Published in final edited form as:
Emotion. 2008 February ; 8(1): 121–126.

Looking Happy: The Experimental Manipulation of a Positive Visual Attention Bias

Heather A. Wadlinger and **Derek M. Isaacowitz**
Brandeis University

Abstract

Individuals with a positive visual attention bias may use their gaze to regulate their emotions while under stress. The current study experimentally trained differential biases in participants' (*N* = 55) attention toward positive or neutral information. In each training trial, one positive and one neutral word were presented and then a visual target appeared consistently in the location of the positive or neutral words. Participants were instructed to make a simple perceptual discrimination response to the target. Immediately before and after attentional training, participants were exposed to a stress task consisting of viewing a series of extremely negative images while having their eyes tracked. Visual fixation time to negative images, assessed with an eye tracker, served as an indicator of using gaze to successfully regulate emotion. Those participants experimentally trained to selectively attend to affectively positive information looked significantly less at the negative images in the visual stress task following the attentional training, thus demonstrating a learned aversion to negative stimuli. Participants trained toward neutral information did not show this biased gaze pattern.

Keywords

positive emotions; selective attention; eye tracking; emotion regulation

Negative emotions such as anxiety and depression produce attentional biases toward negative information (B. P. Bradley, Mogg, & Lee, 1997; Matthews & MacLeod, 2002) and narrow individuals' attentional focus (Mogg et al., 2000). Individuals with high levels of anxiety or depression have been found to exhibit attentional biases that favor emotionally negative information in studies using eye tracking (Eizenman et al., 2003; Mogg, Millar, & Bradley, 2002).

MacLeod, Rutherford, Campbell, Ebsworthy, and Holker (2002) have demonstrated a causal link between selective attention to negative stimuli and increased emotional vulnerability to subsequent negative stimuli. Individuals were asked to attempt to solve unsolvable anagram puzzles under timed conditions with failure feedback while being videotaped. Next, participants were presented with hundreds of consecutive word pairs consisting of one negative word and one neutral word. This acted as training to allocate their attention toward a certain affective word category, as a visual target consistently appeared behind either the neutral or negative word for the majority of the trials. Finally, participants completed another group of unsolvable puzzles under the same conditions as the first set to determine whether their levels of emotional vulnerability had changed as an effect of the attention training. Emotional vulnerability was assessed as an elevation in negative mood state (higher mean anxiety and depression scores) in response to the stress task. Individuals in the train-negative condition

Correspondence concerning this article should be addressed to Derek M. Isaacowitz, Department of Psychology, Brandeis University, MS 062, Waltham, MA 02454-9110. E-mail: dmi@brandeis.edu.
Heather A. Wadlinger and Derek M. Isaacowitz, Department of Psychology, Brandeis University.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

demonstrated greater emotional vulnerability at posttest than did those in the train-neutral condition.

Positive Emotion, Cognition, and Attentional Broadening

Because selective attention to negative stimuli may inhibit individuals' abilities to regulate their mood, it is important to explore whether patterns of attention toward positive stimuli can promote mood regulation. Even moderate fluctuations in positive emotions may influence cognitive processes by producing patterns of thought that are more adaptable, creative, receptive, and integrative (Isen, 1999). Individuals experiencing positive emotions have shown selective attentional patterns toward positive images and away from negative images. Isaacowitz (2005) demonstrated that young optimists, assessed by the Life Orientation Test (LOT; Scheier & Carver, 1985), showed selective inattention to negative emotional images of melanoma in an eye-tracking study, looking more at the neutral skin content around the melanomas rather than directly at them.

In addition to pulling attention away from negative stimuli, positive emotions have been shown to broaden individuals' attention (Fredrickson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000). Broadening is synonymous with the experience of positive stimuli enlarging an individual's breadth of attention (Fenske & Eastwood, 2003). Fredrickson's broaden-and-build theory posits that positive emotions expand attention, thinking, and behavior while subduing the automated arousal responses of the nervous system caused by negative emotion (Tugade, Fredrickson, & Barrett, 2004). Wadlinger and Isaacowitz (2006) found that individuals experiencing a positive mood broaden their attention only toward positive peripheral images. This led us to expect that individuals could be trained to allocate their attention toward positive stimuli and that this trained attention pattern would promote emotional regulation, directing individuals to look less at subsequent negative stimuli.

