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AMBER ALERTS AND THEIR EFFECTIVENESS

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MARJON CREEL

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Dr. Robert Mather, Committee Chairperson

Dr. Mickie Vanhoy, Committee Member

Dr. John Mabry, Committee Member

Abstract

Do 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 (i.e., letters that resembled a real word; e.g., SHUM and LAIP), and then instructed to quickly and accurately conclude whether a discrepant face was present in a matrix of faces. Each participant's performance was measured as the response time for correct responses. The study analyzed data to see whether participants in the AMBER Alert group were able to correctly identify threatening faces faster than participants in the nonword group. Overall, the results confirmed the hypothesis that threatening faces in friendly crowds were more quickly and accurately detected than were friendly faces in threatening crowds. Unfortunately, the results did not show a significant difference in response times (RTs) for correct responses between the AMBER Alert group and the nonword group. As a result, our findings did not support the hypothesis that AMBER Alerts encourage people to become more face-vigilant. Therefore, we were unable to conclude that the AMBER Alert program does in fact galvanize the entire community to assist in the search for and safe recovery of the child.

Keywords: AMBER Alerts, vigilance, discrepant face, non-word

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Chapter 1: AMBER Alerts and Their Effectiveness

Purpose of the Study

Do AMBER Alert messages encourage people to become more face-vigilant? Participants either read an AMBER Alert message or a nonword message. An AMBER Alert message resembled a typical AMBER Alert that people would see in real life. For example, the AMBER Alert message included physical characteristics of the child and perpetrator, the perpetrator's vehicle information, and where the child was last seen. A nonword message contained pseudowords (i.e., letters that resemble a real word; e.g., SHUM and LAIP). The nonword message was used to control for time and for processing the amount of letter-word character content. Participants read the message and completed a recognition task by searching for discrepant faces embedded in threatening, friendly, and neutral crowds. The independent variables were message type (i.e., AMBER Alert or nonword message), target type (i.e., threatening and friendly), and distractor type (i.e., neutral, friendly, and threatening). Each participant's performance was measured as the response time for correct responses. The study analyzed data to see whether participants in the AMBER Alert group were able to correctly identify threatening faces faster than participants in the nonword group. The results did not show a significant difference in response times (RTs) for correct response between the AMBER Alert group and the nonword group. However, the results did show an interaction between target type and distractor type.

Statement of the Hypothesis

Participants in the AMBER Alert group will identify threatening targets in friendly crowds significantly faster and with fewer errors than participants in the nonword group. Thus, the results should show a three-way interaction between message type, target type, and distractor

type. Furthermore, participants in both the AMBER Alert group and the nonword group will identify threatening targets in friendly crowds significantly faster and with fewer errors than friendly targets in threatening crowds. Thus, the results should show a two-way interaction between target type and distractor type.

Significance of the Study

AMBER Alerts notify people about abductions in order to assist in the child's safe recovery (Miller, Griffin, Clinkinbeard, & Thomas, 2009), but the program rests on untested assumptions challenged by psychological theories about memory processes and behavior.

Definition of Terms

Vigilance. The action or state of keeping careful watch for possible danger or difficulties. The degree of wakefulness or responsiveness to stimuli. Vigilance will be measured by response times for correct responses.

AMBER Alerts. AMBER Alerts notify the public that a child has been kidnapped to encourage them to help search for the abducted child. Information issued in an AMBER Alert generally includes physical characteristics of the child and perpetrator, vehicle information, and where the child was last seen. AMBER Alerts notify the public by broadcasting helpful information on the news, roadways, and other media outlets.

Discrepant face. A facial expression that is salient in a series of faces or captures a person's attention faster than any other facial expression. A facial expression is one that appears interesting or important.

Nonword/Pseudoword. A nonword/pseudoword are letters that resemble a real word (e.g., ftbr).

Chapter 2: Literature Review

Amber Hagerman. She was your typical fun-loving nine-year-old living in the great State of Texas. Though her name may not be as recognizable as OJ 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 et al., 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 the child (U.S. Department of Justice, 2006). From 1996 to 2012, the U.S. Department of Justice had documented 758 recoveries (See appendix A). 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: law enforcement should confirm that an abduction occurred, conclude that the abducted child is at

risk of serious injury or death, conclude that there is enough descriptive information available (i.e., child information, captor information, or captor's vehicle description), conclude that the abducted child is 17 years old or younger, and ensure that the AMBER Alert data are entered in the FBI's National Crime Information Center (U.S. Department of Justice, 2006).

