very same stimulating event may also produce directionally different effects for the respective systems. In fact, this possibility is consistent with the assumption that the association between a stimulus and a psychological response develops as a result of their contiguous activation (Hebb, 1948). To the extent that these contingencies vary for different psychological systems, intersystemic differences may evolve. For example, a given stimulus may facilitate a specific behavioral but not a perceptual response, if it is only contingent on the respective behavior. By the same token, interindividual differences may develop if individuals differ with respect to the contingencies they experience.

In summary, this analysis suggests that priming effects may be more complex than was previously assumed. They may not only influence different psychological systems but may also yield directionally different effects on these systems. To understand and predict this complex pattern of influences, it seems necessary to analyze the specific associations that have developed between stimulating events and psychological responses. Insofar as different responses have repeatedly been associated with the stimulating event, the same event may trigger different responses. Similarly, to the extent that different individuals have repeatedly experienced different contingencies and have thus developed different associations, different responses may be triggered for them. To examine this possibility, one has to investigate the perceptual and behavioral effects of priming in a context that is likely to entail such different experiences. The literature on sexual aggression indicates that the realm of sex and aggression may constitute such a context. In fact, there is reason to believe that men and women differ dramatically in their perceptual and behavioral experiences with situations that involve sexual and aggressive components. Consequently, different perceptual and behavioral associations between sex and aggression may have developed for the genders.

The Sex→Aggression Link

A look at current statistics reveals that the roles men and women play in situations that involve milder as well as more extreme forms of sexual aggression are clearly divided. Not only are men often more assertive in sexual situations (Koss, Gidycz, & Wisniewski, 1987), but they are also more likely to be the perpetrators of sexual aggression. That is, typically men are the aggressors, whereas women are the victims. In this respect, statistics on extreme cases of sexual aggression are telling. Data on the prevalence of rape seem most striking: Between 14% and 25% of adult women have endured rape at some point in their lives (Goodman, Koss, Fitzgerald, Russo, & Keita, 1993) and virtually all victims of rape are women (Koss et al., 1987). In fact, more than 50% of female college students report having experienced some form of sexual aggression (e.g., rape, attempted rape, sexual coercion), and 25% of male students report having perpetrated such behaviors (Koss et al., 1987). Although a majority of men and women may not have experienced such extreme cases of sexual aggression (e.g., rape), these data indicate that men and women often behave in ways that are consistent with stereotypic images of sexual behavior that are conveyed in cultural norms and portrayed in the
media. That is, men are more likely to behave in assertive and aggressive ways in sexual situations. In fact, one-sided acts of sexual aggression are believed to be a rather universal phenomenon that prevails in different cultures and species (for an overview, see Zillmann, 1984). Thus, in general, the experiences that men and women have with situations that involve sexual as well as aggressive components appear to differ remarkably. In light of the above analysis, these different experiences foster the development of different associations that may produce directionally different effects of priming on the respective psychological systems.

As the data reviewed above indicate, on average, men are more likely to behave aggressively in sexual situations than women (e.g., Koss et al., 1987). To the extent that these different behavioral responses are enacted repeatedly, an association between the stimulating sexual event and the respective behaviors may develop (Bargh, 1997; Carlston, 1994). As a result, sexual stimuli may automatically elicit aggressive behavioral tendencies for men but not for women. Hence, consistent with ample evidence indicating that men and women differ remarkably with respect to their sexual (e.g., D. M. Buss & Schmitt, 1993) as well as their aggressive behavior (e.g., Eagly & Steffen, 1986), we suggest that different associations between sexual stimuli and aggressive behavioral tendencies may have developed.

The perceptual experiences of men and women, however, are different from the behavioral ones. Because women are typically the victims of sexual aggression, they are more likely to judge a potentially aggressive behavior that is enacted in a sexual context with respect to its aggressiveness. That is, women are more likely to consider whether the behavior they perceive in their male partner is aggressive in nature and could thus potentially put them at risk. With repetition, such judgments become more efficient and are likely to influence subsequent judgments in similar situations (e.g., Smith, 1989; Smith et al., 1988; Smith & Lerner, 1986). Specifically, women may be more likely to see an ambiguous behavior as aggressive, because they have become especially efficient in making such judgments within sexual contexts (Smith, 1989). Because men, on the other hand, are typically not victims of sexual aggression—so that for them the judgmental dimension of aggressiveness is less relevant—they are less likely to judge the behavior they perceive in their female partners with respect to its aggressiveness. As a consequence, such judgments are less likely to become highly efficient and influence social judgment in sexual contexts. Thus, only for women, are perceptions of aggressiveness likely to be associated with sexual stimuli.

The above analysis suggests that the different sex-aggression associations that are likely to have developed for men and women may yield divergent behavioral and perceptual consequences. Before examining these consequences in detail, however, we have to establish that a basic association between sex and aggression does exist. That is, we have to show that activating sex-related concepts also activates concepts associated with aggression. Most of the priming literature, however, has focused on the effects of priming on the primed dimension itself (e.g., more aggressive behavior after priming with aggressive concepts). Still, there is reason to believe that priming may also influence dimensions that are closely related to the primed dimension (e.g., more aggressive behavior after priming with sex concepts). First, this possibility seems plausible on theoretical grounds: According to the principle of contiguous activation (Hebb, 1948), the critical association between two concepts that mediates priming effects may develop for any two concepts that are repeatedly activated together. Second, there is empirical evidence demonstrating such priming effects between different semantic dimensions. In particular, a study investigating an automatic power-sex association (Bargh, Raymond, Pryor, & Strack, 1995) showed that subliminal priming of power-related words (e.g., boss) facilitated pronunciation of sex-related words (e.g., bed), suggesting that power priming rendered the sex concept more accessible. This relationship, however, only held for men who were high in attraction to sexual aggression (Malamuth, 1989), presumably because only for them did an association of power and sex exist.

Applying this reasoning to the sex-aggression link suggests that a similar association may exist between sex and aggression. Because both concepts appear to be closely related and may often have been experienced together, an association between them may have developed. Consequently, activating concepts associated with sex may also activate concepts associated with aggression. Study 1 attempts to demonstrate that such a basic association between both concepts does indeed exist. Studies 2 through 4 then focus more directly on the potentially diverging effects on social perception and behavior.

**Study 1**

To examine the sex-aggression association, Study 1 used a sequential priming paradigm (for a review, see Neely, 1991). In this paradigm, participants are typically presented a letter string and are asked to indicate whether it constitutes a word. Immediately before the presentation of this target word, a prime word is presented subliminally. The typical finding is that lexical decisions for a target word are facilitated if the prime word is semantically or associatively related to it. For example, lexical decisions for the target word robin were facilitated if the prime word bird was presented previously (Neely, 1977).

