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Attentional mechanisms in the generation of sympathy

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Abstract

Empathic responses, such as sympathy towards others, are a key ingredient in the decision to provide help to those in need. The determinants of empathic responses are usually thought to be the vividness, similarity, and proximity of the victim. However, recent research highlights the role that attention plays in the generation of feelings. We expanded on this idea by investigating whether sympathy depends on cognitive mechanisms such as attention. In two studies we found that sympathy responses were lower and reaction times were longer when targets were presented with distractors. In addition, online sympathy judgments that allow attentional focusing on a target lead to greater affective responses than judgments made from memory. We conclude that attention is an ingredient in the generation of sympathy, and discuss implications for research on prosocial behaviour and the interaction between attention and emotions.

Keywords: emotions, attention, pro-social behavior.

1 Introduction

Witnessing the suffering of others often invokes emotional reactions in the observers. The link between empathic responses and willingness to provide help to others has been the subject of recent research on emotional responses and prosocial behaviour. Feelings such as empathy, sympathy, compassion, distress, pity, and even anticipated regret are typically involved in decisions to provide assistance or donate money to those in need (Batson, 1990; Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007; Dickert, 2008; Kogut & Ritov, 2005a, 2005b; Loewenstein & Small, 2007; Small, Loewenstein, & Slovic, 2007).

Given the prominent role of emotions in prosocial behaviour, research has begun to tackle the important question of what drives the generation of feelings relevant for helping others. Slovic (2007) suggests a model by which mental images and attention are two vital precursors for emotional reactions towards others in distress. Mental images can contain affective tags that serve as a signal for the selection of behavioural alternatives (Damasio, 1994; Peters & Slovic, 2000; Slovic, Finucane, Peters, & MacGregor, 2002). A direct consequence of this mechanism is that people are more likely to generate sympathetic responses when they are able to mentally imagine the victim. In fact, research on perspective taking (e.g., Batson et al., 2007; Davis, 1994) supports this notion and shows that more empathic concern is generated for victims that are similar to the perceiver (Loewenstein & Small, 2007). Additionally, we seem to "feel" more for individual victims than for groups of victims because mental images of single, identified victims are more vivid and concrete (Jenni & Loewenstein, 1997; Kogut & Ritov, 2005a; Slovic, 2007; Västfjäll, Peters, & Slovic, in preparation).

The predisposition to perceive groups of people as less unitary is closely connected to Gestalt theories of perception (Hamilton & Sherman, 1996), an association which highlights that perceptual processes are closely related to other, more complex impression formation processes (Glöckner & Betsch, 2008; Kahneman, 2003). The connection between Gestalt principles of perception and impression formation is of particular interest, as perceptual processes impose limitations on our ability to process large numbers of people in the same way that psychological processes may restrict our ability to feel compassion for large numbers of victims. Additionally, it shows that perceptual and attentional processes can influence affective reactions, as posited by Slovic (2007).

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1.1 The interaction between emotions and attention

Research on the interplay between emotions and attention has often highlighted the selective effects of emotions on people's attentional focus (e.g., Fox, 2002). Highly relevant affective stimuli are processed faster and hold attention longer than affectively neutral stimuli (Eastwood, Smilek, & Merikle, 2001). The apparent effects of emotional stimuli (such as threatening or fearful stimuli) on behavioural responses (e.g., orienting reaction times) prompted researchers to suggest neural networks that allow for attentional and emotional modulation of visual processes (Vuilleumier & Driver, 2007). Top-down modulation of emotionally significant stimuli on attentional tasks indicates that neural networks exist that allow for rapid communication between attentional and emotional neural systems (Bush, Luu, & Posner, 2000). Whereas emotions can direct attention to affectively salient objects (Ochsner & Phelps, 2007; Vuilleumier, Armony, Driver, & Dolan, 2003; Vuilleumier, 2005), attention can influence emotional reactions by inhibiting as well as enhancing and generating emotional reactions to stimuli (Fenske & Raymond, 2006). The ability to shift attention helps in regulating one's own negative emotional state (Gross, 2002; Posner & Rothbart, 2007; Rueda, Posner, & Rothbart, 2005), while focal (spatial) attention facilitates subsequent and more elaborate emotional processing and can have a profound effect on the generation of emotions (Holmes, Vuilleumier, & Eimer, 2003).