When faced with negative information, individuals differ in their ability to regulate their emotions. One mechanism through which individuals may regulate their emotion is by selectively attending to certain affective stimuli (Gross, 1998). Gaze away from negative images may help individuals perpetuate positive moods; moreover, groups that have been shown to possess positive affective profiles (e.g., optimists, older adults) have also been found to avert their view from negative stimuli (see, e.g., Isaacowitz, 2005; Isaacowitz, Wadlinger, Goren, & Wilson, 2006a, 2006b). In another study, young adults who were explicitly instructed to regulate their emotions while viewing emotional stimuli looked less at the negative images (Xing & Isaacowitz, 2006), further suggesting links between selective attention and emotion regulation. Thus, gaze patterns away from negative images appear to serve as a convenient marker indicating successful emotion regulation; gaze patterns trained toward positive information may also facilitate regulation.

Attentional Training and the Current Study

Although attentional training methodologies have not yet been tested for positive emotions, attentional biases appear to be plastic, able to be trained and untrained, for negative emotions (Derryberry & Reed, 2002; Foa & McNally, 1986; MacLeod et al., 2002; Monk et al., 2004). To most directly test whether trained attentional biases influence later emotional processing, an online measure of visual attention such as eye tracking is particularly useful (see also Isaacowitz, 2006b).

The current study, therefore, sought to assess whether positive attention training could lead young adults to show later gaze patterns that have been linked with successful emotion regulation, thus demonstrating a potential causal link between attentional training of gaze and emotional regulation. Our methodology was based on MacLeod et al. (2002): A stress task is administered, followed by an attentional training phase, and ending with a final stress task. The stress tasks consisted of showing participants images of high negative valence; thus, we directly measured gaze toward unpleasant, stressful images as a proxy for emotion regulation. Attentional bias in both of these stress tasks was measured by the percentage of gaze fixation to the negative portions of the images. The visual stress task did not serve as a direct measure of affect itself but rather as an indicator of gaze working in the service of successful emotion regulation (Isaacowitz, 2005; Isaacowitz et al., 2006b, Xing & Isaacowitz, 2006). Participants were trained to orient their attention toward affective information by responding to a visual target that appeared consistently behind words of positive or neutral valence. After attention training, participants in the train-positive group were expected to show patterns of selective attention away from the negative images when confronted with the second visual stressor versus their pretraining baseline fixation score compared with the train-neutral group.

Method

Participants

Fifty-five undergraduate students (35 women, 20 men) ranging in age from 18 to 23 years ($M = 18.72$, $SD = 1.12$) served as participants. The data from 8 participants were excluded because of obfuscation of the pupil, reflective eyewear, or epiphora (excessive eye moisture; $n = 6$) and because of missing data in an eye-tracking session ($n = 2$). The remaining 47 participants, who were successfully eye tracked, were randomly assigned to an attentional training condition (22 trackable train neutral; 25 trackable train positive).

Procedure

After giving informed consent, all participants took a Snellen visual acuity test; all had adequate acuity. Next, participants were asked to complete a 17-point eye-tracking calibration procedure. Participants were subsequently informed that they would see a presentation of negative images on the computer screen and were instructed to view the images as they would “naturally as if at home while watching TV.”

After completion of the first visual stressor task, participants completed the attention training procedure. Each attention trial started with a crosshair fixation cue centered on the computer screen for 500 ms followed by a word pair for 500 ms, one word appearing just above the crosshair and one below (following MacLeod et al., 2002). The position of the positive versus neutral word was randomized. Next, a small target, with equal probability of being a single pixel or pair of adjacent pixels, appeared in either the upper or lower location of one of the words previously presented on the screen. The participants’ task was to discriminate the target’s identity as accurately and quickly as possible by pressing a key accordingly. As soon as the computer detected an input response, the target was cleared and the next trial resumed in 500 ms. The train-positive group was exposed to the training condition designed to induce selective attention toward positive information, with 94.39% of the targets behind positive words. The train-neutral group was exposed to the training condition designed to induce selective attention toward neutral information, with 94.39% of the targets behind neutral words.

