Evaluative Consequences of Selective Attention:
The Impact on Socially Meaningful Stimuli and Underlying Processes

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People travel to wonder at the height of the mountains,
at the huge waves of the seas, at the long course of the rivers,
at the vast compass of the ocean, at the circular motion of the stars,
and yet they pass by themselves without wondering.
(St. Augustine)

Abstract

Recently, evidence was found that processes of selective attention modulate affective evaluations (e.g., Raymond, Fenske, & Tavassoli, 2003). Specifically, previously ignored stimuli were found to be affectively devaluated. That is, after a search task, previously ignored stimuli (distractors) were evaluated more negatively than attended stimuli (targets) and previously not seen stimuli (novels). The current research investigated two aspects of the effects of selective attention on evaluations. In the first part, evaluations of previously attended and ignored ingroup and outgroup members were measured to test the effect of selective attention on evaluations of socially meaningful stimuli. In two experiments, a social context was created, ingroup identification was measured (Experiment 1) and experimentally manipulated (Experiment 2), and ingroup bias was assessed from evaluations obtained for ingroup and outgroup members. Analyses showed that ingroup bias was modulated by the attentional focus, however, only for highly-identified individuals. Highly-identified individuals showed more ingroup bias after attending ingroup members and ignoring outgroup members than highly-identified individuals attending outgroup members and ignoring ingroup members. Further analyses showed that this attention-ingroup bias effect was mainly a result of an affective devaluation of previously ignored group members. These results extend previous research by showing that attentional processes affect evaluations of socially meaningful stimuli. In the second part, the underlying processes of the selective attention-evaluation link, that is, the negative effect of attentional inhibition processes on evaluations was investigated. A behavioral measurement was used to assess the effectiveness of distractor inhibition in a feature-based selection task (Experiment 3) and an object-based selection task (Experiment 4) to test the hypothesis that more effective distractor inhibition predicts more negative distractor evaluations. This hypothesis was confirmed. In both experiments, more effective distractor inhibition predicted more negative distractor evaluations. Although these results support the notion that inhibitory processes of selective attention negatively affect evaluations, no support for a general distractor devaluation effect was found in Experiment 3 and 4. Distractors were in general not evaluated more negatively than novel control stimuli. To explain these mixed results it is assumed that negative distractor devaluation effects and positive mere exposure effects partly dissolve each other. In general, the current work provides evidence that processes of selective attention affect evaluations of socially meaningful stimuli (Experiments 1 & 2) and it supports the assumption that inhibitory processes of selective attention negatively affect evaluations of previously inhibited stimuli (Experiments 3 & 4).

Contents

Part I

EFFECTS OF SELECTIVE ATTENTION ON EVALUATIONS OF SOCIALLY MEANINGFUL STIMULI

1 Introduction (Part I)

Processes of selective attention are a prerequisite of any controlled behavioral interaction with our environment. Whether we grab a cup of coffee or start a verbal interaction with somebody, selective attention prioritizes stimuli by amplifying relevant stimuli and suppressing irrelevant stimuli (e.g., Neumann & DeSchepper, 1991; Houghton & Tipper, 1994; Tipper, 1985; Tipper & Driver, 1988). Recently, evidence was found that processes of selective attention modulate evaluations of previously attended and ignored stimuli (e.g., Raymond, Fenske, & Tavassoli, 2003). Given the importance of selective attention in our everyday interactions with our environment, the aim of the current research is to broaden existing evidence for an effect of selective attention on evaluations of neutral stimuli to evaluations of socially meaningful stimuli. In our everyday life, other individuals are among the most important stimuli we encounter and interact with. Unlike non-living objects, we encounter other individuals in a complex social context, one that already provides important evaluative information. The question I addressed in the current work was whether a basic process such as selective attention does affect evaluations made in a social context on socially meaningful stimuli. More precisely, in two experiments I investigated whether selectively attending and ignoring ingroup and outgroup members affects evaluations of these group members.

1.1 Distractor devaluation effect

In recent years, evidence has accumulated that selective attention does affect emotional evaluations (e.g., Fenske, Raymond, & Kunar, 2004; Raymond et al., 2003; Raymond, Fenske, & Westoby, 2005; reviewed by Fenske & Raymond, 2006). In the initial demonstration (Raymond et al., 2003) of the effect, previously in search tasks ignored stimuli (distractors) were found to be evaluated more negatively than search task targets and novel stimuli (i.e., stimuli that had not been presented previously). Because distractors were evaluated more negatively than both targets and novels, the authors concluded that distractors were emotionally devaluated during the course of ignoring them. So far, the distractor devaluation effect has been shown with different kinds of stimuli, for example, abstract neutral patterns (Raymond et al., 2003), letters (Veling, Holland, & van Knippenberg, 2007), and unfamiliar faces (Goolsby et al., 2009; Raymond et al., 2005), as well as with different paradigms, for example, computer-based search tasks with two (Raymond et al., 2003) or more items (Raymond et al., 2005), a simple paper and pencil search task (Veling et al., 2007), and a stop signal paradigm (Fenske, Raymond, Kessler, Westoby, & Tipper, 2005).

To explain distractor devaluation, an inhibition-based account was proposed (Raymond et al., 2003, 2005). Within this account it is argued that the inhibition applied to ignored stimuli is stored together with the mental representation of the stimuli. When a previously inhibited stimulus is reencountered, the inhibitory state is reinstantiated and this is assumed to affect the evaluation of the stimulus negatively (see Fragopanagos et al., 2009).

1.2 Exposure and evaluation

The distractor devaluation effect adds a new dimension to the question of how exposure affects evaluations. A classical effect in this regard is the mere exposure effect (e.g., Bornstein, 1989; Kunst-Wilson & Zajonc, 1980; Zajonc, 1968, 2001). The mere exposure effect refers to the finding that mere unreinforced exposure to a stimulus is sufficient to enhance liking ratings of the stimulus. In research on distractor devaluation, targets and distractors are presented under the same perceptual conditions. Hence, more positive evaluations of targets and distractors would be expected. As reviewed before, research on distractor devaluation (e.g., Raymond et al., 2003) suggests otherwise. Although distractors are perceptually available, which is the minimally sufficient condition for the mere exposure effect, the negative effects of inhibitory processes seem to outweigh the positive effects of mere exposure. A similar argument was put forward by Fragopanagos et al. (2009) while modeling a computational model of the distractor devaluation effect. The authors argued that mere exposure and distractor devaluation effects influence ignored stimuli in parallel. While basically all stimuli, targets and distractors are subject to the positive effects of mere exposure, the distractor devaluation effect outweighs the positive exposure effect for distractor stimuli leading to affective devaluation.

1.3 Applying distractor devaluation to a social context

Distractor devaluation and mere exposure effects were initially tested with neutral stimuli like abstract patterns (Raymond et al., 2003) and Chinese characters (Zajonc, 1968, Exp. 2), respectively. However, to evaluate the impact of these basic effects in a social environment, it is necessary to test them with social stimuli actually presented in a social context. Regarding the mere exposure effect, this was done by demonstrating the effect with people in everyday life situations (e.g., Moreland & Beach, 1992). In contrast, distractor devaluation has only been investigated using abstract pictures (e.g., Raymond et al., 2003) or unfamiliar human faces (e.g., Goolsby et al., 2009). Investigating distractor devaluation with faces employs stimuli that are relatively complex and with which humans have extensive experience. However, in the studies on distractor devaluation that used faces (e.g., Goolsby et al., 2009; Raymond et al., 2005), these stimuli were disenthralled from any features (e.g., hair, clothing) that usually provide social context information. But in our everyday life we normally encounter people displaying various visual features that provide context information. On the basis of some of these features we categorize individuals into different groups (e.g., race based on skin color, sport team affinity based on baseball caps and t-shirts, etc.). Even more important, we categorize people into groups that we ourselves belong to or do not belong to. In social identity theory (Tajfel & Turner, 1979; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) these groups are termed ingroup and outgroup. According to social identity theory, the categorization into ingroup and outgroup has evaluative consequences: The more a group member identifies with a group, the more important the value of the group is because it reflects on the group member's self-concept. Because of humans' central motive to evaluate themselves relatively positively, they tend to evaluate ingroups more positively than respective outgroups. This motive to evaluate ingroups more positively than outgroups is so central that it can even be observed experimentally with individuals placed into newly created groups based on a flip of a coin (Messick & Mackie, 1989).

1.4 The present experiments

In the current research I am interested in the effects of selective attention on evaluations of ingroup and outgroup members. When investigating evaluations of group members in a social context, it must be considered that groups are defined in relation to each other. There is no ingroup without a corresponding outgroup. Hence, evaluations of groups are also relative. The evaluation of an ingroup is a value assessment of the ingroup in relation to a relevant outgroup (Tajfel & Turner, 1979). In intergroup research, a common dimension to measure group evaluations is ingroup bias. Ingroup bias is the difference between ingroup and outgroup evaluations. It combines ingroup favoritism and outgroup derogation in one dimension. Therefore, instead of only investigating ingroup and outgroup evaluations separately, their combination in form of ingroup bias will be my main variable of interest.

Empirical studies have demonstrated that when investigating ingroup bias, group identification must be taken into account (e.g., Sidanius, Pratto, & Mitchell, 1994). Group identification is the degree to which group membership becomes part of the group member's self. More identification means that the group value is more important in regard to the group member's self-concept. Thus, as mentioned above, the more a group member is identified with a group, the more important the value of the group is. Because of this integration of the group's value into the self and our central motivation to evaluate ourselves and the groups we belong to positively (Tajfel & Turner, 1979), it is not surprising that there is a positive relation between one's level of group identification and ingroup bias. Higher group identification predicts higher levels of ingroup bias, that is, more positive evaluations of ingroups compared to outgroups (e.g., Sidanius et al., 1994). Concerning the focus of the current research, which is to assess the evaluative consequences of selective attention, we assessed group identification to control for its evaluative consequences and to explore possible interactions between identification and selective attenion processes.

To sum up the general procedure of both experiments: I established a social context by creating artificial groups to which participants were randomly assigned. To test the effects of selective attention on ingroup bias, participants performed a search task in which they attended and ignored different ingroup and outgroup members and evaluated the group members before and after the search task.

I expected a combined effect of mere exposure and distractor devaluation on ingroup bias. For attended group members, I expected more positive evaluations after the search task compared to evaluations before the search task (mere exposure effect). In contrast, for ignored group members, I expected more negative evaluations after the search task compared to evaluations before the search task (distractor devaluation). Thus, I predicted that a larger ingroup bias would be observed for individuals attending their ingroup (while ignoring the outgroup) compared to individuals attending the outgroup (while ignoring their ingroup). Furthermore, to explore the role of group identification on the selective attention-evaluation link, I measured group identification in Experiment 1 and experimentally manipulated group identification in Experiment 2.

2 Experiment One

2.1 Introduction

I combined a minimal group paradigm (Tajfel & Turner, 1979) with a search task paradigm (Raymond et al., 2005, Exp. 3) to test the effects of selective attention on evaluations of group members in a social context. Following a long tradition of intergroup research, I created artificial groups (Tajfel, Billig, Bundy, & Flament, 1971) to which participants were randomly assigned. Different research shows that behavior in newly created artificial groups reflects behavior in natural groups (e.g., Ellemers, Spears, & Doosje, 1997; Ellemers, Wilke, & Van Knippenberg, 1993). Furthermore, there are significant advantages of using artificial groups compared to natural groups. For example, participants have no prior experience with the newly created groups so that all information about the groups can be controlled by the researcher. This procedure allowed me to test attention-evaluation effects in a social context, but at the same time in a controlled setting that provided the same preconditions for all participants.

To manipulate attention, I used a search task paradigm with human faces as stimuli adopted from Raymond et al. (2005, Exp. 3). In contrast to the stimuli used by Raymond et al., in my experiment, the face stimuli were presented together with visual features that associated them with one of the groups participants were assigned to. In the search task, participants either searched for face stimuli associated with their ingroup (while ignoring outgroup faces) or they searched for face stimuli associated with the outgroup (while ignoring ingroup faces). Before and after the search task participants evaluated all the face stimuli presented in the search task in terms of liking. I expected the ingroup bias to be larger for participants who attended their ingroup while ignoring the outgroup compared to participants who attended the outgroup while ignoring their ingroup.

2.2 Method

2.2.1 Participants

Sixty-three students (42 female/21 male) of New York University with ages ranging from 18 to 21 (M = 19.48, SD = .80) participated in return for course credit for an introductory psychology class. All participants had normal or corrected-to-normal visual acuity. Six participants were excluded from the analyses either because they showed more than 30% errors in the search task (3) or because they were identified as outliers[1] on the identification questions[2] (3). The reported analyses were performed on the data of the remaining 57 participants.

2.2.2 Apparatus and stimuli

Apparatus The experiment was conducted on an IBM-PC compatible computer connected to a 43-cm color CRT display (85-Hz; 1,024 x 768 resolution). The experiment was programmed and run using Macromedia Authorware 4[3]. Participants sat in a small and quiet laboratory booth. There were no other people in the room and the ambient illumination was low. Participants' typical viewing distance to the screen was about 80 cm.

Stimuli All stimuli were gray-scale pictures presented on light gray background (RGB: 170/170/170). In the group categorization task, eight abstract pictures were used (see Figure 1a for examples). Four abstract pictures consisted mainly of horizontal structures (horizontal pictures) and the remaining four pictures consisted mainly of diagonal structures (diagonal pictures). In the search task (attention manipulation), 12 different male faces with neutral expressions were used (see Figure 1b for examples; all stimulus faces are displayed in Appendix B1, B2, and B3). All face stimuli displayed people from the neck upwards wearing baseball caps. The caps displayed a horizontal, diagonal, or undefined picture. The horizontal and diagonal abstract pictures were selected from those used in the group categorization task. The undefined picture was similar to the horizontal and diagonal pictures but manipulated to make any structures blurred. On screen, one face was approximately 4 cm in height. Four stimulus people were presented with horizontal picture caps, four people with diagonal picture caps, and four people with undefined picture caps. Each stimulus person was presented once during the baseline evaluation, 18 times during the search task, and once during post-manipulation evaluations. To avoid systematic stimulus effects, I created six different stimulus sets which counterbalanced the face-group (horizontal, diagonal, and undefined) pairings. Participants were randomly assigned to one of the counterbalanced stimulus sets.

[1] Outliers were defined as values 1.5 interquartile range (IQR) lower than the first quartile or 1.5 IQR higher than the third quartile.

[2] An initial analysis of the three identification questions resulted in a low internal consistency of $\alpha = .50$. Analyzing the variance of answering the identification questions within each participant identified three participants as outliers. After removing these outliers, the internal consistency analysis resulted in an acceptable α-value of .62.

[3] http://www.adobe.com/products/authorware

2.2.3 Experimental design

The experiment followed a one-factorial between participants design with the factor attention-group (attend ingroup vs. attend outgroup). The dependent variable was ingroup bias, calculated from explicit liking ratings of ingroup and outgroup members.

Ingroup, outgroup, and undefined group member stimuli were presented to all participants independent of condition. Attending a group (ingroup or outgroup) was operationalized by the task to search for the specific group. The operationalization of ignoring implicitly followed from the instructions to attend the counterpart. In other words, attending the ingroup in the attend ingroup condition necessarily meant to ignore the outgroup. On the other hand, attending the outgroup in the attend outgroup condition meant to ignore the ingroup. The undefined group members were never attended and only served as filler stimuli for the search task.

Each participant completed 72 search task trials. In each trial three face stimuli were presented. Either two, one or none of these face stimuli were targets. In 40 trials, one target was presented among two distractors, in 16 trials, two targets were presented beside one distractor, and in another 16 trials all three face stimuli were distractors. The positioning of the faces in the search task was the same for all participants and roughly randomized over the trials so that each stimulus face (and group) was presented equally often at all possible positions on the search display.

2.2.4 Procedure

Participants were given a cover story to explain the various tests they would take. They were informed that I am interested in how visual search performance was influenced by different visual processing styles and emotional factors. They were told that for this reason, before and after the main task (search task), short tests were necessary to, first, assess the visual processing style of the participants and second, assess evaluations of the face stimuli.

Minimal group assignment task Participants were told that this task would test their visual processing styles (horizontal versus diagonal) by comparing their reaction times to respond to different horizontal and diagonal pictures. The procedure was as follows: After the presentation of a centered fixation cross for 800 ms and a blank screen for 800, 1300 or 1700 ms, either a horizontal or a diagonal abstract picture was presented centered on the screen. The participants' task was to decide as quickly as possible whether the stimulus was a horizontal or diagonal picture by pressing the “H” or “D” key, respectively. After the completion of 18 trials with stimuli randomly drawn from a pool of

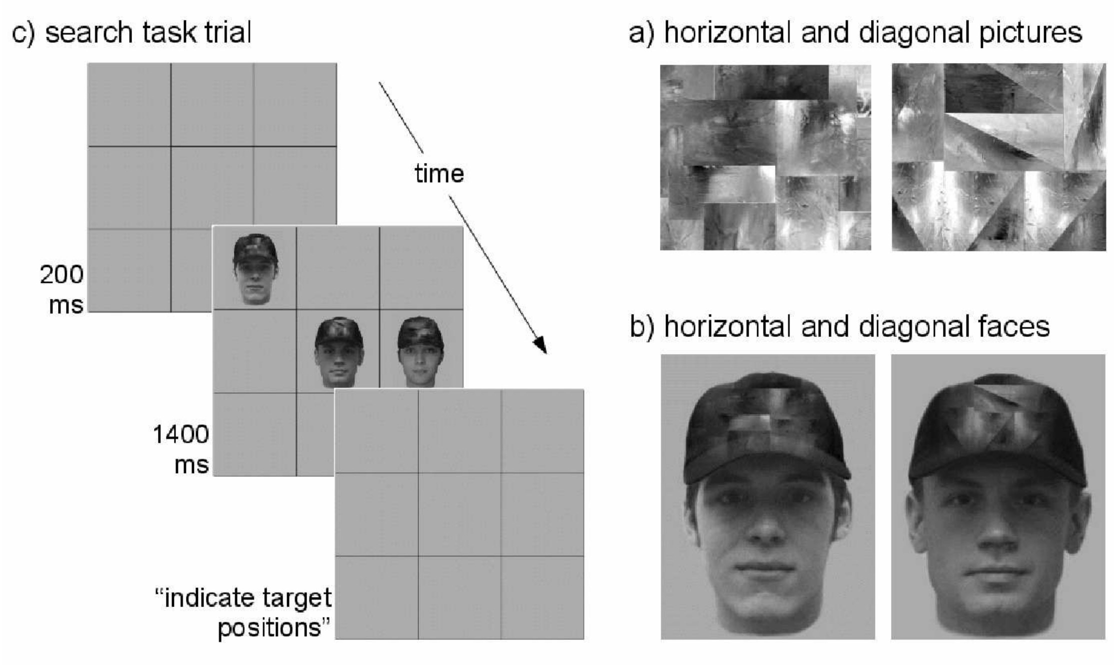

Figure 1: Stimulus material and procedure of the search task of Experiment 1 and 2. a.) Examples of the pictures presented in the group categorization task. b) Examples of the pictures presented in the search task. c) Sequence of events of one search task trial.

four horizontal and four diagonal pictures, an information screen appeared presenting the following sentence: "The comparison of your reaction times to the horizontal and diagonal pictures indicates the following processing style:". According to the random assignment to the horizontal or diagonal group, the name of the respective group appeared after the colon. After a few seconds, a continue button appeared. Participants clicked on the button and on the following screen they were asked to call the experimenter. The experimenter explained that he needed to enter the participants' code. For that reason he asked the participants to which group they were assigned. According to the participants' (correct) response the experimenter entered "h17" or "d17" into the computer while the participant watched. This was done to check whether the participants understood and remembered their assignment as well as to reinforce the group assignment.

Baseline evaluations After the assignment to the horizontal or diagonal group, participants were asked to evaluate the face stimuli. After a fixation cross was presented for 700 ms and a blank screen for 300 ms, a single face appeared centered on the screen.

The face was presented for 900 ms before it was replaced by a 5-point likert scale with the extreme points "less positive" and "definitely positive". After participants made their response by clicking in the respective field of the scale, the scale disappeared and the next trial started with the presentation of a fixation cross. After evaluating the 12 faces, participants received instructions for the main part of the experiment.

Search task The sequence of events of one search task trial is pictured in Figure 1c. One trial of the search task consisted of a search display and a response display. First, an empty 3x3 grid appeared centered on the screen for 200 ms. Then, 3 face stimuli appeared in 3 boxes of the grid. Participants had 1400 ms to locate the target face(s). The faces disappeared after 1400 ms, leaving the empty grid on the screen. Participants then clicked in the respective boxes in which they had seen the target face(s). After locating all targets to the best of their knowledge, participants clicked the “continue” button to advance to the next search trial, starting again with the appearance of the empty 3x3 grid. After participants completed 72 search task trials, they were told that the main part of the experiment was over and in the last task they would be asked to evaluate the face stimuli again.

Post-manipulation evaluation and additional questionnaires The post-manipulation evaluations followed exactly the same procedure as the baseline evaluations. All 12 face stimuli were evaluated one at a time in random order. After the post-manipulation evaluations, participants filled in a questionnaire presented to them on the computer screen. The questionnaire first required them to enter the group they belonged to, followed by three questions concerning their identification with their ingroup (see Appendix B4). Participants responded to the identification questions on a 5-point scale with the extreme points “applies” and “does not apply”. After the identification questions, participants were asked to guess what the experiment was about. The questionnaire and the experiment ended with demographic questions regarding their year of birth, gender, and major.