The effects of attention on the generation of emotions were demonstrated in a series of insightful experiments that highlight the emotional inhibitory consequences of attending to specific locations in one's visual field (Fenske et al., 2005; Fenske, Raymond, & Kunar, 2004; Raymond, Fenske, & Tavassoli, 2003). These authors consistently show that not attending to distractor stimuli devalues these on affective as well as other dimensions, a phenomenon that they term the attentional inhibition hypothesis (Fenske & Raymond, 2006). For example, smiling and neutral distractor faces were seen as less trustworthy than attended target faces, and abstract Mondrian stimuli were evaluated as less cheerful when unattended.

In this article, we expand on the attentional inhibition hypothesis by examining the facilitating effects that attention has on the generation of sympathy. Groups and individuals are processed differently on cognitive (Ariely, 2001; Hamilton & Sherman, 1996) and emotional dimensions; affective reactions towards single identified victims are often more intense compared to groups of victims (Slovic, 2007). A peculiar and inherent property of a group of individuals is that attention to any single individual can be decreased by the presence of the other victims. If attentional focus is indeed facilitating the generation of empathic emotions for individual victims, then other members of a group can assume a distracting role for single individual members. Sympathy for individual victims would then be dependent on the constraints that the distraction places on the ability to attend to each individual.

In two experiments, we used a paradigm that placed participants in a position to react empathically to victims in need of help and manipulated their ability to visually attend to a single target victim. It was expected that distracting attention away from individual targets decreases emotional responses. We hypothesized that visual distractors, in the form of other victims, negatively influence the attention needed to generate sympathy towards a target victim, and that sympathy judgments are higher for a single target victim presented alone vs. with distractor victims. Additionally, we were interested in whether these emotional reactions are different when targets were evaluated online (i.e., while visually focusing on a picture of the target) vs. when these evaluations were made from memory. Hastie and Park (1986) propose that judgments from memory are more effortful than spontaneous online judgments, and that attending to a target is easer when judged online vs. from memory. Affective reactions are thought to be stronger when mental representations are attended to and more vivid (Pham, 2007; Slovic et al., 2002). Judgments based on memory retrieval, on the other hand, can lead to less vivid impression formation (e.g., Reyna & Brainerd, 1995) and subsequently to weaker emotional responses.

2 Experiment 1

2.1 Method

Participants. Fifty-eight participants (79% female) with an average age of $M = 21.9$ ($SD = 4.5$) at the University of Oregon completed Experiment 1. All participants had normal or corrected-to-normal vision.

Design and materials. Online vs. memory judgments and presence vs. absence of distractors were manipulated in a fully factorial 2x2 within-subjects design. Participants rated their sympathy for victims identified by a spatial cue that appeared either before or after a target picture. Online judgments were realized by a spatial cue presented before the target picture, while memory judgments featured a cue that appeared after the presentation of the target picture. Thus, in the online judgment condition, participants were able to focus on the specific location where the target picture would appear and make an online sympathy judgment while attending to the picture. In the memory condition, the spatial cue appeared after