Finally, participants were instructed that they would see a final presentation of negative emotional images while having their eyes tracked, with identical viewing instructions as the first presentation. After this task, participants were debriefed.

Materials and Apparatus

Eye tracker—An ASL Model 504 eye-tracking system (Applied Science Labs, Bedford, MA) was used to measure gaze fixations within one visual degree of angle on a location on a computer monitor for 100 ms or more within predetermined area-of-interest (AOI) locations.

The eye tracker records the duration and location of the participant's left eye 60 times/s, allowing total viewing time within an AOI to be calculated. Eye-tracking data were recorded using Eyenal software (Eye Respone Technologies, Charlottesville, VA) as percentage gaze fixation times, instead of mean values, to minimize effects of interindividual differences in gaze patterns and momentary recording failures. MATLAB software (The MathWorks, Natick, MA) automated data recording and stimulus presentation.

Emotional word pairs—Fifty word pairs were selected as stimuli for the attentional training trials from the *Affective Norms for English Words (ANEW)* manual (M. M. Bradley & Lang, 1999). Word pairs consisted of one neutral and one positive word that were matched in letter length and frequency of usage (Bradley & Lang, 1999). Valence ratings ranged from 4.00 to 5.88 for neutral words and from 7.20 to 8.82 for positive words (mean difference = 3.33). Arousal ratings ranged from 3.29 to 7.00 for neutral words and from 2.97 to 7.65 for positive words (mean difference = 0.67). Word frequency usage ranged from 1 to 203 for neutral words and from 1 to 216 for positive words. Location of word appearance was randomized. The entire attention training incorporated 510 trials. The following are examples of word pairs (first word positive): sweetheart—skyscraper, paradise—elevator, caress—rattle, trophy—hammer, adored—icebox, sunset—insect, proud—truck, angel—bench, joke—lion.

Visual stressor images—Thirty different negative images served as visual stressors: 15 in the preattentional training phase and 15 after the training. Images were taken from the International Affective Picture System (IAPS; Center for the Study of Emotion and Attention, 1999). Images displayed predominantly negative emotional context; however, neutral area was also visible. Images were surrounded by gray screen. After negative and neutral AOIs were initially designated within each of the images by the researchers, independent judges ($N = 11$) rated these AOIs on 7-point Likert scales indicating their emotional valence and arousal. The negative AOIs ($M = 2.16$, $SD = 0.30$, range = 1.81–2.65) were rated as significantly different in valence than the neutral AOIs ($M = 3.75$, $SD = 0.43$, range = 2.80–4.20), $t(10) = 9.53$, $p < .001$. The negative AOIs ($M = 5.12$, $SD = 0.60$, range = 4.01–5.83) were also rated as significantly more arousing than their neutral counterparts ($M = 3.05$, $SD = 1.15$, range = 1.45–4.80), $t(10) = -5.91$, $p < .001$. Images were presented one per slide and were centered on the screen. Presentation valence and arousal ratings were not significantly different between image sets, $Fs(1, 29) = 0.59$ and 0.67, respectively, $p = ns$. Pictures of different thematic orientations were kept unique between presentations to prevent a desensitization effect resulting from image novelty. Participants were randomly assigned to see one of two image orders in both presentations.

Images were presented on a computer screen for 8,000 ms each. Immediately before each image, a visual crosshair was presented as a fixation cue for 1,000 ms. For the second stress task, 15 novel negative images were presented in the same manner as the first. Percentage of visual fixation to the negative components of the images served as the dependent variable, an index of selective attention acting in the service of emotion regulation. Composite mean viewing time scores to the negative components of the images were calculated separately for both stress tasks (pretraining vs. posttraining).