To summarize the whole procedure, participants first completed a group assignment task that assigned them to the horizontal or diagonal group. Participants then evaluated the ingroup and outgroup member faces. In the main task, participants either searched for ingroup or outgroup targets among ingroup, outgroup, and undefined distractors. Following this attention manipulation, participants evaluated the face stimuli again.

2.2.5 Data preparation

The three identification questions were combined to form an identification scale with an internal consistency of $\alpha = .62$. The mean search task error rate (misses and false hits) was 3.96% ($SD = 5.50$). Evaluative responses made faster than 200 ms and slower than 3 *SD*s above the mean evaluation response time in baseline and post-manipulation evaluations were treated as errors. This procedure excluded 2.16% of the baseline evaluations and 2.59% of the post-manipulation evaluations. Mean evaluations for the different conditions and stimulus types were calculated from the remaining correct responses.

To create a variable reflecting ingroup bias, a difference score was calculated from the mean evaluations for ingroup and outgroup members. A positive value reflected ingroup bias, that is, more positive ingroup evaluations compared to outgroup evaluations.

2.3 Results

All analyses were performed on mean ratings of the group member evaluations. All effects referred to as statistically significant are associated with *p*-values of .05 or less, two-tailed.

Baseline ingroup bias A paired *t*-test on the baseline evaluations of ingroup members ($M = 3.00$, $SD = .55$) and outgroup members ($M = 2.79$, $SD = .52$) revealed a significant difference, $t(57) = 2.73$, $p < .01$, $d = .39$. Baseline evaluations showed an ingroup bias, evident in more positive evaluations of ingroup members compared to outgroup members.

2.3.1 Effects of selective attention on the post-manipulation ingroup bias

I expected a modulation of the ingroup bias depending on participants' attentional focus with a larger ingroup bias for participants attending their ingroup compared to participants attending the outgroup. A multiple regression analysis was conducted to test the impact of the attention-group condition on the post-manipulation ingroup bias (Aiken & West, 1991). To explore the effects of group identification, I included both identification and the interaction of identification and attention-group condition in the analysis. Furthermore, I included the variables baseline ingroup bias, gender, and group assignment (horizontal versus diagonal) to control for their effects. The regression model was significant, $F(6, 50) = 7.27$, $p < .01$, and accounted for about 47% of the variance (see Table 1 for a summary of the regression analysis).

Table 1: Summary of simultaneous regression analysis for variables predicting post-manipulation ingroup bias in Experiment 1 (N = 57)

Variable	Zero-order correlation	*B*	*SE B*	β
Gender	-.25	-.1	.12	-.09
Group assignment	.30	.16	.11	.17
Baseline ingroup bias	.43	.33	.11	.33**
Group identification	.15	.11	.11	.11
Attention-group condition	-.35	-.33	.10	-.33**
Attention-group condition x group identification	-.41	-.30	.11	-.30**

Note: **p <= .01

My main interest was the effect of attending ingroup members versus attending outgroup members (attention-group condition) on the magnitude of the post-manipulation ingroup bias. As can be seen in Table 1, I observed a significant effect of the attention-group condition on the post-manipulation ingroup bias. As hypothesized, the ingroup bias was larger in the attend ingroup (ignore outgroup) condition (M = .50, SD = 1.08) than in the attend outgroup (ignore ingroup) condition (M = -.18, SD = .76). However, as can be seen in Table 1, this attention-group condition effect was qualified by a significant interaction with group identification. I used the simple slopes test method (Aiken & West, 1991) to investigate the interaction between the attention-group condition and group identification in detail (for a plot of the interaction see Figure 2). This analysis showed that the attention-group condition was a significant predictor of post-manipulation ingroup bias among highly-identified group members only (β = -.63, p < .01). For those less identified with their group, no attention-group condition effect was observed (β = .03, *n.s.*). In sum, as hypothesized, attending ingroup members led to a larger ingroup bias compared to attending outgroup members. However, this effect was only found for highly-identified participants.

Not surprisingly, the main regression analysis further indicated a significant effect of baseline ingroup bias on the post-manipulation ingroup bias. Greater baseline ingroup bias predicted greater post-manipulation ingroup bias. The remaining predictors had no significant effect on the post-manipulation ingroup bias.

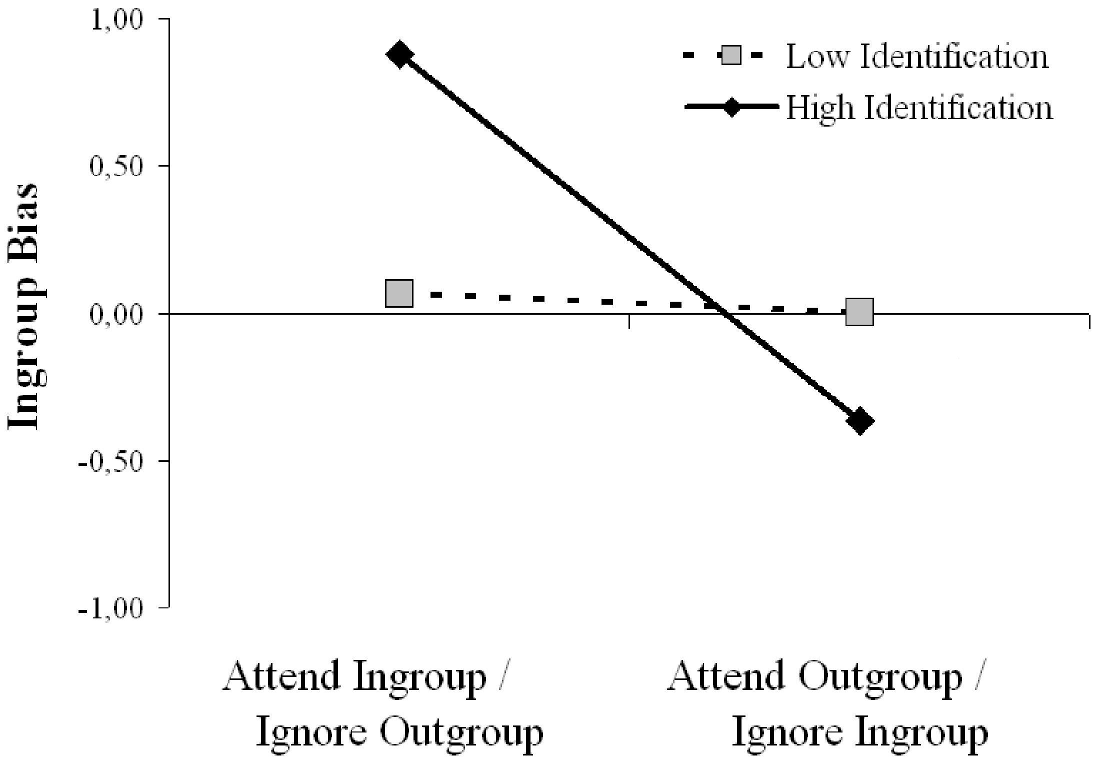

Figure 2: Interaction of attention-group condition and group identification on the post-manipulation ingroup bias in Experiment 1 (positive ingroup bias values represent more positive evaluations of ingroup members compared to outgroup members).

2.3.2 Evaluations of ignored and attended group members

Whereas the ingroup bias variable previously reported was a combined evaluation index of attended and ignored group members, I conducted additional analyses to separately investigate the evaluations of group members who were either attended or ignored. First of all, I tested whether there was a difference between evaluations of attended and ignored group members and whether group identification did affect ignored and attended group members differently. This was done by a repeated measure ANCOVA with group member evaluations as the dependent variable and the factor attention (attended groups versus ignored groups) as predictor. Additionally, the continuous variable group identification was entered as a covariate to test for interactions with the

Table 3: Summary of simultaneous regression analyses for variables predicting ignored and attended group member evaluations in Experiment 1 (N = 57)

	Ignored group members				Attended group members			
Variable	ZOC	*B*	*SE B*	β	ZOC	*B*	*SE B*	β
Gender	-.01	-.12	.08	-.17	-.13	-.03	.08	-.04
Group assignment	-.09	-.02	.07	-.04	.12	.04	.07	.09
Baseline evaluation	.50	.32	.07	.49**	.42	.23	.07	.39**
Group type	-.02	-.06	.07	-.09	-.29	-.14	.07	-.24*
Group identification	-.39	-.25	.08	-.39**	.24	.13	.07	.21†
Group type x group identification	.10	.04	.08	.06	-.19	-.11	.07	-.18

Note: ZOC = Zero-order correlation. †p <= .10. *p <= .05. **p <= .01

attention factor (mean evaluations of ignored and attended group members for baseline and post-manipulation evaluations are pictured in Figure 3). The analysis revealed a significant attention effect, $F(1, 55) = 5.31$, $p = .03$, partial eta squared = .09, indicating that ignored group members ($M = 2.70$, $SD = .65$) were evaluated significantly more negatively than attended group members ($M = 3.04$, $SD = .60$). Furthermore, I found a significant interaction between attention and group identification, $F(1, 55) = 11.48$, $p < .01$, partial eta squared = .17. This interaction indicates that identification affected ignored and attended group member evaluations differently. In the next step, I investigated the ignored and attended group members separately and thereby disentangled the different effects of identification on the ignored and attended group members evaluations.

Ignored group member evaluations Regarding ignored group members, my main interest was whether ignored group members were emotionally devaluated. A distractor devaluation effect (Raymond et al., 2003) would be evident in more negative evaluations of ignored group members compared to baseline evaluations. A paired t-test confirmed this assumption. Post-manipulation evaluations of ignored group members were significantly more negative than baseline evaluations ($M = 2.87$, $SD = .52$), $t(56) = 2.17$, $p = .03$, $d = .29$.

Above I found evidence that attended and ignored group members were affected differently by group identification. Therefore, I further investigated the effect of group identification on the evaluations of ignored group members. A multiple regression analysis was conducted to test the impact of group identification, group type (ingroup vs. outgroup), and their interaction on the post-manipulation evaluations of ignored group members (Aiken & West, 1991), controlling for baseline evaluations, gender, and group assignment. The regression model was significant, $F(6, 50) = 5.72$, $p < .01$, and accounted for about 41% of the variance (see Table 3 for a summary of the regression analysis).

As shown in Table 3, I observed a significant effect of group identification on the ignored group member evaluations. More identification predicted more negative evaluations of ignored group members. I observed no effect of group type (ingroup versus outgroup) on the ignored group member evaluations and no interaction effect between group type and identification. This indicates that ignored ingroup and outgroup members were not evaluated (and devaluated) differently. Not surprisingly, I observed a significant positive effect of baseline evaluations on the post-manipulation evaluations of ignored group members. The remaining predictors had no significant effect on the post-manipulation evaluations of ignored group members.

In sum, evaluations for ignored group members decreased from baseline to post-manipulation evaluations. Group identification influenced this decrease. More identification predicted more negative evaluations (i.e., distractor devaluation). There was no difference in the evaluation of ignored ingroup and outgroup members and both ignored ingroup and outgroup members were similarly influenced by group identification.

Attended group member evaluations Finally, I analyzed the evaluations of the attended group members for which I expected more positive post-manipulation evaluations compared to baseline evaluations. However, a paired *t*-test did not confirm this assumption. Although evaluations of attended group members ($M = 3.04$, $SD = .60$) were more positive compared to baseline evaluations ($M = 2.91$, $SD = .57$), this difference did not reach a significant level, $t(56) = 1.61$, $p = .11$.

I was also interested in how group identification affected the attended group member evaluations. A multiple regression analysis was conducted to test the impact of group identification, group type, and their interaction on the post-manipulation evaluations of attended group members (Aiken & West, 1991), controlling for baseline evaluations, gender, and group assignment. The regression model was significant, $F(6, 50) = 4.13$, $p < .01$, and accounted for about 33% of the variance (see Table 3 for a summary of the regression analysis).

My main interest was again the identification variable. As shown in Table 3, I observed a marginally significant effect of identification on the post-manipulation evaluations of attended group members with more identification predicting more positive evaluations. Furthermore, I observed a significant effect of group type (ingroup versus outgroup) on the attended group evaluations. Attended ingroup members (M = 3.21, SD = .54) were evaluated more positively than attended outgroup members (M = 2.87, SD = .49). No interaction effect between identification and group type was observed. Not surprisingly, I observed a significant positive effect of baseline evaluations of (later) attended group members on the post-manipulation evaluations of attended group members. The remaining predictor variables had no significant effect on post-manipulation evaluations of attended group members.

In sum, for attended group members, there was no change from baseline to post-manipulation evaluations. Identification did affect evaluations of attended group members, however, in the opposite direction that was found for ignored group members. More identification predicted more positive evaluations of attended group members. Finally, in contrast to the ignored group members, attended ingroup members were evaluated more positively than attended outgroup members.

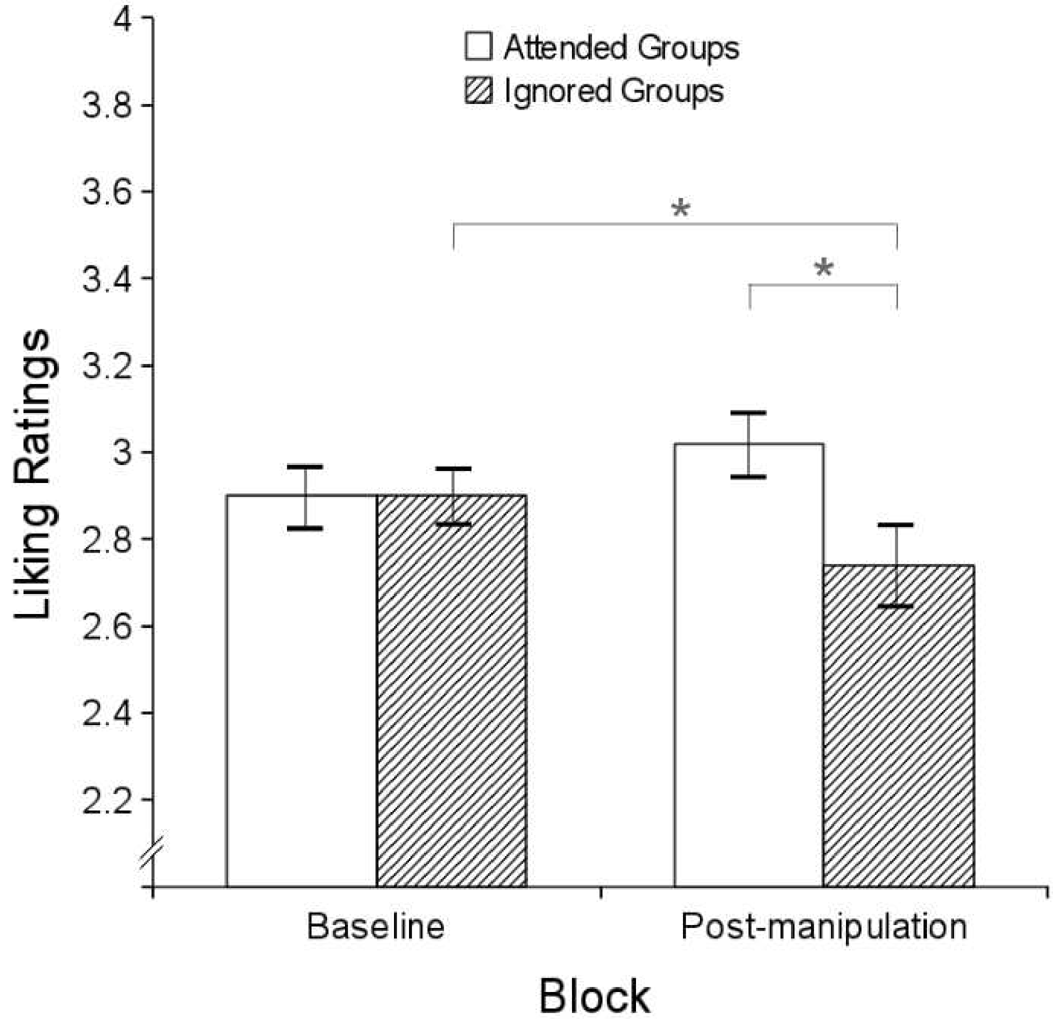

Figure 3: Baseline and post-manipulation evaluations of attended and ignored group members in Experiment 1 (+/- 1 *SE*).

2.4 Discussion

As hypothesized, I found evidence that one's attentional focus modulated post-manipulation ingroup bias. However, this effect was moderated by group identification. For highly-identified individuals, this meant that attending ingroup members while ignoring outgroup members increased the difference between ingroup and outgroup evaluations (i.e., more ingroup bias). On the other hand, highly-identified individuals who attended outgroup members while ignoring ingroup members showed less ingroup bias. In fact, those who were instructed to attend outgroup members in the search task showed no ingroup bias at all. In contrast, for low-identified individuals, attending ingroup or outgroup members had no effect on ingroup bias. I will further discuss the moderating effect of group identification on the attention-ingroup bias effect after discussing the results for attended and ignored group members separately.

2.4.1 Ignored and attended groups

As the effect of attentional focus on ingroup bias was a combination of evaluations for the attended and the ignored group members, I further analyzed previously ignored and attended group members separately to disentangle the different effects of ignoring and attending. The most important finding in this regard was that group members were evaluated more negatively after they had been ignored (post-manipulation) compared to evaluations before they had been ignored (baseline). This is in line with research on distractor devaluation (e.g., Raymond et al., 2003, 2005) showing more negative evaluations of previously ignored stimuli compared to novel stimuli. As expected, this devaluation effect was unique to ignored group members. I found no difference between baseline and post-manipulation evaluations of attended group members. However, this also suggests that no mere exposure effect was observed for attended group members. This lack of a mere exposure effect might be caused by the frequency of stimulus presentations. There is evidence that although evaluations become more positive after some repeated presentations, at a certain point the positive effects reach a plateau (Zajonc, Shaver, Tavris, & Van Kreveld, 1972) or even decline (Stang & O'Connell, 1974). In these studies, the plateau or decline of evaluations started after 10 repeated presentations. The stimuli in my experiment were presented 20 times each and for a relatively long presentation duration of 1400 ms. This presentation configuration might have resulted in the lack of a reliable mere exposure effect for attended group members.

Group identification The evaluations of ignored and attended group members were influenced by individuals' group identification. Interestingly, this influence was different for ignored and attended group members. While for ignored group members more identification predicted more negative evaluations, for attended group members, more identification predicted more positive evaluations. This pattern seems to indicate that identification amplified the effects of attention and ignoring on subsequent evaluations. I will return to this issue in the discussion of Experiment 2 and in the general discussion.

Ingroup versus outgroup members There was one more difference between the evaluations of ignored and attended group members besides the reversed influence of group identification. Ingroup and outgroup member evaluations did not differ from each other when they were ignored. Both ignored ingroup and ignored outgroup members were affectively devaluated. Furthermore, there was no difference in the effect of identification on the evaluations of ignored ingroup and outgroup members. For both, more identification resulted in more negative evaluations. This effect is not surprising with regard to the outgroup but it is surprising regarding the ingroup. More group identification goes along with higher ingroup value (Tajfel & Turner, 1979). However, for highly-identified individuals, this ingroup value did not prevent a devaluation of ignored members of one's ingroup. The fact that identification had a similar impact on the evaluation of ignored outgroup and ingroup members further supports the idea that identification amplified the effects of selective attention.

In contrast, for attended group members, the pattern of results is in line with social identity theory (Tajfel & Turner, 1979). Namely, attended ingroup members were evaluated more positively than attended outgroup members.

2.4.2 Summary

To recapitulate, the presence of an ingroup bias in the baseline evaluations suggests that I successfully established a social context. Within this social context, I showed that basic attentional processes do have an impact on evaluations of socially meaningful stimuli. That is, attentional focus modulated the post-manipulation ingroup bias and a distractor devaluation effect was found for previously ignored group members. This is, to my knowledge, the first evidence that attentional selection processes do affect evaluations of socially meaningful stimuli.

Given the importance of identification in a social context, I explored its effect on the attention-evaluation link. In general it can be concluded that identification amplified the effects of attention on evaluations. That is, I only found an effect of attention on ingroup bias for highly-identified individuals. When ignored and attended group members were looked at separately, more identification led to lower ignored group member evaluations but to higher attended group member evaluations.

Before I further discuss the group identification effect, two important problems with the identification variable must be addressed: First, identification was only measured, and therefore I cannot make any causal inferences about how identification moderated the effects of attention. Second, identification was measured at the end of the experiment, after the attention manipulation and the evaluations. Therefore both the attention manipulation and the evaluations could have had an effect on the identification measurement that I was not able to control or quantify. These two issues make the interpretation of the influence of identification on the attention-evaluation link problematic. To address these problems, I conducted a second experiment with the goal of replicating the results of Experiment 1 but with necessary improvements to the methods of investigating the role of group identification. In Experiment 2, I experimentally manipulated individuals' group identification at the beginning of the experiment.

3 Experiment Two

3.1 Introduction

The purpose of Experiment 2 was to replicate the effect of attention on evaluations and the influence of group identification on the attention-evaluation link. Rather than only measuring group identification as in Experiment 1, I experimentally manipulated identification to allow causal interpretations of its influence. The identification manipulation was adapted from Faddegon, Scheepers, and Ellemers (2008, Exp. 2) and modified to fit my needs. To establish a high and low identified group of participants, in addition to information about the group membership provided in Experiment 1, in Experiment 2, participants received information about how prototypical they are for their group. It was reasoned that participants who received information that they were very prototypical for their group would identify stronger with this group than participants who received information that they were not prototypical for their group (e.g., Reid & Hogg, 2005, Exp. 2). Apart from this identification manipulation, Experiment 2 followed exactly the same procedure as Experiment 1.