Such facilitation effects indicate that a mental association exists for the prime and the target, so that activating the prime automatically activates the target. The automaticity of this relationship is secured by two features of the sequential priming paradigm. First, primes are presented subliminally and thus outside of conscious awareness. Second, the time interval between the presentation of the prime and the target is too short to allow for conscious processing (Bargh et al., 1995; Neely, 1977). In our context, a facilitation of lexical decisions for words that are associated with aggression after presenting primes that are associated with sex would thus indicate that an association between both concepts (i.e., a sex-aggression link) exists. Building on the above analysis, we expected such facilitation effects to occur for men and women.

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1 Naturally, these different experiences are not shared by every man or woman. Rather, they are likely to vary between individuals. For instance, a sadistic woman may well have more experiences as a perpetrator of sexual aggression than does a masochistic man. Moreover, the described "gender-specific" experiences are likely to be limited to heterosexual men and women. The described statistics focus on heterosexuals, so our analysis is also restricted to this group. The available data do suggest, however, that at least for heterosexuals—on average—the experiences men and women have with sexual aggression differ dramatically.
Regardless of their specific roles, men and women appear to frequently experience situations that involve sexual and aggressive components. Consequently, both concepts are likely to have become associated for both genders.

Study 1 also tests for the directionality of the sex–aggression association. As lined out before, such associations develop if two concepts are continguously activated together (Hebb, 1948). To the extent that these contingencies differ for both directions (e.g., sex→aggression and aggression→sex), a unidirectional link may develop. In fact, this seems likely for the sex→aggression link. Specifically, because sexual situations often involve aggressive components (see e.g., Koss et al., 1987), an automatic sex→aggression link is likely to have developed. Consequently, activating concepts associated with sex should also activate concepts associated with aggression. In contrast, many aggressive situations are free of sexual components, so sex is not contiguous on aggression. As a result, an automatic aggression→sex link is less likely to have developed. Thus, activating aggression concepts should not activate sex concepts. These predictions are also consistent with Bargh et al.’s (1995) finding of a unidirectional power→sex link.

Method

Participants. We recruited 20 male and 22 female nonpsychology students at the Universität Würzburg as participants. They were asked to take part in a study on perception. As a compensation, they were offered DM 7 (about US$3.90 at the time).

Materials. We developed four sets of stimulus words that were used as primes and targets in the lexical decision task: aggression words, sex words, neutral words, and nonwords. In a pretest, a different set of 20 participants (10 men and 10 women) rated the strength of association of 37 words with sex and aggression, using 9-point rating scales that ranged from 1 (not at all associated) to 9 (strongly associated). Out of this pool of 37 words, we selected six that were strongly associated with aggression (mean rating > 7) and weakly associated with sex (M < 4) as aggression words. These words were Gewalt (violence), Haß (hatred), brutal (brutal), Mord (murder), Angriff (attack), and böswillig (malevolent). We also chose six words that were moderately associated with sex (5 < M < 7) and weakly associated with aggression (M < 4) as sex words: Haut (skin), feucht (wet), spären (feel), schwitzen (sweat), Bett (bed), and steif (stiff). Moreover, six words with a weak association with sex and aggression (M < 4) served as neutral words: lesen (read), Computer (computer), Herd (herd), Ampel (traffic light), Tisch (table), and Haus (house). The nonwords were Watz, Mulp, nonar, bör, gnaten, and Sulm.

Using these words, we constructed a total of 36 prime-target pairs consisting of six types of prime-target combinations with six pairs each: sex→aggression, aggression→sex, neutral→aggression, sex→neutral, sex→nonword, and aggression→neutral or nonword. Each of the critical sex words and aggression words was used four times: twice as a target and twice as a prime. As a target, each of the sex words followed a neutral prime once and an aggression prime once. As a prime, it preceded an aggression target once and a neutral or nonword target once. Similarly, each of the critical aggression words followed a neutral or sex prime and preceded a sex or a neutral or nonword target. Two sets of random pairings for the six types of prime–target combinations were used to construct two random orders.

Procedure. The procedure closely followed the one used by Bargh et al. (1995). Up to 4 participants of the same gender participated at the same time. On arrival, they were greeted by the experimenter who was also of the same gender. They were led to separate booths and seated in front of a 70-Hz computer monitor at a predetermined distance (about 70 cm from their eyes to the center of the computer screen), which they were instructed to keep throughout the entire experiment. Then, instructions were presented on the computer screen. Participants were informed that the current study was investigating the ability to detect objects under distraction. Specifically, they would be presented a number of letter strings for which they had to decide whether they constituted German words. At the same time, light flashes would be presented to distract them. Half the participants were told to press the “.” key (marked with yellow) to indicate that the presented letter string was a word and the “x” key (marked with blue) to indicate that it was not a word. For the other half, this assignment was reversed. To reduce variance in response latencies, participants were told to position their forefingers on the two keys and to keep this position throughout the task. Moreover, participants were instructed to solve this task as fast and as accurately as possible. Finally, it was pointed out that they should attempt to remain uninfluenced by the light flashes and to do so, they should concentrate on the focus point that was presented in the center of the screen. The letter strings would occur at exactly the same position.

The lexical decision task was constructed following the suggestions by Bargh and Chartrand (in press). For each trial, a blinking focus point ("!!") appeared in the center of the screen. After 2, 3, or 4 s, the prime was presented for 86 ms at one of four positions on the screen (on the upper or lower left or right of the word). It was immediately masked with a letter string that was presented for 14 ms. We varied the location of the prime as well as the time interval between the presentation of the focus point and the prime to ensure that participants could not anticipate the prime and focus their attention on it. In all four positions, primes were presented in a region of 2.6° to 5.6° of visual angle, so that they were in the area of parafoveal perception (between 2° and 6° visual angle). It has been shown that words presented in this area activate their semantic representation in memory outside of conscious awareness (for a review, see Bargh & Chartrand, in press). In sum, these precautions ensured that for participants who followed instructions (i.e., kept the described distance to the screen and concentrated on the focus point), primes were presented subliminally.

Immediately after the presentation of the masking stimulus, the target stimulus was presented, overcoming the focus point. It remained on the screen until the answer key was pressed. After the lexical decision, the focus point appeared in the center of the screen again and the described procedure was repeated. A total of 46 trials were presented. The first 10 trials served as practice trials that included primes and targets that were unrelated to sex and aggression and differed from those used in the 36 critical trials. After completion of the lexical decision task, participants answered a final questionnaire that tested for awareness of the priming manipulation. Specifically, they were told that the flashes actually consisted of briefly presented words and were asked to list the words that they were able to detect.

Results

Preliminary analysis. An analysis of the answers to the awareness check revealed that 9 participants recalled at least one of the priming words. Because it is not entirely clear that priming was indeed subliminal for these participants (for a discussion, see Bargh & Chartrand, in press), they were excluded from the analysis. Thus, the reported analysis is based on the remaining 33 participants.