Results

Eye-tracking data were analyzed to determine whether participants in the train-positive condition demonstrated less attention toward the negative components of images in the second stress task than the first; such a training effect was not expected in the train-neutral group. The viewing time data were analyzed with a 2 × 2 repeated measures analysis of variance. Test phase (pretraining vs. posttraining) was a within-subjects factor and training condition (train neutral vs. train positive) a between-subjects factor. Presentation image order was first added as a covariate within this repeated measures design for negative emotional images. No order effects were found for the first visual presentation task, $F(1, 43) = 0.01$, *ns*, or the second visual presentation, $F(1, 43) = 0.40$, *ns*; therefore, we collapsed data across presentation orders. No main effects were found for test phase, $F(1, 45) = 0.61$, $p = ns$, or training condition, $F(1, 45) = 0.40$, *ns*. However, a significant Test Phase × Training Condition interaction did emerge, $F(1, 45) = 6.78$, $MSE = 685.68$, $p < .05$, $\eta^2 = 0.13$. The mean percentage viewing times to negative components of images in the experimental training conditions are shown in Table 1.

Following up on this significant interaction, an independent-samples *t* test revealed no significant differences in viewing time to negative components of images between training groups at baseline, $t(45) = -0.97$, *ns*. However, training groups did differ in how much they viewed the negative components after the attention training, $t(45) = 2.07$, $p < .05$, $d = 0.62$. Whereas the training groups did not differ significantly in their gaze to the negative images pretraining, participants in the train-positive condition viewed the negative components for less time than did the train-neutral participants after training.

A change score was computed by subtracting the percentage viewing time to the second visual stressor from the first stressor to further investigate the direction of change in viewing time between the two presentations. A positive score indicates that participants looked less at the negative components of images in the posttraining presentation, consistent with heightened emotion regulation; a negative score indicates that participants looked more at negative components of images posttraining. Inspecting means, participants in the train-positive condition looked less at the visual images in the posttraining visual stressor presentation ($M = 5.93$; $SE = 2.92$) compared with the train-neutral group ($M = -4.90$; $SE = 2.93$). The significant Test Phase × Training Condition interaction signifies that the change scores differed between the groups. A series of one-sample *t* tests further indicated that, although the change score for participants in the train-positive group was different than zero, $t(24) = 2.03$, $p < .05$, $d = 0.41$, showing an effect of training, this change score was not significantly different than zero in the train-neutral condition, $t(21) = -1.67$, *ns*. Figure 1 shows examples of viewing patterns of two train-positive participants after training: They gaze either off the negative image altogether or at the neutral components of the image compared with two train-neutral participants, who fixate primarily on the negative aspects of the picture.

Discussion

This study sought to determine whether trained attention toward positive information could lead individuals to demonstrate gaze patterns consistent with successful emotion regulation under stressful conditions. Participants were shown a visual stressor of highly negatively valenced pictures while having their eyes tracked, a baseline measure of their attentional deployment, and then were experimentally trained to selectively attend to positive or neutral information. Participants were finally eye tracked through another series of highly negative images to determine whether there was a difference in viewing patterns from their baseline (a training effect). Compared with individuals in the train-neutral condition, those in the train-positive condition were expected to show less visual attention toward the negative components of the images in the second stress task after training versus the first stress task.

No significant differences emerged in the quantity of time participants in either condition viewed the negative images at baseline; however, a significant difference emerged regarding the amount of time participants viewed the negative pictures after training. In the second visual stressor, participants in the train-positive condition appeared to learn an attentional avoidance of the negative components of the stimuli, looking at them less after the training than they did beforehand. In contrast, although it appears from the means that the train-neutral participants viewed the negative pictures more after the training, the change score for this group was not significantly different than zero. However, this trend for train-neutral participants to look longer at negative images at posttest suggests that these negative stimuli are particularly attention grabbing in the absence of a natural or trained motivation to avoid them.

Demand characteristics may have contributed to this pattern of findings; however, questionnaires given to participants after the experiment indicated that only 2 (of 47) participants noted awareness that the targets appeared consistently behind words of a particular valence. In addition, 13 individuals were run through an abridged protocol that lacked preexperiment questionnaires but included a more explicit manipulation check administered immediately after the second eye-tracking session before debriefing. Only 1 of these additional participants indicated that they were aware of this target pattern. Therefore, it seems unlikely that demand characteristics were a major confound. When the data from these additional participants were combined with the original data, the direction of the results remained the same, and the critical Test Phase × Training Condition interaction remained significant.