I expected to replicate the results found in Experiment 1. Specifically, I postulated that identification would influence the attention-ingroup bias effect. Highly-identified individuals attending their ingroup were expected to show a larger ingroup bias compared to highly-identified individuals attending the outgroup. Furthermore, I expected a distractor devaluation effect (Raymond et al., 2003) of previously ignored groups, that is, a decrease in evaluations from baseline to post-manipulation evaluations. These post-manipulation evaluations of ignored groups (but not attended groups) are also expected to be affected by group identification, with more identification leading to more negative evaluations.

3.2 Method

3.2.1 Participants

Eighty-nine students (67 female/22 male) of New York University with ages ranging from 18 to 22 (M = 19.34, SD = 1.10) participated in return for course credit for an introductory psychology class. All participants had normal or corrected-to-normal visual acuity. Eight participants were excluded from the analyses because they either did not remember or incorrectly remembered the group to which they were assigned (3), they showed more than 30% errors in the search task (2), or they were identified as outliers[4] on the main dependent variable (3). The reported analyses were performed on the data of the remaining 81 participants.

3.2.2 Apparatus and stimuli

The configuration of apparatus and stimuli in Experiment 2 was the same as in Experiment 1.

3.2.3 Experimental design

The experiment followed a 2 (attention-group: attend ingroup vs. attend outgroup) x 2 (group identification: high vs. low) between participants design. The dependent variable was ingroup bias, calculated from explicit liking rating of ingroup and outgroup members. The design of the attention-group condition was the same as in Experiment 1. Ingroup, outgroup, and undefined group members were presented to all participants independent of condition and attending ingroup members consequently meant to ignore outgroup members and vice versa. Undefined group members were never attended and served only as filler stimuli for the search task.

3.2.4 Procedure

The procedure of Experiment 2 was the same as in Experiment 1 with two exceptions. The instructions for the group assignment task and the group assignment task itself were modified to include an explanation of each participant's prototypicality (identification manipulation). Furthermore, a manipulation check was included after the group assignment task to assess the participants' group identification.

Minimal group assignment task The procedure of the modified group assignment task was as follows: Participants were told that the following task would test their processing advantages for horizontal versus diagonal visual stimuli and how prototypical they are for the assigned to group.

After the presentation of a centered fixation cross for 800 ms and a blank screen for 800, 1300 or 1700 ms, a horizontal or diagonal picture was flashed centered on the screen for 100 ms, followed, after a 50 ms blank screen by the target picture (horizontal or diagonal). The participants' task was to decide as quickly as possible whether the

[4]Outliers were defined as values 1.5 IQR lower than the first quartile or 1.5 IQR higher than the third quartile.

presented target stimulus was a horizontal or a diagonal picture by pressing the “H” or “D” key, respectively. After the completion of 18 trials with stimuli randomly drawn from a pool of 4 horizontal and 4 diagonal pictures, an information screen appeared, presenting the following sentence: “The comparison of your reaction times to the horizontal and diagonal pictures indicates the following processing style:”. According to the random assignment to the horizontal and diagonal group the name of the respective group appeared after the colon. Participants were then told that these reaction times were also analyzed to calculate a score of prototypicality with their group. According to their random assignment to the high or low identification condition, participants received feedback that their score was either 83 or 23, together with an explanation that the scale ranged from 0 to 100 points with 0 equals “not prototypical” and 100 equals “very prototypical”. After a few seconds, a continue button appeared. Participants clicked on the button to advance to a screen where they were asked to call the experimenter. The experimenter explained that he needed to enter the participants’ code. For that reason he asked the participants to which group they were assigned. According to the participants’ (correct) response the experimenter entered “h17” or “d17” into the computer while the participant watched. This was done to check whether the participants understood and remembered their assignment as well as to reinforce the group assignment. Before the procedure continued with the baseline evaluations, participants were asked three questions concerning their identification with their group (see Appendix B4). After the group assignment task and the manipulation check the procedure continued in the same manner as in Experiment 1, with the baseline evaluations, the search task (attention manipulation) and the post-manipulation evaluations.

3.2.5 Data preparation

The three identification questions were combined to an identification scale with an internal consistency of $\alpha = .68$. The mean search task error rate (misses and false hits) was 6.93% ($SD = 9.44$). Evaluative responses made faster than 200 ms and slower than 3 *SD*s above the mean evaluation response time in baseline and post-manipulation evaluations were treated as errors. This procedure excluded 1.45% of the baseline evaluations and 2.23% of the post-manipulation evaluations. Mean evaluations for the different conditions and stimulus types were calculated only from the remaining correct responses. As in Experiment 1, a variable reflecting ingroup bias was created from the difference between the mean evaluations for ingroup and outgroup members. A positive value reflected ingroup bias, that is, more positive ingroup member evaluations compared to outgroup member evaluations.

3.3 Results

All analyses were performed on mean ratings of the group member evaluations. All effects referred to as statistically significant are associated with p-values of .05 or less, two-tailed.

Identification manipulation An independent samples t-test confirmed that participants' mean identification score was significantly higher in the high identification condition (M = 3.72, SD = 1.26) compared to participants' identification score in the low identification condition (M = 2.73, SD = 1.14), $t(79) = 3.71$, $p < .01$, $d = .82$. This difference confirms that I successfully manipulated participants' identification and established a high and a low identified group.

Baseline ingroup bias A paired t-test on the baseline evaluations of ingroup members (M = 2.91, SD = .57) and outgroup members (M = 2.94, SD = .64) did not reveal a significant difference, $t(80) < 1$. There was no ingroup bias in the baseline evaluations.

3.3.1 Effects of selective attention on the post-manipulation ingroup bias

As in Experiment 1, I expected an attention-group condition effect on the post-manipulation ingroup bias, moderated by the group identification condition. A multiple regression analysis was conducted to test the impact of the attention-group condition, identification condition, and their interaction on the post-manipulation ingroup bias (Aiken & West, 1991), controlling for baseline ingroup bias, gender, and group assignment (horizontal versus diagonal). The regression model was significant, $F(6, 74) = 4.31$, $p < .01$, and accounted for about 26% of the variance (see Table 5 for a summary of the regression analysis).

My main interest was the effect of attending ingroup members versus attending outgroup members (attention-group condition) and its interaction with group identification on the post-manipulation ingroup bias. As shown in Table 5, I observed a significant attention-group condition effect on the post-manipulation ingroup bias. The ingroup bias was larger in the attend ingroup (ignore outgroup) condition (M = .19, SD = .80) than in the attend outgroup (ignore ingroup) condition (M = -.15, SD = .61). Similar to Experiment 1, this attention-group condition effect was qualified by a

Table 5: Summary of simultaneous regression analysis for variables predicting the post-manipulation ingroup bias in Experiment 2 ($N = 81$)

Variable	Zero-order correlation	*B*	*SE B*	β
Gender	.04	.01	.08	.01
Group assignment	-.06	-.05	.07	-.07
Baseline ingroup bias	.39	.29	.07	.40**
Group identification	.10	.10	.07	.14
Attention-group condition	-.24	-.16	.07	-.23*
Attention-group condition x group identification	-.19	-.12	.07	-.16†

Note: †p <= .10. *p <= .05. **p <= .01

marginally significant interaction with the identification condition. I used the simple slopes test method (Aiken & West, 1991) to investigate the interaction between the attention-group condition and the identification condition in detail (for a plot of the interaction see Figure 4). The analysis showed that for highly-identified participants the attention-group condition was a significant predictor of the post-manipulation ingroup bias (β = -.39, $p < .01$). Highly-identified participants attending their ingroup showed more post-manipulation ingroup bias (M = .39, SD = .72) compared to highly-identified participants attending the outgroup (M = -.20, SD = .60). For less-identified participants, no attention-group condition effect was observed (β = -.06, *n.s.*). There was no difference in the post-manipulation ingroup bias for less-identified participants attending their ingroup (M = -.02, SD = .83) compared to less-identified participants attending the outgroup (M = -.10, SD = .63). Furthermore, in the main regression model, baseline ingroup bias was positively related to the post-manipulation ingroup bias. The remaining predictors had no significant effect on the post-manipulation ingroup bias.

In sum, this replicates the results found in Experiment 1. Attending ingroup members led to a larger post-manipulation ingroup bias compared to attending outgroup members, and this effect was only found for highly-identified participants.

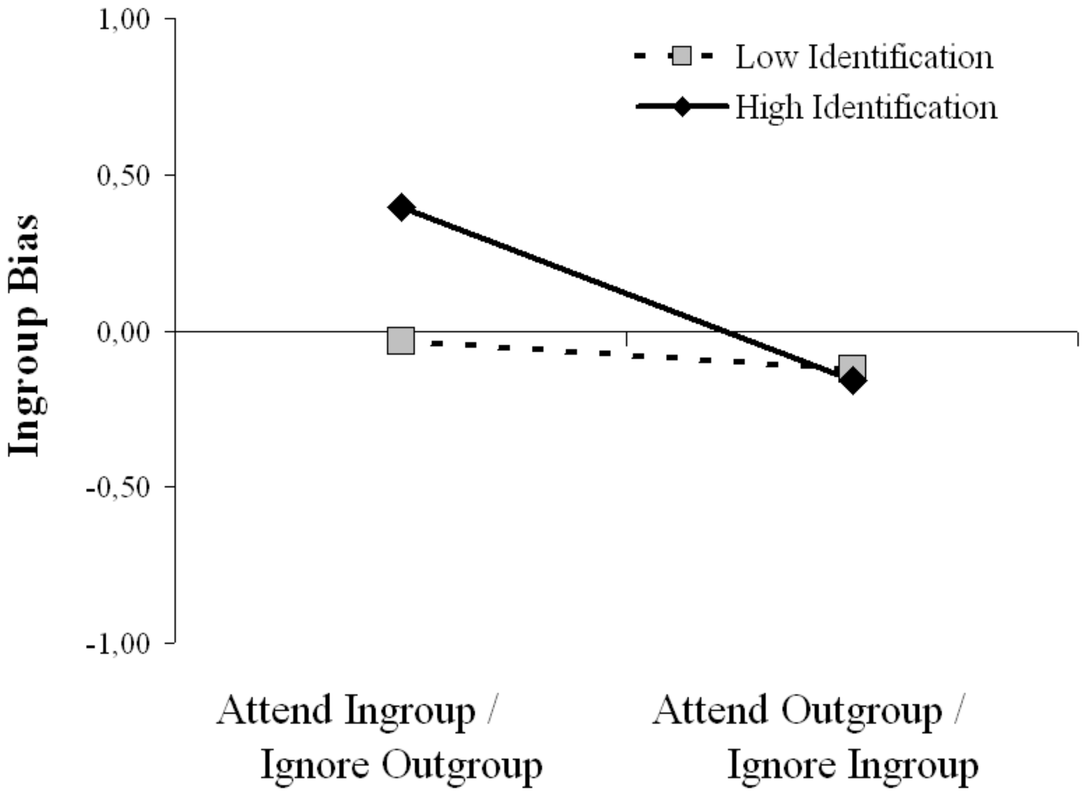

Figure 4: Interaction of attention-group condition and group identification condition on post-manipulation ingroup bias in Experiment 2 (positive ingroup bias values represent more positive evaluations of ingroup members compared to outgroup members).

3.3.2 Evaluations of ignored and attended group members

As in Experiment 1, I conducted additional analyses to test the effects for ignored and attended group members separately. First, I again tested whether there was a difference between attended and ignored group members and whether group identification affected the groups differentially. I conducted a repeated measurement ANOVA with group member evaluations as dependent variable and the factors attention (attended groups versus ignored groups) and group identification (high versus low) as predictors (mean evaluations of ignored and attended group members for baseline and post-manipulation evaluations are pictured in Figure 5). The analysis revealed a significant attention effect, $F(1, 79) = 4.71$, $p = .03$, partial eta squared = .06, in which ignored group members ($M = 2.80$, $SD = .55$) were evaluated significantly more negatively than

Table 7: Summary of simultaneous regression analyses for variables predicting ignored and attended group member evaluations in Experiment 2 ($N = 81$)

	Ignored group members				Attended group members			
Variable	ZOC	*B*	*SE B*	β	ZOC	*B*	*SE B*	β
Gender	-.03	-.05	.06	-.08	.02	-.05	.07	-.07
Group assignment	-.13	-.05	.05	-.09	-.19	-.12	.06	-.20*
Baseline evaluation	.63	.34	.05	.61**	.38	.27	.06	.46**
Group type	-.12	-.05	.05	-.09	-.15	-.09	.06	-.14
Group identification	-.25	-.11	.05	-.19*	-.02	-.01	.06	-.01
Group type x group identification	-.02	-.05	.05	-.08	-.14	-.14	.06	-.24*

Note: ZOC = Zero-order correlation. *p <= .05. **p <= .01

attended group members (M = 2.97, SD = .59). Furthermore, the analysis revealed a marginally significant attention by identification interaction, $F(1, 79) = 2.70$, $p = .10$, partial eta squared = .03. This interaction indicates that group identification affected ignored and attended group members differently. In the next step, I investigated the ignored and attended group members separately and thereby disentangled the different effects of identification on the ignored and attended group members.

Ignored group member evaluations Regarding ignored group members, my main interest was again whether ignored group members were emotionally devaluated. A distractor devaluation effect (Raymond et al., 2003) would be evident in more negative post-manipulation evaluations of ignored group members compared to baseline evaluations of (later) ignored group members. A paired t-test confirmed this assumption. Post-manipulation evaluations of ignored group members were significantly more negative than baseline evaluations (M = 2.92, SD = .60), $t(80) = 2.20$, $p = .03$, $d = .20$.

As in Experiment 1, above, I found evidence that attended and ignored group members were affected differently by group identification. Therefore, I further investigated the effect of identification on the evaluations of ignored group members. A multiple regression analysis was conducted to test the impact of the group identification condition, group type (ingroup vs. outgroup), and their interaction on the post-manipulation evaluations of ignored group members (Aiken & West, 1991), controlling for baseline evaluations, gender, and group assignment. The regression model was significant, $F(6, 74) = 10.48$, $p < .01$, and accounted for about 46% of the variance (see Table 7 for a summary of the regression analysis).

As shown in Table 7, I observed a significant effect of identification on the post-manipulation evaluations of ignored group members. Highly-identified participants evaluate ignored group members ($M = 2.66$, $SD = .53$) more negatively than less-identified participants ($M = 2.94$, $SD = .50$). I observed no effect of group type on the ignored group member evaluations and no interaction effect between group type and identification. Not surprisingly, I observed a significant positive effect of baseline evaluations on the post-manipulation evaluations of ignored group members. The remaining predictors had no significant effect on post-manipulation evaluations of ignored group members.

In sum, these results are consistent with the results found in Experiment 1. I found a significant distractor devaluation effect for previously ignored group members and this distractor devaluation was affected by identification. More identification resulted in more distractor devaluation. Again, ignored ingroup and outgroup members were not evaluated (and devaluated) differently.

Attended group member evaluations Finally, I analyzed the evaluations of the attended group members. A paired t-test revealed no difference between post-manipulation evaluations of attended group members ($M = 2.97$, $SD = .60$) compared to baseline evaluations ($M = 2.94$, $SD = .62$), $t(80) < 1$, *n.s.*.

I was also interested in how group identification affected attended group member evaluations. A multiple regression analysis was conducted to test the impact of the group identification condition, group type (ingroup vs. outgroup), and their interaction on the post-manipulation evaluations of attended group members (Aiken & West, 1991), controlling for baseline evaluations, gender, and group assignment. The regression model was significant, $F(6, 74) = 4.44$, $p < .01$, and accounted for about 27% of the variance (see Table 7 for a summary of the regression analysis).

As shown in Table 7, I did not observe an effect of identification on the evaluations of attended group members and there was also no effect of group type. However, I observed a significant interaction of group type and identification on the evaluations of attended group members. I used the simple slopes test method (Aiken & West, 1991) to investigate the interaction between group type and the identification condition in detail. The analysis showed that for highly-identified participants group type (ingroup versus outgroup) was a significant predictor of the evaluations of attended group members (β = -.39, $p < .01$). Highly-identified participants did evaluate attended ingroup members ($M = 3.13$, $SD = .64$) more positively than attended outgroup members ($M = 2.80$, $SD = .57$). For less-identified participants no group type effect was observed (β = .1, *n.s.*). Less-identified participants evaluated attended ingroup members ($M = 2.98$, $SD = .69$) and outgroup members ($M = 2.97$, $SD = .43$) similar.

Finally, in the main analysis I observed a significant positive effect of baseline evaluations on the post-manipulation evaluations of attended group members. Furthermore, I found a significant effect of group assignment and no effect of gender.

In sum, the basic findings match the results obtained in Experiment 1. Attending a group had no effect on the evaluations of the attended group members. However, highly-identified participants evaluated attended ingroup members more positively than attended outgroup members. For less-identified participants, there was no difference between evaluations of attended ingroup and attended outgroup members.

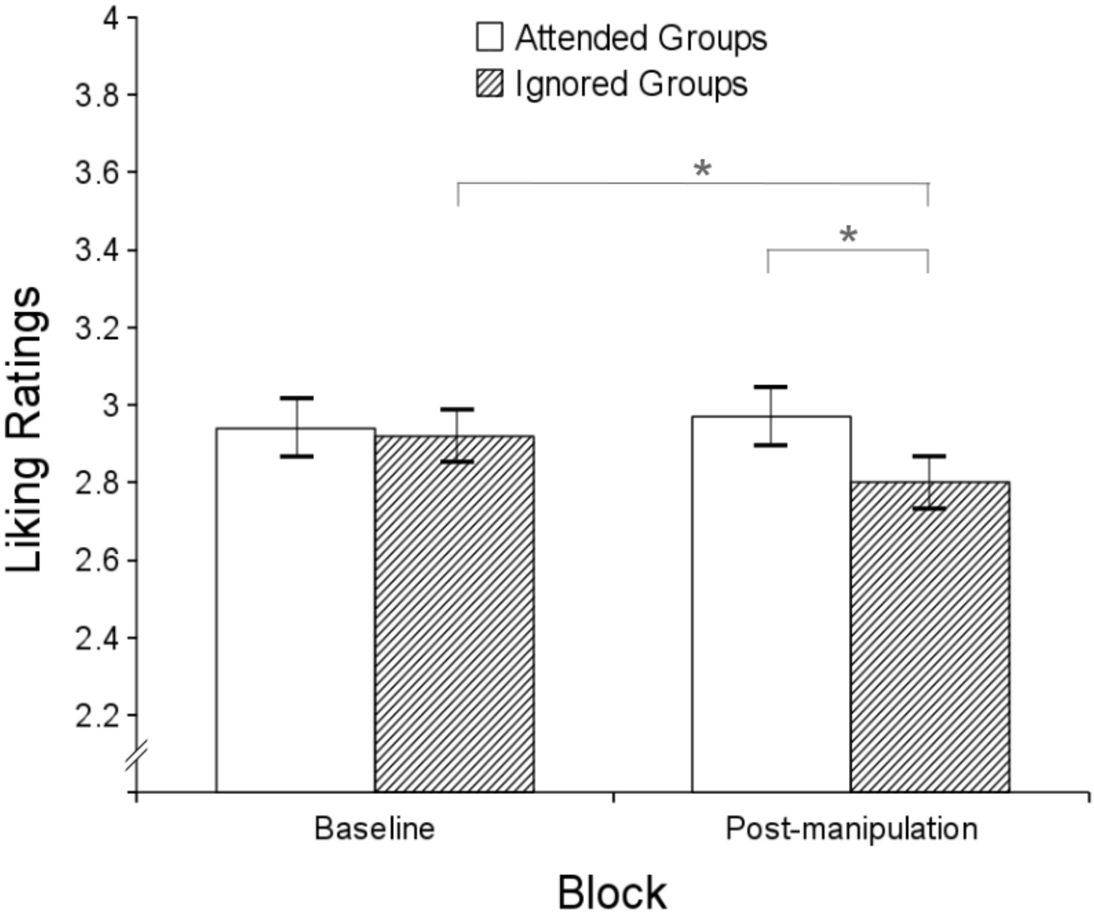

Figure 5: Baseline and post-manipulation evaluations of attended and ignored group members in Experiment 2 (+/- 1 *SE*).

3.4 Discussion

In Experiment 2, I addressed the shortcomings of Experiment 1 in regard to the group identification variable by experimentally manipulating identification. I replicated the result patterns of Experiment 1 in all important aspects. Specifically, for highly-identified individuals, attending ingroup members while ignoring outgroup members did increase the difference between ingroup and outgroup evaluations (i.e., they showed more ingroup bias) but attending outgroup members while ignoring ingroup members reduced the difference between ingroup and outgroup evaluations (i.e., they showed less ingroup bias). As in Experiment 1, I did not find an attention-ingroup bias effect for less-identified individuals.

3.4.1 Ignored and attended groups

When analyzing ignored group members separately, I found a distractor devaluation effect, that is, a decrease in evaluations from baseline to post-manipulation evaluations. Again, this distractor devaluation effect was larger for highly-identified individuals and was not different for ingroup and outgroup members.

The lack of increased evaluations for attended group members in Experiment 1 was confirmed in Experiment 2. There was no evaluative change from baseline to post-manipulation evaluations for attended group members. The only reliable effect concerning the attended group members was that highly-identified individuals evaluated attended ingroup members more positively than attended outgroup members. This is in line with social identity theory (Tajfel & Turner, 1979). Highly-identified individuals' value of the ingroup is reflected in more positive evaluations of the ingroup compared to the outgroup. The initially expected positive evaluative effect for attended group members thus was only found for attended ingroup members and individuals who were highly-identified with their ingroup.

