Testing the Effect of AMBER Alerts on Face Vigilance

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Abstract

This experiment was conducted to test whether AMBER Alert messages encourage people to become more face-vigilant. Face-vigilance was measured through a recognition task that instructed participants to search for discrepant faces in friendly, threatening, and neutral crowds. Participants were primed with either an AMBER Alert message or a nonword message and then instructed to quickly and accurately conclude whether a discrepant face was present in a matrix of faces. Performance was measured as the response time for correct responses. Results confirmed that threatening faces in friendly crowds were more quickly and accurately detected than were friendly faces in threatening crowds. The results did not show a significant difference in response times for correct responses between the AMBER Alert group and the nonword group. Our findings did not support the hypothesis that AMBER Alerts encourage people to become more face-vigilant.

Keywords: AMBER Alerts, vigilance, discrepant face, face in the crowd effect, priming

Amber Hagerman was your typical fun-loving nine-year-old in Texas. Although she may not be as recognizable as O.J. Simpson, her legacy is as high profile. At the time, there was no formal program that could have quickly alerted people about her disappearance (Miller, Griffin, Clinkinbeard, & Thomas, 2009). In 1996, it was Amber's kidnapping and murder that lead to the formation of our renowned emergency response system for missing children. The system is called America's Missing: Broadcast Emergency Response (AMBER) Alert program, popularly known as the AMBER Alert (U.S. Department of Justice, 2006).

The AMBER Alert program created an early warning system in order to galvanize the entire community to assist in the search for and safe recovery of a missing child (U.S. Department of Justice, 2006). From 1996 to 2012, the U.S. Department of Justice had documented 758 recoveries. Moreover, when law enforcement officials decide to issue an AMBER Alert, they notify state transportation officials and broadcasters. AMBER Alerts are then made available on numerous highway signs and media outlets (e.g., radio, TV, internet, and phones). Generally, law enforcement follows recommended criteria when deciding whether to issue an AMBER Alert.

The Prosecutorial Remedies and Other Tools to end the Exploitation of Children Today (PROTECT) Act of 2003 enabled the AMBER Alert program and established recommended criteria to follow when deciding whether to issue an Alert (U.S. Department of Justice, 2006). The criteria were established to maintain the program's effectiveness by preventing errors such as false alarms. Furthermore, the PROTECT Act provided for the national coordination of state and local programs. Five criteria were recommended for issuing AMBER Alerts: (1) law enforcement should confirm that an abduction occurred; (2) conclude that the abducted child is at risk of serious injury or death; (3) conclude that there is enough descriptive information available (i.e., child information, captor information, or captor's vehicle description); (4) conclude that the abducted child is 17 years old or younger; (5) ensure that the AMBER Alert data are entered in the FBI's National Crime Information Center (U.S. Department of Justice, 2006)..

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The AMBER Alert program is based on three assumptions (Sicafuse & Miller, 2010). First, it is assumed that people will attend to the AMBER Alert because they can elicit strong emotional responses (Sicafuse & Miller, 2010). Furthermore, media coverage of an AMBER Alert case could trigger people to become fearful and anxious (Sicafuse & Miller, 2010). For example, people might fear that their children could be abducted or they might sympathize with the parents of an abducted child, and thus people are more likely to pay attention to the Alert. Moreover, entities such as law enforcement and the news media are generally viewed as credible, knowledgeable, and trustworthy (Sicafuse & Miller, 2010). Thus, people are more likely to pay attention to AMBER Alerts because law enforcement officials and the news media broadcast them.

Do AMBER Alerts have unintended effects? The emotional responses that influence people to pay attention to an AMBER Alert also hamper its effectiveness. AMBER Alerts could trigger people to have fearful thoughts (e.g., criminal attacks) that could result in a moral panic (Griffin & Miller, 2008). This moral panic could be exaggerated and eventually inflict extreme fear that does not dissipate. For example, the Alert could trigger parents to feel less safe or have a false sense of security (Miller et al., 2009). Furthermore, false alarms could lead people to become less interested in AMBER Alerts and possibly take them less seriously. This could lead to the Alerts losing their intended effects. Such a claim was facilitated by the fact that missing children are no longer displayed on milk cartons. People became accustomed to the photos on the milk cartons and, eventually, the awareness campaign lost its intended effect (Miller et al., 2009).