Note that even for those participants who recognized some of the primes, the obtained effects are likely to result from automatic processing. As pointed out before, the sequential priming paradigm ensures automatic processing not only by presenting stimuli subliminally but also by using an extremely short time interval between prime and target. Because conscious processing requires at least 500 ms (Bargh & Chartrand, in press), it seems highly unlikely that it produced our results. Consistent with this assumption, including these 9 participants did not change the pattern of results. Still, to perform a conservative test of our hypotheses, we excluded the responses of the critical participants from our analysis.
Lexical decision. Our main hypothesis pertains to the sex→aggression link. To examine this link, we compared response latencies for lexical decisions concerning aggression-related words after the presentation of sex-related versus neutral primes. First, we calculated the mean latency for each of the relevant types of prime–target combinations. Specifically, the mean latency for the six aggression-related words when presented after a sex prime or when presented after a neutral prime was calculated for each participant (see Table 1). For one participant, these latencies deviated from the mean by more than 3 standard deviations, so she was excluded from this analysis. Inspection of Table 1 reveals that—as predicted—lexical decisions for aggression-related words were faster after presenting a sex prime ($M = 529$ ms) than after a neutral prime ($M = 556$ ms). Moreover, this difference did not depend on participants’ gender. In a 2 (neutral vs. sex priming) × 2 (female vs. male participants) mixed model analysis of variance (ANOVA), this pattern produced a significant main effect for priming, $F(1, 30) = 4.13, p < .05$. In this analysis, none of the effects involving gender reached significance, $F(1, 30) < 1$.

To examine the possibility of an aggression→sex link, we calculated similar scores for the six sex-related words when presented after an aggression versus a neutral prime. These latencies neither depended on whether the prime was neutral ($M = 580$ ms) or aggression related ($M = 574$ ms) nor on whether participants were male ($M = 575$ ms) or female ($M = 579$ ms). In a 2 (neutral vs. aggression priming) × 2 (female vs. male participants) mixed model ANOVA, all effects failed to reach significance, $F(1, 31) < 1$.

Discussion

These results demonstrate that lexical decisions for aggression-related words were facilitated by the presentation of sex-related primes. This effect occurred for men and women alike. Thus, for both men and women, an association between sex and aggression seems to exist, so that activating sex-related semantic concepts automatically activates aggression-related concepts. As predicted, this automatic link is unidirectional in that activation only transfers from sex to aggression but not from aggression to sex (see also Bargh et al., 1995).

In sum, the results of Study 1 demonstrated that an automatic sex→aggression link exists for both men and women. Building on the principle of contiguous activation (Hebb, 1948), this link may have developed because sexual situations often involve aggressive components, so both are frequently experienced together. The above cited research on the perceptual and behavioral influences of priming (see Bargh, 1997) indicates that this link may also affect social perception and behavior. To explore this possibility, Study 2 investigated the behavioral consequences of sex priming.

Study 2

Because on average men are more likely to behave aggressively in sexual situations than women (Koss et al., 1987), divergent behavioral tendencies are likely to be associated with sexual situations for both genders. Specifically, sexual stimuli may automatically elicit aggressive behavioral tendencies for men but not for women.

Table 1

<table>
<thead>
<tr>
<th>Gender of participant</th>
<th>Male</th>
<th>SD</th>
<th>Female</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>557.16</td>
<td>115.97</td>
<td>555.74</td>
<td>103.79</td>
</tr>
<tr>
<td>Sex</td>
<td>523.03</td>
<td>97.09</td>
<td>535.96</td>
<td>81.82</td>
</tr>
</tbody>
</table>

Note. Latencies are given in milliseconds. $N = 16$ for all cells.

To demonstrate that behavioral tendencies are indeed facilitated automatically, one has to assess these tendencies in situations in which participants do not intend to act aggressively. As Bargh (1989, 1997) pointed out, preconscious automaticity presupposes that a specific process is activated by the mere presence of the triggering event, regardless of current intentions or goals. Tasks that are typically used to assess aggressive behavior (for an overview, see Geen, 1990), such as administering shocks to a confederate who failed to solve a learning task (e.g., A. H. Buss, 1961; Carver et al., 1983), do not fulfill this requirement (for a critical discussion of this measure, see Bargh et al., 1996). Thus, we used an alternative task that does not include an explicit goal to act aggressively, namely a dart throwing task. Specifically, participants were instructed to throw darts at a board that depicted human faces and nonhuman objects (e.g., a vase). The number of darts directed at human faces was taken as an indicator of participants’ tendency to behave aggressively.

One may argue that this measure does not assess aggressive behavior in its strict sense, which is typically defined as including the intention to harm another person (e.g., Baron & Richardson, 1994). In the task we chose, harm is not inflicted on the person per se but merely on his or her image. It has been suggested (Rozin, Millman, & Nemeroff, 1986), however, that people often believe that “the image equals the object” (p. 703) and consequently behave toward an image in a similar way as they would toward the actual object. Consistent with this claim, it has been demonstrated that just as people are less willing to aggress against an actual person whom they like (Ahmed & Lee, 1987), they also have more problems in aggressing against the picture of a liked person. For example, in one study people were less accurate in throwing darts at pictures of liked people (e.g., John F. Kennedy) than at pictures of disliked people (e.g., Adolf Hitler; Rozin et al., 1986). In light of these findings, the dart throwing task appears to be a good proxy for actual aggressive behavior that allows researchers to assess aggressive behavioral tendencies in a situation that does not include the explicit intention to act aggressively. Given our focus on automatic behavior activation that occurs independently of conscious intentions (Bargh, 1997; Bargh et al., 1999), we resorted to this more indirect measure. Note also that because the dart throwing task is nonsexual, it assesses a general behavioral tendency for aggression rather than a specific tendency for sexual aggression. Thus, it provides a more critical test of the priming effects between the two dimensions of sex and aggression that we were interested in. Our reasoning suggests that men should direct more darts at human faces when sexually primed. This, however, should not be the case for women.
Method

Pretest. To validate our measure of aggressive behavioral tendencies, we asked a different set of 12 female and 12 male participants to indicate how aggressive they see throwing a dart at a picture of an orange, a vase, a face of a woman, and a face of a man on a 9-point scale ranging from 1 (not at all aggressive) to 9 (very aggressive). Participants clearly saw throwing a dart at a picture of a human face as more aggressive ($M = 6.32$) than throwing a dart at a picture of an object ($M = 2.35$), $F(1, 22) = 100.41, p < .001$. Moreover, throwing a dart at a picture of a male face was seen as similarly aggressive ($M = 6.42$) as throwing a dart at a picture of a female face ($M = 6.21$; $F < 1$). These effects did not depend on participants’ gender ($F < 1$). Consistent with the research of Rozin et al. (1986), these findings suggest that throwing a dart at the picture of a human face is indeed seen as an aggressive act.