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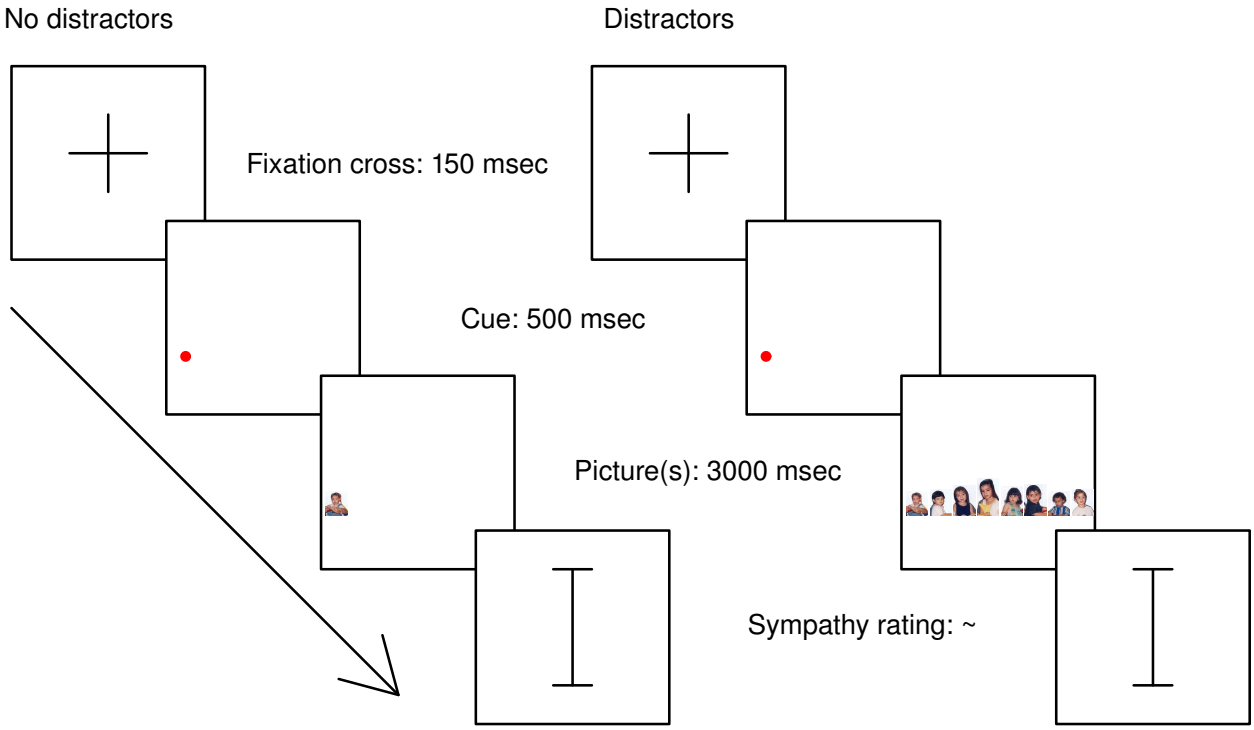

Figure 1: Design schematic (online judgment pair).

the presentation of the target picture, and sympathy judgments were based on a memory representation. Target pictures were either flanked by seven distractor victims or presented alone. The primary dependent variable was sympathy ratings for the target picture. Reaction times for these sympathy ratings were also recorded.

The target and distractor pictures were part of the same set of eight pictures (four female children and four male children, taken from Kogut & Ritov, 2005a,b). Participants saw each picture an equal number of times in the four conditions. In each condition the eight possible pictures served as the target victim twice, resulting in 64 experimental trials.

Apparatus and procedure. Participants were seated 65cm in front of a 17" computer screen (resolution = 1024 x 768) and were informed that they would see pictures of children in need of a financial contribution due to a life-threatening disease. Participants were further told that the child that elicited the highest average sympathy would receive a donation from the experimenters on behalf of the participants. Each trial started with a fixation cross presented for 150ms at the center of the screen, as shown in Figure 1. In the online judgment conditions, a red dot cue (size = .5°) appeared at one of eight possible locations (on a horizontal line) at the exact spatial location where the target picture (size = 4.5°) would appear later. Dot cues were shown for 500ms, pictures for 3000ms, and between dots and pictures a 150ms blank screen was interleaved. After seeing the target picture, participants rated how much sympathy they felt on a vertical sliding scale (300 pixels = 8.7° anchored by 0="No sympathy at all" to 300="Very much sympathy") with a vertically movable cursor corresponding to movements of the mouse. The memory judgment condition was identical to the online judgment condition, except that pictures were presented before the cues, such that participants first saw one (or eight) pictures, but could identify the target only after the pictures disappeared and the spatial cue was presented. The order of pictures presented was determined with a Latin-square to ensure that any effect of picture order on sympathy would be counterbalanced.

2.2 Results

Sympathy judgment. Sympathy ratings were averaged across pictures for each condition. The results, depicted in Figure 2, suggest that, regardless of whether judgments were made online or from memory, target victims received higher sympathy ratings when they were presented without distractor victims. Sympathy ratings were lowest when the target victim was presented with distractors and judgments were made from memory.

A repeated-measures analysis of variance (ANOVA) with judgment mode and presence of distractors as within-subject factors revealed a significant main effect for judgment mode, such that sympathy ratings were sig-

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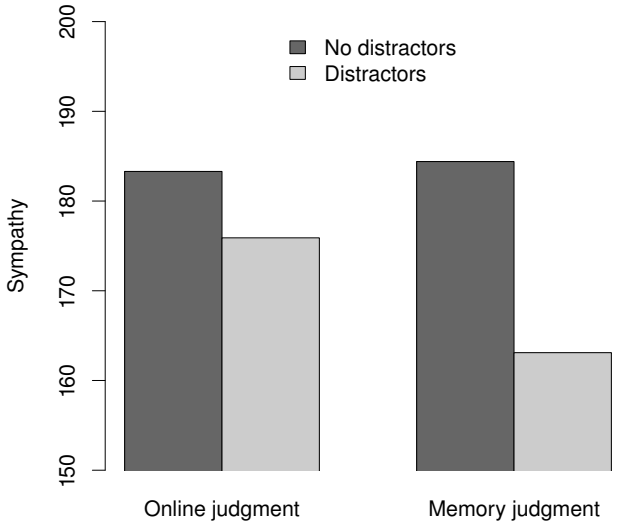

Figure 2: Mean sympathy ratings for Experiment 1.