The AMBER Alert program also assumes that people could recognize the perpetrator because they will be able to effectively acquire, retain, and retrieve the Alert information (Miller & Clinkinbeard, 2006). All three memory processes (i.e., acquisition, retention, and retrieval) must work appropriately in order for the Alert to be effective (Miller & Clinkinbeard, 2006). The program assumes that once people see the AMBER Alert, the acquired information will be encoded and processed in the short-term memory. The second phase of memory—retention--determines whether the information will retain in the long-term memory. The program assumes that people will retain the information until the point comes that they will need to use it. The third phase of memory—retrieval—is where important information is accurately recalled from their long-term memory. If people encounter the abductor, they must be able to retrieve the image from their memory in order to accurately identify the abductor.

The Alert program is based on questionable assumptions about memory processes (Miller et al., 2009). Temporal factors could lead to issues in the acquisition process. Generally, people recall information more accurately when they are exposed to stimuli for longer periods of time (Laughery, Alexander, & Lane, 1971). In a study using a driving simulator, participants drove along a highway and viewed an AMBER Alert message on a changeable message sign (i.e., electronic device used on highways to provide important information; Harder & Bloomfield, 2008). Only ten participants accurately recalled the details in the Alert. Thus, longer exposure to AMBER Alerts could be an important factor when people try to commit information to memory (Greer et al., 2012).

The frequency of exposure can affect how information is acquired. Bluck and Li (2001) found that people who were repeatedly exposed to information more accurately recalled details at a later time. In their study, each participant's memory was tested after watching the verdict in a criminal trial. The participants who had the most accurate recall of the event were those who had the most frequent exposure to the television coverage. Therefore, issuing an AMBER Alert on a changeable message sign, on the radio, on Facebook, and sending out text messages could help people accurately process the information for later recall.

Several factors could influence the retrieval process to fail. If people are able to acquire the details in the AMBER Alert, they also need to retain and retrieve the information (Miller & Clinkinbeard, 2006). However, retention failure can happen when more time passes between the presentation of the Alert and the point at which people apply that information. Participants who observed a series of faces presented two at a time for 16 seconds were not able to accurately recall information when they had more time (i.e., 24-hour retention interval; Hannigan, & Reinitz, 2000). For example, unconscious transference suggests that people might confuse an individual that they see in one location with an individual that they actually saw in another location (Davis, Loftus, Vanous, & Cucciare, 2008). Processing errors at any of the three memory phases could negatively affect people's ability to accurately encode information and fulfill the intended effects of the AMBER Alerts.

The AMBER Alert program also assumes that people are willing and able to report helpful information. This is because AMBER Alerts are assumed to encourage community involvement and the maintenance of social control (Zgoba, 2004). Law enforcement officials actively recruit people's attention and assistance in identifying offenders. Furthermore, news broadcasts provide identifying information on a fleeing abductor and instruct people to call in any sightings (Zgoba, 2004). Fear appeals could be persuasive to the extent that the people will recognize their ability to participate in reducing negative outcomes. For example, if people fear that their own child could be abducted or they sympathize with the abducted child's parents, then it could enhance their willingness to report a suspect sighting to the police. Thus, this recognition could increase people's willingness to help locate the abducted child. Unfortunately, there is no research on the willingness to report AMBER Alerts; instead, research has investigated the willingness to report crimes committed against others (Miller et al., 2009).

Social influence and witness characteristics can negatively affect people's willingness to report a crime (Greenberg & Beach, 2004). A majority of participants (i.e., burglary and theft victims) were more likely to seek advice from others when deciding if they should notify the police. Although this type of social influence occurred with crime victims, it could also apply to people's willingness to report AMBER Alerts to police. Advice from another individual could deter people from reporting information to the police. Participants were more likely to help a person when they experienced increased empathy compared to when they experienced lower levels of empathy (Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007). Thus, witness characteristics could affect people's willingness to report pertinent information to the police. If people are not willing to report, then the AMBER Alert program may not be as effective.