3.4.2 Social context

One problem concerning the baseline ingroup bias needs to be discussed. While I found an ingroup bias in the baseline evaluations of Experiment 1, I did not find this bias in Experiment 2. In Experiment 1, I argued that the baseline ingroup bias provided evidence for my claim of having successfully established a social context. However, other indicators in Experiment 2 can provide evidence that a social context was established. When establishing the artificial groups, I manipulated participants' identification by providing information about their prototypicality for their group. The manipulation check confirmed that participants in the high identification condition identified more strongly with their group than participants in the low identification condition. As group identification is a variable that only makes sense when interpreted in a social context, the successful manipulation of identification provides evidence that a social context was successfully created. Furthermore, the above mentioned effects of identification on the evaluation of attended ingroup and outgroup members which are in line with social identity theory are further evidence supporting the idea that a social context was effectively created in the study.

In sum, in Experiment 2 I addressed the shortcomings of Experiment 1 and replicated the result patterns of Experiment 1 in all important aspects. The implications of the effects of attentional focus on evaluations and the amplification effect of group identification on the attention-evaluation links will be discussed in more detail in the general discussion.

4 General discussion (Part I)

In two experiments, participants evaluated different ingroup and outgroup members before and after they attended or ignored these group members in a search task. The main results of both experiments are the following: For highly-identified individuals, attending ingroup members led to an increased ingroup bias (i.e., more negative outgroup member evaluations compared to ingroup member evaluations). However, attending outgroup members reduced ingroup bias (i.e., less difference between outgroup member and ingroup member evaluations were observed).

When disentangling the effects of ignoring and attending, I found that the attention-ingroup bias effect was mainly driven by a devaluation of previously ignored group members. Whereas attending group members had only little evaluative consequences (e.g., positive effects on evaluations of ingroup members evaluated by highly-identified individuals), the negative evaluative consequences of ignoring group members were consistently evident in both experiments. Furthermore, in both experiments these negative consequences for ignored group members were amplified by group identification.

4.1 Distractor devaluation effect

The affective devaluation of previously ignored group members, found in both experiments, is in line with reseach on the distractor devaluation effect (e.g., Goolsby et al., 2009; Raymond et al., 2003, 2005; Veling et al., 2007). Furthermore, the experiments extend existing evidence for distractor devaluation effects with neutral stimuli (e.g., abstract pictures, unfamiliar faces) to socially meaningful stimuli. These results provide first evidence for effects of selective attention on evaluations made in a social context, in which the evaluated stimuli were not neutral but already possessed evaluative value.

Whereas previous distractor devaluation evidence was obtained by comparing previously ignored stimuli with either previously attended (e.g., Goolsby et al., 2009) or novel stimuli (e.g., Raymond et al., 2003), I actually showed a decrease in liking ratings by comparing evaluations of group members assessed before and after they were ignored. This strengthens the distractor devaluation hypothesis because the distractor devaluation in my case could not have been produced by effects pertaining to the reference stimuli (attended or novel).

Although the distractor devaluation effect was statistically reliable, the effect size was rather small (Exp. 1: $d = .29$; Exp. 2: $d = .20$). These small effects could be the result of different processes which affected distractor evaluations simultaneously. Distractor stimuli were perceptually available to the participants during the search task.

This is a sufficient condition for the mere exposure effect (Zajonc, 1968). Therefore, I assume that negative distractor devaluation effects and positive mere exposure effects affected distractor evaluations simultaneously. Although the negative influence of the distractor devaluation effect was predominant, it may have been partly concealed by the positive influence of the mere exposure effect (see Fragopanagos et al., 2009 for a similar argumentation).

4.2 Group identification and attention-ingroup bias link

In both experiments, group identification amplified the effects of selective attention on evaluations. The effect of selective attention on ingroup bias was only found for highly-identified individuals and the distractor devaluation effect found for previously ignored group members was larger for highly-identified individuals than for less-identified individuals. These effects were consistently found both when identification was measured as an individual difference variable (Experiment 1) and when it was experimentally manipulated (Experiment 2).

How does group identification amplify the effects of selective attention on ingroup bias and how does it increase distractor devaluation, independently of whether ingroup members or outgroup members were ignored? There is research applying social identity theory (Tajfel & Turner, 1979) to an organizational context which might help to explain these findings. These studies have demonstrated that identification with one's organization is positively associated with effort and performance within the organization (reviewed by Ouwerkerk, Ellemers, & de Gilder, 1999; van Knippenberg & Ellemers, 2003). Similarly, Worchel, Rothgerber, Day, Hart, and Butemeyer (1998) provided evidence that factors increasing group categorization and the importance of the group to the social identity (i.e., identification) enhances productivity and work effort in various tasks. I therefore assume that a greater group identification with the ingroup in my experiments led to more effort in the group-related search task. This might have resulted in more effective ignoring of the distractors and thus led to more negative distractor evaluations, not only for ignored outgroup members but also for ignored ingroup members. This interpretation is in line with evidence from distractor devaluation research showing that distractor devaluation only occurs when distractors are effectively ignored (Fenske et al., 2004; Kiss et al., 2007; see also Part 2 of this work).

4.3 Distractor devaluation and the intergroup contact theory

Selective attention processes are fundamental for controlled behavior. Valence evaluations (e.g., positive-negative, good-bad) are one of the most basic psychological dimensions. Therefore, it seems important to elaborate the role of attention-evaluation effects within other social psychological theories. In the following section, I want to incorporate the attention-evaluation link into the intergroup contact theory (Allport, 1954). In the intergroup contact theory, Allport formulated four optimal conditions (equal status, common goals, cooperation, support of authorities) under which intergroup contact reduces prejudice between groups. Although this theory has inspired a lot research, different analyses have come to different conclusions as to whether the assumption is true (see Harrington & Miller, 1992; Pettigrew, 1998 in favor of the contact hypothesis, but see Ford, 1986; McClendon, 1974).

At a first glance, one may think that the relation between groups, contact, and prejudice in everyday life is far too complex that simple effects of attention on evaluations may play a role in this context. However, recently Pettigrew and Tropp (2006) conducted a meta-analysis with the intent of overcoming some of the obstacles that made previous analyses difficult to interpret. The authors found reliable evidence that intergroup contact reduces prejudice. More important, they found reliable negative correlations between contact and prejudice, even in studies not fulfilling Allport's optimal conditions. To explain these positive contact effects, Pettigrew and Tropp applied the mere exposure effect to the contact research and concluded that mere exposure processes enhance liking even in the complex intergroup context.

If mere exposure is a factor influencing evaluations and eventually prejudice in intergroup contact situations as Pettigrew and Tropp (2006) suggested, then it seems inevitable to also incorporate research on distractor devaluation. As research on distractor devaluation (e.g., Raymond et al., 2003) showed, not all exposure is good exposure. The here presented experiments extent this notion to the intergroup context. Exposing individuals to group members who had to be ignored, affected evaluations of these group members negatively. Therefore, intergroup research might benefit from identifying factors that advocate ignorance and avoidance attitudes among groups. Active acts of focusing on ingroup members and avoiding contact with outgroup members may have negative evaluative consequences for the outgroups and eventually these negative evaluative consequences may facilitate processes leading to prejudice.

4.4 Conclusion

Basically, the presented research provides evidence that basic attentional selection processes have evaluative consequences even on socially meaningful stimuli in an intergroup context. Further research should be done to evaluate the consequences of these findings in the different aspects of everyday intergroup behavior. The potential consequences of this initial evidence are multifaceted. For example, consider an individual joining a new group (e.g., university sports team). Depending on the person's eagerness to belong to the new group attentional resources have to be devoted to this new group and other salient groups (e.g., competing teams) have to be ignored. The presented research suggests that this focus on the new group can have negative evaluative consequences for the ignored groups. The effects of attention on evaluation alone would produce the classically observed ingroup bias, that is, more positive ingroup evaluations than evaluations of outgroups. While this example is rather harmless, the attention-evaluation link might be more critical in other situations. For example, consider political campaigns that are aimed at advocating patriotism. Regardless of the actual content of such campaigns, they draw attention to one's own group. Because ingroups are always defined in relation to other groups (outgroups), this attention to the ingroup always comes at the expense of relevant outgroups. As suggested by the presented research, outgroup devaluation processes may be facilitated merely by attentional processes and their effects on evaluations.

The presented research provided initial evidence that processes of selective attention and their effect on evaluations can have an impact in a socially meaningful context. Although this initial evidence was obtained in rather artificial settings, it points to potential consequences in natural situations as described above. Future research should be done to test these potential consequences of the attention-evaluation link in natural social situations.

Part II

EFFECTIVENESS OF DISTRACTOR INHIBITION PREDICTS DISTRACTOR EVALUATIONS: EVIDENCE FROM A FEATURE-BASED AND AN OBJECT-BASED PARADIGM

5 Introduction (Part II)

The foundation of any purposeful, controlled interaction with our environment is the selection of relevant stimuli from irrelevant distractors. Selective attention is at the basis of this selection process. Proponents of dual process models of selective attention assume that both excitatory and inhibitory mechanisms work on relevant and irrelevant stimuli, respectively (e.g., Neumann & DeSchepper, 1991; Houghton & Tipper, 1994; Tipper, 1985; Tipper & Driver, 1988). The inhibition of distractors is an important aspect of this process to minimize the probability of accidental distractor selection by maximizing the activation difference between relevant and irrelevant stimuli (e.g., Keele & Neill, 1978; Neumann & DeSchepper, 1991; Tipper, 1985). In the presented research I investigated the evaluative consequences for previously ignored stimuli (distractors). Specifically, I investigated the link between effectiveness of distractor inhibition and distractor evaluations in a feature-based and in an object-based selection paradigm.

Recently, evidence was found that processes of selective attention influence evaluations of previously ignored stimuli (Raymond et al., 2003). In two experiments Raymond et al. presented simple abstract patterns in a visual search task and assessed evaluations of the searched-for (targets), searched-through (distractors), and not previously presented stimuli (novels). The authors found an affective devaluation of distractor stimuli. Devaluation refers to the finding that distractors were evaluated more negatively compared to targets and also more negatively compared to novel stimuli. Raymond et al. concluded that the attentional state in the search task modulated subsequent evaluations. While there is ample evidence that the emotional content of stimuli influences attentional processes (e.g., Eastwood, Smilek, & Merikle, 2001; Vuilleumier & Schwartz, 2001; reviewed by Compton, 2003), this was first evidence that links between emotion and attention are bidirectional (Raymond et al., 2003), that is, that processes of attention also influence the emotional content of stimuli. So far, distractor devaluation has been shown with different kinds of stimuli, for example, abstract neutral patterns (Raymond et al., 2003), letters (Veling et al., 2007), and unfamiliar faces (Goolsby et al., 2009; Raymond et al., 2005), as well as with different paradigms, for example, computer-based search tasks with two (Raymond et al., 2003) or more items (Raymond et al., 2005), a simple paper and pencil search task (Veling et al., 2007), and a stop signal paradigm (Fenske et al., 2005).

5.1 Inhibitory processes and distractor devaluation

To explain the emotional devaluation of distractors, Raymond et al. (2003, 2005) proposed an inhibition-based account. In this account they state that inhibition applied to distractors during visual search is encoded together with the mental representation of the distractors. When the distractors are encountered again, the stored inhibition (see Kessler & Tipper, 2004) is reinstantiated and negatively affects the evaluation of the stimuli, thereby leading to distractor devaluation (for a neural model of distractor devaluation see Fragopanagos et al., 2009).

Up to now, there is only indirect evidence for the claim that inhibitory processes negatively affect evaluations: For example, besides search tasks, distractor devaluation was found in other selection tasks that comprise attentional inhibition processes. In line with the inhibition-based account of distractor devaluation, affective devaluation was reported for stimuli presented in no-go trials of a go/no-go task (Fenske et al., 2005). Further studies have demonstrated that the spatial distance between target and distractor affects distractor devaluation. In line with evidence that attentional inhibition is stronger in regions immediately around the target compared to regions farther away (e.g., Cave & Zimmerman, 1997; Cutzu & Tsotsos, 2003), stronger distractor devaluation was found for distractors presented near targets compared to distractors presented farther away (Raymond et al., 2005).

Besides the above mentioned evidence for the involvement of inhibitory processes in distractor devaluation, there is also evidence that emphasizes the importance of effective distractor inhibition for distractor devaluation effects. For example, using a special search paradigm (Fenske et al., 2004), in which some distractors were presented earlier than the remaining stimulus set, it was shown that the previewed distractors were affectively devaluated, but only if participants effectively inhibited these previewed distractors. The effectiveness of distractor inhibition was indirectly inferred from search performance benefits that some participants showed as a consequence of the distractor preview. The authors reasoned that only participants who showed a search performance benefit effectively inhibited the previewed distractors. Consequently, only those participants showed distractor devaluation effects.

Finally, neurophysiological evidence hints to the important role of effective inhibition for the distractor devaluation effect. In an event-related potential study Kiss et al. (2007) correlated the emergence of the N2pc component with distractor evaluations. The N2pc component is assumed to be an indicator of efficient target selection and thereby also efficient distractor inhibition (e.g., Eimer, 1996; Luck & Hillyard, 1994; but see Mazza, Turatto, & Caramazza, 2009). A relation was found between effective target selection (i.e., early N2pc) and distractor evaluations, with more effective selection predicting more negative distractor evaluations.

In sum, the above reviewed research provides initial evidence for two claims: First, that inhibitory processes negatively affect evaluations and second, that more effective distractor inhibition is related to more negative distractor evaluations. Although this evidence is quite compelling, most of the evidence comes from studies that rather indirectly tap on inhibitory processes (e.g., search task performance benefits in a preview search task). In regard to the neurophysiological evidence (Kiss et al., 2007), the validity of the study relies on the interpretation of the N2pc component. While Kiss et al. argued that the N2pc component reflects distractor suppression processes, others doubt this interpretation. For example, recently, Mazza et al. (2009) provided evidence that is better explained by a target enhancement interpretation of the N2pc component, rather than by distractor suppression.

In the light of these difficulties to interpret previous evidence, the first aim of the present research is to extend the methods of investigating the inhibition-based account of distractor devaluation. By using a behavioral method of measuring effectiveness of distractor inhibition more directly, I aimed to provide further evidence that more effective distractor inhibition predicts more negative distractor evaluations. The second aim of the current research was to investigate the link between inhibitory processes and evaluations at different levels at which selection processes can operate. Specifically, I investigated selection processes that operated at the level of certain features of an object (Experiment 3) and selection processes that operated at the level of whole objects (Experiment 4).

5.2 Feature-based and object-based distractor devaluation

Selection processes can operate at different levels, for example, at the level of features of an object (e.g., Nobre, Rao, & Chelazzi, 2006) or at the level of whole objects (e.g., Duncan, 1984; O'Craven, Downing, & Kanwisher, 1999). For example, feature-based selection would be to select a red apple from a bowl of green apples. The selection criterion (e.g., color) is only one feature of the objects (e.g., apples). In contrast, object-based selection would be to select a cup of coffee from the table in front of you that is cluttered with other objects, like books, pens, and a computer mouse. In the latter case, not a single feature, but the different properties of the whole object differentiate the target (e.g., cup of coffee) from the distractors (e.g., pen).

The different selection levels have consequences for the inhibitory aspects of the selection process. These inhibitory aspects of selection were often investigated in the context of the negative priming effect (Neill, 1977; Tipper, 1985, 2001). Negative priming refers to impaired (e.g., slowed) responses to stimuli previously presented as distractors. One prominent explanation argues that these impaired responses are caused by inhibitory processes of selective attention (Neumann & DeSchepper, 1991; Houghton & Tipper, 1994; Tipper, 1985, 2001). Evidence from negative priming research suggests that inhibitory processes also operate at different levels of stimulus representations (reviewed by Fox, 1995) and that they operate rather flexible, depending on task-demands (e.g., Frings & Wentura, 2006; Tipper, Weaver, & Houghton, 1994). Regarding the example from above, this means that if selection occurs at the level of one feature of an object (e.g., color of red and green apples) inhibitory processes do not necessarily inhibit the distractors (e.g., green apples) as whole objects. Only the distractor feature (e.g., green) is inhibited to support the selection process.

If inhibitory processes negatively affect evaluations, then it seems important to take this flexibility of inhibitory processes into account when testing distractor devaluation effects. For example, if selection is feature-based (e.g., color) and therefore only the distractor feature (e.g., green) is effectively inhibited and not the whole distractor object (e.g., green apple), the negative consequences of the inhibitory processes might only affect the distractor feature (e.g., green) and not the object itself (e.g., apple). This was recently investigated by Goolsby et al. (2009). The authors investigated distractor devaluation effects in feature-based selection tasks. Their result pattern points to the notion that in feature-based selection tasks, the negative evaluative consequences of inhibitory processes are tied to the selection feature and not to the whole objects. This assumption is based on three results: First, they found a normal distractor devaluation effect for previously ignored objects if the selection feature (e.g., gender) was present at the time of evaluation (Goolsby et al., 2009, Exp. 1A and B). Second, they even found distractor devaluation effects for previously not presented objects if the novel objects were furnished with a selection feature from a previous selection task (e.g., color) (Goolsby et al., 2009, Exp. 3). Third, they found no evidence for distractor devaluation for actually previously ignored objects if the selection feature (e.g., color) was not present at the time of evaluation (e.g., objects were presented for evaluation in grayscale) (Goolsby et al., 2009, Exp. 2). The authors concluded that distractor devaluation is feature-based because distractor devaluation effects depended on the presence of the selection criterion. Goolsby et al. also concluded that these result patterns show no evidence for object-based distractor devaluation effects. However, in my opinion, the lack of an object-based distractor devaluation effect in Goolsby et als. second experiment was caused by the fact that feature-based selection tasks do not necessarily demand the efficient inhibition of the whole distractor objects. Therefore, Goolsby et al. did not test object-based distractor devaluation. They tested whether the negative evaluative consequences of inhibiting a certain object feature generalize to the whole object after the selection feature is removed. The question if distractor devaluation can be object-based is still unanswered and it is obvious that an object-based selection task needs to be employed to investigate the negative evaluative consequences of object-based inhibitory processes.

In sum, there is evidence that selection and the involved inhibitory processes can operate at the level of whole objects (e.g., DeSchepper & Treisman, 1996; Duncan, 1984). Therefore, based on the inhibition-based account of distractor devaluation, there is no reason to expect that object-based effects of inhibitory processes on evaluations cannot be found if the selection task is object-based and affords the efficient inhibition of the whole distractor object rather than just certain features.

5.3 The Present Research

The main goal of the present experiments was to extend existing evidence for the inhibition-based account of distractor devaluation (Raymond et al., 2003) by testing whether effectiveness of distractor inhibition measured in a selection task predicts subsequent distractor evaluations. By using a behavioral measurement of distractor inhibition I extend existing indirect (e.g., Fenske et al., 2004) and neurophysiological (Kiss et al., 2007) evidence for the inhibition-based account of distractor devaluation. The second goal was to provide evidence for the inhibition-evaluation link by using two different methods. All distractor devaluation research so far was done using feature-based selection tasks. Therefore, in the first experiment, I also employed a feature-based paradigm to test the inhibition-evaluation link. In the second experiment, I extended the used methods by employing an object-based selection paradigm to test whether the effect of inhibition on evaluations can be object-based, that is, as specific as affecting certain distractors among targets without an obvious selection criterion to distinguish among them.

Both experiments followed a similar logic: Effectiveness of distractor inhibition and distractor evaluations were measured in an attentional priming paradigm to test whether effectiveness of inhibition predicted evaluations. The experiments integrated similarities between distractor devaluation paradigms (e.g., Raymond et al., 2003) and attentional priming paradigms (e.g., Tipper, 1985). Both paradigms consist of a prime and a thereupon following probe presentation. Both presentations demand a certain response to a target. In both paradigms it is assumed that the attentional state in the prime presentation influences the response in the subsequent probe presentation. The only difference between the paradigms is the probe response, which is a reaction time response in the attentional priming paradigm and an evaluation in the distractor devaluation paradigm. However, regarding responses towards previously ignored stimuli both paradigms offer inhibition-based accounts to explain the responses to previously ignored stimuli. Inhibition-based accounts of attentional priming effects (e.g., Houghton & Tipper, 1994; Tipper, 1985), predict impaired (e.g., slowed) responses to stimuli previously presented as distractors (i.e., negative priming). The inhibition-based account of distractor devaluation (Raymond et al., 2003) predicts that the inhibition applied to ignored stimuli will negatively affect subsequent evaluations of the previously ignored stimuli (i.e., distractor devaluation). Based on these accounts, I expected overall effectiveness of distractor inhibition to predict overall distractor evaluations. More effective distractor inhibition was expected to predict more negative distractor evaluations in both a feature-based (Experiment 3) and an object-based (Experiment 4) selection paradigm.

6 Experiment Three

6.1 Introduction

The first experiment was designed to test the link between distractor inhibition processes and distractor evaluations in a feature-based paradigm. Feature-based search tasks are commonly used in research on distractor devaluation (e.g., Fenske et al., 2005; Goolsby et al., 2009; Raymond et al., 2003; Veling et al., 2007). To test the inhibition-evaluation link, I relied on individual differences of inhibitory abilities (e.g., DeSchepper & Treisman, 1996; Tipper & Baylis, 1987). I reasoned that participants would differ in their ability to effectively inhibit the distractor stimuli in a visual search task paradigm. On the basis of these individual differences I expected to find a relation between the measurement of overall effectiveness of distractor inhibition and distractor evaluations, with more effective inhibition leading to more negative evaluations.