Positive Attention Training Promotes Emotion Regulation

Because individuals experiencing negative emotions show naturalistic viewing biases toward negative stimuli, learning to avoid negative stimuli may help assuage subsequent negative emotion. Participants in the train-positive condition may have visually avoided the negative images as an emotional regulation technique, instead seeking information that would not threaten their current mood. Optimists exhibit similar preferential viewing strategies, showing selective inattention to images of a negative valence (Isaacowitz, 2005), possibly to maintain their well-being. Older adults, who have been shown to regulate their emotions better than young adults (Gross et al., 1997), tend to naturally look toward positive stimuli and away from negative stimuli (Isaacowitz et al., 2006a, 2006b). Individuals with positive affective profiles may, therefore, show an intrinsic motivation to process stimuli in a way that facilitates emotion regulation (e.g., Isaacowitz, 2006a). Individuals trained to “look happy,” to move their attention away from the negative aspects of their environment, demonstrate these same gaze patterns indicative of successful emotion regulation.

Attention training to positive information may lead to an avoidance of subsequent negative information through a variety of mechanisms. First, exposure to a substantial amount of positive stimuli may heighten individuals’ sensitivity toward positive material, effectively redirecting attentional guidance mechanisms toward positive representations while making negative representations less accessible. Second, this negativity avoidance could be a result of improved mood achieved from selective positive attention. Finally, there is a possibility that this inattention to the negative could be a result of a more controlled, effortful processing such as thought suppression.

When Looking Happy Turns Maladaptive: Pollyannaism

Although regulating gaze toward positive information may help individuals to maintain or improve their well-being, paying attention to certain negative environmental cues may also be critical and highly adaptive in ensuring survival and long-term well-being. Thus, an overzealously optimistic gaze, in which negative stimuli are ignored altogether, may be just as unhealthy or maladaptive as a more negatively oriented one. Rather than being Pollyannaish, though, individuals experiencing positive emotions appear to seek out the most adaptive viewing strategy to fit their motivations and goals, even if that strategy involves being receptive to negative information. Reed and Aspinwall (1998), for example, found that individuals experiencing positive emotion oriented more quickly to self-relevant, but negative, health risk information and rated it as more convincing than did a control group. Thus, although gaze acts as one filter through which we selectively process material through the lens of our emotions

NIH-PA Author Manuscript

NIH-PA Author Manuscript

and motivations, training more positively oriented attentional patterns does not necessarily mean creating perceivers who miss important but negative information in their environment.

Limitations and Future Directions

Beyond the obvious limitation that only a homogenous pool of young adults was used to train attention, another serious limitation to the current study was that it did not assess whether the attention training increased attention to positive stimuli. Future studies should also include a direct measure of participants' affect, such as self-report mood measures before and after training. Such data would permit going beyond using a proxy for successful emotion regulation to be able to investigate training effects on feeling states themselves.

Therefore, although we have demonstrated the possibility that positive attentional training can produce changes relevant to emotion regulation, this work is just a beginning. To produce higher impact effects, future attentional training methodologies likely need much more time than a single training session. Combining attention training methodologies with higher order interventions, like mindfulness meditation, may maximize their effectiveness. Although such interventions are unlikely to be easy, there is nonetheless hope from the current study that they may be effective.

Acknowledgements

This work was supported by National Institute on Aging Grants R03 AG022168 and R01 AG026323 to DMI. The authors express their gratitude to Art Wingfield for his helpful methodological suggestions.

References

Bradley BP, Mogg K, Lee SC. Attentional biases for negative information in induced and naturally occurring dysphoria. Behavioral Research Therapy 1997;35:911–927.

Bradley, MM.; Lang, PJ. Affective norms for English words (ANEW): Instruction manual and affective ratings (Tech. Rep. No. C-1). Gainesville: Center for Research in Psychophysiology, University of Florida; 1999.

Center for the Study of Emotion and Attention. International affective picture system: Digitized photographs. Gainesville: Center for Research in Psychophysiology, University of Florida; 1999.