Participants. Twenty female and 20 male psychology students at the Universität Würzburg participated for course credit. They were asked to take part in two separate studies that would be run together for efficiency reasons. One male participant refused to throw darts at human faces. He was thanked, debriefed, and excluded from the analysis. An additional male participant was excluded, because he was unable to complete our priming procedure (i.e., he did not manage to find any words in the word-search puzzle). Thus, the analysis reported below is based on the responses of 20 female and 18 male participants.

Materials. The priming manipulation consisted of a word-search puzzle similar to the one described by Bargh and Gollwitzer (1994). In particular, we constructed two word-search puzzles. Each puzzle consisted of a matrix of 19 x 17 letters. The matrix contained a total of 12 words that were located horizontally and vertically. Both puzzles included the same six words which were neutral with respect to sex and aggression: Tafel (board), Radio (radio), Dach (roof), Uhr (clock), Zeitung (newspaper), and Brot (bread). In addition to these, the sex-priming puzzle included the six moderately sex-related words used in Study 1, whereas the neutral puzzle included another six neutral words: Teekenne (tea pot), bunt (colorful), Kalender (calendar), Kahn (barge), Stuhl (chair), and Tasse (cup). The pretest described in Study 1 revealed that all 12 neutral words were only weakly associated with sex and aggression ($M < 4$). For each puzzle, all 12 words were depicted on the right side of the letter matrix.

The dartboard was about 60 cm x 40 cm in size and consisted of four black-and-white photocopies of photographs (30 cm x 20 cm) each that were arranged in a square. Two of the photos depicted faces with a slightly smiling expression (one male, one female), whereas the other two depicted objects (a vase and an orange). Objects and faces were similar in size and appeared in front of a white background. Each participant received a new set of copies, so that they could not infer where preceding participants had thrown their darts from the resulting punctures. Moreover, the position of the pictures was counterbalanced.

Procedure. Participants were run individually by same-sex experimenters. On arrival, they were led to a separate table and told to read instructions carefully. They were informed that they were taking part in two unrelated experiments that were conducted together solely for efficiency reasons. The first experiment would examine how cognitive performance is influenced by music, whereas the second one would investigate the effects of self-determination on motor skills.

Participants then received the materials for the first experiment that included a set of instructions, a word-search puzzle, and a brief questionnaire. Instructions explained that participants’ task was to find and circle the 12 words listed on the right side of the puzzle. At the same time, music would be playing in the background. They were further informed that words could be hidden either horizontally or vertically. After completion of the task, participants received four brief questions that were merely included to keep up the cover story. Specifically, they were asked to indicate on 10-point scales, ranging from 1 (not true) to 10 (true), whether they liked playing Memory as a kid, liked solving crossword puzzles, could generally concentrate well, and were generally good at solving memory tasks. Subsequently, to assess participants’ mood, they were asked to indicate how they felt at that moment on a 9-point rating scale, ranging from 1 (very bad) to 9 (very well). Then, they were led to a separate part of the room to commence with the second experiment. They were informed that this experiment investigated the influence of self-determination on their performance in a motor-skill task. To examine this relation, they would be asked to throw darts. In a first phase, the experimenter would tell them where to throw the darts, in the second phase they would then choose targets themselves. Our hypothesis was that they would be better at throwing darts if the target was self-determined.

After the instructions, the experimenter positioned the participant at a distance of approximately 3 m in front of the dartboard and explained that for the following 10 trials he or she would tell him or her where to throw the dart ("upper right," "lower left," etc.). The predetermined sequence was identical for all participants and included faces as well as objects. After each throw, participants went to the dartboard to collect the dart and then came back to the original position to throw the next dart. After the 10th trial (i.e., about 4 to 5 minutes after the priming task had been completed), participants were instructed that now they could determine the targets themselves and that they were not restricted to the sequence of the first 10 trials. Before each trial, they informed the experimenter, who was sitting behind them ostensibly to record the hits, of the target they had chosen ("upper right," etc.). These self-reports of where participants were aiming the darts served as our central dependent measure. After the final dart had been thrown, participants received a final questionnaire that assessed how often they play darts, on a 9-point scale ranging from 1 (very rarely) to 9 (very often), and then tested for their awareness about the true nature of the experiment. None of the participants expressed any suspicion. They were then thanked and debriefed.

In sum, Study 2 is based on a 2 (neutral vs. sex priming) x 2 (female vs. male participants) experimental design. Both factors were manipulated between participants.

Results

The number of times that participants reported to have chosen a face as the target in the 10 trials served as the central dependent variable. As inspection of Table 2 reveals, men chose faces as targets more often after sex priming than in the control condition. This, however, was not the case for women. In fact, for them there is a tendency in the opposite direction. In a 2 (neutral vs. sex priming) x 2 (female vs. male participants) ANOVA, this pattern produced a significant interaction effect, $F(1, 34) = 4.12, p < .05$. In this analysis, none of the remaining effects reached significance (all $F$s < 1). Moreover, entering mood as a covariate did not weaken the critical interaction effect. A supplementary analysis further revealed that this effect did not depend on the gender of the

Table 2
Number of Darts Directed at Faces by Gender and Priming (Study 2)

<table>
<thead>
<tr>
<th>Priming</th>
<th>Gender (of participant)</th>
<th>Male</th>
<th>SD</th>
<th>Female</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>2.56</td>
<td>2.56</td>
<td></td>
<td>4.00</td>
<td>1.76</td>
</tr>
<tr>
<td>Sex</td>
<td>4.67</td>
<td>1.94</td>
<td></td>
<td>3.30</td>
<td>2.21</td>
</tr>
</tbody>
</table>

Note. A total of 10 darts were thrown. $N = 9$ for the male cells and $N = 10$ for the female cells.
argued so far that exposure to sexual stimuli facilitates aggressive behavior. We have examined the specificity of this effect. Thus, for men exposure to sexual stimuli appears to facilitate aggressive behavior in men.

At first sight, the fact that in the control group women behaved more aggressively than men seems counterintuitive. It is important to note, however, that this difference in the baseline level of aggressiveness is extraneous to the questions under consideration here. Because our hypotheses pertain to the amount of facilitation relative to this baseline, the absolute level of aggressiveness does not matter. Moreover, reviews of gender differences in aggressive behavior have demonstrated that the stereotypically expected differences in aggressive behavior (i.e., men behave more aggressively than women) are far less stable than intuition would suggest and depend heavily on the type of task that is used to assess aggressive behavior (e.g., Eagly & Steffen, 1986; Frodi, Macaulay, & Thome, 1977).