A few studies indicate that AMBER Alerts may be useful for facilitating public assistance in assisting law enforcement locate missing children. In a study by Greer et al. (2012), participants read one of two stories (i.e., labeled as "AMBER Alert" or "missing child") and then completed a survey. Participants were asked to estimate the likelihood that they would participate in a series of behaviors. For example, participants were asked if they would keep an eye out for the automobile or contact the police if they saw the abducted child (Greer et al., 2012). The AMBER Alert message prompted participants to rate the information as significantly more important than did those who read a missing child story (Greer et al., 2012). Thus, labeling a missing child as an AMBER Alert could aid law enforcement efforts to recover missing children.

In an effort to help address the research deficiency, data were gathered from 333 publicized AMBER Alerts to determine how well they demonstrated the program's ability to rescue gravely endangered children (Griffin, 2010). A majority did not involve dramatic rescues from life-threatening situations and most perpetrators were related to or otherwise known to the victim. Furthermore, participants were not able to accurately recall the details in the AMBER Alert that they saw on a changeable message sign (Harder & Bloomfield, 2008). Moreover, the AMBER Alert program's intention is to galvanize (i.e., shock or excite someone into taking action; Merriam-Webster's online dictionary, 2008) the entire community to assist in the search for and safe recovery of the child. However, does an AMBER Alert shock or excite someone? Does it make them preferentially orient their attention toward threatening stimuli? Further research needs to assess the very basis of the program's intent in order to properly evaluate whether AMBER Alerts are effective, such as experimentally testing whether AMBER Alerts encourage people to become face-vigilant.

Face-vigilance is measured through a recognition task instructing participants to search for discrepant faces (i.e., a facial expression that stands out in a series of faces or captures people's attention faster than any other facial expression) in friendly, threatening, and neutral crowds. Facial threat can be expressed by gestures suggesting an emotional expression of anger such as pronounced frowning brows, intensely staring eyes, and a closed mouth with lowered corners (Ekman & Friesen, 1975). According to the evolutionary perspective, pictures portraying a facial threat is an efficient cue for human fear conditioning (Öhman, Lundqvist, & Esteves, 2001). Thus, it is probable that people preferentially orient their attention toward threatening facial stimuli (Hansen & Hansen, 1988).

To examine which facial features are most salient to decoding emotions, McKelvie (1973) evaluated whether schematic facial expressions were dependent on one particular feature that operated independently of others. Participants were exposed to varying types of schematic facial expressions and were instructed to rate how easy it was for them to pick an adjective that described the face. The results showed that facial features interacted together to produce facial expressions. Specifically, a schematic face with neutral eyebrows and a friendly mouth produce a meaningful friendly face. Thus, schematic facial expressions were not dependent on one particular feature.

However, it was unknown whether there were specific physical features of the facial display that underlined the more universal categories of emotion (i.e., friendly and threatening). Aronoff, Barclay, and Stevenson (1988) conducted two studies to examine whether participants, across a diversity of cultures, expressed threat in a similar way. Participants were given a scenario and were instructed to draw facial expressions for each scenario. In the first study, the results showed a set of facial features (e.g., eyebrows pointed down and closed mouth with lowered corners) that were significantly associated with threat across several cultures.

In the second study, Aronoff et al. (1988) used the schematic visual patterns (i.e., lines and angles) embedded in the set of facial features to examine whether specific features of the facial expression evoked the response associated with threat. For example, one pair included two angular lines pointing inward and two curved lines pointing upward. Participants were instructed to rate the threat level of each pair. The results showed that the diagonal lines and acute angles had the highest rated threat value, whereas the curved or straight lines had the lowest rated threat value. Although the stimuli did not resemble a face, the schematic visual patterns were able to evoke a response that was associated with threat.

Previous studies have tested whether participants preferentially orient their attention toward threatening stimuli (Hansen & Hansen, 1988). Participants, using a visual search paradigm, were exposed to matrices of schematic threatening, friendly, and neutral faces, and were instructed to detect the presence of a discrepant face. Participants identified threatening faces in friendly crowds significantly faster and with fewer errors than when they identified friendly faces in threatening crowds (Hansen & Hansen, 1988). However, there were noticeable dark areas on the threatening facial stimuli that were not visible on the friendly facial stimuli. Thus, the stimulus confound could have been the reason why participants identified threatening faces at a faster rate. This particular confound was avoided a study by Öhman et al. (2001) when they used schematic facial stimuli with physical features that could be tightly controlled.