The AMBER Alert program appears to be straightforward and simple. Once the Alert is issued, people provide evidence to the police and then the police catch the perpetrator and rescue the child (Sicafuse & Miller, 2010). However, the program involves assumptions about psychological processes (e.g., memory processes and behavioral theories), and assumes that these psychological processes are required for the program to be successful. Although the AMBER Alert program has been in effect for over a decade, the research on AMBER Alerts is scarce (Greer, Pan, Flores, & Collins, 2012).

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 inflict strong emotional responses among the people (Sicafuse & Miller, 2010). Furthermore, the media surrounding 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, authority figures 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 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 doesn't go away. AMBER Alerts could have unintended consequences. 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 accordingly 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 made details easier to remember at a later time. In their study, each participant's memory was tested after watching a verdict in a criminal trial. The participants who had the most accurate recall of the event were the ones 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 are an effective measure of crime control. 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 be an effective measure of crime control.

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) the entire community to assist in the search for and safe recovery of the child (Merriam-Webster's, 2008). However, does an AMBER Alert shock or excite someone? Does it make them preferentially orient their attention towards 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. For example, creating an experiment to see whether AMBER Alerts encourage people to become face-vigilant.

Face-vigilance was measured through a recognition task instructing participants to search for discrepant (i.e., a facial expression that stands out in a series of faces or captures peoples attention faster than any other facial expression) faces 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 towards threatening facial stimuli (Hansen & Hansen, 1988).

The human face has the ability to express numerous emotional expressions that serve as a tool for nonverbal social exchange (Darwin, n.d.). Darwin's theory of evolution suggested that facial expressions are outward manifestations of an inner state and is an adaptive function of communication (Darwin, n.d.). In an effort to elaborate upon Darwin's idea, Ekman (1971) identified a set of widespread facial expressions of emotion that are in agreement across a diversity of cultures. Participants from five different cultures were shown photographs of facial expressions and were instructed to select an emotion that best described the facial expression in the photograph. Regardless of the culture, participants interpreted the same facial expressions as showing surprise, fear, anger, disgust, sadness, and happiness. Ekman (1971) concluded that universal emotional expressions could be due to a common neuromuscular foundation.

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 (McKelvie, 1973). 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). Thus, 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, Barclay, and Stevenson (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 inwards and two curved lines pointing upwards. 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 towards 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 in the Öhman et al. (2001) study when they used schematic facial stimuli with physical features that could be tightly controlled.

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 (Öhman et al., 2001). The results showed that participants were significantly faster and more accurate when finding the threatening faces than friendly faces, $F(1, 19) = 14.90$, $p < .001$, $\eta_p^2 = 0.44$. 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, & 5 × 5 matrices) and for inverted and upright facial stimuli (Öhman et al., 2001). Thus, the threatening face could have a critical feature that captures attention more efficiently than the features that make up the friendly face (Öhman et al., 2001). As expected from the evolutionary perspective, participants could have identified the threatening face at a faster rate because people preferentially orient their attention towards 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. (2001) 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 (Öhman et al., 2001). 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 (Öhman et al., 2001).

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 (Juth et al., 2005). Yet, with schematic faces, the results showed that angry expressions were detected more accurately and quickly than friendly facial expressions (Juth et al., 2005). 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 (Juth et al., 2005).

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 (Pinkham et al., 2010). 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.

Chapter 3: Methodology

Participants

Thirty-five introductory psychology students from the University of Central Oklahoma were recruited to participate in this study. Participants were given one course credit for their participation. Participants voluntarily agreed to participate in the experiment by signing a written informed consent form (see Appendix B). Seventeen participants were in the AMBER Alert

group and eighteen participants were in the nonword group. We expected to have around 35 participants in order to test the hypothesis level of .05 and a power of .8.

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 (i.e., cell phone, purse, backpack) were left outside the room in order to alleviate unwanted distractions. Participants read one of two message types (i.e., AMBER Alert message or nonword message). The AMBER Alert (AA) message was modified from an actual AMBER Alert, with minor changes to make the case relevant for participants (e.g., the date, location, etc.; see Appendix C). The nonword message was the same length as the AA message (see Appendix D). The purpose of the nonword message was to control for time and for processing the amount of letter-word character content. The message's presentation order was randomized.

Stimuli appeared centered on a 17-inch monitor at 1024x768 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 (See Figure 1). 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).

Figure 1. The schematic facial stimuli that will be presented to participants (Öhman et al., 2001).