Derryberry D, Reed MA. Anxiety-related attentional biases and their regulation by attentional control. Journal of Abnormal Psychology 2002;111:225–236. [PubMed: 12003445]

Eizenman M, Yu LH, Grupp L, Eizenman E, Ellenbogen M, Gemar M, Levitan RD. A naturalistic visual scanning approach to assess selective attention in major depressive disorder. Psychiatry Research 2003;118:117–128. [PubMed: 12798976]

Fenske MJ, Eastwood JD. Modulation of focused attention by faces expressing emotion: Evidence from flanker tasks. Emotion 2003;3:327–343. [PubMed: 14674827]

Foa EB, McNally RJ. Sensitivity to feared stimuli in obsessive-compulsives: A dichotic listening analysis. Cognitive Therapy Research 1986;10:477–486.

Fredrickson BL. What good are positive emotions? Review of General Psychology 1998;2:300–319.

Fredrickson BL, Mancuso RA, Branigan C, Tugade MM. The undoing effect of positive emotions. Motivation and Emotion 2000;24:237–258.

Gross JJ. The emerging field of emotion regulation: An integrative review. Review of General Psychology 1998;2:271–299.

Gross JJ, Carstensen LL, Pasupathi M, Tsai J, Götestam SC, Hsu AYC. Emotion and aging: Experience, expression, and control. Psychology and Aging 1997;12:590–599. [PubMed: 9416628]

Isaacowitz DM. The gaze of the optimist. Personality and Social Psychology Bulletin 2005;3:407–415. [PubMed: 15657455]

Isaacowitz DM. Motivated gaze: The view from the gazer. Current Directions in Psychological Science 2006a;15:68–72.

Isaacowitz, DM. Understanding individual and age differences in well-being: An experimental, attention-based approach. In: Ong, A.; van Dulmen, M., editors. Oxford handbook of methods in positive psychology. New York: Oxford University Press; 2006b. p. 220-232.

Isaacowitz DM, Wadlinger HA, Goren D, Wilson H. Is there an age-related positivity effect in visual attention? A comparison of two methodologies. Emotion 2006a;6:511–516. [PubMed: 16938091]

Isaacowitz DM, Wadlinger HA, Goren D, Wilson H. Selective bias in visual fixation to negative images in old age: An eye tracking study. Psychology and Aging 2006b;21:40–48. [PubMed: 16594790]

Isen, AM. Positive affect. In: Dalgleish, T.; Power, M., editors. Handbook of cognition and emotion. Hillsdale, NJ: Erlbaum; 1999. p. 521-539.

MacLeod C, Rutherford E, Campbell L, Ebsworthy G, Holker L. Selective attention and emotional vulnerability: Assessing the causal basis of their association through the experimental manipulation of attention bias. Journal of Abnormal Psychology 2002;111:107–123. [PubMed: 11866165]

Mathews A, MacLeod C. Induced processing biases have causal effects on anxiety. Cognition and Emotion 2002;16:331–354.

Mogg K, McNamara J, Powys M, Rawlinson H, Seiffer A, Bradley BP. Selective attention to threat: A test of two cognitive models of anxiety. Cognition and Emotion 2000;14:375–399.

Mogg K, Millar N, Bradley BP. Biases in eye movements to threatening facial expressions in generalized anxiety and depressive disorder. Journal of Abnormal Psychology 2002;109:695–704. [PubMed: 11195993]

Monk CS, Nelson EE, Woldehawariat G, Montgomery LA, Zarahn E, McClure EB, et al. Evidence-dependent plasticity for attention to threat: Behavioral and neuro-physiological evidence in humans. Biological Psychiatry 2004;56:607–610. [PubMed: 15476691]

Reed MB, Aspinwall LG. Positive affect and self-regulation. Motivation and Emotion 1998;22:9–132.

Scheier MF, Carver CS. Optimism, coping, and health: Assessment and implications of generalized coping expectancies. Health Psychology 1985;4:219–247. [PubMed: 4029106]

Tugade MM, Fredrickson BL, Barrett BL. Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. Journal of Personality 2004;72:1161–1190. [PubMed: 15509280]

Wadlinger H, Isaacowitz DM. Positive affect broadens visual attention to positive stimuli. Motivation and Emotion 2006;30:89–101.