Although the used priming manipulation was supraliminal, such that mediation by conscious processing cannot be ruled out for certain, this possibility seems unlikely. First, the priming stimuli were only moderately associated with sex, making it difficult for participants to detect the nature of the activated concept. In fact, none of them did, as the awareness check revealed. This suggests that despite the supraliminal nature of our priming manipulation, it activated the sex concept outside of participants’ awareness. Second, because the primed and the activated concepts are on different semantic dimensions, conscious mediation of the obtained effects presupposes that participants are aware of the link between sexual stimulation and aggressive behavior (for a related point regarding the correction of priming influences, see Strack, 1992; Strack, Schwarz, & Wänke, 1991; Wegener & Petty, 1997; Wilson & Brekke, 1994). Given that even after two decades of priming research most social psychologists were unaware of this possibility, it seems unlikely that they were surpassed by the intuitive knowledge of their research participants. In line with this reasoning, none of the participants reported to be aware of the true nature of the study in the manipulation check, so conscious mediation seems unlikely as an alternative explanation for the obtained findings. Thus, for men exposure to sexual stimuli appears to automatically facilitate aggressive behavior. In Study 3, we further examined the specificity of this effect.

Study 3

In particular, we examined whether the obtained facilitation of aggressive behavior depends on the gender of its target. We have argued so far that exposure to sexual stimuli facilitates aggressive behavior for men, because on average men are more likely to have repeatedly acted aggressively in sexual situations. Doing so creates a link between sexual stimuli and aggressive behavior so that exposure to the first automatically triggers the latter. For heterosexual men—who constitute the focus of our analysis—however, acts of aggression in sexual situations are likely to be primarily directed at female targets. As a consequence, a specific link between sexual stimuli and aggression toward women may have developed. If this was the case, then sex priming should facilitate aggressive behavior toward only a female but not a male target person. This possibility is also consistent with previous research demonstrating that judgmental priming effects may depend on the gender of the target (Banaji et al., 1993). In particular, it has been shown that priming aggressiveness influences judgments about a male (Donald) but not a female (Donna) target person (Banaji et al., 1993). The facility effects of sex priming on aggressive behavioral tendencies may depend on target gender in a similar way.

Note that in Study 2 we already had a first, rather tentative look at this possible specificity by including a picture of a male as well as a female target person. In this study, we did not find any indication that target gender has an effect. This, however, may be due to the specific task we used to assess aggressive behavioral tendencies. For one, this measure is not very sensitive in that it only involves 10 darts of which participants direct the majority at objects anyway. Thus, in the critical sex priming condition, men on average aimed only 4.7 darts at human faces. With such a small total number of aggressive acts, it may be difficult to show the potential influence of target gender. Moreover, instructing participants to direct equal numbers of darts at the male and female target during the practice trials may have suggested to them to also distribute darts evenly during the critical trials. The fact that participants indeed directed similar numbers of darts at the male and the female target is suggestive of this possibility. To provide a more critical test for possible influences of target gender, we used a more sensitive measure of aggressive behavioral tendencies in Study 3 and also manipulated target gender between participants.

Specifically, we had participants choose 10 pictures, which ostensibly were to be presented to another participant. The provided pictures differed markedly with respect to their pleasantness. Some of them showed very unpleasant objects, such as a rotting animal corpse, and some of them showed very pleasant objects, such as a puppy. Thus, we put our participants in a situation in which they could determine the pleasantness of the task another participant ostensibly had to complete. In other words, participants could determine whether another person would be exposed to an aversive stimulus and how intensive this exposure would be. In this respect, the measure we used in Study 3 is conceptually equivalent to classic measures of aggressiveness that typically involve the delivery of aversive stimuli (e.g., electric shocks) to a confederate (for an overview and discussion, see Geen, 1990). At
the same time, because this measure involves behavior that is directed at an actual person, it assesses aggressive behavioral tendencies more directly than the dart-throwing task used in Study 2. If our reasoning is correct, then men (but not women) should choose more unpleasant pictures for a female (but not a male) target person when sexually primed.

**Method**

**Participants.** Forty-six female and 42 male students with different majors at the Universität Würzburg were recruited as participants for a study that ostensibly investigated “problem solving while listening to music.” Participants were randomly assigned to four experimental conditions and received either course credit or a chocolate bar as compensation.

**Materials.** We selected 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, Ciccioppo, & Lang, 1998; Lang, Greenwald, Bradley, & Hamm, 1993). These pictures have been extensively pretested with respect to their valence (e.g., Ito et al., 1998; Lang, Bradley, & Cuthbert, 1995). Ten of the selected pictures were negative (ratings below 4 on a 9-point scale ranging from 1 to 9; e.g., depiction of a rotting animal corpse), 10 were neutral (ratings between 4 and 6; e.g., depiction of a hairdryer), and 10 were positive (ratings above 6; e.g., depiction of a puppy).

**Procedure.** Participants were run individually by female experimenters. On arrival, they were told to read instructions carefully. They were informed about the ostensible purpose of the study—examining how music influences cognitive performance. Specifically, they were told that we would compare performance of participants who solved a cognitive task while listening to music with those who did so without music. All participants were further informed that they had been assigned to the “with music” group.

Participants then received the same word-search puzzles used in Study 2. About half the participants solved the puzzle that contained the 6 sex-related words, the other half received the puzzle with neutral words only. Participants were given 10 min to solve the task and were then handed a questionnaire concerning their background in music (e.g., “Do you usually work with music?”), which was merely included to keep up the cover story. After completion of this questionnaire, the experimenter indicated that participants would have to answer a second questionnaire and started searching for it. After a while, the experimenter apologetically pointed out that she had apparently run out of this questionnaire and would now have to go to another room to print out a new copy. Unfortunately, this would take a few minutes, because this room was in a different part of the building. In the meantime, however, participants could help her with preparing materials she needed for an unrelated study that she would run afterwards. The experimenter asked participants whether they would be willing to do her a favor and help her out with these materials, all of the participants agreed to do. She then led participants to a separate room in which the 30 photographs were spread out on a table in such a way that all of them could be seen simultaneously. The experimenter asked participants to randomly select 10 of these pictures that would be given to a participant of the other study and handed participants an envelope in which to put the selected pictures. For about half the participants, this envelope was marked with “#5 Martin” for the other half it was marked with “#5 Martina.” Moreover, while handing participants the questionnaire, the experimenter incidentally mentioned that “...the pictures you will choose are for participant number 5...Martin (Martina).” She then left the room, came back after about 3 min, and handed participants the final questionnaire that assessed their current affective state using 6-point scales that ranged from 1 (not at all) to 6 (very much). Instructions to this questionnaire pointed out that all questions pertained to participants’ affective state at this moment. The critical question that assessed participants’ level of arousal read, “How aroused are you?” After completion of the questionnaire, participants were asked about their hypotheses concerning the purpose of the study. None of the participants expressed any suspicion. They were thoroughly debriefed and dismissed.

In sum, Study 3 is based on a 2 (neutral vs. sex priming) × 2 (female vs. male participants) × 2 (female vs. male target person) experimental design. All factors were manipulated between participants.

**Results**

We used the average valence of the 10 pictures each participant selected for the other subject as our measure of aggressiveness. The more unpleasant the selected pictures, the more harm participants inflict on the other subject and thus the more aggressive their behavior. To facilitate the interpretation of this measure, we reversed the original valence scores, so that now high numbers indicate more negative valence and thus higher levels of aggressiveness.

