

Men on the “Pull”

Automatic Approach-Avoidance Tendencies and Sexual Interest Behavior

Wilhelm Hofmann¹, Malte Friese², and Tobias Gschwendner³

¹University of Würzburg, Germany, ²University of Basel, Switzerland, ³University of Koblenz-Landau, Germany

Abstract. In the present study, we adapted and validated a measure of automatic approach-avoidance tendencies toward sexual stimuli in a male heterosexual sample ($N = 29$). As expected, automatic approach-avoidance tendencies, as measured via push and pull reactions in a joystick task, primarily predicted an unobtrusive measure of the time participants viewed erotic slides but not a more deliberate measure of forced-choice between an erotic and an art calendar. Conversely, participants' explicit attitudes primarily predicted the forced-choice measure but not viewing time. Furthermore, automatic approach-avoidance tendencies discriminated reliably between those participants who were and those who were not currently engaged in a romantic relationship.

Keywords: approach-avoidance, sexual impulses, explicit attitudes, viewing time, sexual motivation

Introduction

Human sexuality is a classic example of the driving force of spontaneously triggered impulses on behavior. Often, such impulses may be triggered by the perception of sexual cues in our environment: Life is full of tempting sexual cues that have the power to grab our attention (Maner, Gailiot, Rouby, & Miller, 2007) and to elicit spontaneous behavioral-reaction tendencies. People may differ with regard to the direction and strength of the impulses thus generated. Moreover, impulses may not always influence actual behavior as people may be able to control themselves (e.g., Friese, Hofmann, & Wänke, 2008; Hofmann, Rauch, & Gawronski, 2007). However, impulse control may be more difficult for some behaviors (e.g., disengaging attention from an attractive cover model of a sex magazine) than for others (e.g., deciding not to buy the sex magazine).

Despite the renewed theoretical interest in the role of impulses on behavior and the mechanisms by which impulses may operate (Carver, 2005; Strack & Deutsch, 2004), good measures of sexual impulses are hard to find. Recently, researchers have begun to employ reaction-time measures of approach-avoidance tendencies in other domains of self-regulation such as eating (Seibt, Häfner, & Deutsch, 2007) or drinking (Wiers, Rinck, Kordts, Houben, & Strack, 2008). These measures are part of the family of so-called indirect measures (see De Houwer, 2003, for a conceptual definition) and are assumed to tap into automatically activated behavioral schemas of approach or avoidance, which are thought to mediate the relationship between stimulus encounter and actual behavior (Strack & Deutsch, 2004). More specifically, it

is generally assumed that stimuli from the environment may elicit relatively crude evaluative reactions in an automatic, that is, effortless and unintentional, manner (Fazio, 2001) in terms of a simple good-bad distinction (Russell, 2003). These automatic evaluations may then activate affectively congruent behavioral schemas of approach (resulting from positive affect) and avoidance (resulting from negative affect), respectively (e.g., Chen & Bargh, 1999; Neumann, Hülsebeck, & Seibt, 2004). Finally, the activated behavioral schemas may translate into actual behavior if their activation potential exceeds that of other, concurrently activated schemas (Strack & Deutsch, 2004). Employing measures that tap into this relatively automatic, impulsive pathway of behavior determination (Strack & Deutsch, 2004) may yield important insights into the processes by which and the conditions under which impulsive behavior is generated.

In the present research, we adapted a reaction-time measure for the assessment of automatic approach-avoidance reactions toward sexual stimuli. We aimed at validating this measure against an unobtrusive behavioral measure of sexual interest (i.e., the viewing time of erotic material while the focus of attention was drawn to a memory task), and a more transparent, controllable behavior of sexual interest (i.e., a forced-choice between an erotic calendar and an art calendar). In accordance with previous research using indirect measures (Asendorpf, Banse, & Mücke, 2002), we held the directional hypothesis that the approach-avoidance measure would show stronger predictive validity with regard to the unobtrusive viewing-time measure than with regard to the deliberate-choice measure. Conversely, we expected explicit attitudes to primarily predict the forced-choice behavior but not unobtrusive viewing time.