Xing C, Isaacowitz DM. Aiming at happiness: How motivation affects attention to and memory for emotional information. Motivation and Emotion 2006;30:243–350.

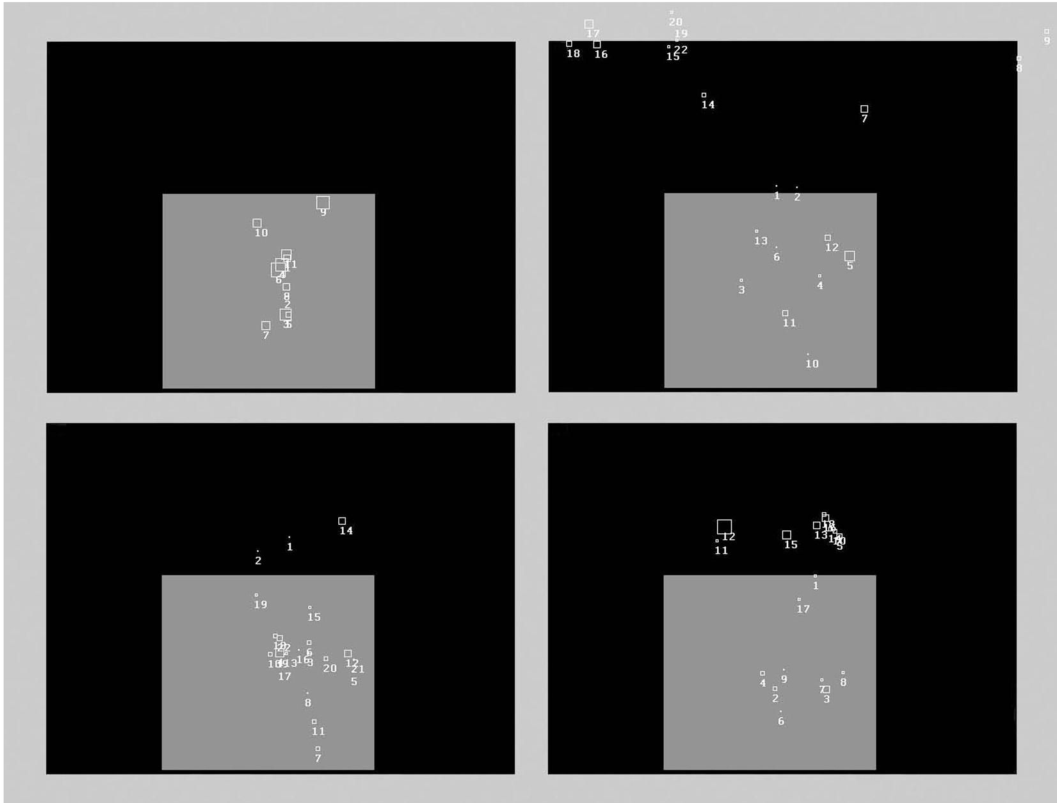

Figure 1.
Fixation patterns superimposed on a schematic representation of a negative stimulus from the second (post-training) visual stressor task, of two individuals from the train-neutral condition (left) and two individuals from the train-positive condition (right). The area in black represents the emotionally neutral areas of the image; the dark gray indicates the negative emotional area of interest (AOI) in the image. Numbers signify the order of fixation (1 = first fixation), and box size is an indicator of fixation length, with larger boxes signifying a longer fixation at that location. For the left panels, the participants in the train-neutral condition showed a 100.0% percent fixation (top) and an 89.01% fixation (bottom) within the negative AOI. The individuals in the train-positive condition (right panels) fixated 36.59% (top) and 36.15% (bottom) within the negative AOIs. All images presented to participants in the actual study were color photographs from the International Affective Picture System (IAPS: CSEA-NIMH, 1999); a schematic version is used here for copyright protection purposes.

Table 1

Percentage of Visual Fixation to Negative Components of Images

Test phase	Train-neutral group		Train-positive group	
	M	***SD***	***M***	***SD***
Pretraining	59.50	13.23	63.05	11.91
Posttraining	64.40	11.51	57.12	12.51