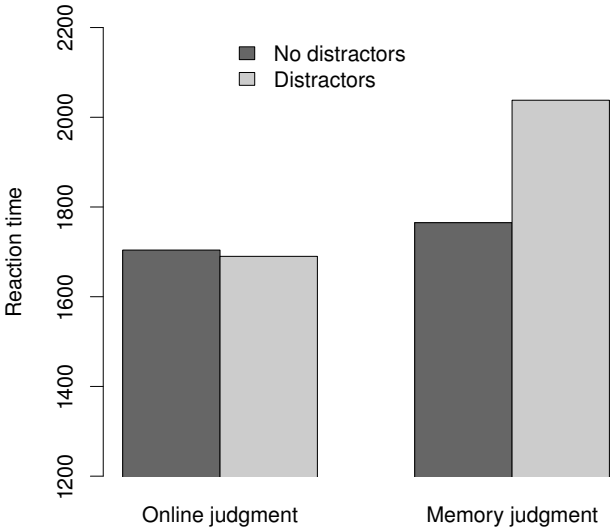

Figure 3: Mean reaction times for Experiment 1.

nificantly higher when made online (M=179.6, SD=70.8) vs. from memory (M=173.7; SD=72.5), $F(1,57)$=4.8, $p < .05$, η_p^2=.08. Participants also gave higher sympathy ratings when target pictures were presented without distractors (M=183.4, SD=70.1) vs. with distractors, (M=169.5; SD=73.2), $F(1,57)$=10.7, $p < .01$, η_p^2=.16. Furthermore, a significant interaction between judgment mode and presence of distractors emerged from the data, $F(1,57)$=10.8, $p < .01$, η_p^2=.16. To further elucidate this interaction, simple contrasts were conducted and revealed that, for memory judgments, targets without distractors (M = 184.4; SD = 70.1) received significantly higher sympathy ratings compared to targets with distractors (M = 163.1; SD = 75.0), $t(57)$=3.8, $p < .01$, *Cohen's d*=0.51. This difference was still marginally significant for online judgments, with participants expressing higher sympathy for targets without distractors (M = 183.3; SD = 70.2) vs. with distractors present (M = 175.8; SD = 71.2), $t(57)$=1.8, $p < .08$, *Cohen's d* = 0.24.

It is possible that the observed decrease of sympathy judgments in the memory condition with distractors was due to participants not being able to remember which target picture they were rating and making an average judgment instead. If this was indeed the case, we would expect lower variance in sympathy responses especially in the memory judgment condition when distractors were presented. However, we found no evidence for decreased variance in this condition relative to the other conditions. In fact, F-tests revealed that variances were similar in all four conditions, Fs<1.1, ps>.31. To further exclude the possibility that participants were making average judgments in the memory condition, we also examined whether significant differences in sympathy judgments existed for the individual pictures. If participants did not recall which picture to judge, we would expect that their responses differ systematically compared to the online condition. A 2 judgment condition (online vs. memory) x 8 picture, repeated-measures ANOVA with sympathy ratings as the dependent variable revealed that some pictures evoked more sympathy than others, $F(7,399) = 56.4$, $p < .001$, η^2=.50. However these ratings did not interact with the judgment condition, $F(7,399) = 1.7$, $p = .10$, η^2=.03, showing no evidence that the differences in ratings of the individual pictures were dependent on the judgment condition.

Reaction time analysis. A similar 2x2 repeated-measures ANOVA was conducted on participants' average reaction times for each condition. Results show that memory judgments took longer than online judgments, $F(1,57)$=9.8, $p < .01$, η_p^2=.15, and participants' reaction time was slower when distractors were present, $F(1,57)$=23.4, $p < .001$, η_p^2=.29. Additionally the interaction between these two factors was also significant, $F(1,57)$=15.7, $p < .001$, η_p^2=.22. As can be seen in Figure 3, reaction times were longer for memory judgments when distractors were present. In this condition, participants had to first recall which of the previously seen pictures corresponded to the cue before indicating their sympathy rating. Given that the reaction times are similar in the other conditions, it is possible that the difficulty and compound effects of memory retrieval and distractors are responsible for the longer reaction times.