Inspection of Table 3 reveals that overall men selected more negative pictures (M = 5.79) and thus behaved more aggressively than women (M = 4.96). Moreover, whereas women’s level of aggressiveness remained uninfluenced by the priming manipulation (M = 4.93 vs. M = 4.99), men behaved more aggressively when primed with sex (M = 6.15 vs. M = 5.44). This, however, was only the case if the target of the aggressive behavior was a woman, not when it was a man. In a 2 (neutral vs. sex priming) × 2 (female vs. male participants) × 2 (female vs. male target) ANOVA, this pattern was borne out in a significant 3-way interaction, F(1, 80) = 4.14, p < .05. In this analysis, the interaction of Participant Gender × Priming, F(1, 80) = 4.46, p < .04, and the main effect of participant gender, F(1, 80) = 23.74, p < .001, also proved to be significant. None of these effects was influenced by controlling for participants’ self-rated level of arousal: Entering arousal as a covariate in the ANOVA did not weaken any of the effects. Moreover, in the critical condition in which sexually primed male participants behaved toward a female target person, level of arousal and aggressiveness were not correlated (r = -.03, ns).

Contrast analyses further revealed that the difference between the sex-priming and the control condition was only significant for male participants who behaved toward a female target, r(80) = 5.55, p < .001; all other, r(80) < 0.20, p > .8.

**Discussion**

These findings hold several noteworthy implications. First, they replicate the central finding of Study 2 using a more direct measure of aggressive behavioral tendencies. Again, sex priming facilitated aggressive behavior only for men, not for women. Note that just as in Study 2, the obtained gender difference in the baseline of aggressiveness is extraneous to our hypothesis that refers to changes in aggressiveness relative to this baseline. Moreover, Study 3 demonstrates that this behavioral facilitation effect depends on the gender of the target person. Men behaved more aggressively after sex priming only if the target of their behavior was a woman, not when it was a man. This specificity is consistent

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4 Study 4 demonstrates that sex priming has no general evaluative consequences, so it is unlikely to have influenced the perceived negativity of the critical pictures.
with the principle of contiguous activation (Hebb, 1948) that we have proposed to underlie the development of the sex—aggression link. Because in sexual situations heterosexual men are likely to aggress primarily against women, it is specifically aggressive behavior against women that becomes associated with sexual stimuli. Consequently, exposure to sexual stimuli triggers this specific class of behavior.

Taken together, Studies 2 and 3 demonstrate that the hypothesized sex—aggression link has divergent behavioral effects for men and women. This link, however, is likely to have not only behavioral consequences. Rather, our reasoning suggests that it may also influence social perception. Our final study examined this possibility.

Study 4

As is true for the behavioral effects of the sex—aggression link, its influence on social perception is likely to diverge for men and women. Because, on average, women are more likely than men to have repeatedly judged their partners’ behavior in sexual situations with respect to its aggressiveness, such judgments may have become highly efficient for women but not for men. As a consequence, women in sexual situations (i.e., sexually primed) may be more inclined to judge an ambiguously aggressive behavior as aggressive (Smith, 1989; Smith et al., 1988; Smith & Lerner, 1986). Just as with the behavioral effects of sex priming, however, these perceptual or judgmental effects are likely to depend on the gender of the target person. That is, because women are likely to primarily judge behaviors of male partners with respect to aggressiveness when they are in sexual situations, it is this specific class of judgments that is likely to become more efficient. As a consequence, sex priming may induce women to see ambiguously aggressive behavior displayed by a man as more aggressive. Perceptions of the identical behavior enacted by a woman, however, are likely to remain uninfluenced by sex priming. Thus, we expected the perceptual or judgmental consequences of sex priming to show the reverse pattern obtained on the behavioral measure.

To examine the judgmental consequences of sex priming, we used the classic “Donald” paradigm (Srull & Wyer, 1979) in which a target person is described as performing a number of ambiguously aggressive behaviors. For about half our participants the target person was a man (“Martin”), for the other half she was a woman (“Martina”). If our reasoning is correct, then women (but not men) should see Martin (but not Martina) as more aggressive after sex priming.

**Method**

**Participants.** We recruited 53 male and 57 female nonpsychology students at the Universität Würzburg as participants. They were asked to participate in two separate studies, one on cognitive performance and one on person perception, and received DM 10 (about US$6 at the time) as compensation.

**Materials.** We used a translation of Srull and Wyer’s (1979) “Donald paragraph” as our target description. In this paragraph, the target person (Martin or Martina) was described as performing a number of ambiguously aggressive behaviors (e.g., denying a salesman entry into the apartment, refusing to pay rent until the landlord repaints the apartment). Previous research has demonstrated that this paragraph is ambiguous with respect to its evaluative implications (e.g., Mussweiler & Neumann, 2000; Srull & Wyer, 1979).

The central questionnaire of the main study included 10 bipolar scales that were used to assess participants’ judgments of the target’s standing along a number of personality dimensions. They ranged from 1 to 9 and their endpoints were specified with antagonistic trait labels (e.g., assertive—hostile). In some of our previous research (e.g., Mussweiler & Neumann, 2000), we have repeatedly found that such bipolar scales are more sensitive to judgment tendencies than are unipolar scales. The endpoints of the two critical scales were labeled with assertive—hostile and determined—belligerent. These two critical scales were interspersed with eight scales assessing dimensions that are not directly related to aggressiveness (e.g., self-confident—arrogant, cowardly—cautious). The order of the dimensions was kept constant, with the critical items appearing in the 5th and 8th position.

**Procedure.** Participants were contacted by phone and asked to take part in a set of different psychological experiments. On arrival in the lab, they were greeted by a same-sex experimenter and were led to a separate booth where they received a stack of five folders. They were instructed to work through these folders in the given order and to close each of them after completion of the included material. The first folder contained the general instructions. Participants were informed that they were about to take part in two separate studies: one on cognitive performance and one on person perception. It was pointed out that both studies were completely unrelated and were administered together solely for efficiency reasons. To further underline the unrelatedness of both studies, the materials were printed in different fonts and on paper with different shades of white.

The second folder contained the “cognitive performance study.” In the instructions, participants were informed that the purpose of the study was to pretest material that would later be used to examine cognitive performance. They were asked to solve the word-search puzzle used in Studies 2 and 3 and to subsequently answer four questions about it that were merely

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Valence of Pictures Selected by Participant Gender, Priming, and Target Gender (Study 3)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Priming</td>
</tr>
<tr>
<td>Neutral</td>
</tr>
<tr>
<td>Sex</td>
</tr>
</tbody>
</table>

*Note.* The higher the value, the more negative the valence of the selected pictures and thus the higher the level of aggressiveness. \(N = 10\) to 13 per cell.
included to keep up the cover story. As in Studies 2 and 3, about half the participants received a puzzle containing six sex-related words; the other half received a puzzle containing no sex-related words.