In the study by Ohman et al. (2001), participants viewed threatening, friendly, and neutral facial stimuli that allowed for the physical features to be tightly controlled. Participants were asked to search for a discrepant face in friendly, threatening, and neutral crowds. The results showed that participants were significantly faster and more accurate when finding the threatening faces than friendly faces. Furthermore, in a series of studies, participants were faster and more accurate when finding threatening faces compared to friendly faces, both with neutral and emotional (i.e., threatening or friendly) distractors across a variety of experimental conditions. The advantage for threatening over friendly facial expressions, also known as the “face in the crowd effect” (FICE), was apparent in crowds of varying sizes (i.e., 2 × 2, 3 × 3, 4 × 4, and 5 × 5 matrices) and for inverted and upright facial stimuli. Thus, the threatening face could have a critical feature that captures attention more efficiently than the features that make up the friendly face. As expected from the evolutionary perspective, participants could have identified the threatening face at a faster rate because people preferentially orient their attention toward facial gestures that convey a threat.

One major criticism is that the FICE could be attributed to some additional characteristic other than the threatening face (Öhman et al., 2001). Faster and more accurate detection of threatening schematic faces have been attributed to the varying frequency with which threatening and friendly facial expressions were encountered in typical environments (Whalen, 1998). For example, less frequently encountered facial expressions (i.e., threatening) may capture attention because of its uniqueness rather than its threat value. Öhman et al. sought to rule out that possibility by including sad and scheming (e.g., a V-shaped eyebrow with an upward curve for the mouth) facial expressions that were more unique and less frequently encountered than threatening facial expressions. The results demonstrated that threatening facial expressions were detected at a faster and more accurate rate than the sad and scheming facial expressions. Thus, the significant effect was specific to threat value rather than dependent on the uniqueness of stimuli.

Another criticism of schematic faces is that they lack ecological validity (Öhman et al., 2001). However, studies that utilized real faces in visual search tasks have produced inconsistent results. Juth, Lundqvist, Karlsson, and Öhman (2005) found different effects for visual search of real versus schematic faces. With real facial expressions, the results showed advantages for friendly expressions. Yet, with schematic faces, the results showed that angry expressions were detected more accurately and quickly than were friendly facial expressions. The more efficient processing of schematic faces could have been because they had direct access to crucial features of emotional faces that avoided the variability inherent in real faces.

More recently, Pinkham, Griffin, Baron, Sasson, and Gur, (2010) created a visual search task that contained validated veridical facial expressions within heterogeneous crowds. The results showed that angry expressions were detected more accurately and quickly in a crowd of distractors than were friendly expressions. However, the emotional intensity was not controlled. For example, angry expressions were more intense than the friendly expressions. Thus, it could have disproportionately contributed to the reported effect. This type of confound was tightly controlled in studies that utilized visual search with schematic faces (Eastwood, Smilek, & Merikle, 2001; Juth et al., 2005; Öhman et al., 2001).

Replicating the facial recognition task from the study by Öhman et al. (2001) will help examine whether AMBER Alerts are effective; specifically, whether they encourage people to become more face-vigilant. AMBER Alerts intend to galvanize the entire community to help search for the abducted child and the perpetrator (U.S. Department of Justice, 2006). Although the AMBER Alert program is a well-intentioned program, more empirical research is needed to examine its effectiveness (Miller & Clinkinbeard, 2006). In accordance with the Öhman et al. (2001) study, previous research regarding the FICE, and the AMBER Alert program’s intent to galvanize the community, participants exposed to an AMBER Alert should identify threatening targets (i.e., schematic faces) in friendly crowds significantly faster and with fewer errors than friendly faces in threatening crowds.