Furthermore, we also assessed the relationship status of participants. From a motivational perspective, we explored whether participants not currently engaged in a romantic relationship would exhibit relatively stronger approach tendencies toward possible sexual interaction partners than participants in a steady relationship because of possible differences in the sexual motivation toward new possible mating partners (e.g., McIntyre et al., 2006; Simpson, Gangestad, & Lerma, 1990). Previous research has shown that reaction-time measures of approach-avoidance tendencies are sensitive to differences in motivational need states such as hunger (Seibt et al., 2007). Hence, we were interested in whether a known-groups comparison of single and attached men would reveal analogous differences in motivational state in the sexual domain.

Method

Participants

Participants were 29 male undergraduate students between 20 and 31 years of age ($M = 23.18$; $SD = 2.64$) from several faculties at the University of Landau, Germany. We chose a male-only sample as sexual desire and interest for the other sex have been shown to be stronger in males (Baumeister, Catanese, & Vohs, 2001). Of the total sample, 28 participants indicated a heterosexual orientation. One participant did not fill in the last page of the questionnaire containing the sexual orientation and relationship question (see below). As excluding this participant did not alter any conclusions, we report the results for the full sample.

Measures

Automatic Approach-Avoidance Tendencies

Participants' automatic approach-avoidance tendencies were assessed with an adaptation of a task used by Neumann et al. (2004). In two blocks, participants had to either pull a joystick toward themselves (approach movement) or to push it away from themselves (avoidance movement) in response to erotic or art stimuli presented sequentially on the computer screen. Task instructions made it clear to participants that moving the joystick toward oneself meant bringing the object closer while moving the joystick away meant moving the object further away from oneself (Seibt, Neumann, Nussinson, & Strack, 2008). In the first block, participants were asked to push the joystick away from themselves whenever they saw an erotic stimulus and to pull the joystick toward themselves whenever they saw an

art stimulus. This assignment was reversed for the second test block. Each block contained 40 trials (in which each stimulus was shown twice) and was preceded by 8 practice trials. The order of blocks was kept constant for all participants as was the order of stimuli because the assessment of individual differences had priority (see Banse, Seise, & Zerbes, 2001). In the case of an error, a red cross appeared for 500 ms. Furthermore, we employed a response window of 1700 ms to prompt spontaneous reactions.

For each category, we used 10 stimuli of equal size, taken from public websites related to eroticism or art. Sexual stimuli were color pictures, each depicting one naked or half-naked physically attractive woman aged roughly between 20 and 30 years from different angles and in a stimulating posture. All pictures contained at least the head and the upper part of the body. On five of the pictures, the women's breasts were uncovered, two pictures showed targets' backs and buttocks, and three pictures included erotic underwear.¹ Art stimuli were color pictures depicting modern art and were chosen to match the sexual stimuli in richness and colorfulness.

For the analyses, we discarded trials in which participants either gave incorrect responses or exceeded the threshold imposed by the response window of 1700 ms (5% of all responses). In order to arrive at a single index of automatic approach-avoidance tendency, we computed a difference score by subtracting the mean response latency of the second test block (sex approach, art avoid) from the mean response latency of the first test block (sex avoid, art approach; Neumann et al., 2004).² Thus, higher values indicate relatively faster approach movements toward sexual stimuli as compared to arts stimuli. Corrected split-half reliability of this difference score, computed across two block halves, amounted to .71.

Explicit Attitudes

Two bipolar 7-point rating scales were used in order to assess participants' general explicit attitudes toward erotic and art stimuli, respectively. The poles were *repulsive* (1) versus *engaging* (7) and *unaesthetic* (1) versus *esthetic* (7). A relative explicit-attitude index was calculated by computing the relative sex – arts difference for both dimensions and averaging the resulting difference scores (Cronbach's $\alpha = .79$). Positive scores on this index indicate a greater preference for erotic over art stimuli.

Viewing-Time Measure

Viewing time was used as an unobtrusive measure of sexual interest (e.g., Gress, 2005; Harris, Rice, Quinsey, &

¹ The stimulus material can be obtained from the first author.

² Raw scores rather than log-transformed scores were used as the raw score index showed somewhat superior psychometric characteristics (in terms of skew, kurtosis, and normal approximation) when computed from raw score differences.

Chaplin, 1996). Participants were told that we wanted to assess their ability to discriminate the pictures that had been presented during the joystick task from new pictures that had not been shown before. Participants watched a total of 20 erotic and 20 art stimuli, half of which were identical to the stimuli used in the approach-avoidance task. For each picture, participants had to indicate whether the picture was “known” or “unknown” with the help of two keys on the computer. Key assignment was displayed permanently on the lower part of the screen. Stimuli were presented in a random order. Participants were instructed “. . . to take as much time as you need in order to be able to judge each picture correctly as known or unknown.”