On the top page of the next folder, participants were informed that the purpose of the second study was to present material that would later be used in studies on social perception. They were asked to read the following description of a target person and to subsequently answer a number of questions about this person that were contained in the fourth folder. For about half the participants, the target person was a man (Martin); for the other half she was a woman (Martina). Pretesting had revealed that participants typically needed about 2 min to answer the four questions about the word-search puzzle and to read the instructions, so they started working on the behavioral description after this period of about 2 min. A final set of questions tested for participants’ awareness of the purpose of the study, which was discovered by none of them. After completion, participants were thanked and debriefed.

In sum, Study 4 is based on a 2 (neutral vs. sex priming) × 2 (female vs. male target person) × 2 (female vs. male target person) experimental design. All factors were manipulated between participants.

Results

We calculated a mean “aggressiveness” score for the two critical dimensions (r = .50) and used this score as our main dependent measure. Inspection of Table 4 reveals that overall men judged the target person to be more aggressive (M = 6.39) than did women (M = 5.69) and that the male target was judged to be more aggressive (M = 6.42) than the female target (M = 5.64). More important, women saw the target person as more aggressive after sex priming than in the control condition (M = 6.18 vs. M = 5.15), whereas for men there was a tendency in the opposite direction (M = 6.19 vs. M = 6.60). These divergent effects of sex priming for male and female participants, however, are apparent only for judgments about the male, and not the female, target. In a 2 (neutral vs. sex priming) × 2 (female vs. male target) ANOVA, this pattern produced a significant 3-way interaction, F(1, 102) = 3.93, p < .05. In addition, the main effects of participant gender, F(1, 102) = 3.85, p < .05, and target gender, F(1, 102) = 4.94, p < .03, as well as the 2-way interaction of Priming × Participant Gender, F(1, 102) = 3.92, p < .05, proved to be significant in this analysis.

Contrast analyses further revealed that the difference between sex-priming and the control condition was only significant for female participants who judged a male target person, t(102) = 2.25, p < .03. The difference in male participants’ judgments of the male target was not reliable, t(102) = 1.71, p < .09; all other, t(102) < 8, p > .16. This suggests that the judgmental effects of sex priming are specific to the dimension of aggressiveness.

Discussion

As expected, these findings indicate that the judgmental effects of sex priming depend on the gender of both the judge and the target person. Women judged the male target (Martin) to be more aggressive after sex priming than in the control condition. Their judgments about the female target (Martina), however, remained uninfluenced by sex priming. This is also true for men’s judgments about Martina. Unlike female participants, however, men did not judge the male target to be more aggressive after sex priming. If anything, there is a (nonsignificant) tendency in the opposite direction, such that Martin was even judged to be less aggressive after sex priming than in the control condition.

These findings map onto the divergent perceptual experiences that men and women have in sexual situations. Because men stand a higher risk of becoming victims of sexual aggression, they are more likely to judge the behaviors of their male partners with respect to aggressiveness. Doing so increases the efficiency of these judgments and, as a consequence, the likelihood that an ambiguously aggressive behavior is seen as aggressive (e.g., Smith, 1989). Our results further demonstrate that this effect is specific to male targets.

As in Studies 2 and 3, responses in the control group differed for men and women. Specifically, men judged Martin and Martina to be more aggressive than did women. Again, it is important to note that, because our hypotheses pertain to increases and decreases in judged aggressiveness relative to this baseline, these differences are extraneous to the theoretical question under consideration here. The literature on priming effects on social perception, however, suggests that this finding may be due to differences in the chronic accessibility (e.g., Higgins, King, & Mavin, 1982) of aggression-related concepts between men and women: Because aggressiveness is stereotypic of men (Eagly & Steffen, 1986), it is more likely to be chronically accessible for men than for women. This increased accessibility may then produce more extreme aggressiveness ratings.

General Discussion

Taken together, all four experiments suggest that an association of sex and aggression does, in fact, exist. Moreover, they show that this association is rather complex and multifaceted. The finding that, for men as well as for women, subliminally presenting sex-related words facilitated lexical decisions for aggression-related words (see Study 1) indicates that a basic semantic association between the sex concept and the aggression concept exists for both genders. Studies 2 and 3, however, demonstrate that this link has divergent behavioral consequences for men and women. Specifically, sex priming leads to a facilitation of aggressive behavior for men but not for women. Moreover, this behavioral facilitation is specific to female targets. Finally, Study 4 shows that the sex-aggression link may influence social perception in yet another way.

This moderate correlation may have resulted because the two critical dimensions, although both closely associated with aggressiveness, have different connotations in meaning.

One possible, though speculative explanation for this tendency is that men may have used their own level of aggressiveness as a comparison standard for their judgments of Martin. Previous research has demonstrated that people use themselves as comparison standards when judging others and that doing so typically produces a contrast effect (e.g., Dunning & Hayes, 1996). Because—as Studies 2 and 3 have demonstrated—sex priming increases men’s own aggressive behavioral tendencies, Martin’s behavior may appear less aggressive in comparison to this heightened level of aggressiveness that male participants experience in themselves. Although such a self-as-standard-of-comparison explanation could potentially account for the obtained tendency of contrast, it clearly requires further empirical scrutiny.
other way. Here, sex priming induced only women to judge ambiguously aggressive behavior as more aggressive, and again this effect is dependent on the gender of the target person in that it occurs only for male targets.

These findings are consistent with the notion that an automatic link between sex and aggression exists, so activating sex-related concepts also activates aggression-related concepts. Such associations develop as a result of contiguous activation (Hebb, 1948). That is, two concepts become associated if they are frequently and repeatedly activated together (e.g., Bargh, 1997; Carlston, 1994). Because such contingencies may vary remarkably for different psychological systems as well as for different individuals, the resulting network of associations may be quite complex.

Our results indicate that on the most basic semantic level, men and women have developed the same sex→aggression link. Thus, for both genders, sex and aggression seem to be closely associated. On the behavioral level, however, divergent links appear to have evolved. Presumably because—on average—men are more likely than women to have repeatedly enacted aggressive behavior in sexual situations (Koss et al., 1987), a facilitative behavioral link has developed only for men. The reverse appears to be true for the perceptual level. Presumably because women are more likely than men to have repeatedly judged their partner’s behavior in sexual situations with respect to its aggressiveness, a facilitative perceptual link has developed only for women. Moreover, both of these links are specific to the respective target gender with which it has been established. Men’s aggressive behavior in sexual situations is most likely to be directed at their female partners, whereas women’s judgments about aggressiveness are most likely to pertain to the behaviors of their male partners. As a consequence, aggressive behavior is only facilitated if it is directed at a woman, whereas judgments of aggressiveness are only facilitated if they pertain to a man.