We further investigated whether participants' sympathy judgments correlated with reaction times. Although faster reactions times were generally accompanied by higher sympathy ratings in each of the four conditions (rs ranged from $-.24$ to $-.01$), the correlation approached conventional significance levels only in the

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online judgment/no-distractor condition, $r(57) = -.24$, $p<.08$. However, across all observations, the correlation between sympathy ratings and reaction times was statistically significant, $r(230) = -.13$, $p = .037$.

2.3 Discussion

Experiment 1 was designed to investigate the role of attention in the generation of sympathy. Results supported the hypothesis that a single target victim evokes more sympathy when presented alone vs. flanked by distractor victims, which is in line with findings that emotional responses decrease as the number of victims increase (Slovic, 2007). This effect was present when judgments were made online as well as from memory, however it was especially pronounced when affective judgments were made based on memory. It seems likely that online processing enabled more vivid images and, in turn, stronger empathic responses than memory processing, an explanation that dovetails nicely with research on person perception (Hamilton & Sherman, 1996) and affect (e.g., Slovic, et al., 2002; Loewenstein, Weber, Hsee, & Welch, 2001).

A possible alternative explanation of the results in Experiment 1 is that participants gave lower sympathy ratings in the memory judgment/distractor condition simply because they were unable to clearly identify which target they were supposed to rate. However, similar results (albeit less pronounced) were obtained for the online judgment condition, which cannot be explained by an account that focuses solely on unsuccessful retrieval of the target picture. Moreover, if participants were unable to identify the individual pictures in the memory judgment/distractor condition and instead gave average ratings, we would expect little difference in how the individual pictures were rated in this condition. This was not the case, and differences in sympathy ratings for individual pictures did not depend on the judgment condition. Nonetheless, we addressed this concern directly in Experiment 2 to clarify the role that correct identification plays in empathic responses.

3 Experiment 2

Experiment 2 sought to replicate the general findings in Experiment 1 and rule out the possibility that lower sympathy ratings were mainly a product of unsuccessful retrieval of the target picture. The number of distractors was reduced and the viewing time for the pictures was extended to facilitate better encoding. We also added a manipulation check to verify that participants could indeed identify the target retrospectively. Moreover, we were in a position to replicate the basic findings in a different setting to test whether the effects of attention on the generation of empathic feelings generalize to a different culture.

3.1 Method

Participants. Forty-eight participants (53% female) from the University of Bonn, Germany, and community members with an average age of 25.7 (SD = 7.4) took part in this study and were paid an average of 12€ as compensation for their time in a test battery that included other experiments unrelated to this study.

Design and materials. The design and materials were similar to those used in Experiment 1. Participants saw a total of 64 experimental trials, in which they rated their sympathy for one of eight possible children suffering from an unspecified disease. The two variables of interest (judgment mode and presence of distractors) were manipulated in the same fashion as in Experiment 1. However, unlike Experiment 1, here we reduced the number of distractor pictures to three and used a block-design where trials were blocked by judgment mode. Half of the participants made online judgments for the first 32 trials and memory judgments for the second 32 trials, and this order was reversed for the other half. Within each block, target pictures were presented randomly with and without distractors. The target and distractor pictures could appear in four locations: above, below, right, or left at an equal distance from a central fixation cross. As in Experiment 1, the distractor variable was crossed with judgment mode. On half of the trials a spatial cue appeared before the picture(s), and followed the pictures on the other half of the trials. The spatial cue was presented for 500ms and the pictures for 4000ms. At the end of each trial, participants rated their respective sympathy level of the target picture with a sliding scale (500 pixels = 13.8°, anchored by 0="No sympathy at all" to 500="Very much sympathy").

After completion of the 64 experimental trials, 24 manipulation check trials were added in which participants had to correctly identify a target picture. The correct identification of the target picture was a concern only for trials in the memory condition with distractors. Thus, the manipulation check trials had a similar structure as the memory judgment condition: In each of these trials, four pictures were presented after the fixation cross, followed by a cue. Participants were then asked to judge whether a test picture corresponded to the target picture identified by the cue. Three types of manipulation check trials were used, each presented a total of eight times: The test picture was (1) identical to the target picture, (2) not identical to the target picture but part of the picture set used in the study, and (3) not identical to the target picture and belonged to a completely different set of pictures not used in the 64 experimental trials.