For analyses, viewing times of all stimuli were log-transformed because of a skew in the data (Gress, 2005). A viewing-time index of relative preference of erotic versus art pictures was computed by subtracting the mean viewing time for art stimuli from the mean viewing time for erotic stimuli. For ease of interpretation, means and standard deviations are reported for untransformed viewing time whereas analyses are based on the log-transformed data.

Forced-Choice Measure

Participants were informed about a lottery involving two calendars worth approximately EUR 15 each. They were told that one participant from the study would be allotted per chance and would win his preferred calendar (which actually was the case). Participants were first presented on the computer with an image of an art calendar depicting a modern art painting. Then they were shown an erotic calendar (Bond Girls) depicting a half-naked girl on the front cover. Finally, participants were presented with both calendars on the left and right side of the screen and asked to make a judgment about which calendar they would like to choose on a 7-point scale from 1 (art calendar) to 7 (erotic calendar). Participants’ preference for one calendar over the other served as a measure of choice behavior, with higher values indicating a preference for the erotic calendar.

Relationship Status

Participants indicated whether they were currently in a long-term romantic relationship on a dichotomous scale (*yes* versus *no*). Responses were coded such that a higher score indicated no current romantic relationship. 16 (12) participants indicated that they currently had (did not have) romantic partners.

Procedure

A male confederate seated up to three participants in separate cubicles. Participants were told that the study involved esthetic judgments in a broad variety of domains.

After providing informed consent and demographic information, they were administered the approach-avoidance task, followed by the assessment of explicit attitudes on the computer. As a filler task intended to separate predictors and criteria, they then watched a 7-minute video clip from the documentary “Deep Blue” describing animal life in the sea, followed by several questions on the film. Next, participants completed the viewing time measure and the choice measure in this order. Finally, participants indicated their relationship status and their sexual orientation.

Results

In the approach-avoidance task, a preliminary analysis indicated that participants were faster when pulling the joystick toward themselves (approach) than when pushing the joystick away from themselves (avoidance), $F(1, 28) = 5.38$, $p = .03$, $\eta^2 = .16$. Also, responses to sexual stimuli were faster than responses to art stimuli $F(1, 28) = 9.07$, $p = .01$, $\eta^2 = .25$. These two main effects were qualified by a significant Joystick movement \times Type-of-stimuli interaction, $F(1, 28) = 8.26$, $p = .01$, $\eta^2 = .23$, indicating that approach movements toward sexual stimuli were facilitated in comparison to all other conditions (see Figure 1). For the analyses to follow we applied the single index of automatic approach-avoidance tendency as described above (mean of the first minus mean of the second block) with higher values indicating faster approach toward sexual stimuli.

The means and standard deviations of all variables as well as their intercorrelations are presented in Table 1. Automatic approach-avoidance tendencies were significantly different from zero, $M = 26.41$, $SD = 50.44$, $t(28) = 2.82$, $p < .01$, $d = .52$ (two-sided), indicating faster approach ten-

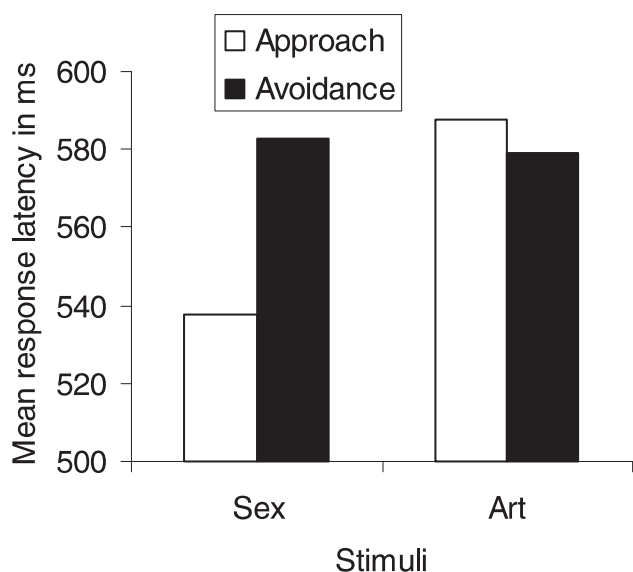


Figure 1. Mean reaction times toward sex and art stimuli as a function of approach or avoidance movements.