Method

Participants

Thirty-five introductory psychology students at the University of Central Oklahoma participated in this experiment. There were 29 women and six men. The median age was 20 years, with a range of 18 to 27 years. All participants received credit toward their introductory psychology course.

Materials

Participants completed the experiment individually in one room with a desk and adjustable chair so that their eyes were positioned at the center of the screen. A white noise sound machine (Marpac DOHM-DS-TAN) was used to mask any unwanted noises. All personal belongings (e.g., cell phone, purse, backpack) were left outside the room in order to alleviate unwanted distractions. Participants were randomly assigned to read one of two message types (i.e., AMBER Alert message or nonword message). The AMBER Alert message was modified from an actual AMBER Alert, with minor changes to make the case relevant for participants (e.g., the date, location, etc.). The nonword message was the same length as the AMBER Alert message. The purpose of the nonword message was to control for time and for processing the amount of letter-word character content.

Stimuli appeared centered on a 17-inch monitor at 1024 x 768 resolution attached to a Dell computer with a dual-core Intel processor and two gigabytes of RAM. The visual stimuli were matrices composed of nine schematic faces (i.e., neutral, friendly, or threatening) arranged in 3 x 3 matrices drawn in black against a white background. Each schematic face was 84 x 98 pixels, and had a size on the screen of approximately 3° x 3.5°. The outline of the stimulus matrix had visual angles of approximately 10° x 11.5°. Specifically, the outline of the schematic face and the nose was drawn with lines of 1 pixel, and the eyebrows, eyes, and mouth were drawn with lines of 2 pixels. Each schematic face had the general features of a normal face (i.e., ears, eyebrows, eyes, nose, and mouth).

The neutral schematic face had horizontal lines for both the eyebrows and the mouth, and had ellipses for the eyes. The ears, nose, and face shape were the same for all schematic face types. The friendly schematic face had angular lines pointing upward for the eyebrows, a curved mouth pointing upward, and two half circles for the eyes. Specifically, the bottom portion of the half circle was replaced with a straight line. The threatening schematic face had angular lines pointing inward for the eyebrows, an upside down curved mouth, and two half circles for the eyes. Specifically, the top portion of the half circle was replaced with a straight line (Öhman et al., 2001).

The faces appeared on the screen for two seconds. Fifty-four matrices (i.e., distractor expressions) were schematic faces that displayed the same facial expression (i.e., neutral, friendly, or threatening). For example, one matrix displayed all friendly expressions. The other 54 matrices (i.e., target expressions) had one face designated as the target and had a different emotional expression from the background distractors. There were six different target-distractor combinations.

The target expressions were either neutral, friendly, or threatening and appeared at any of the nine positions in the matrix. Previous research demonstrated that a unique feature of horizontal lines triggered the neutral targets to be efficiently picked up by parallel search (Öhman et al., 2001). Also, neutral targets with emotional distractors (i.e., friendly or threatening) repeatedly had the shortest search times in all conditions (Öhman et al., 2001). In the current study, neutral target expressions were not included in the analyses because—consistent with the analyses used in Öhman et al. (2001)—they were not specifically part of the hypothesis,. Moreover, participants performed 108 randomly-ordered trials in which presentation order was randomized. Each participant's performance was measured as the response time (RT) for correct responses. The RT values for trials in which participants pressed the wrong button (i.e., missing a target or falsely identifying a target in a target-absent display) were replaced by the participant's mean RT for that condition (Öhman et al., 2001).

Procedure

All materials and measures were presented using DirectRT. Participants read brief instructions typed in black Times New Roman font against a white background. Participants had three minutes to read one of two stories (i.e., AMBER Alert message or nonword message). After three minutes, instructions appeared on the computer screen that explained the recognition task. The instructions explained that their task was to detect whether there was a face with a discrepant expression present on the screen or whether there was no discrepant expression present on the screen.

Participants were asked to quickly and accurately decide whether a target was present in a matrix or not. Participants were instructed to press different keys depending on whether a discrepant face was present in a matrix. A "yes" response (target present) was indicated by pressing the Z key on the keyboard, and a "no" response (target absent) was indicated by pressing the forward slash key on the keyboard. For example, if the participant saw a discrepant face, she would press the Z key. If a discrepant face was not present, then the participant would press the forward slash key. Participants were taken through a series of self-paced practice trials that demonstrated the stimuli and the nature of the task. Trial order was counterbalanced across participants.