6.2 Method

6.2.1 Participants

Thirty-two students (22 female/10 male) of University of Konstanz with ages ranging from 20 to 32 (M = 25.69, SD = 2.60) participated in return for 3 Euros. All participants had normal or corrected-to-normal visual acuity. Four participants were excluded from the analyses either because of random responses in the search task (attentional priming) (1) or because they were identified as outliers[5] on the main dependent variables (3). The reported analyses were performed on the data of the remaining 28 participants.

6.2.2 Apparatus and stimuli

Apparatus The experiment was conducted on an IBM-PC compatible computer connected to a 43-cm color CRT display (85-Hz; 1,024 x 768 resolution). The experiment was programmed and run using E-Prime 1.1 software (Schneider, Eschman, & Zuccolotto, 2002). Participants sat in a small and quiet laboratory booth. There were no other people in the room and the ambient illumination was low. Participants' typical viewing distance to the screen was about 80 cm.

[5]Outliers were defined as values 1.5 IQR lower than the first quartile or 1.5 IQR higher than the third quartile.

Stimuli Examples of the stimuli are depicted in Figure 6a (all stimuli are displayed in Appendix B5). All stimuli were presented in color on white background. I used abstract visual patterns[6] of four different shapes (3-, 4-, 5-, or 6-sided). The shapes were filled with similar but unique patterns, each consisting of a mixture of different colors (green, yellow, blue, and red). This created a pool of 72 unique stimuli with 18 stimuli of each shape.

6.2.3 Design

In a quasi-experimental design the effectiveness of distractor inhibition in a selection task and distractor evaluations were assessed. The effectiveness of distractor inhibition was measured in an attentional priming paradigm by comparing reaction times to respond to stimuli previously encountered as distractors (distractor repetition condition) with reaction times to respond to novel (not previously encountered) stimuli (control condition). Distractor evaluations were measured as explicit liking ratings on a 5-point scale ranging from "rather positive" to "rather negative".

Participants completed 20 trials (inclusive 2 practice trials) of the general procedure (see Figure 6b). Each of these trials consisted of two separate parts (attentional priming/accessibility and attentional priming/evaluation) and each of these parts consisted of a prime presentation followed by a probe presentation. While in both tasks the prime presentation afforded a similar reaction (target detection), the probe presentation either afforded a target related decision (accessibility task) or an evaluation (evaluation task).

For both tasks I distinguished three conditions (distractor repetition, control, and target repetition[7]): In the distractor repetition condition, the probe stimulus was from the previously ignored distractor category. In the control condition, the probe stimulus was from the novel category (never presented in the prime presentation). In the target repetition condition, the probe stimulus was from the previously attended target category. Regarding the evaluation task, to simplify matters, I called evaluations made in the distractor repetition, control, and target repetition condition simply distractor, novel, and target evaluations, respectively. The three conditions were equally distributed throughout the task. To avoid systematic stimulus effects I created six different stimulus sets with different shapes assigned to different stimulus categories (targets, distractors,

[6] Pre-tests with stimuli reproduced following the description of the stimuli used by Raymond et al. (2003) revealed significant differences between evaluations of the different stimulus types ("squares", "circles", "polygon", and "squiggles"). To avoid these pre-manipulation differences I created the described four new stimulus types.

[7] The target repetition condition was not important for my argumentation. It was only included to use a complete procedure with the commonly used priming conditions.

and novel).

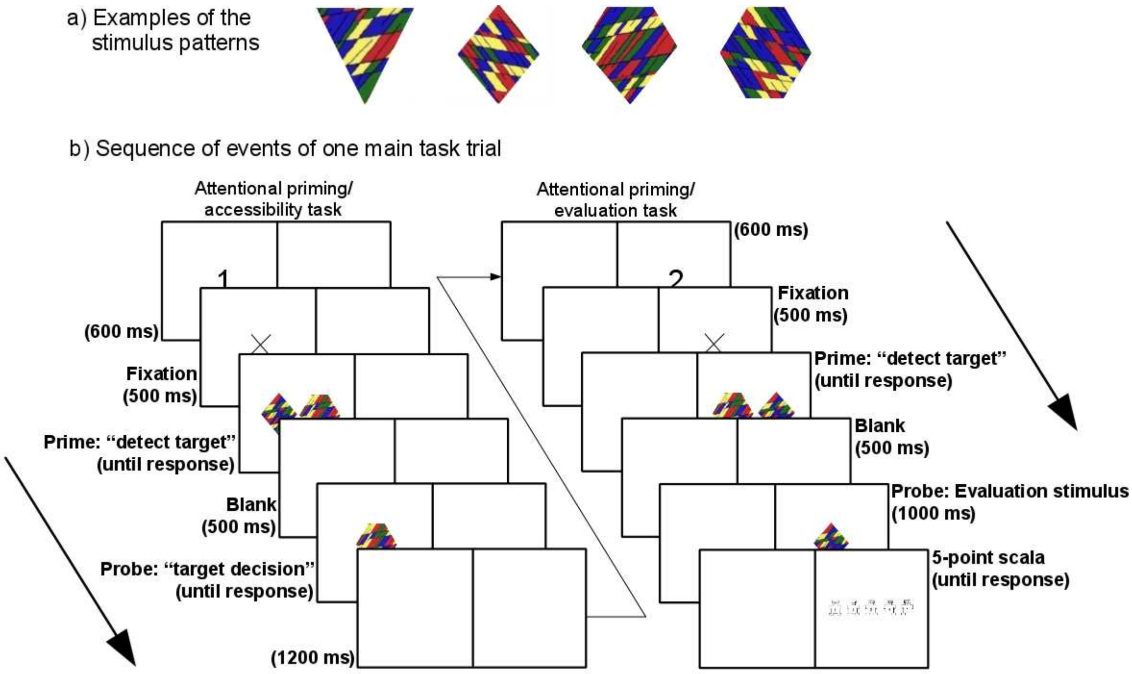

Figure 6: Stimulus material and procedure of Experiment 3. a) Examples of 3-, 4-, 5-, and 6-sided abstract stimulus pictures. b) Sequence of events of one accessibility task and evaluations task trial.

6.2.4 Procedure

First, participants received instructions for the task and depending on the random assignment to one stimulus set they were told that either the 3-, 4-, 5-, or 6-sided stimulus shape was their target shape. The sequence of events of one trial of the general procedure is pictured in Figure 6b. The first part (attentional priming/accessibility task) was always presented on the left half of the screen and the second part (attentional priming/evaluation task) was always presented on the right half of the screen. Participants started each trial by pressing the space bar. First, a vertical line appeared in the middle of the screen, then the number "1" appeared centered on the left side of the divided screen to indicate the beginning of the first part. After 600 ms the number disappeared and after a 600 ms lasting blank screen a fixation cross was presented centered on the left side of the screen. After 500 ms the fixation cross was replaced by two stimuli positioned left and right to the former position of the fixation cross. The two stimuli were always one stimulus from the target category (e.g., 3-sided shape) and one stimulus from the distractor category (e.g., 5-sided shape). The participants' task was to indicate as fast and accurately as possible the position of the target by pressing the "F" (left) or "J"-key (right) on the keyboard. After the response, a blank screen lasting for 500 ms was presented before one stimulus appeared alone centered on the left side of the screen. This single stimulus was either a stimulus from the target, distractor, or novel category. The participants' task was to decide as fast as possible whether the presented stimulus was from the target category or not by pressing the "F" or "J"-key on the keyboard. Half of the participants responded with "F" for "Target" and "J" for "Non-Target". For the other half of the participants the key assignment was reversed. After the participants' response the stimulus disappeared leaving only the vertical line on the screen for 1200 ms. Then the number "2" appeared centered on the right side of the divided screen indicating the start of the second part. After the number was presented for 600 ms and a 600 ms lasting blank screen, a fixation cross appeared for 500 ms centered on the right side of the screen. Following the fixation cross, two stimuli were presented positioned left and right to the former position of the fixation cross. The two stimuli were again always from the target and distractor category. The participants' task was again to indicate the position of the target by pressing the "F" (left) or "J"-key (right). After the participants' response and a 500 ms lasting blank screen, one stimulus was presented alone centered on the right side of the screen. This to-be-evaluated stimulus was either from the target, distractor or novel category. It was presented for 1000 ms and then replaced by a 5-point scale with the extreme points "rather positive" and "rather negative". Half of the participants responded on a scale with the positive extreme point on the left and the negative extreme point on the right. For the other half of the participants the scales orientation was reversed. After the participants' response the scale disappeared and after a 500 ms lasting blank screen the participants were asked again to start the next trial by pressing the space bar.

6.2.5 Data preparation

Trials with false responses in either the prime or the probe presentation and responses with reaction times shorter than 200 ms or longer than 3 *SD*s above the mean for each condition were treated as errors. This procedure identified 2.41% error trials. Reaction time data were analyzed only from the remaining correct trials. Evaluative responses made slower than 3 *SD*s above the mean evaluation response time were treated as errors. This procedure excluded 2.68% of the evaluations. Mean evaluations for target, distractor, and novel stimuli were calculated only from the remaining correct responses.

6.3 Results

6.3.1 Distractor inhibition (DI) index

I calculated an index as indicator of distractor inhibition effectiveness. The DI index is a difference score calculated from the mean probe reaction times of the distractor repetition condition and the control condition. It provided an index of the degree of impaired or facilitated responses in the distractor repetition condition in reference to the control condition of the attentional priming task.

6.3.2 DI index and evaluations

The main purpose of the experiment was to investigate the relation between effectiveness of distractor inhibition and distractor evaluations. I expected more effective distractor inhibition (i.e., impaired responses) to predict more negative distractor evaluations. A multiple regression analysis was conducted to test the impact of the DI index on the distractor evaluations (Aiken & West, 1991), controlling for gender, key assignment, and scale orientation. The regression model was significant, $F(4,\ 23) = 4.24$, $p = .01$, and accounted for about 43% of the variance (see Table 9 for a summary of the regression analysis). As shown in Table 9, the DI index significantly predicted distractor evaluations. More impaired responses (i.e., effective distractor inhibition) in the distractor repetition condition predicted more negative distractor evaluations in the evaluation task (see Figure 7).

Surprisingly, key assignment had a significant effect on distractor evaluations[8]. The remaining predictors had no significant effect on distractor evaluations.

The DI index was expected to exclusively affect distractor evaluations. To support this assumption additional regression analyses were conducted to test for effects of the DI index on the evaluations of target and novel stimuli (see Table 9 for a summary of the regression analyses). As predicted, the DI index did not significantly predict target evaluations nor novel stimuli evaluations.

[8]Key assignment referred to the probe response in the attentional priming/accessibility task and was not directly related to the evaluation task. I am confident that this effect does not put my main argument into question for two reasons: First, key assignment (as well as the orientation of the evaluation scale) was randomly varied between participants to eliminate systematic procedure effects. Second, the relation between inhibition and evaluation was found while controlling for the key assignment variable. Therefore, the effect will not be further discussed.

Table 9: Summary of simultaneous regression analyses for variables predicting distractor, target, and novel evaluations in Experiment 3 ($N = 28$).

Variable	Zero-order correlation	*B*	*SE B*	β
	Distractor evaluations			
Key assignment	-.33	-0.21	0.10	-0.35*
Scale orientation	-.07	-0.04	0.10	-0.06
Gender	.18	0.13	0.11	0.20
DI index	-.53	-0.32	0.10	-0.51**
	Target evaluations			
Key assignment	0.11	0.09	0.14	0.14
Scale orientation	0.07	0.06	0.14	0.09
Gender	-0.19	-0.16	0.15	-0.22
DI index	-0.07	-0.06	0.14	-0.09
	Novel evaluations			
Key assignment	0.24	0.18	0.14	0.25
Scale orientation	-0.11	-0.08	0.14	-0.12
Gender	0.01	-0.03	0.15	-0.04
DI index	-0.28	-0.2	0.14	-0.28

Note: *$p <= .05$. **$p <= .01$

6.3.3 Attentional priming condition and stimulus type evaluations

To test for main effects for the attentional priming paradigm and evaluations, supplemental analyses were performed to test for differences in reaction times between the attentional priming conditions (distractor repetition versus control versus target repetition) and for evaluation differences between the stimulus types (distractor versus novel versus target).

Attentional priming/accessibility task To test for attentional priming condition effects, a one factorial (priming condition: distractor repetition vs. control vs. target repetition) repeated measures ANOVA was conducted on mean probe reaction times of the accessibility task. The result indicated a significant attentional priming condition effect, $F(2, 26) = 4.78$, $p = .02$, partial eta squared = .27. Follow-up paired t-tests revealed that reactions in the target repetition condition ($M = 1029$ ms, $SD = 314$ ms) were significantly faster compared to the control condition ($M = 1139$ ms, $SD = 390$ ms), $t(27) = 2.21$, $p = .04$, $d = .31$. Reactions in the target repetition and distractor repetition condition ($M = 1045$ ms, $SD = 354$ ms) did not differ significantly, $t(27) < 1$, *n.s.*. Reactions in the distractor repetition condition were significantly faster than in the control condition, $t(27) = 2.83$, $p < .01$, $d = .25$. In sum, compared to the control condition, target repetition did produce facilitated responses in the probe presentation. In contrast to my expectations, overall, distractor repetition did also produce facilitated responses in the probe presentation.

Stimulus type evaluations To test for stimulus type effects a one factorial (stimulus type: distractor vs. novel vs. target) repeated measures ANOVA was conducted on mean evaluations. The result indicated a significant stimulus type effect, $F(2, 26) = 8.78$, $p < .01$, partial eta squared = .40. Follow-up paired t-tests revealed that targets ($M = 3.66$, $SD = .68$) were evaluated significantly more positive than distractors ($M = 2.95$, $SD = .62$), $t(27) = 4.07$, $p < .01$, $d = 1.10$ and novels ($M = 3.07$, $SD = .72$), $t(27) = 3.19$, $p < .01$, $d = .84$. Evaluations of distractors and novels did not differ significantly, $t(27) < 1$, n.s..

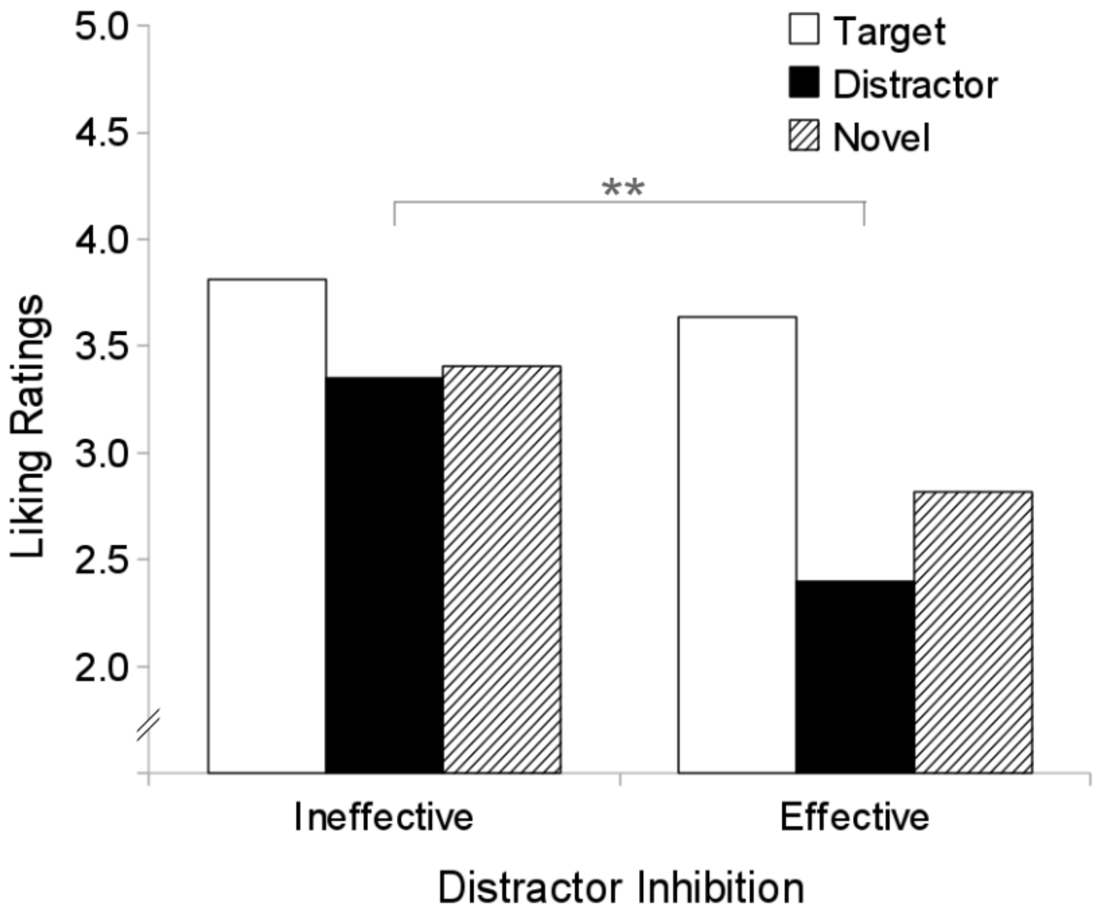

Figure 7: Effects of effectiveness of distractor inhibition on evaluations of target, distractor, and novel stimuli in Experiment 3 (1.5 *SD* above and below the mean).

6.4 Discussion

6.4.1 Distractor inhibition and distractor evaluations

According to the assumption that impaired responses to previously ignored stimuli (negative priming) reflects inhibitory mechanisms in visual selective attention (e.g., Houghton & Tipper, 1994; Tipper, 1985), I calculated an index of impaired versus facilitated response times as index of effectiveness of distractor inhibition. In line with my hypothesis, effectiveness of distractor inhibition predicted distractor evaluations (but neither target nor novel evaluations). More effective distractor inhibition, as evident in more impaired responses to previously ignored stimuli, did result in more negative distractor evaluations. These results were found in a feature-based selection task, which is a commonly used paradigm in distractor devaluation research (e.g., Goolsby, et al., 2009). The results comply with the inhibition-based account of distractor devaluation (Raymond et al., 2003) and with indirect evidence demonstrating that only effective distractor inhibition leads to distractor devaluation (e.g., Fenske et al., 2004).

6.4.2 Distractor devaluation

Besides the relation between distractor inhibition and distractor evaluations, I found an effect of selective attention on evaluations of previously ignored and attended stimuli. Previously ignored stimuli (distractors) were evaluated more negatively compared to previously attended stimuli (targets). Elsewhere, this result pattern was called distractor devaluation effect (Goolsby et al., 2009). However, on the basis of my result patterns, I cannot call it distractor devaluation effect because distractors were not evaluated more negatively than novel stimuli. This result does not concur with the initial results on the distractor devaluation effect (Raymond, et al., 2003) in which targets and novels were evaluated similarly and distractors were evaluated more negatively compared to both. As this points out differences between my study and earlier studies, it is an important issue that will be discussed in the general discussion.

6.4.3 Summary

I found evidence in support of the assumption that attentional inhibition processes negatively affect distractor evaluations because more effective distractor inhibition predicted more negative distractor evaluations. However, I did not find a general distractor devaluation effect, as reported by Raymond et al. (2003). I will return to this issue in the general discussion.

All research on distractor devaluation, so far, employed feature-based selection paradigms (Fenske et al., 2005; Fenske et al., 2004; Goolsby et al., 2009; Kiss et al., 2007; Raymond et al., 2003; Raymond et al., 2005; Veling et al., 2007). Goolsby et al. (2009) showed that the evaluative consequences of feature-based selection tasks are limited to the selection feature and distractor stimuli who posses them. However, selection can also operate at the level of objects (e.g., Duncan, 1984). Therefore, in a second experiment, I extended existing research by investigating the negative effects of inhibitory processes on evaluations in an object-based paradigm. That is, by using a selection task that does not depend on certain selection features, but afforded the selection of whole object.

7 Experiment Four

7.1 Introduction

The aim of Experiment 4 was to replicate the effect of distractor inhibition on distractor evaluations found in a feature-based paradigm in Experiment 3 with an object-based paradigm. As mentioned earlier, selection processes can operate at the level of objects (e.g., Duncan, 1984) and inhibitory processes can operate at the level of the physical appearance of unique stimuli (DeSchepper & Treisman, 1996). Therefore, if combining an object-based selection task that demands inhibitory processes at the level of the whole distractor object then negative effects of distractor inhibition on distractor evaluations should be found in line with the inhibition-based account of distractor devaluation proposed by Raymond et al. (2003). Finding effects of inhibitory processes on evaluations in an object-based paradigm is not only theoretically relevant by extending evidence for the inhibition-based account. It also highlights the importance that these processes might play in adaptive behavior by selectively devaluating specific distractor objects instead of whole categories defined by a certain feature.

Regarding the basic method, Experiment 4 followed the same idea as Experiment 3. Again, I measured effectiveness of distractor inhibition in an attentional priming paradigm and assessed stimulus evaluations. However, the paradigm in this second experiment had to meet certain criteria to qualify as an object-based paradigm. To meet these criteria, I used a flanker task paradigm (Eriksen & Eriksen, 1974). In contrast to the feature-based selection in Experiment 3, in a flanker task, target and distractors are defined by their position in the task. Because of this location-based differentiation between target and distractors, the stimuli had no features that identified them as targets or distractors. Baylis and Driver (1992) provided evidence that even in location-based tasks, selection processes operate at the level of separate perceptual units (also see Duncan, 1984). To induce object-based selection processes the target response was based on the appearance of the target stimulus as a whole (symmetry) while interference was created by distractor stimuli. To encourage the encoding of the distractor stimuli in the attentional priming procedure I included a distractor preview in the flanker task (see Grison, Tipper, & Hewitt, 2005 for a similar procedure).