Table 1. Means, standard deviations, and intercorrelations among all variables

	1)	2)	3)	4)	5)
1) Approach-avoidance tendencies	–				
2) Explicit attitudes	.07	–			
3) Relative viewing time	.45*	.22	–		
4) Calendar forced-choice	.19	.54**	.45*	–	
5) Relationship status	.38*	.07	.05	-.05	–
<i>M</i>	26.41	1.48	-53.81	5.90	.43
<i>SD</i>	50.44	1.36	323.92	1.78	.50

Note. $N = 29$ for variables 1) through 4) and $N = 28$ for relationship status. * $p < .05$, ** $p < .01$.

dencies for sexual rather than art stimuli, on average. On the explicit preference measure, participants indicated a preference for erotic pictures on average, too, $M = 1.48$, $SD = 1.36$, $t(28) = 5.87$, $p < .001$, $d = 1.09$ (two-sided). However, automatic approach-avoidance tendencies were not significantly related to explicit attitudes, a finding that supports the distinctiveness of indirect and direct measurement outcomes (e.g., De Houwer, 2003; Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Concerning the dependent variables, participants had a slight overall tendency to view art pictures longer than sexual stimuli in the viewing-time task ($M = -53.81$, $SD = 323.92$), but this difference was not significantly different from zero, $t(28) = .08$, $p = .94$, $d = .16$ (two-sided). On the calendar-choice task, participants preferred the erotic calendar over the art calendar ($M = 5.90$, $SD = 1.78$) as indicated by a significant difference from the midpoint (4) of the scale, $t(28) = 5.74$, $p < .01$, $d = 1.07$ (two-sided).

In order to test our main hypotheses, we investigated how approach-avoidance tendencies and explicit attitudes were related to viewing time and the choice measure, respectively. As can be seen from Table 1, as expected, automatic approach-avoidance tendencies were significantly related to the relative amount of time spent looking at sexual stimuli, indicating that participants with relatively stronger approach tendencies toward sexual stimuli looked longer at the erotic material presented during the ostensible recognition task. As expected, however, automatic approach-avoidance tendencies were not significantly related to the forced-choice decision, and the predicted directional difference between the two correlations was marginally statistically significant, Steiger's $Z = 1.37$, $p = .08$ (one-sided; Steiger, 1980). In contrast, explicit attitudes were substantially related to the forced-choice behavior but not the viewing-time measure. The difference in the magnitude of correlations was statistically significant, Steiger's $Z = 1.75$, $p < .05$ (one-sided).

We also checked whether the pattern of associations among predictor and criterion variables replicated when the approach-avoidance tendencies and explicit attitudes were entered simultaneously into separate regression analyses

on viewing time and choice behavior. All statistical conclusions remained the same and beta-weights were close to the zero-order correlations in Table 1 because of the near-independence of predictors. Therefore, we do not report the regression results separately here.

Furthermore, participants' relationship status was significantly related to the approach-avoidance index (see Table 1), indicating that the joystick task discriminated successfully among those participants currently in a romantic relationship ($M = 12.13$, $SD = 45.48$) and those without a partner ($M = 50.08$, $SD = 49.69$), $t(26) = -2.10$, $p = .046$, $d = .80$ (two-sided). A fine-grained follow-up analysis revealed a significant Joystick movement \times Type-of-stimuli \times Group interaction, $F(1,26) = 4.56$, $p = .042$. An inspection of the interaction pattern indicated that (a) for sexual stimuli, single men exhibited longer avoidance latencies ($M = 604.49$) as compared to attached men ($M = 565.41$) whereas approach latencies were almost identical ($M = 526.62$ and $M = 536.28$, respectively), and that (b) among art stimuli, single and attached men did not differ in their approach ($M = 594.46$ and $M = 577.86$) or avoidance reactions ($M = 570.28$ and $M = 581.83$).