Once the trials began, participants viewed a central fixation point for two seconds that was replaced by a matrix of nine faces. Participants pressed a key with their right index finger or their left index finger, which indicated whether a target appeared in the matrix. Each trial was terminated by the participant's response. There was a four-second delay after each interstimulus interval. This presentation sequence continued until participants completed all 108 trials.

Results

A $2_B \times 2_W \times 3_W$ mixed factorial ANOVA was conducted to evaluate whether RT's for correct responses in the AMBER Alert group were faster at correctly identifying threatening targets than the RT's for correct responses in the nonword group. The between-subjects independent variable was the message type (i.e., AMBER Alert or nonword message). The within-subjects independent variables were target type (i.e., threatening and friendly), and distractor type (i.e., neutral, friendly, and threatening). Data screening techniques were conducted in order to reduce the impact of outliers.

Four participants' data were removed from the analysis because they did not complete the experiment correctly. For example, across both conditions, these participants only hit one key during the experiment. As a result, this led to missing a target and falsely identifying a target in a target-absent display. Furthermore, RTs that were unrepresentative and biased toward the statistical model were changed to the next highest score in that particular category (e.g., threatening targets with neutral distractors).

A series of assumption tests were conducted in order to properly interpret the data. Levene's test indicated that the assumption of homogeneity of variance was met for all levels of the repeated measure variables. Mauchly's test of sphericity was significant for the main effect of distractor, $W(2) = .791$, $p = .024$, and for the interaction between target and distractor, $W(2) = .491$, $p < .001$, indicating a violation of the assumption of sphericity. Greenhouse-Geisser was used to correct for this violation. Box's $M(46.456)$ was significant, $p = .016$, indicating that the assumption of homogeneity of covariance was violated. Pillai's Trace was used to correct for this violation.

The $2_B \times 2_W \times 3_W$ mixed factorial ANOVA revealed a significant interaction between target and distractor, $F(2, 32) = 7.933$, $p = .002$, $\eta^2_{\text{partial}} = .3$, observed power = .935, and a main effect of distractor, $F(2, 32) = 64.319$, $p < .001$, $\eta^2_{\text{partial}} = .8$, observed power = 1.000. The analysis revealed no significant effect of target, $F(1, 33) = .130$, $p = .721$, $\eta^2_{\text{partial}} = .004$. Furthermore, the analysis showed no significant interaction between target and group, $F(1, 32) = 1.620$, $p = .212$, $\eta^2_{\text{partial}} = .047$ and between distractor and group, $F(2, 32) = .179$, $p = .837$, $\eta^2_{\text{partial}} = .011$. The analysis showed no significant three-way interaction between target, distractor, and group, $F(2, 32) = .653$, $p = .527$, $\eta^2_{\text{partial}} = .039$. A two-way ANOVA was conducted to follow up the main effect of distractor. The results showed no significant interaction between target (i.e., friendly targets with angry distractors and all angry faces) and group, $F(1, 33) = 2.186$, $p = .149$, $\eta^2_{\text{partial}} = .3$.

Three paired-samples *t*-tests were conducted to evaluate the simple main effects for RT for correct responses of target at each level of distractor. The results indicated that the RT's for friendly targets with threatening distractors ($M = 1806$, $SD = 728$) were significantly faster than the RT's for threatening targets with threatening distractors ($M = 2089$, $SD = 799$), $t(34) = -3.034$, $p < .05$. Furthermore, the results showed that the RT's for threatening targets with threatening distractors ($M = 1769$, $SD = 122$) were significantly faster than friendly targets with friendly distractors ($M = 2154$, $SD = 828$), $t(34) = 3.572$, $p < .05$. The results showed that friendly targets with neutral distractors ($M = 1324$, $SD = 557$) were not significantly different than the RT's for threatening targets with neutral distractors ($M = 1371$, $SD = 598$), $t(34) = -.896$, $p = .376$. Consistent with the findings reported in Öhman et al. (2001), these results showed that RT's for correct responses were longer when the distractors were emotional (i.e., friendly and threatening) than when they were neutral. Figure 1 displays the means for the six target-distractor combinations.