Furthermore, to allow for an uninterrupted measurement of distractor inhibition in the attentional priming task, I assessed evaluations after the selection task in a separate procedure. Veling et al. (2007) showed that distractor devaluation effects can be found even if the selection and evaluation task are separated. Finally, I used a pool of unique Chinese characters as stimuli. In contrast to the shape stimuli used in Experiment 3, the

Chinese characters contained no features that identified them as targets or distractors. Furthermore, they were a good match for my object-based paradigm requirements because there is evidence that for inexperienced individuals Chinese characters are percept as whole integrated objects (Hsiao & Cottrell, 2009) and second, they proved appropriate for investigating evaluative processes elsewhere (e.g., Payne, Cheng, Govorun, & Stewart, 2005; Zajonc, 1968, Exp. 2).

In sum, these experimental features - a flanker task to measure effectiveness of distractor inhibition and stimuli that could not be identified as targets, distractors, or novels by certain stimulus features - met the requirements of testing the effects of distractor inhibition on distractor evaluations in an object-based paradigm. As in Experiment 3, I hypothesized that effectiveness of distractor inhibition would predict distractor evaluations, with more effective inhibition leading to more negative evaluations.

7.2 Method

7.2.1 Participants

Thirty students (22 female/8 male) of University of Konstanz with ages ranging from 19 to 29 ($M = 22.53$, $SD = 2.21$) participated in return for 3 Euros. All participants reported normal or corrected-to-normal visual acuity. Four participants were excluded from the analyses either because they showed more than 40% error trials in the attention priming task (3) or they were identified as outliers[9] on the main dependent variable (1). The reported analyses were performed on the data of the remaining 26 participants.

7.2.2 Apparatus and stimulus

Apparatus The experiment was conducted on an IBM-PC compatible computer connected to a 43-cm color CRT display (85-Hz; 1,024 x 768 resolution). The experiment was programmed and run using E-Prime 1.1 software (Schneider, Eschman, & Zuccolotto, 2002). Participants sat in a small and quiet laboratory booth. There were no other people in the room and the ambient illumination was low. Participants' typical viewing distance to the screen was about 80 cm.

Stimuli Fifty-two Chinese characters were used as stimuli. All characters were presented in black on white background. Each character as presented on the screen was approximately 3 cm in height and 2 cm in width.

[9] Outliers were defined as values 1.5 IQR lower than the first quartile or 1.5 IQR higher than the third quartile.

The 52 Chinese characters (see Figure 8 for examples; all Chinese characters are displayed in Appendix B6, B7, and B8) were divided into three groups to form a pool of 20 critical, 24 non-critical, and 8 practice stimuli. Twenty critical stimuli formed three subgroups of 8 target, 8 distractor, and 4 novel stimuli. The assignment of stimuli to these subgroups was randomized for each participant, so that any participant was tested with a unique combination of target, distractor, and novel stimuli. Critical stimuli (target and distractors) were presented each 4 times during the prime presentation of the flanker task and only at target and distractor positions, respectively. Together with the novel stimuli, they appeared once in the evaluation task. Non-critical stimuli were presented only in the flanker task and each stimulus appeared between 13 and 15 times at different target and distractor positions in the prime and probe presentation of the flanker task. Vertically symmetrical and asymmetrical stimuli were equally distributed among all subgroups of stimuli.

7.2.3 Design

In a quasi-experimental design the effectiveness of distractor inhibition in a flanker task and distractor evaluations in a subsequent evaluation task were assessed. The effectiveness of distractor inhibition was operationalized by reaction times to respond to previously ignored stimuli (distractor repetition condition) relative to reaction times to respond to not previously presented stimuli (control condition). Distractor evaluations were measured as indirect liking ratings on a 7-point scale ranging from “rather positive” to “rather negative”. The participants were asked to guess the valence of the original meaning of the presented Chinese character.

The flanker task consisted of 85 trials (including practice trials). Each flanker task trial consisted of a prime and a probe presentation. Different stimulus repetition patterns between prime and probe presentation created three flanker task conditions: (1) In the distractor repetition condition, the distractor stimulus from the prime presentation was repeated as target in the subsequent probe presentation. (2) In the target repetition condition, the target from the prime presentation was repeated as target in the subsequent probe presentation and (3) in the control condition, no stimulus from the prime presentation was repeatedly presented in the subsequent probe presentation. The conditions were presented balanced and in a fixed random order. The stimuli presented in the prime display of the flanker task were balanced regarding response compatibility (50%) and incompatibility (50%). Critical distractors were presented two times in a compatible and two times in an incompatible trial. In the distractor repetition and control condition, responses between prime and probe presentations were balanced for response repetition (50%) and response alternation (50%).

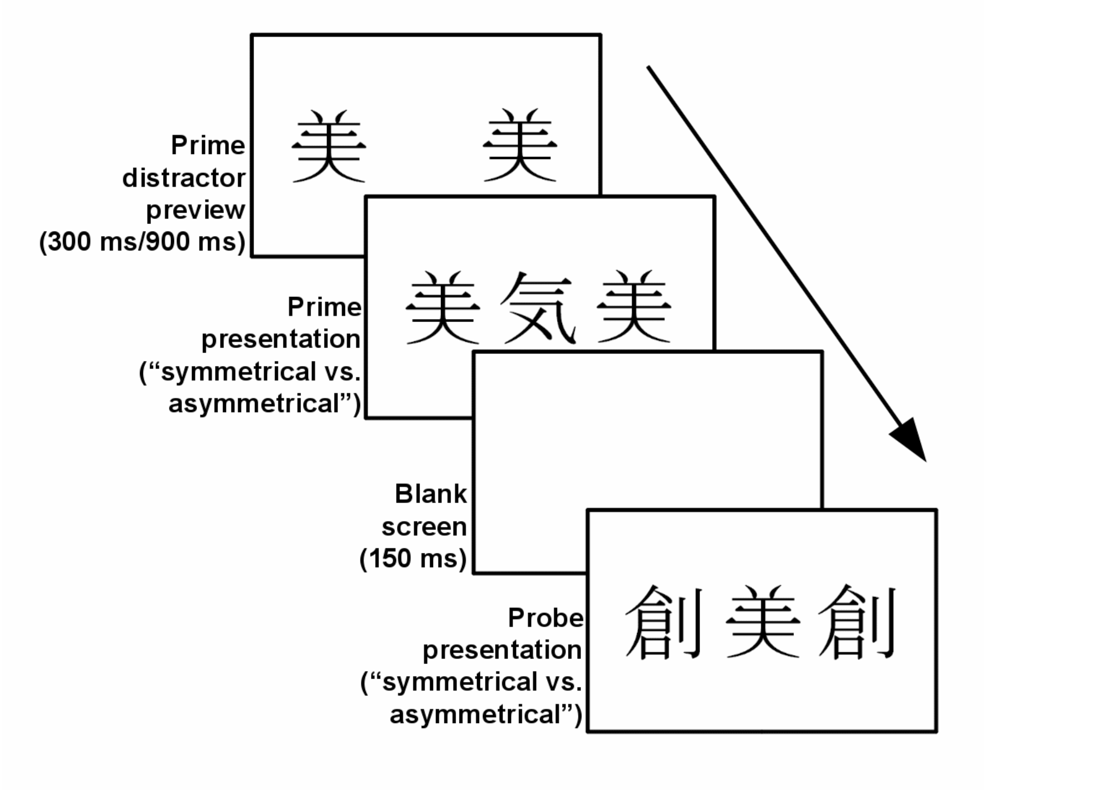

Figure 8: Sequence of events of one flanker task trial in Experiment 4. The example displays a distractor repetition condition trial in which the prime distractor is repeated as the probe target.

7.2.4 Procedure

Participants were told that the experiment investigated various aspects of visual perception. Instructions were displayed on the computer screen. Participants started with the flanker task, followed by the evaluation task.

Flanker task The sequence of events of one flanker task trial is displayed in Figure 8. One trial started with the prime distractor preview. Two identical distractors appeared left and right from the center of the display. After either 300 or 900 ms[10], one

[10] A paired t-test showed no differences between evaluations of 300 ms previewed distractors ($M = 4.32$, $SD = .82$) and 900 ms previewed distractors ($M = 4.30$, $SD = .86$), $t(25) < 1$, *n.s.*. Another paired t-test showed no differences for the mean distractor inhibition index when calculated only from 300

target appeared in between the two distractors centered on the display. Participants decided whether the target was vertically symmetrical or asymmetrical by pressing the "F" or "J" key on the keyboard. The response key assignment was counterbalanced over all participants. After the participants' response, a blank screen was presented for 150 ms before the probe presentation started.

In the probe presentation, all three stimuli (target and distractors) were presented simultaneously. Depending on the flanker task condition the probe target was either the previously presented prime distractor (distractor repetition condition; see Figure 8), the previously presented prime target (target repetition condition), or a novel stimulus not presented in the previous prime presentation (control condition). Participants again decided whether the target was symmetrical or asymmetrical by pressing the "F" or "J" key. After the participants' response, a blank screen was presented for 150 ms before the next trial started with the next prime presentation. After participants completed 85 trials they received instructions for the evaluation task.

Evaluation task Participants were told that each Chinese character represents a word in the Chinese language. They were asked to guess the valence of the original meaning of the Chinese characters. In the evaluation task the 20 critical stimuli (targets, distractors, and novels) were presented in random order one at a time centered on the screen. After a fixation cross, a single stimulus was presented for 1000 ms. Then, a 7-point likert-scale replaced the stimulus. Participants responded by clicking at one of the scale's boxes. The extreme points of the scale were labeled with "rather positive" and "rather negative". Simultaneously with the scale an additional check box was presented. Participants were instructed to check it if they actually knew the original meaning of the presented character[11].

After the evaluation task, participants filled in a demographic questionnaire asking for the participants' gender, year of birth, and major. Furthermore, the questionnaire included questions concerning their beliefs about the nature and purpose of the experiment.

ms previewed distractors (M = 13.78, SD = 71.87) compared to when only calculated from 900 ms previewed distractors (M = 19.60, SD = 49.39), $t(25) < 1$, *n.s.* (For an explanation of the distractor inhibition index see the distractor inhibition index section below). Because of a lack of a difference for the two main variables when calculated separately for 300 ms and 900 ms previewed distractors, all analyses were performed without taking the preview time into account.

[11]None of the participants knew the meaning of any of the presented Chinese characters, therefore this aspect will not be discussed further.

7.2.5 Data preparation

Flanker task trials with false responses in either the prime or the probe presentation and responses with reaction times shorter than 200 ms or longer than 3 *SD*s above the mean for each condition were treated as errors. This procedure identified 6.26% ($SD = 5.71$) error trials. Reaction time data were analyzed only from the remaining correct trials. Evaluative responses made slower than 3 *SD*s above the mean evaluation response time were treated as errors. This procedure excluded 1.96% of the evaluations. Mean evaluations for target, distractor, and novel stimuli were calculated only from the remaining correct responses.

7.3 Results

7.3.1 Distractor inhibition (DI) index

As in Experiment 3, I calculated an index as indicator of distractor inhibition effectiveness. The DI index is a difference score calculated from the mean probe reaction times in the distractor repetition condition and the control condition of the flanker task. It provided an index of the degree of impaired or facilitated responses in the distractor repetition condition in reference to the control condition.

7.3.2 DI index and evaluations

The main purpose of the experiment was to investigate the relation between effectiveness of distractor inhibition and distractor evaluations. I expected more effective distractor inhibition (i.e., impaired responses) to predict more negative distractor evaluations. A multiple regression analysis was conducted to test the impact of the DI index on the distractor evaluations (Aiken & West, 1991), controlling for gender and key assignment. The regression model was significant, $F(3, 22) = 4.49$, $p = .01$, and accounted for about 38% of the variance (see Table 11 for a summary of the regression analysis). As expected, the DI index significantly predicted distractor evaluations. More impaired responses (i.e., effective distractor inhibition) in the distractor repetition condition predicted more negative distractor evaluations in the subsequent evaluation task (see Figure 9).

Surprisingly, gender had a marginally significant effect on distractor evaluations. Female participants evaluated the distractor (and novel) stimuli more positive compared to male participants[12]. Key assignment did not affect distractor evaluations.

[12]Because the gender effect was unexpected and it does not put my main argument into question the

Table 11: Summary of simultaneous regression analyses for variables predicting distractor, target, and novel evaluations in Experiment 4 (N = 26).

Variable	Zero-order correlation	*B*	*SE B*	β
		Distractor evaluations		
Gender	0.33	0.16	0.09	0.32†
Key assignment	0.35	0.11	0.08	0.25
DI index	-0.42	-0.2	0.08	-0.45*
		Target evaluations		
Gender	-0.17	-0.11	0.18	-0.13
Key assignment	-0.16	-0.09	0.16	-0.13
DI index	-0.09	-0.06	0.16	-0.08
		Novel evaluations		
Gender	0.49	0.37	0.13	0.52**
Key assignment	0.13	-0.01	0.12	-0.01
DI index	-0.18	-0.15	0.12	-0.24

Note: †p <= .10. *p <= .05. **p <= .01

The DI index was expected to exclusively affect distractor evaluations. To support this assumption additional regression analyses were conducted to test for effects of the DI index on the evaluations of target and novel stimuli (see Table 11 for a summary of the regression analyses). The DI index did not predict target stimuli evaluations nor novel stimuli evaluations.

effect will not be further discussed.

7.3.3 Flanker task conditions and stimulus type evaluations

Supplemental analyses were performed to test for differences in reaction times between the flanker task conditions (distractor repetition versus control versus target repetition) and for evaluation differences between the stimulus types (distractor versus novel versus target).

Flanker task To test for flanker task condition effects a one factorial (flanker condition: distractor repetition vs. control vs. target repetition) repeated measures ANOVA was conducted on mean probe reaction times. The result indicated a significant flanker condition effect, $F(2, 24) = 30.69$, $p < .01$, partial eta square = .72. Follow-up paired t-tests revealed that reaction times in the target repetition condition ($M = 594$ ms, $SD = 98$ ms) were significantly faster compared to reactions in the distractor repetition condition ($M = 678$ ms, $SD = 65$ ms), $t(25) = 6.71$, $p < .01$, $d = 1.01$, and the control condition ($M = 697$ ms, $SD = 81$ ms), $t(25) = 7.93$, $p < .01$, $d = 1.14$. Reaction times in the distractor repetition condition were significantly faster compared to the control condition, $t(25) = -2.09$, $p = .05$, $d = .25$. In sum, compared to the control condition, target repetition did produce facilitated responses in the probe presentation. However, in contrast to my expectations, distractor repetition did also produce facilitated responses in the probe presentation.

Stimulus type evaluations To test for stimulus type effects a one factor (stimulus type: distractor vs. novel vs. target) repeated measures ANOVA was conducted on mean evaluations. No significant effect was observed, $F(2, 24) < 1$, n.s., indicating that mean evaluations for targets ($M = 4.28$, $SD = .74$), distractors ($M = 4.30$, $SD = .45$), and novels ($M = 4.23$, $SD = .64$) did not differ from each other.

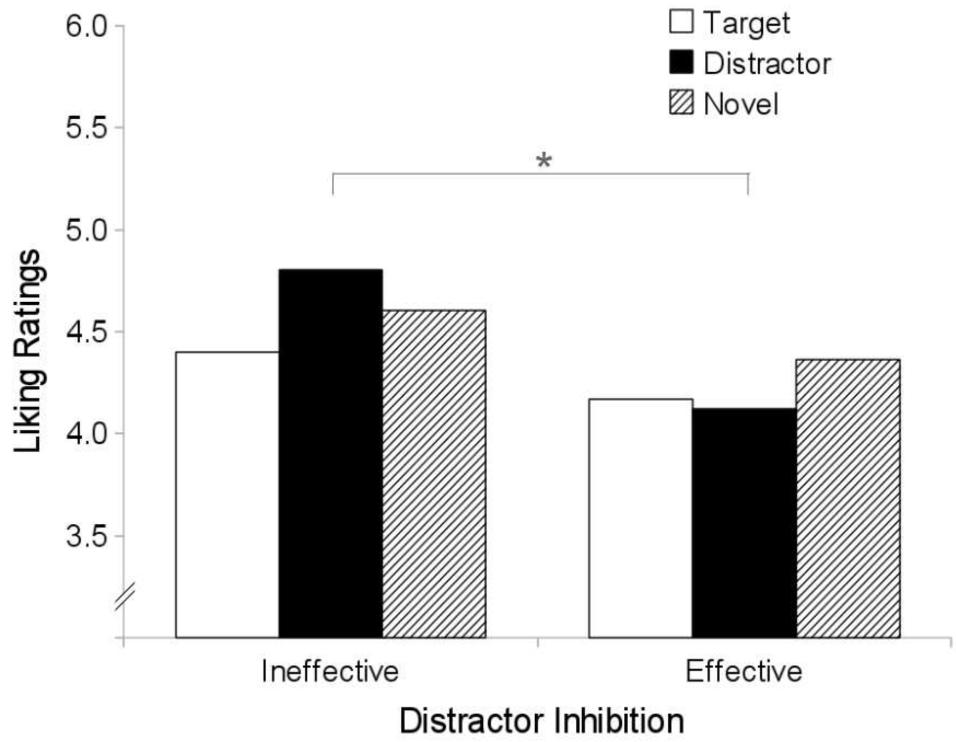

Figure 9: Effect of effectiveness of distractor inhibition on evaluations of target, distractor, and novel stimuli (1.5 *SD* above and below the mean).

7.4 Discussion

7.4.1 Distractor inhibition and distractor evaluations

As in Experiment 3, I calculated an index of impaired versus facilitated responses to previously ignored stimuli as index of effectiveness of distractor inhibition. In line with my hypothesis, effectiveness of distractor inhibition predicted distractor evaluations (but neither target nor novel evaluations). More effective distractor inhibition predicted more negative distractor evaluations. This result is in line with the inhibition-based account of distractor devaluation (Raymond et al., 2003, 2005) and the results of Experiment 3. In Experiment 4, I extended previously used methods by employing an object-based selection paradigm instead of a feature-based selection paradigm. The paradigm was designed to afford object-based selection processes. There were no stimulus features present to identify stimuli as targets, distractors, or novels, neither at the time of the selection task nor at the time of the evaluations. Therefore, the evaluative consequences of the inhibitory processes must have been tied specifically to the different distractor stimuli. This evidence for object-based effects of inhibition on evaluations seems to be inconsistent with the lack of an object-based effect in a study reported by Goolsby et al. (2009, Exp. 2). However, this conflict is solved if one considers that Goolsby et al. tested object-based distractor devaluation with a feature-based selection task and the selection feature was removed at the time of the evaluations. A feature-based selection task does not necessarily demanded inhibitory processes at the level of the whole object. Therefore, object-based effects of inhibition on evaluations were not observed. In the current research, I used a selection task that afforded object-based selection processes and in line with the inhibition-based account of distractor devaluation, I found evidence for an object-based effect of inhibition on evaluations.

These results provide first evidence that the negative effects of distractor inhibition on distractor evaluations can be object-based, that is, they can be tied to the unique physical appearance of single distractor stimuli. These object-based inhibition-evaluation processes are in line with research showing that inhibitory mechanisms of attention can be associated with certain objects (Kessler & Tipper, 2004).

7.4.2 Summary

The second experiment extended research investigating distractor devaluation by showing a link between distractor inhibition and distractor evaluations in an object-based paradigm. In this paradigm, the negative effects of effective distractor inhibition processes were tied to the unique physical features of certain distractor stimuli. However, similar to Experiment 3, the experiment failed to provide evidence for a general distractor devaluation effect. This might be a result of positive mere exposure and negative distractor devaluation effects working simultaneously (see Fragopanagos et al., 2009). I will return to this important issue in detail in the general discussion.

8 General discussion (Part II)

Two experiments were designed to test the assumption that distractor inhibition negatively affects distractor evaluations. Effectiveness of distractor inhibition was measured by assessing relative impairment (i.e., effective inhibition) or facilitation (i.e., ineffective inhibition) of responses to previously ignored stimuli in an attentional priming paradigm (e.g., Tipper, 1985, 2001). In both experiments, more effective distractor inhibition predicted more negative distractor evaluations, but not target or novel evaluations. This inhibition-evaluation link is in line with the inhibition-based account of distractor devaluation proposed by Raymond et al. (2003) and it is in line with indirect evidence that only effective distractor inhibition leads to distractor devaluation (e.g., Fenske et al., 2005; Kiss et al., 2007).

Both presented experiments are in line with evidence that the negative priming effect and distractor devaluation can be found simultaneously as recently reported by Griffiths and Mitchell (2008). The authors added an evaluation assessment to a negative priming paradigm and found both negative priming and distractor devaluation effects. However, they did not report a relation between the magnitude of the negative priming effect and the distractor devaluation. Both the study by Griffiths and Mitchells and my experiments used a similar approach and the results do complement each other. While they found a negative priming and a distractor devaluation effect but no relation between both, I did not find the main effects but the relation. The lack of a relation between the negative priming effect and distractor devaluation in Griffiths and Mitchells experiment might be due to a small variance in the negative priming effect as a result of a procedure that produced overall effective distractor inhibition. In contrast, my procedure which did not elicit overall effective distractor inhibition produced enough variance to reveal a robust relationship between inhibition and evaluations. In any case, the results from both experiments can be interpreted in support of the inhibition-based account of distractor devaluation.