Discussion

In the present study, we validated a measure of automatic approach-avoidance tendencies toward erotic (relative to art) stimuli. The measure was reliably related to an unobtrusive measure of the time participants spent looking at erotic (relative to art) slides while performing an ostensible memory task. However, the measure was unrelated to a more deliberate measure of forced choice between an erotic and an art calendar. Participants' explicit attitudes showed the opposite pattern of results. Hence, automatic approach-avoidance tendencies primarily predicted relatively uncontrolled sexual interest behavior (i.e., behavior produced while the focus of attention lay on a thematically irrelevant second task), whereas explicit attitudes better predicted deliberate choice behavior. To our knowledge, this is the first study to suggest such a double dissociation pattern with regard to behavioral outcomes by using an indirect approach-avoidance measure rather than an indirect attitude or personality self-concept measure (Asendorpf et al., 2002; Dovidio, Kawakami, & Gaertner, 2002). These findings indicate the utility of an automatic approach-avoidance measure designed to tap into the mediating motivational mechanism of *behavioral readiness* that links the automatic evaluation of a stimulus with actual behavior execution (Strack & Deutsch, 2004). In concert with previous studies showing the first half of this proposed mediation (e.g., Neumann et al., 2004), the present data complements the picture by yielding support for the second half of this mediation pathway (i.e., the relationship between approach-avoidance tendencies and behavior). Future research into the processes underlying impulsive behavior in

self-regulation contexts may profit from a routine incorporation of approach-avoidance measures into the methodological toolkit. Such measures may prove to be useful for at least two reasons: First, approach-avoidance tendencies, because their assumed mediation role is at a downstream processing stage of impulsive behavior determination, may be more closely related to actual behavioral outcomes than indirect measures of automatic evaluation. Hence, the predictive validity of the former type of measure may be superior. Second, by directing interventions designed to reduce impulsive-action tendencies specifically at approach-avoidance, new avenues for the treatment of self-control disorders may be discovered (Wiers et al., 2008).

Our measure of automatic approach-avoidance tendencies also discriminated successfully among those participants currently engaged or not engaged in a long-term relationship. This finding points to the approach-avoidance task's sensitivity for motivational differences between engaged and unengaged participants. These differences may reflect differences in the opportunity for need fulfillment, physiological (e.g., testosterone-related) changes of romantic involvement (McIntyre et al., 2006), or evolved psychological mechanisms that promote relationship stability by downgrading alternative sexual partners (e.g., Simpson et al., 1990). Whereas need fulfillment and physiological changes would be more consistent with facilitated approach-reactions toward sexual stimuli, indicating a stronger incentive value, the follow-up finding of greater differences in the avoidance reactions toward sexual stimuli between the two groups suggests that the latter account, i.e., facilitated avoidance-reactions in attached men because of the downgrading of alternatives, may be a likely explanation. However, more systematic future research is certainly needed to more closely identify the mechanism(s) underlying this difference.

The present study was limited by using nonsocial (i.e., arts) pictures as a standard of comparison in the approach-avoidance task as well as the behavioral indicators. Future studies should contrast explicit sexual material (e.g., attractive nude women) with nonsexual but socially relevant material (e.g., pictures of similar, but clothed, women in ordinary social interactions) in order to keep constant the social nature of the employed stimulus material. Second, it is important to note that only distal indicators of sexual behavior (such as sexual interest and choice behavior) were collected in the present study. Clearly, a proximal indicator of sexual behavior is difficult to realize in any laboratory setting (see Gailliot & Baumeister, 2006, for an ingenious solution that, nevertheless, depends on participants' retrospective self-reports). Therefore, it would be worthwhile to think about additional sources of behavioral data (such as flirting behavior with an attractive confederate or acquaintance ratings of nightlife sexual behavior) in order to gain a more complete picture of the impact of automatic approach-avoidance tendencies on everyday sexual behavior. The

present findings are intended as a first step in that direction and we hope to have shown that measures of automatic approach-avoidance may be employed in a fruitful way to further trace the mechanisms by which people self-regulate their sexual impulses and desires.