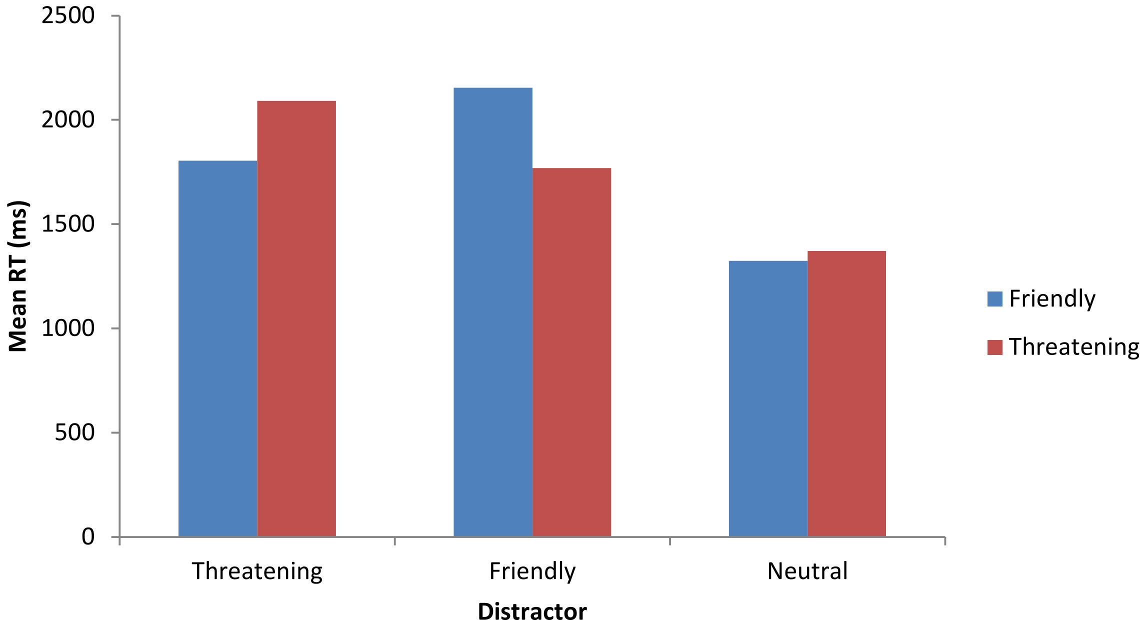

Figure 1. Means for the six target-distractor combinations.

Discussion

The present study tested the hypothesis that response times for correct responses in the AMBER Alert group would be faster at correctly identifying threatening targets than the response times for correct responses in the nonword group. Our results support the hypothesis that threatening faces in friendly crowds were more quickly and accurately detected than were friendly faces in threatening crowds. However, the results did not support the hypothesis that participants in the AMBER Alert group would be faster at correctly identifying threatening targets than participants in the nonword group. The AMBER Alert program assumes certain memory processes are required in order for the program to be successful. However, we were not able to address those issues in the current study.

Target Type and Distractor Type

The significant interaction between distractor and target was evidence of the face-in-the-crowd effect (FICE). Replicating Öhman et al. (2001), a threatening face in a crowd of friendly faces was detected faster than a friendly face in a crowd of threatening faces, regardless of their location. The present findings support the theory that a threatening facial expression could command more attention, whereas a friendly facial expression in a crowd of attention-grabbing threatening faces could be overlooked (Hansen & Hansen, 1988). Also, in line with the evolutionary perspective, the threatening facial advantage provides support for the theory that people preferentially orient their attention toward facial gestures that convey a threat.