8.1 Feature-based and object-based selection

Two different levels at which inhibitory processes operate were investigated, namely, at the level of object features (Experiment 3) and at the level of the physical appearance of whole objects (Experiment 4). All distractor devaluation research up to now investigated the consequences of distractor inhibition on evaluations in feature-based selection paradigms (Fenske et al., 2005; Fenske et al., 2004; Goolsby et al., 2009; Griffiths & Mitchell, 2008; Kiss et al., 2007; Raymond et al., 2003; Raymond et al., 2005; Veling et al., 2007). In Experiment 3, I also employed a feature-based paradigm and found evidence for the hypothesized inhibition-evaluation link. Goolsby et al. (2009) provided evidence that feature-based but not object-based distractor devaluation can be found after a feature-based selection task. However, in Experiment 4, I extended existing distractor devaluation research by using a paradigm that demanded object-based selection processes. In this paradigm, I assumed distractor inhibition to operate at the level of the unique physical appearance of the distractor stimuli (DeSchepper & Treisman, 1996). I replicated the results of Experiment 3, that is, more effective distractor inhibition predicted more negative distractor evaluations. Because of the object-based nature of the paradigm, the inhibition-evaluation link must have been caused by negative effects of inhibitory processes associated with the unique distractor representations, because no features were present to provide a basis to distinguish targets, distractors, and novels.

This first evidence of object-based effects of inhibitory processes on evaluations is an important finding because it produces more complexe evaluative consequences for different stimuli compared to feature-based effects. Distractor devaluation may serve adaptive behavior, for example, by decreasing the salience of distractors (Fenske & Raymond, 2006). Feature-based effects of inhibitory processes on evaluations have the advantage to generalize to other stimuli with the same features (e.g., a certain color). At the same time, this generality seems problematic. For example, it may not be very adaptive to dislike all green objects after having effectively inhibited some green apples while picking red ones. Object-based effects of inhibitory processes on evaluations seem more reasonable in regard to producing adaptive behavior. After effectively inhibiting a certain distractor object, the object-based negative evaluative consequences are tied to the specific object and may affect future behavior in regard to this specific object only. This would allow for much more complex influences on behavior compared to feature-based effects.

8.2 Distractor devaluation and mere exposure

In contrast to research on distractor devaluation (e.g., Raymond et al., 2003), in the presented two experiments I did not find evidence for a general distractor devaluation effect. Distractors were in general not evaluated more negatively compared to novel stimuli. The result pattern in both studies provided a rather ambiguous picture. On the one hand, the inhibition-evaluation link found in both experiments provides evidence for the inhibition-based account of distractor devaluation. On the other hand, the lack of a general distractor devaluation effect for previously ignored stimuli does not support the inhibition-based account. To solve this inconsistency one has to consider that evaluations are a very basic psychological dimension and therefore numerous factors influence evaluations, for example, evaluative conditioning (e.g., De Houwer, Thomas, & Baeyens, 2001; Walther, 2002), perceptual fluency (e.g., Reber, Winkielman, & Schwarz, 1998), or salient goals (e.g., Ferguson & Bargh, 2004). In particular the effect of mere exposure needs to be considered in the context of the distractor devaluation effect. Mere exposure refers to increased liking ratings following simple unreinforced exposure (e.g., Bornstein, 1989; Zajonc, 1968). Fragopanagos et al. (2009) argued that positive mere exposure effects and negative distractor devaluation effects might work at distractor stimuli simultaneously. In the light of this assumption, my results are especially interesting. When investigating distractor devaluation effects one faces two problems: On the one hand, comparing distractor evaluations only with target evaluations (e.g., Goolsby et al., 2009) has the important disadvantage that one cannot be sure whether the target-distractor difference is only caused by enhanced target evaluations rather than by a devaluation of the distractors. On the other hand, comparing distractor evaluations with novel stimuli has the disadvantage that possible distractor devaluation effects might be concealed because positive mere exposure effects and negative distractor devaluation effects annihilate themselves, as it might have been the case in the presented two experiments. However, in both of my experiments I had a method to assess the effectiveness of distractor inhibition. Analyzing the effects of distractor inhibition on distractor evaluations provided evidence for the assumption that inhibitory processes have a negative effect on evaluations, despite the lack of a distractor devaluation effect. Especially Experiment 4 provided evidence for the parallel influence of mere exposure and distractor devaluation. According to the argumentation that mere exposure and distractor devaluation work simultaneously, the relative positive distractor evaluations[13] for individuals who did not effectively inhibit the distractors indicates a mere exposure effect that was less influenced by the negative consequences of inhibitory processes. However, the relatively negative distractor evaluations for individuals who did effectively inhibit the distractors indicates that the negative effect of inhibitory processes gained influence over the mere exposure effect.

It seems obvious that a basic dimension as evaluations is affected by different factors working simultaneously. However, regarding mere exposure and distractor devaluation, further research is necessary to understand this interaction.

[13]More positive distractor evaluations compared to target evaluations might be explained by evidence that exposure under suboptimal conditions produces greater mere exposure effects compared to exposure under optimal conditions (see Bornstein, 1989). Unattended stimulus presentation might by a suboptimal exposure condition compared to explicitly attended stimuli.

8.3 Additional aspects of the distractor inhibition measurement

In the following section, I will address some issues concerning the behavioral measurement of attentional inhibition processes. In both experiments, I measured responses to stimuli previously encountered as distractors in reference to responses to novel control stimuli. In contrast to research on the negative priming effect (e.g.,Neill, 1977; Tipper, 1985), I did not find overall impaired responses to previously ignored stimuli. I identified one factor that might have contributed to this result in both experiments. Different studies show that no negative priming effect is found in experiments with target-only probe trials (e.g., Lowe, 1979; Tipper & Cranston, 1985). Frings and Wentura (2006b) investigated this issue and argued that if prime and probe presentations are easy to differentiate (which is the case if the prime presentation consists of two stimuli and the probe presentation only of one stimulus) then there is a higher probability that participants detect contingencies between prime and probe presentations (e.g., repetition of the prime distractor as probe target). The detection of such contingencies might encourage processing of the supposed to be ignored prime distractors to prepare for a possible repetition. In both of my experiments, prime and probe presentations could be differentiated easily because in Experiment 3, there was a target-only probe presentation and in Experiment 4, there was a distractor preview in the prime presentation. Therefore, more participants than usual might have become aware of the contingencies between prime and probe presentations and therefore did not effectively inhibit the distractors. However, the contingency detection problem does not compromise the validity of the measurement of inhibitory processes. Impaired responses to previously ignored stimuli still reflected more effective inhibitory processes compared to facilitated responses. The contingency problem only decreased the probability that participants showed effective distractor inhibition.

Besides this practical issue concerning the inhibition measurement, there is also a theoretical issue that needs to be discussed. I measured impaired versus facilitated responses to previously ignored stimuli, assuming that impaired responses reflected inhibitory processes. This is in line with the dominant view on the negative priming effect (e.g., Houghton & Tipper, 1994; Tipper, 1985, 2001; reviewed by Fox, 1995). However, there are also alternative explanations for impaired responses to previously ignored stimuli (e.g., Neill & Valdes, 1992; Rothermund, Wentura, & De Houwer, 2005). For example in the episodic retrieval account (Neill & Valdes, 1992), it is assumed that ignored stimuli are outfitted with a “do-not respond” tag. If a stimulus is encountered later as a target, this “do-not respond” tag conflicts with the current task demands (i.e., to respond). This conflict between the task demands and the “do-not respond” tag results in impaired responses. A similar account was proposed by Rothermund et al., with the difference that not a “do-not response” tag is associated with the distractor but the distractor stimulus is associated with the actual target response made while the distractor is ignored. If the distractor is encountered again as a target, but a different response than the associated one is demanded, the resulting conflict leads to impaired responses.

My experiments were not designed to differentiate between the different accounts for impaired responses to previously ignored stimuli. I found a link between impaired responses of previously ignored stimuli and evaluations of previously ignored stimuli. This relation is in line with both the inhibition-based account of the negative priming effect and distractor devaluation. My argumentation is based on the predominant view that negative priming effects reflect inhibitory processes (e.g., Houghton & Tipper, 1994; Tipper, 1985, 2001). As far as I know, no assumptions have been made about evaluations being affected by a “do-not response” tag or a specific response association (in my case, “left” versus “right”)[14]. Although effects of this kind cannot definitely be excluded, I interpret the link between impaired responses and evaluations as evidence for the assumption that inhibitory processes negatively affect evaluations as proposed by Raymond et al. (2003).

8.4 Individual differences in distractor devaluation?

There is evidence for individual differences in inhibitory efficiency (Tipper & Baylis, 1987, reviewed by Fox, 1995). I relied on this evidence to test the relation between the effectiveness of distractor inhibition and distractor evaluations and as hypothesized, I found that individuals who showed more effective distractor inhibition showed more negative distractor evaluations. Although I used an individual difference method, I do not argue for an individual differences approach in regard to the negative consequences of inhibitory processes on evaluations. The current view of inhibitory processes is that they are a family of different functions rather than one unified construct (e.g., Nigg, 2000) and there are doubts on the reliability of different measurements of inhibitory processes (e.g., Friedman & Miyake, 2004). Therefore, I do not understand inhibitory efficiency as an personality trait in the way that some individuals show stable distractor devaluation effects because they are efficient inhibitors, whereas others do not show distractor devaluation effects because they are inefficient inhibitors. I used an individual

[14] Actually, one could expect evaluations to be influenced by a left versus right response association if evaluations are made on a response scale oriented from left to right, as was the case in my experiments. However, the response key assignment (Experiment 3 and 4) and the evaluation scale (Experiment 3) were varied randomly between participants to guard against such systematic effects.

differences approach to test participants effectiveness of distractor inhibition in the specific selection context to compare it with evaluations of stimuli presented in this context. I do not suggest that the same individuals would show the same behavior (effective inhibition and distractor devaluation) in a different context or situation. However, I conclude that if an individual effectively inhibits a stimulus in a specific situation, then this effective inhibition has negative evaluative consequences for the inhibited stimulus.

8.5 Future research

The two presented experiments were correlational studies. The relation between effectiveness of distractor inhibition and distractor evaluations is in line with the inhibition-based account of distractor devaluation and therefore supports this account. However the correlational design of the studies does not allow me to draw causal inferences about the direction of the influence. Future research should address this shortcoming. Only experimentally manipulating effectiveness of distractor inhibition and observing the evaluative consequences of this manipulation can ultimately provide evidence for the claim that inhibitory processes negatively affect evaluations.

Furthermore, the presented experiments and all other studies on the distractor devaluation effect tested the negative effects of inhibitory processes on evaluations in the context of visual selective attention. However, inhibition is not a single construct but a family of different functions (Nigg, 2000). Further research is necessary to investigate whether the negative effects of inhibitory processes are limited to processes of inference control in visual selective attention or whether the negative effects of inhibitory processes are a general phenomenon also at work in other domains (e.g., inhibitory processes in memory and language; see Dagenbach & Carr, 1994).

8.6 The adaptive function of distractor devaluation

Attaching emotional significance to stimuli is important to facilitate adaptive behavior. How may the negative evaluative consequences of attentional inhibition processes fit into this notion? In the current work, I provided evidence that processes of selective attention have evaluative consequences for distractors. More effective distractor inhibition led to more negative distractor evaluations. The affective devaluation of distractors in the presence of targets basically increases the evaluative difference between targets and distractors. This evaluative difference may affect the allocation of attentional resources when the stimuli are encountered again. Different research hints to biased allocation of attentional resources on the basis of the valence dimension of stimuli, with advantages for positive (e.g., Juth, Lundqvist, Karlsson, & Oehman, 2005) or negative (e.g., Oehman, Lundqvist, & Esteves, 2001; Oehman & Mineka, 2001) stimuli. Regardless of whether the attention allocation is biased toward positive or negative stimuli, an increased evaluative difference between targets and distractors, for example, as a consequence of attentional inhibition processes, would lead to increased differences in the allocation of attentional resources to the targets and the distractors. This difference in the automatic allocation of attentional resources could then facilitate subsequent selection processes. In other words, the evaluative consequences of selection processes may serve as a link between effortful, controlled attentional processes (e.g., selective attention) and more automatic attentional processes (e.g., allocation of attentional resources). Thereby, repeated selection of specific targets in the presence of the same distractors may be facilitated by this transfer from controlled to early, more automatic attentional processes.

Part III
Conclusion

The four presented experiments basically support previous evidence that processes of selective attention modulate evaluations. In part one, I extended previous research by showing that processes of selective attention affect evaluations of socially meaningful stimuli (ingroup and outgroup members). The experiments in the second part support the assumption that the effects of selective attention on evaluations are a result of attentional inhibition processes that negatively affect evaluations of previously inhibited stimuli.

The notion that processes of selective attention affect evaluations is a very recent finding. First empirical evidence was found by Raymond et al. (2003) and most of the following work on this effect, so far, came from the research group around Jane Raymond and Mark Fenske. Thus, research on the effects of selective attention on evaluations is still in its infancy. Many questions have to be addressed in future research. Some of these questions were investigated in the presented research, namely, the impact of the effect in a social context and some aspects of the underlying processes.

The present research highlights two important issues concerning the attention-evaluation link. In general, all four presented experiments support the notion that not unattended stimuli but only effectively inhibited stimuli are affectively devaluated. In Part one, when testing the effects of selective attention on evaluations of socially meaningful stimuli, reliable distractor devaluation effects were found. However, they were stronger for individuals highly identified with their group compared to individuals less identified. I argued that this amplification of distractor devaluation was a result of motivational aspects of identification. Thus, in the present studies more identification may have led to more effective distractor inhibition and consequently to more distractor devaluation.

In Part two, the notion that only effective distractor inhibition negatively affects evaluations was confirmed more directly than in earlier studies by showing a link between effectiveness of distractor inhibition and distractor evaluations. However, in the experiments in the second part, I had no means of telling what factors determined why some individuals showed effective distractor inhibition in the specific experimental situation and others did not. Future research should investigate more closely the conditions that lead to distractor devaluation for ignored stimuli and condition that have no evaluative consequences.

Finally, based on the presented results, it seems important to take other processes that affect evaluations into account when investigating distractor devaluation. As argued in the second part of the presented research, it is likely that mere exposure (e.g., Bornstein, 1989; Kunst-Wilson & Zajonc, 1980; Zajonc, 1968, 2001) interacts with the distractor devaluation effect. Especially, when distractor devaluation is defined as more negative evaluations of distractors compared to novel control stimuli. Because in some of the used experimental paradigms, the control stimuli were never presented previously, thus, they were never subject to positive mere exposure effects. Distractor stimuli were repeatedly presented and therefore it is likely that they were subject to positive mere exposure effects. Eventually, the mere exposure effect and the distractor devaluation effect may have dissolved each other. Besides mere exposure, other processes have been found to affect evaluations of previously presented stimuli, for example, evaluative conditioning (e.g., De Houwer, Thomas, & Baeyens, 2001; Walther, 2002). Research on evaluative conditioning showed that a neutral stimulus acquires the valence of another valent stimulus (positive/negative) after both stimuli were presented together. Basically, this means that presenting two stimuli together results in a convergence of the valence of both stimuli. There are some overlaps in the research on evaluative conditioning and distractor devaluation. In both cases, two stimuli are presented together. Research on evaluative conditioning predicts a convergence of the valence of both stimuli. However, in research on distractor devaluation, the additional aspect of attending one of the stimuli and ignoring the other predicts a different outcome than in evaluative conditioning paradigms, namely, a differentiation between both stimuli. In spite of the similarities of these paradigms and different predictions concerning the evaluative consequences, no effort has been made so far to systematically integrate these different theories.

In sum, even though one has to keep in mind, that the present research was only a first step to investigate the consequences of selective attention on evaluations in a social context and to test the basic processes that underlie the attention-evaluation link, I am confident to conclude that the effects of selective attention on evaluations are relevant in a social meaningful context and that attentional inhibition processes are the cause of the affective devaluation of previously ignored stimuli.

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List of Figures

List of Tables

A Deutsche Zusammenfassung

Die präsentierten Experimente untersuchen den Zusammenhang zwischen selektiver Aufmerksamkeit und Valenzbewertungen. Es gibt zahlreiche Belege, dass der emotionale Gehalt von Reizen einen Einfluss auf Aufmerksamkeitsprozesse hat (z.B., Eastwood, Smilek & Merikle, 2001; für einen Überblick siehe Compton, 2003). In den vergangenen Jahren fanden sich aber auch Hinweise für Prozesse, die in die umgekehrte Richtung wirken. In verschiedenen Untersuchungen fanden sich Belege dafür, dass Prozesse selektiver Aufmerksamkeit Einfluss auf den emotionalen Gehalt von Reizen haben, genauer gesagt auf Valenzbewertungen (z.B., Raymond, Fenske & Tavassoli, 2003; Raymond, Fenske & Westoby, 2005). Dies betraf vor allem die Bewertung zuvor ignorierter Reize, für welche eine emotionale Abwertung gefunden wurde. Abwertung bedeutet, dass zuvor ignorierte Reize (Distraktoren) negativer bewertet wurden als zuvor beachtete Reize (Zielreize) und auch negativer als zuvor nicht präsentierte Reize (Kontrollreize). In Folge dessen wurde dieser Effekt als „Distraktorabwertungseffekt“ bezeichnet. Raymond et al. (2003) postulierten einen inhibitions-basierten Erklärungsansatz, in welchem sie annehmen, dass Inhibitionsprozesse der selektiven Aufmerksamkeit für die affektive Abwertung zuvor ignorierter Reize verantwortlich sind (siehe auch Fragopanagos et al., 2009).

Die hier präsentierte Arbeit gliedert sich in zwei Teile zu welchen jeweils zwei Experimente durchgeführt wurden. Im ersten Teil wurde der Einfluss selektiver Aufmerksamkeit auf die Bewertung sozial relevanter Reize untersucht. Der Fokus des zweiten Teils lag auf den zugrunde liegenden Prozessen des Distraktorabwertungseffekts. Im zweiten Teil wurde der inhibitions-basierte Erklärungsansatz der Distraktorabwertung getestet.

Bisherige Forschung zu den Konsequenzen selektiver Aufmerksamkeit auf Bewertungen wurde ausschließlich mit neutralen Reizen durchgeführt (z.B., abstrakte Muster, Buchstaben, neutrale Gesichter). Darauf aufbauend wurde im ersten Teil der vorliegenden Arbeit der Rahmen der bisherigen Untersuchungen um einen sozialen Kontext erweitert, indem der Einfluss selektiver Aufmerksamkeit auf die Bewertung von zuvor beachteten und ignorierten Eigen- und Fremdgruppenmitgliedern untersucht wurde. Methodisch wurde dabei folgendermaßen vorgegangen: Ein sozialer Kontext wurde etabliert indem die teilnehmenden Versuchspersonen einer von zwei Gruppen zugeteilt wurden. Des Weiteren wurden die Bilder von Gesichtern, welche als Reizmaterial dienten, jeweils mit Merkmalen einer der beiden Gruppen ausgestattet, um sie als der jeweiligen Gruppe zugehörig zu kennzeichnen. Im Gegensatz zu bisherigen Untersuchungen, in welchen das

Gesichtsbildmaterial jeglicher sozialer Kontextinformation bereinigt wurde, wurde das von mir verwendete Gesichtsbildmaterial gezielte mit diesen Informationen ausgestattet. Das den Versuchspersonen präsentierte Gesichtsbildmaterial gehörte somit entweder zur Eigen- oder Fremdgruppe der Versuchspersonen an und erhielten damit eine Wertigkeit und Relevanz wie sie auch für Personen in einer realen Umgebung natürlich sind. Als wichtigste abhängige Variable, um den Einfluss selektiver Aufmerksamkeit auf Bewertungen sozial bedeutsamer Reize zu untersuchen, wurde *Ingroup Bias* erhoben. *Ingroup Bias* ist ein klassisches Maß der Intergruppenforschung. Es ist ein Differenzwert aus Eigen- und Fremdgruppenbewertung und stellt somit ein Maß für die relative Bewertung der Eigengruppe in Bezug zu einer relevanten Fremdgruppe dar.

Beide Experimente des ersten Teils folgten einem ähnlichen Ablauf: Zu Beginn wurden die Versuchspersonen zufällig einer von zwei Gruppen zugeteilt. Daraufhin fand ein erster Bewertungsdurchgang (Baselinebewertungen) statt, in welchem die Versuchspersonen das Gesichtsbildmaterial bewerteten. Auf diese Baselinebewertung folgte eine visuelle Suchaufgabe welche als Aufmerksamkeitsmanipulation diente. In einer Reihe von Durchgängen suchten die Versuchspersonen verschiedene Zielreize und ignorierten in Folge dessen Distraktorreize. Eine Hälfte der Versuchspersonen suchte nach Gesichtern der Eigengruppe und ignorierte in Folge dessen Gesichter der Fremdgruppe. Die verbleibende andere Hälfte der Versuchspersonen suchte nach Gesichtern der Fremdgruppe ignorierte in Folge dessen Gesichter der Eigengruppe. Zum Abschluss erfolgte ein zweiter Bewertungsdurchgang in welchem das Gesichtsbildmaterial erneut bewertet wurde. Die Experimente des ersten Teils unterschieden sich nur in einem Detail: Um den Einfluss der Identifikation der Versuchspersonen mit ihrer Eigengruppe auf den Aufmerksamkeits-Bewertungszusammenhang zu untersuchen wurde in Experiment 1 die Eigengruppenidentifikation der Versuchspersonen erhoben. In Experiment 2 wurde die Analyse des Einflusses der Identifikationsvariable erweitert, indem die Eigengruppenidentifikation nicht nur erhoben, sondern experimentell manipuliert wurde.