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References

- Asendorpf, J.B., Banse, R., & Mücke, D. (2002). Double dissociation between implicit and explicit personality self-concept: The case of shy behavior. *Journal of Personality and Social Psychology, 83*, 380–393.
- Banse, R., Seise, J., & Zerbes, N. (2001). Implicit attitudes toward homosexuality: Reliability, validity, and controllability of the IAT. *Zeitschrift für Experimentelle Psychologie, 48*, 145–160.
- Baumeister, R.F., Catanese, K.R., & Vohs, K.D. (2001). Is there a gender difference in strength of sex drive? Theoretical views, conceptual distinctions, and a review of relevant evidence. *Personality and Social Psychology Review, 5*, 242.
- Carver, C.S. (2005). Impulse and constraint: Perspectives from personality psychology, convergence with theory in other areas, and potential for integration. *Personality and Social Psychology Review, 9*, 312–333.
- Chen, M., & Bargh, J. (1999). Consequences of automatic evaluation: Immediate behavioral predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*, 215–224.
- De Houwer, J. (2003). A structural analysis of indirect measures of attitudes. In J. Musch & K.C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion* (pp. 219–244). Mahwah, NJ: Erlbaum.
- Dovidio, J.F., Kawakami, K., & Gaertner, S.L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology, 82*, 62–68.
- Fazio, R.H. (2001). On the automatic activation of associated evaluations: An overview. *Cognition and Emotion, 15*, 115–141.
- Friese, M., Hofmann, W., & Wänke, M. (2008). When impulses take over: Moderated predictive validity of explicit and implicit attitude measures in predicting food choice and consumption behavior. *British Journal of Social Psychology, 46*, 397–419.
- Gailliot, M.T., & Baumeister, R.F. (2006). Self-regulation and sexual restraint: Dispositionally and temporarily poor self-regulatory abilities contribute to failures at restraining sexual behavior. *Personality and Social Psychology Bulletin, 33*, 173–186.
- Gress, C.L.Z. (2005). Viewing time measures and sexual interest: Another piece of the puzzle. *Journal of Sexual Aggression, 11*, 117–125.
- Harris, G.T., Rice, M.E., Quinsey, V.L., & Chaplin, T.C. (1996). Viewing time as a measure of sexual interest among child molesters and normal heterosexual men. *Behavior Research and Therapy, 34*, 389–394.

- Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the Implicit Association Test and explicit self-report measures. *Personality and Social Psychology Bulletin*, *31*, 1369–1385.
- Hofmann, W., Rauch, W., & Gawronski, B. (2007). And deplete us not into temptation: Automatic attitudes, dietary restraint, and self-regulatory resources as determinants of eating behavior. *Journal of Experimental Social Psychology*, *43*, 497–504.
- Maner, J.K., Gailliot, M.T., Rouby, D.A., & Miller, S.L. (2007). Can't take my eyes off you: Attentional adhesion to mates and rivals. *Journal of Personality and Social Psychology*, *93*, 389–401.
- McIntyre, M., Gangestad, S.W., Gray, P.B., Chapman, J.F., Burnham, T.C., O'Rourke, M.T. et al. (2006). Romantic involvement often reduces men's testosterone levels – But not always: The moderating role of extrapair sexual interest. *Journal of Personality and Social Psychology*, *91*, 642–651.
- Neumann, R., Hülsebeck, K., & Seibt, B. (2004). Attitudes toward people with AIDS and avoidance behavior: Automatic and reflective bases of behavior. *Journal of Experimental Social Psychology*, *40*, 543–550.
- Russell, J.A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, *110*, 145–172.
- Seibt, B., Häfner, M., & Deutsch, R. (2007). Prepared to eat: How immediate affective and motivational responses to food cues are influenced by food deprivation. *European Journal of Social Psychology*, *37*, 359–379.
- Seibt, B., Neumann, R., Nussinson, R., & Strack, F. (2008). Movement direction or change in distance? Self- and object-related approach and avoidance movements. *Journal of Experimental Social Psychology*, *44*, 713–770.
- Simpson, J.A., Gangestad, S.W., & Lerma, M. (1990). Perception of physical attractiveness: Mechanisms involved in the maintenance of romantic relationships. *Journal of Personality and Social Psychology*, *59*, 1192–1201.
- Steiger, J.H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, *87*, 245–251.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*, 220–247.
- Wiers, R.W., Rinck, M., Kordts, R., Houben, K., & Strack, F. (2009). Retraining automatic action-tendencies to approach alcohol in hazardous drivers. Manuscript submitted for publication.

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Wilhelm Hofmann

Department of Psychology
University of Würzburg
Röntgenring 10
D-97070 Würzburg
Germany
Tel. +49 931 312860
Fax +49 931 312812
E-mail hofmannw@psychologie.uni-wuerzburg.de