Knowledge Accessibility Versus Procedural Practice

It is important to note that in sum, these findings are difficult to explain as knowledge accessibility effects. As Study 1 demonstrated, men and women do not differ on the level of semantic accessibility of aggressiveness after sex priming. For both genders, aggression words were more accessible after sex priming. Thus, if our behavioral and judgmental effects were mediated by the mere semantic accessibility of aggression, then we would expect similar effects for men and women on both tasks. Our data clearly draw a different picture.

The fact that the divergent behavioral and judgmental effects we obtained appear to map onto the differing experiences men and women—on average—have in situations that involve sexual as well as aggressive components hints at the central role practice may play for our findings. In this respect, our findings appear to be more consistent with a perspective that conceptualizes priming effects as practice effects (Smith & Branscombe, 1987, 1988). Smith and Branscombe (1987) have demonstrated that the judgmental effects of mere knowledge accessibility are fairly weak and short lived and that practice of specific judgmental procedures may be responsible for more robust priming effects. Consistent with their findings, our results show that a mere increase in the semantic accessibility of aggression (as assessed by the lexical decision task in Study 1) is not sufficient to yield either behavioral or judgmental effects. Rather, the specific associations between sexual stimuli on the one hand and behavioral and judgmental responses on the other hand appear to play a crucial role. Because men are more likely to have repeatedly behaved aggressively in sexual situations, these behavioral responses may have become highly practiced and associated with sexual stimuli, so that they can unfold automatically when sexual features are present. Similarly, in sexual situations women are more likely to judge potentially aggressive behavior with respect to its aggressiveness. With repetition, these judgments may become highly efficient and thus more likely to influence subsequent judgments in similar situations.

Thus, our findings appear to be more consistent with a conceptualization of priming effects as practice effects (Smith & Branscombe, 1987, 1988) rather than pure knowledge accessibility effects (e.g., Higgins, Bargh, & Lombardi, 1985; Wyer & Srull, 1986). In their entirety, our findings are also difficult to explain in terms of gender differences in the applicability of accessible concepts. It has repeatedly been demonstrated (e.g., Banaji et al., 1993; Higgins et al., 1977; Strack & Mussweiler, 1997; for an overview, see Higgins, 1996) that accessible knowledge only exerts its effects if it is applicable to the critical task. Building on

7 In our view, the obtained gender differences are not due to some innate difference between men and women. Rather, we suggest that they result from differential experiences with situations that entail sexual as well as aggressive aspects. As pointed out before, this assumption also implies that the described dependencies only hold for men and women who share such gender-specific experiences. Because our studies did not focus on the origins of the described gender differences, more research is needed to qualify these speculations.

Table 4
Mean Aggressiveness Ratings by Participant Gender, Priming, and Target Gender (Study 4)

<table>
<thead>
<tr>
<th></th>
<th>Male participant</th>
<th>Female participant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male target</td>
<td>Female target</td>
</tr>
<tr>
<td></td>
<td>M     SD</td>
<td>M     SD</td>
</tr>
<tr>
<td></td>
<td>Male target</td>
<td>Female target</td>
</tr>
<tr>
<td></td>
<td>M     SD</td>
<td>M     SD</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>Sex</td>
</tr>
<tr>
<td></td>
<td>7.32  1.30</td>
<td>6.12  1.53</td>
</tr>
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<td></td>
<td>5.75  1.95</td>
<td>6.25  1.72</td>
</tr>
<tr>
<td></td>
<td>5.27  1.47</td>
<td>6.83  1.79</td>
</tr>
<tr>
<td></td>
<td>5.04  2.18</td>
<td>5.53  2.37</td>
</tr>
</tbody>
</table>

Note. Ratings were given along two 9-point scales ranging from 1 (assertive/determined) to 9 (hostile/belligerent). The higher the value, the higher the judged aggressiveness. N = 12 to 15 per cell.
this notion, one may argue that sex priming activates a more specific concept of “male aggression,” which is then differentially applicable for male and female participants. From this perspective, women would fail to behave more aggressively after sex priming, because the concept that is rendered easily accessible (i.e., male aggression) is not applicable to them. Although this rationale might thus explain our findings on the behavioral measure, it is difficult to reconcile with our judgmental data. Previous research on the role of applicability in social perception (Banaji et al., 1993) suggests that the critical factor that would determine the applicability of such a male aggression concept is the gender of the target person to be judged, not the gender of the judge (Banaji et al., 1993). Thus, if our effects were indeed driven by the mere accessibility of male aggression, similar judgmental effects of sex priming should result for male and female participants. Our results clearly show that this is not the case and thus speak against this alternative account.

Our results indicate that the semantic, behavioral, and perceptual effects of priming can be clearly dissociable. In this respect, they supplement previous findings that demonstrate parallel effects on the semantic, perceptual, and behavioral level (e.g., Bargh et al., 1996; Dijksterhuis et al., 1998). Of course, such parallel effects may well result if the contingencies for each of the psychological systems are similar, but they are not inevitable. Instead, to understand and predict the complex pattern of influences on different responses, one has to analyze the specific associations that have developed between the respective psychological systems. In this context, one question that remains to be addressed is why we found divergent judgmental and behavioral effects on the same kinds of tasks for which other researchers (e.g., Bargh et al., 1996; Carver et al., 1983; Dijksterhuis et al., 1998) have found parallel effects. Moreover, at first glance the gender differences we obtained seem surprising in light of previous research (e.g., Banaji et al., 1993; Carver et al., 1983; Sroll & Wyer, 1979) that did not report such differences. Why do our findings deviate from these earlier ones even though we used very similar procedures? What are procedural differences that might be responsible for these seeming inconsistencies?

One potentially important way in which our studies differ from these earlier ones is that rather than priming the critical dimension (i.e., aggression) directly, we primed it indirectly by means of the assumed sex→aggression link. Because this link may entail different behavioral and judgmental associations for men and women, priming sex may then yield divergent behavioral and perceptual effects. In this respect, our findings are related to those of Lepore and Brown (1997) who showed that although priming the Black stereotype produced higher judgments of hostility for both high- and low-prejudiced people, priming the category of Blacks increased judgments of hostility only for high-prejudiced people. Thus, if the content of the stereotype is not primed directly, the differences that high- and low-prejudiced people have with Blacks come into play. Similarly, if aggressiveness is not primed directly, the different behavioral and perceptual associations that men and women have with the priming event may become influential. This suggests that at least when the critical dimension is not primed directly, the specific associations participants have developed with the prime critically determine its effects.
automatic behavioral tendency is likely to blend with the effects of increased sympathetic excitation (Zillmann, 1984). That is, the more sexual and aggressive a given situation gets, the more sympathetic excitation it is likely to produce. Excitation transfer may then strengthen the initial—and possibly automatically triggered—aggressive behavioral tendency. From this perspective, automatic behavioral activation and excitation transfer are complementary rather than mutually exclusive. The exact interplay of the automatic cognitive link that was the focus of our research and mechanisms of excitation transfer, however, is beyond the scope of this article and open to future research.

References