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3.2 Results

Manipulation check. Overall, every participant answered more than 87% of the manipulation check trials correctly, and none performed below 75% in any of the three manipulation check trial types. We took this as evidence that participants were quite able to correctly identify the target picture and base their sympathy judgment on the correct mental representation when target pictures were presented with distractors in the memory condition.

Sympathy judgments. A preliminary analysis confirmed that no significant difference existed between the orders in which the blocked online and memory judgments were made, which justified simplifying further analyses to a 2 (online vs. memory judgment) x 2 (distractors vs. no distractors) within-subjects design. An ANOVA with judgment mode and presence of distractors revealed a significant main effect for distractors, $F(1,47) = 4.19$, $p < .05$, $\eta_p^2 = .08$. Participants gave higher sympathy judgments when pictures were presented without distractors ($M = 230.5$, $SD = 69.4$) than when distractors were present ($M = 218.8$, $SD = 90.6$). The main effect for judgment mode was not significant, $F(1,47) = 1.01$, $p = .32$, $\eta_p^2 = .02$, however the mean difference was in the predicted direction such that participants gave higher sympathy judgments when making their judgment online ($M = 227.3$, $SD = 86.6$) vs. from memory ($M = 222.0$, $SD = 73.8$). Finally, although the interaction between judgment mode and presence of distractors was not significant, $F(1,47) < 1$, $p = .72$, $\eta_p^2 = .01$, simple contrasts revealed that participants gave significantly higher sympathy judgments without distractors ($M = 228.5$, $SD = 71.0$) vs. with distractors ($M = 215.5$, $SD = 76.5$) only in the memory judgment condition, $t(47) = 4.06$, $p < .001$, *Cohen's d* = 0.59. This effect was also present but not significant when participants made online judgments ($M = 222.1$, $SD = 105.3$ and $M = 232.4$, $SD = 67.8$ for with and without distractors, respectively), $t(47) = 1.13$, $p = .26$, *Cohen's d* = 0.16. See Figure 4 for details.

As in Experiment 1, we tested whether the decrease in sympathy judgments in the memory condition with distractors was based on participants' not being able to identify the target picture retrospectively and instead making an average judgment. A 2 judgment condition (online vs. memory) x 8 picture repeated-measures ANOVA indicated that although sympathy ratings differed for the pictures, $F(7,329) = 13.5$, $p < .001$, $\eta^2 = .22$, this did not depend on whether pictures were seen in the memory or online judgment condition as indicated by a non-significant interaction, $F(7,329) = 0.4$, $p = .87$, $\eta^2 = .01$.

Reaction time results. A similar 2 x 2 factorial ANOVA for reaction times showed a significant main effect for judgment mode, $F(1,47) = 26.52$, $p < .001$, $\eta_p^2 = .36$, and presence of distractors, $F(1,47) = 10.75$, $p = .01$, $\eta_p^2 = .19$. As expected, sympathy judgments were faster when made online than when made from memory. Additionally, sympathy judgments were faster when targets were presented without distractors. Apart from the main effects, the interaction between judgment mode and distractors was also significant, $F(1,47) = 11.37$, $p = .01$, $\eta_p^2 = .20$. Figure 5 illustrates that judgments were generally slower when distractors were present, but that this effect was particularly present when judgments were made online, $t(47) = 5.5$, $p < .001$, *Cohen's d* = 0.79. In the memory condition, the effect of distractors on participants' reaction times was minimal, $t(47) = .1$, $p = .93$, *Cohen's d* = 0.01. Unlike in Experiment 1, we did not find that reaction times correlated with sympathy ratings, (rs ranged from .14 to -.02), ps $> .35$.