Unlike in the Öhman et al. (2001) study, participants in the present study were slightly faster at detecting friendly faces compared to threatening faces when the distractors were neutral. One explanation for these findings could be that friendly facial expressions are more frequently encountered and more accessible (Becker et al., 2011). Furthermore, increased frequency of exposure to friendly facial expressions could lead to an increased perceptual fluency that is similar to the word frequency effect (Oldfield & Wingfield, 1965). For example, familiar words (i.e., high-frequency) are often recognized faster than unfamiliar words. Therefore, friendly facial expressions may have been detected faster because they were more familiar and detection was more practiced. However, these unexpected findings contradict the findings that establish a threatening facial advantage. This contradiction suggests that it was the distractors that could have had a significant effect on RT's. For example, in the target-present matrices, when the distractors were emotional (i.e., friendly or threatening), there was a threatening facial advantage. Whereas when the distractors were neutral, there was a friendly facial advantage.

One limitation of this study is the indirect method that was used to control where the participant fixated on the computer screen. In the present study, participants were instructed to fixate on the plus sign in order for the stimulus to be displayed in the intended visual field. Batt, Underwood, and Bryden (1995) recorded participant's eye movements and found that participants failed to fixate on the central marker up to 17% of the time. A more efficient method would involve controlling the stimulus presentations. For instance, Hardyck, Chiarello, Dronkers, and Simpson (1985) objectively monitored participants' eye movements and were only shown the stimulus when they were fixating on the central marker. However, this method can be time-consuming and the equipment is expensive.

Overall, our findings are similar to those of Hansen and Hansen (1988) study and Öhman et al. (2001). Specifically, our findings provide support for the theory that the threatening facial advantage we have observed could be attributed to the threat value of the schematic face. Similar to the Öhman et al. (2001) study, future research should replicate this study across a variety of experimental conditions (e.g., crowds of varying sizes) in order to provide stronger support for the FICE.

AMBER Alert Message

The lack of statistical significance between the AMBER Alert group and the nonword group raises at least one alternative interpretation of the data. It may be that the AMBER Alert message simply did not have a true effect on participants' RTs. As a result, the AMBER Alert message did not increase face vigilance. Additionally, the present study's lack of diversity among participants limits the generalizability of the results. However, experimental studies usually recruit students as participants when the objective is to isolate key variables of interest and study their relationships with each other (Greer et al., 2012). Furthermore, researchers have argued that the goal of an experiment is to investigate tightly-defined, causal relationships rather than to generalize to a larger population (Berkowitz & Donnerstein, 1982). This experiment was designed to test the relationship of the independent variables with control of internal validity rather than to establish generalizablity.

Laboratory settings can demonstrate how people respond in an automatic fashion under conditions that can only be revealed in well-controlled experiments (Berkowitz & Donnerstein, 1982), such as using response times to calculate whether people identify threatening faces at a faster rate than friendly or neutral faces. Our findings can be generalized to other settings because many laboratory results have been duplicated by investigations carried out in a more representative manner. For example, the facial recognition task has been duplicated in various other settings (Eastwood et al., 2001; Juth et al., 2005; Öhman et al., 2001). However, this was the first time that an AMBER Alert message was read prior to completing a recognition task. We believe that the impact of an AMBER Alert messages is important to study in a controlled experiment.

AMBER Alerts intend to galvanize the community to help search for the abducted child and the perpetrator (U.S. Department of Justice, 2006). In a real-life setting, participants would most likely be engaging in an additional task (i.e., driving, cooking food, or talking on the phone) when exposed to an AMBER Alert. Thus, it was important to eliminate any distractors and start at the very core of the program to test whether AMBER Alerts can encourage people to become more face-vigilant. Unfortunately, although participants were in a controlled environment that was free of distractors, our findings showed that the AMBER Alert could not make an impact on even a handful of participants. Therefore, our findings did not support the hypothesis that AMBER Alerts encourage people to become more face-vigilant. We recommend future replication of our study in order to specifically test whether the program's assumptions are accurate.

AMBER Alerts intend to alert people to assist in the search for and recovery of a missing child. AMBER Alerts have the possibility of becoming a successful tool for crime control. Our findings made a small contribution to AMBER Alerts and the understanding of its effectiveness. However, in order for the program to be successful, its effectiveness must be tested and verified. Our results did not show a significant difference between RT's for correct responses in the AMBER Alert group and the nonword group. Nevertheless, future research should evaluate AMBER Alerts and their effectiveness in order to bring the program one step closer to becoming a successful tool for crime control.

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