Die Analyse der Bewertungen der Eigengruppen- und Fremdgruppenmitglieder ergab folgende Ergebnisse: Die Manipulation der Aufmerksamkeit hatte einen Einfluss auf den *Ingroup Bias*. Versuchspersonen welche die Eigengruppe beachteten und die Fremdgruppe ignorierten wiesen einen größeren *Ingroup Bias* auf als Versuchspersonen welche die Fremdgruppe beachteten und die Eigengruppe ignorierten. Ein größerer *Ingroup Bias* bedeutete, dass die Eigengruppe positiver bewertet wurde als die Fremdgruppe. Dieser Effekt zeigte sich allerdings nur für Versuchspersonen die sich stark mit ihrer Eigengruppe identifizierten. Für niedrig identifizierte Versuchspersonen hatte die Aufmerksamkeitsmanipulation keinen Einfluss auf die Bewertungen. Detailliertere Analysen zeigten, dass dieser Effekt der Aufmerksamkeit auf den *Ingroup Bias* hauptsächlich durch die Abwertung von zuvor ignorierten Gruppen hervorgerufen wurde. Während das Beachten einer Gruppe keinen Einfluss auf die Bewertungen hatte wurden zuvor ignorierte Gruppen affektiv abgewertet. Dieses Ergebnis ist im Einklang mit Befunden zum Distraktorabwertungseffekt (z.B., Raymond et al., 2003, 2005). Des Weiteren hatte Identifikation auch einen Einfluss auf die Bewertungen von zuvor ignorierten Gruppenmitgliedern. Je stärker eine Versuchsperson mit der Eigengruppe identifiziert war, desto stärker wertete sie die zuvor ignorierten Gruppenmitglieder ab, ungeachtet dessen ob es sich um Eigen- oder Fremdgruppenmitglieder handelte. Der Moderatoreffekt der Identifikation zeigte sich sowohl in Experiment 1, in welchem Identifikation nur gemessen wurde, als auch in Experiment 2, in welchem Identifikation experimentell manipuliert wurde. Die Ergebnisse lassen darauf schließen, dass eine motivationale Komponente der Identifikation für diese Moderatorrolle verantwortlich ist. Diese Ergebnisse decken sich mit Hinweisen, dass nur effektive Distraktorinhibition (z.B., Fenske, Raymond & Kunar, 2004) zu Distraktorabwertungseffekten führt. Aus diesen Hinweisen ergibt sich der zweite Teil der vorliegenden Arbeit.

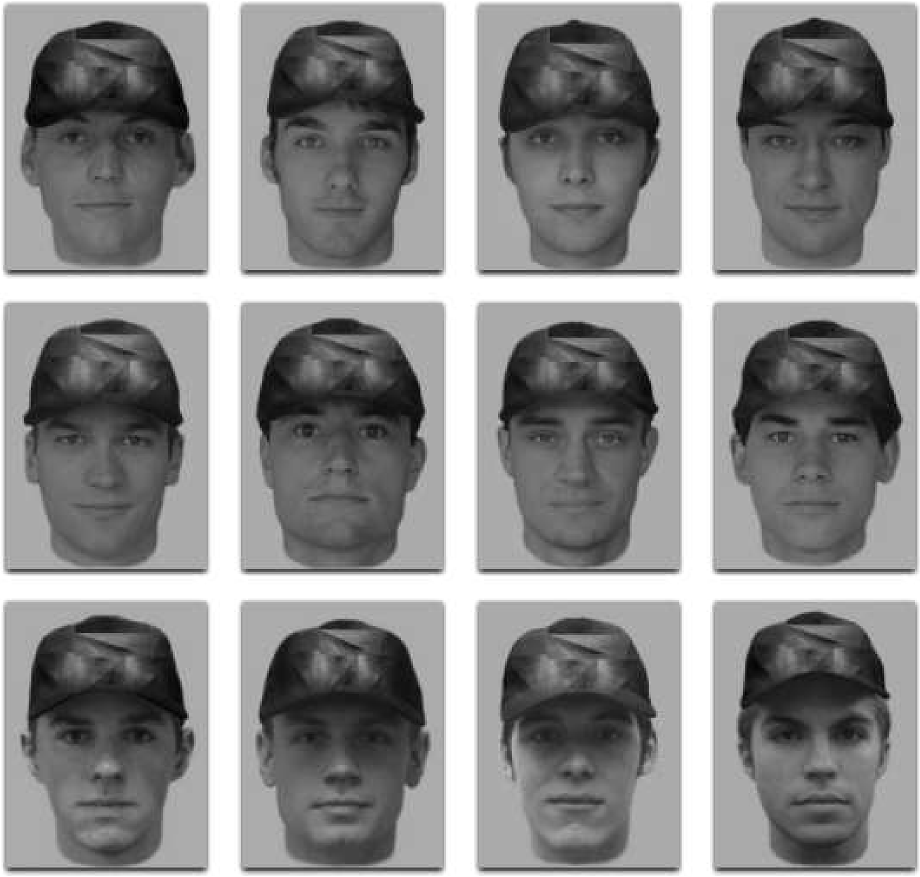
Raymond et al. (2003, 2005) postulierten einen inhibitions-basierten Erklärungsansatz für den Distraktorabwertungseffekt, in welchem sie annehmen, dass Inhibitionsprozesse der selektiven Aufmerksamkeit Bewertungen negativ beeinflussen. Unterstützt wird diese Annahme bisher allerdings nur durch indirekte Indizien (z.B., Fenske et al., 2004) und einen neurophysiologischen Beleg (Kiss et al., 2007). Das Hauptziel der Experimente im zweiten Teil war es den Methodeneinsatz zum Testen des inhibitions-basierten Erklärungsansatzes zu erweitern. Aus dem inhibitions-basierten Erklärungsansatz wurde die Hypothese abgeleitet, dass die Effektivität der Distraktorinhibition in einer Selektionsaufgabe Distraktorbewertungen vorhersagen sollte. Effektive Distraktorinhibition sollte demnach zu negativeren Distraktorbewertungen führen als ineffektive Distraktorinhibition. Zusätzlich dazu wurden zwei Ebenen auf denen Selektion stattfinden kann untersucht. Im ersten Experiment des zweiten Teils (Exp. 3) erfolgte dies mittels einer merkmals-basierten Selektionsaufgabe, in welcher ein Merkmal eines Reizes diesen als Zielreiz oder Distraktor kategorisierte. Dies ist im Einklang mit bisherigen Untersuchungen zum Distraktorabwertungseffekt, die ausschließlich mit merkmals-basierten Selektionsaufgaben durchgeführt wurden. Im zweiten Experiment des zweiten Teils (Exp. 4) wurde dieser Methodeneinsatz um eine objekt-basierte Selektionsaufgabe erweitert. Im Unterschied zur merkmals-basierten Selektion enthielten die Reize keine Merkmale, welche sie als Zielreiz oder Distraktor kategorisierten, sondern die Selektion fand auf der Ebene der physischen Erscheinung des Reizes als Gesamtes statt.

In beiden Experimenten wurde mittels eines Aufmerksamkeitsprimingparadigmas Aufmerksamkeit manipuliert und die Effektivität der Distraktorinhibition gemessen. Als Maβ der Distraktorinhibition diente das Vorhandensein oder Nicht-Vorhandensein des sogenannten *Negative Priming* Effektes (Tipper, 1985).

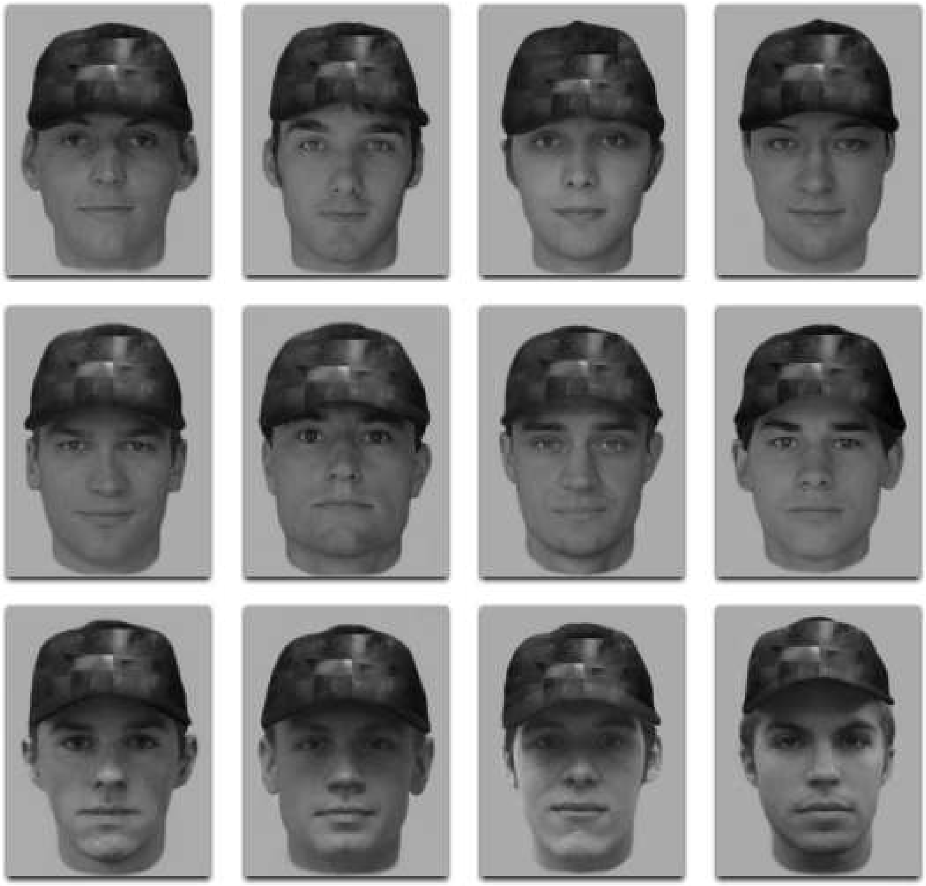
In beiden Experimenten des zweiten Teils wurde ein Zusammenhang zwischen Effektivität der Distraktorinhibition und den Distraktorbewertungen gefunden. Entsprechend der Hypothese, sagte effektivere Distraktorinhibition negativere Distraktorbewertungen hervor, sowohl in der merkmals-basierten als auch in der objekt-basierten Selektionsaufgabe. Trotz der Konsistenz dieser Befunde mit dem inhibitions-basierten Erklärungsansatz der Distraktorabwertung wurden in beiden Experimenten keine Belege für einen Distraktorabwertungseffekt gefunden. Während in Experiment 3 zwar ein Unterschied zwischen den Bewertungen der Zielreize und Distraktoren bestand, Distraktoren aber nicht negativer bewertet wurden als Kontrollreize, fand sich in Experiment 4 kein Unterschied zwischen den Bewertungen der Ziel-, Distraktor-, und Kontrollreize. Diese inkonsistenten Befunde in Bezug auf die Distraktorabwertung lassen sich unter Berücksichtigung des *Mere Exposure* Effekts (Zajonc, 1969, 2001) erklären. Es gibt Grund zur Annahme, dass der positive *Mere Exposure* Effekt und der negative Distraktorabwertungseffekt parallel wirken, und sich gegebenenfalls gegenseitig aufheben.

Zusammenfassend wurden in vier Experimenten Belege gefunden, dass Prozesse der selektiven Aufmerksamkeit Valenzbewertungen beeinflussen. Dieser Einfluss wurde im ersten Teil für Bewertungen von sozial relevanten Reizen aufzeigt. Des Weiteren wurden Belege gefunden, dass in einem sozialen Kontext, Gruppenidentifikation ein Moderator für den Aufmerksamkeits-Bewertungszusammenhang ist. Im zweiten Teil lieβ sich zwar ein genereller Distraktorabwertungseffekt nicht nachweisen aber der Zusammenhang zwischen der Effektivität der Distraktorinhibition und den Distraktorbewertungen spricht für die Annahme, dass Inhibitionsprozesse der selektiven Aufmerksamkeit Bewertungen negativ beeinflussen.

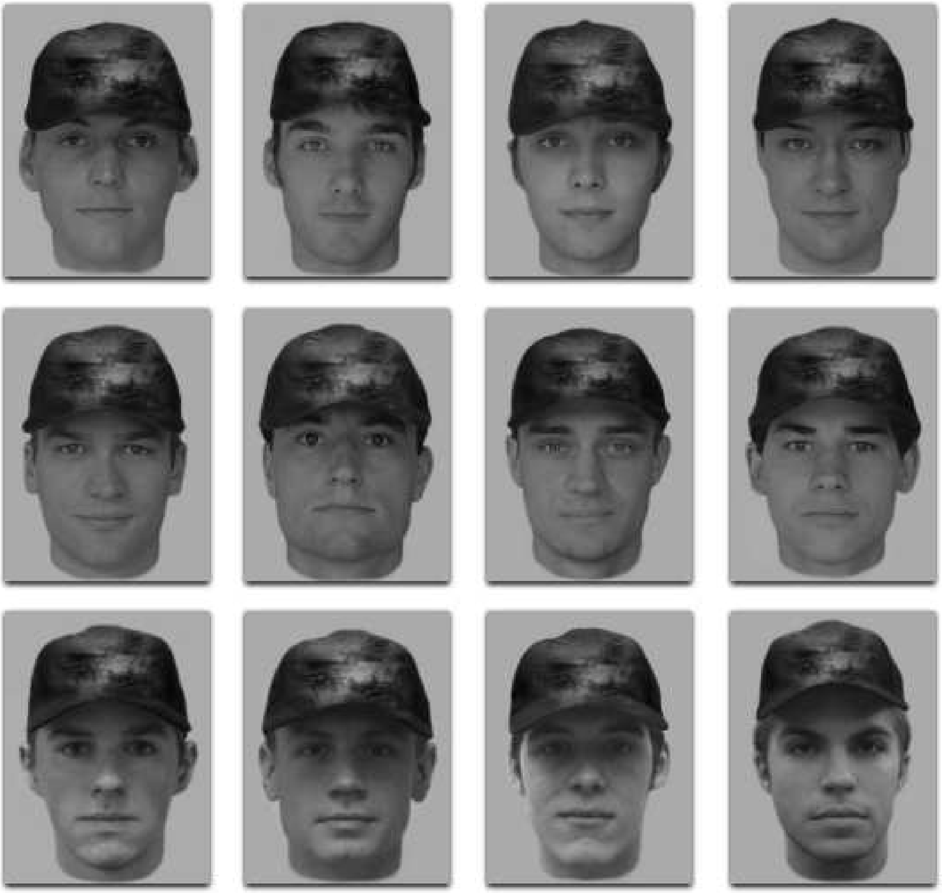
B Materials



Appendix B1: "Diagonal" faces presented in Experiment 1 and 2.



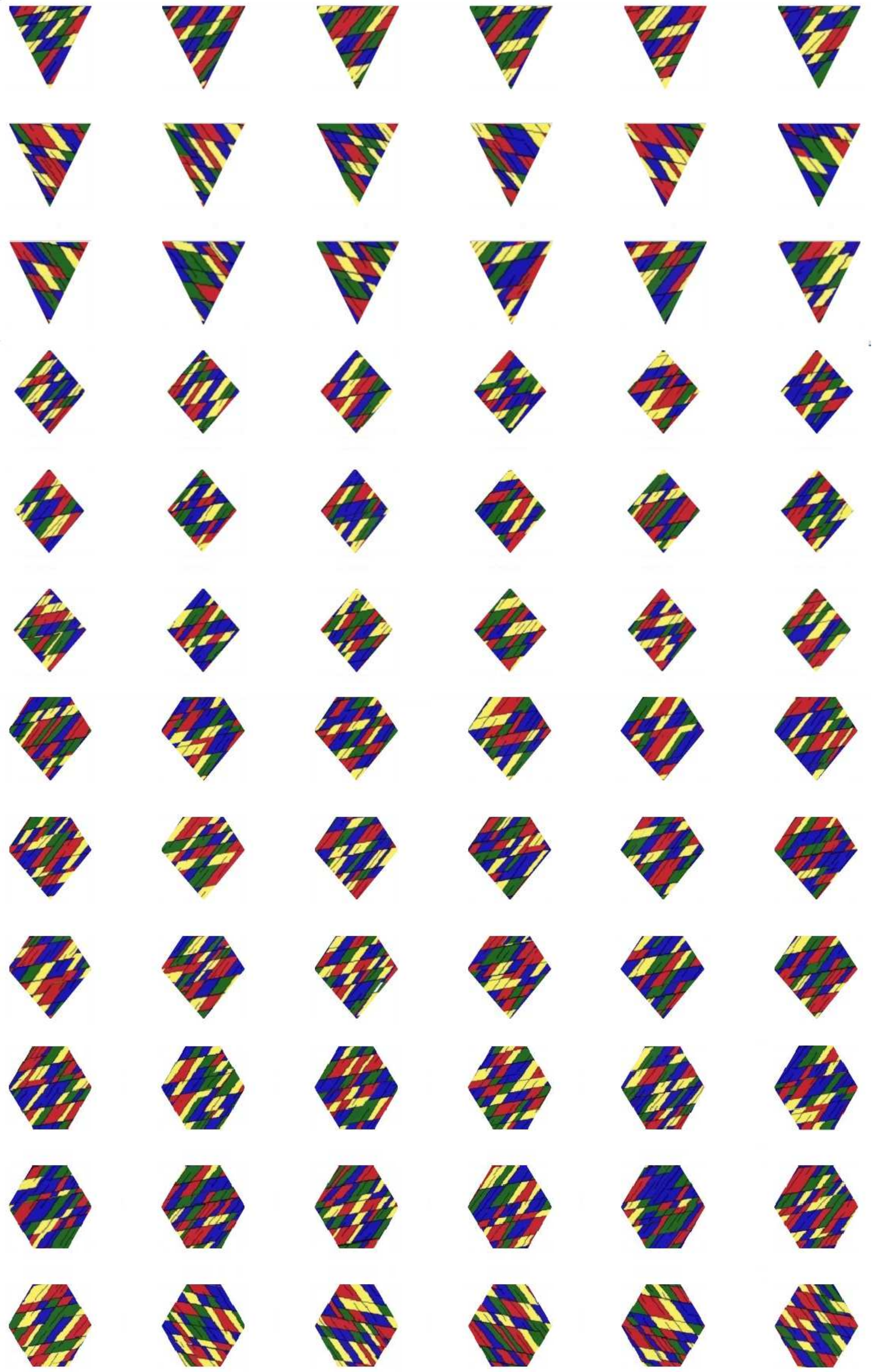
Appendix B2: “Horizontal” faces presented in Experiment 1 and 2.



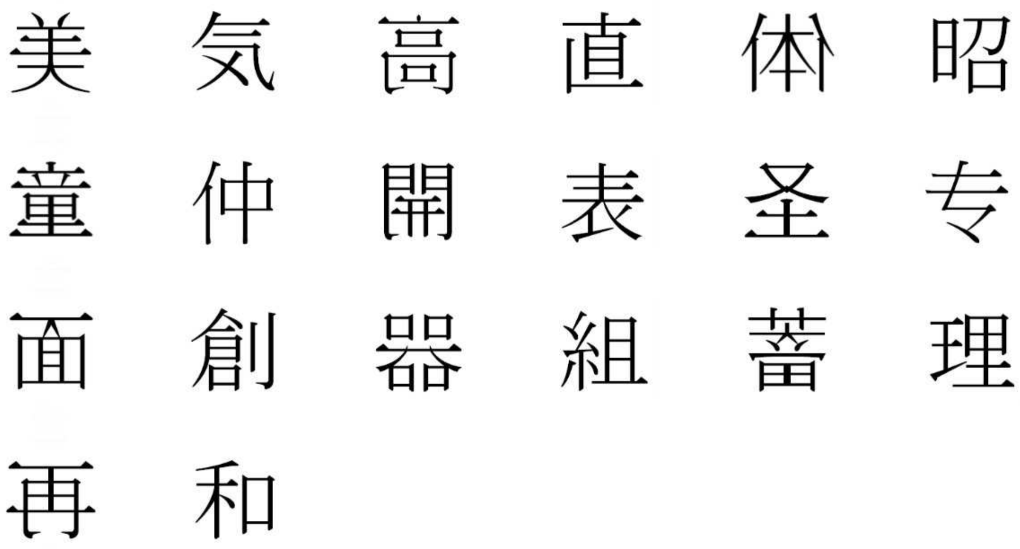
Appendix B3: “Undefined” faces presented in Experiment 1 and 2.

Appendix B4: Group identification questions used in Experiment 1 and 2.

1.) I am a prototypical member of the diagonal/horizontal group.
2.) In general, the fact that I am a member of the diagonal/horizontal group is part of how I see myself.
3.) I identify myself with the diagonal/horizontal group.



Appendix B5: 3-, 4-, 5-, and 6-sided abstract pictures presented in Experiment 3.



Appendix B6: Critical Chinese characters presented in Experiment 4.

Appendix B7: Noncritical Chinese characters presented in Experiment 4.

Appendix B8: Chinese characters presented in test trials of Experiment 4.