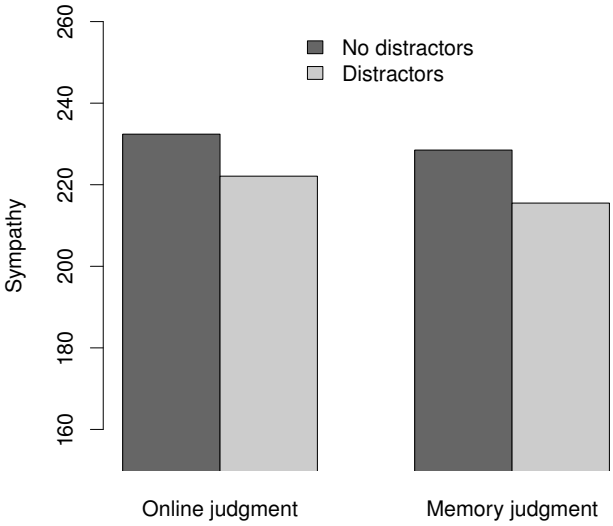

Figure 4: Mean sympathy ratings for Experiment 2.

3.3 Discussion

Experiment 2 was designed to replicate and extend the finding that presenting distractors reduces emotional responses to individual targets while controlling whether participants could successfully recall the target picture in the memory condition. As predicted, participants gave lower sympathy ratings towards individual victims when distractor victims were presented simultaneously. Additionally, in Experiment 2 sympathy judgments from memory were lower than online judgments, as was expected, albeit not significantly so.[1] It is of note that reduc-

[1] In order to increase power, we reanalyzed our sympathy data combining both experiments. The results showed that participants gave higher sympathy ratings when target pictures were shown without distractors ($M = 205$, $SD = 73.1$) compared to when they were presented with distractors ($M = 191.8$, $SD = 85.5$), $F(1,105) = 14.0$, $p < .001$, $\eta^2 = .12$. Sympathy ratings were also higher when participants made their judgments online ($M = 201.2$, $SD = 82.4$) vs. from memory ($M =$

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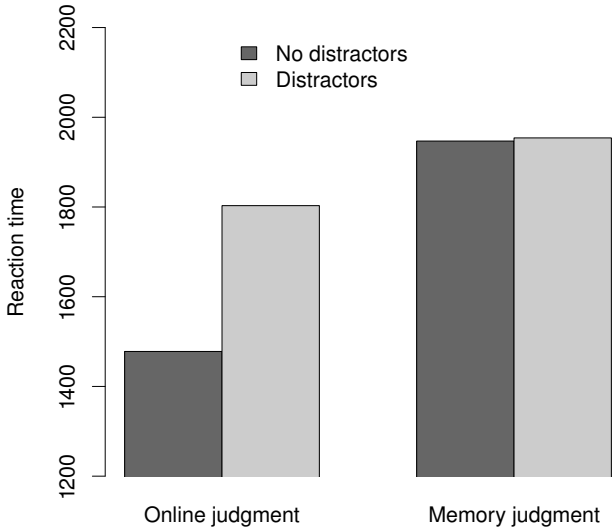

Figure 5: Mean reaction times for Experiment 2.

ing the number of distractors from seven to three across experiments did not eliminate the effect of distractors on sympathy judgments. However, compared to Experiment 1, participants in Experiment 2 gave lower sympathy ratings in general.

Reaction times in Experiment 2 were slightly different compared to Experiment 1. Memory judgments took longer than online judgments in both Experiments, but the effect of distractors was most prominent in the memory condition in Experiment 1, whereas in Experiment 2 the effects of distractors was most visible in the online condition. It would be expected that seven distractors are more attention diverting than three, resulting in slower judgments in the memory condition in Experiment 1 compared to Experiment 2. However, it is unclear why participants were faster in the online judgment/no-distractor condition compared to the distractor condition in Experiment 2 and could be due to the change in distance between distractors and target. Additionally, it is possible that having fewer distractors leads to a slower, more comparative process underlying the sympathy judgment of the target. Hyde and Spelke (2009) show that a fundamental difference exists in how small and large numbers are processed, and that adults treat small numbers (i.e., 1–3) as separate objects that are individually compared.

195.6, SD = 77.0), $F(1,105) = 4.1$, $p < .05$, η^2=.04. The interaction between presence of distractors and judgment mode was also significant, $F(1,105) = 4.6$, $p < .001$, η^2=.04. Of note is that sympathy judgments were higher for targets shown without distractors in both the online and memory condition, $t(105) = 1.86$, $p = .065$ and $t(105) = 5.2$, $p < .01$, respectively.

4 General discussion

Two experiments were conducted to test the hypothesis that distractors and judgment mode influence the generation of emotions. Specifically, these studies were designed to test whether attention is a precursor for empathic feelings, as proposed by Slovic (2007). Across both experiments, sympathy for others was lower when distractor victims were present. Additionally, we found evidence that sympathy judgments were higher when made online vs. from memory. Both of these results indicate that attention to a target can intensify an emotional response. Reaction time results further show that judgments from memory take longer, which is indicative of a more difficult retrieval process compared to online judgments. We found partial evidence that longer reaction times coincide with lower sympathy ratings indicating that sympathy judgments may be sensitive to the timing of the emotional response. Greater temporal distance between encountering and emotionally reacting to a victim might be related to and contribute to other determinants of sympathy, such as vividness and newness (Loewenstein & Small, 2007). Our findings also suggest that empathic concern for others and the often observed reduction in empathy for multiple victims is, at least partly, a result of divided attention. This result contributes to recent advances made in the exploration of how attentional mechanisms influence social-emotional evaluations, and extends research by Fenske and colleagues (e.g., Fenske & Raymond, 2006), who examined the inhibitory effects of attention on judgments of trustworthiness of faces (Fenske et al., 2005; Raymond, Fenske, & Westoby, 2005) and cheerfulness (Fenske, Raymond, & Kunar, 2004).

Our results are best viewed from the perspective that the effects of attention are not unilateral, and can inhibit as well as facilitate emotional reactions. Thus, we suggest that sympathy is not generated to a similar degree when target victims are flanked by distractor victims due to attentional constraints of the perceptual system (e.g., Posner & Raichle, 1994). Furthermore, our results also shed new light on the identified-victim and singularity effects reported in research on prosocial behaviour (e.g., Kogut & Ritov, 2005a,b; Small, Loewenstein, & Slovic, 2007) by suggesting that a precursor to affective reactions is attentional focus.

In our studies we used pictures of other victims as distractors to target victims. It is possible that the observed attention effects on sympathy ratings are not limited to the use of other victims as distractors and could be visible with other classes of stimuli. However, evidence exists that human faces tend to be processed differently and are more attention grabbing than other, non-face stimuli (Downing, Chan, Peelen, Dodds, & Kanwisher, 2006;

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Lavie, Ro, & Russell, 2003; Ro, Russell, & Lavie, 2001; Theeuwes & Van der Stigchel, 2006). In fact, Ro et al. demonstrate that faces are preferentially attended to in comparison to other common objects, and Theeuwes and Van der Stigchel argue that the discrimination of human faces from other objects is based on pre-attentive and unconscious processing, which automatically draws focal attention to the faces.

4.1 Alternative accounts and limitations

Alternative accounts for how perceptual experience translates into affective evaluations (such as the mere-exposure effect and perceptual fluency) could potentially explain our results. However, the fact that participants saw each victim an equal amount of times makes explanations based on theories that capitalize on the mere exposure effect less likely (Murphy & Zajonc, 1993; Zajonc, 1968). The result that individual victims received higher sympathy ratings when presented alone seems to be better explained by the influence that distractors have on participants' attention to the individual target when other victims were present. Research on perceptual fluency (e.g., Winkielman, Schwarz, Fazendeiro, & Reber, 2003) posits that easier cognitive processing elicits differential emotional reactions. Recall that sympathy judgments were lowest in the distractor/memory condition, which is also cognitively most demanding. However, the effect of distractors was also present in the cognitively less demanding online judgment condition. Furthermore, the perceptual fluency account suggests that ease of processing results in distinctly positive affect. However, empathic concern is usually classified as an arousal state with distinctly negative valence that motivates prosocial behaviour in order to reduce this negative feeling (Batson, 1990).

A possible limitation in our design was that we did not collect sympathy judgments for distractors, which would have allowed us to directly compare whether attended targets receive more sympathy than unattended distractors. Additionally, because we were interested in the connection between perceptual systems and emotions we specifically investigated the role of focal visual attention, which does not allow definite conclusions for other forms of attention (Posner & Rothbart, 2007).

4.2 Implications and future research

Our results point to exciting relationships between attentional and affective systems, which are of importance in understanding the generation of feelings and its consequences for behavior. Presenting a group of people in need of help can increase the difficulty of attending to any single individual, leading to lower sympathy. Consequently, in order to elicit more empathic concern and possibly a higher willingness to help others, it might be better to use presentation formats that take advantage of attentional processes (e.g., single presentation). While we have used a research task specific to prosocial behavior, the attentional mechanisms discussed in the current paper are important for other tasks that capitalize on the relationship between emotions and decision making (such as the endowment effect). Future research should address the extent to which attention is a precursor to affective reactions related to the construction of preferences and valuations.

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