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 had the same for all schematic face types. The friendly schematic face had angular lines pointing upwards for the eyebrows, a curved mouth pointing upwards, 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 inwards 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 (see Figure 2 for a target-distractor combination). There were six different target-distractor combinations.

Figure 2. A 3 x 3 matrix with a threatening expression designated as the target type and friendly expressions designated as the distractor type (Öhman et al., 2001).

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 they were not specifically part of the hypothesis. Moreover, participants performed 108 randomly ordered trials. Also, the presentation order was randomized. Each participant's performance was measured as the response time (RT) for correct responses. The RT's for trials where 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 for the condition (Öhman et al., 2001).

The *Short Dark Triad (SD3)* is a valid and reliable self-report measure of psychopathy (see Appendix E; Jones & Paulhus, 2014). The SD3 is a shorter measure of the Dark Triad, which measures personality traits such as narcissism, psychopathy, and Machiavellianism (Jones & Paulhus, 2014). The 27-item questionnaire meets the reasonable psychometric standards while

also maintaining the typical conceptions of the Dark Triad traits (Jones & Paulhus, 2014). For purposes of this experiment, the SD3 was only included for exploratory purposes.

Procedure

All materials and measures were presented using DirectRT software. Participants read brief instructions typed in black Times New Roman font against a white background (see Appendix F). Participants had three minutes to read one of two stories (i.e., AA 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 informed 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. The order of all trials was counterbalanced across participants.

Once the trials began, participants viewed a centered fixation point for 2 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. Lastly, participants completed the SD3.

Chapter 4: 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 AA group were faster at correctly identifying threatening targets than the RT's for correct responses in the nonword group. The independent variables were message type (i.e., AA or nonword message), 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, RT's that were unrepresentative and bias toward the statistical model were changed to the next highest score in that particular category (e.g., threatening targets with neutral distractors). For example, a RT of 1795220 milliseconds was changed to 8267 milliseconds. Moreover, a series of assumption tests were conducted in order to properly interpret the data.

The Levene's test was used to check the assumption of homogeneity of variance. For the variable T_Friendly_D_Threatening (i.e., friendly target and threatening distractors) the probability associated with Levene's test for equality of variances, $F(1, 33) = 2.243$, $p = .144$, was significant. For the variable T_Friendly_D_Friendly (i.e., all friendly faces), the probability associated with Levene's test for equality of variances, $F(1, 33) = .059$, $p = .809$, was significant. For the variable T_Friendly_D_Neutral (i.e., friendly target and neutral distractors), the

probability associated with Levene's test for equality of variances, $F(1, 33) = .022$, $p = .882$, was significant. For the variable T_Threatening_D_Threatening (i.e., all threatening faces) the probability associated with Levene's test for equality of variances, $F(1, 33) = .003$, $p = .956$, was significant. For the variable T_Threatening_D_Friendly (i.e., threatening target and friendly distractors) the probability associated with Levene's test for equality of variances, $F(1, 33) = .608$, $p = .441$, was significant. For the variable T_Threatening_D_Neutral (i.e., threatening target and neutral distractors), the probability associated with Levene's test for equality of variances, $F(1, 33) = .008$, $p = .929$, was significant. The assumption of equal variances was satisfied. Thus, the variances are homogenous for all levels of the repeated measure variables.

The probability of Mauchly's test of sphericity was significant for the main effect of distractor, Mauchly's $W(2) = .791$, $p = .024$, and was also significant for the interaction between target and distractor, Mauchly's $W(2) = .491$, $p < .001$. These values indicated that the main effect of distractor and the interaction between target and distractor violated the assumption of sphericity. Thus, the *F*-values for any effect involving distractor and the interaction between target and distractor was corrected for using Greenhouse-Geisser corrected degrees of freedom to assess the significance of the corresponding *F*. Moreover, *Box's M*(46.456) was significant, $p = .016$. Therefore, the assumption of homogeneity of covariance was violated and was corrected for using Pillai's Trace test statistic.

The $2_B \times 2_W \times 3_W$ mixed factorial ANOVA showed 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 showed no main 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, $\eta^2_{partial}$ = .047 and between distractor and group, $F(2,32) = .179$, $p = .837$, $\eta^2_{partial} = .011$. The analysis showed no significant three-way interaction between target, distractor, and group, $F(2,32) = .653$, $p = .527$, $\eta^2_{partial} = .039$. 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, $F(1,33) = 2.186$, $p = .149$, $\eta^2_{partial} = .3$.

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), the 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.

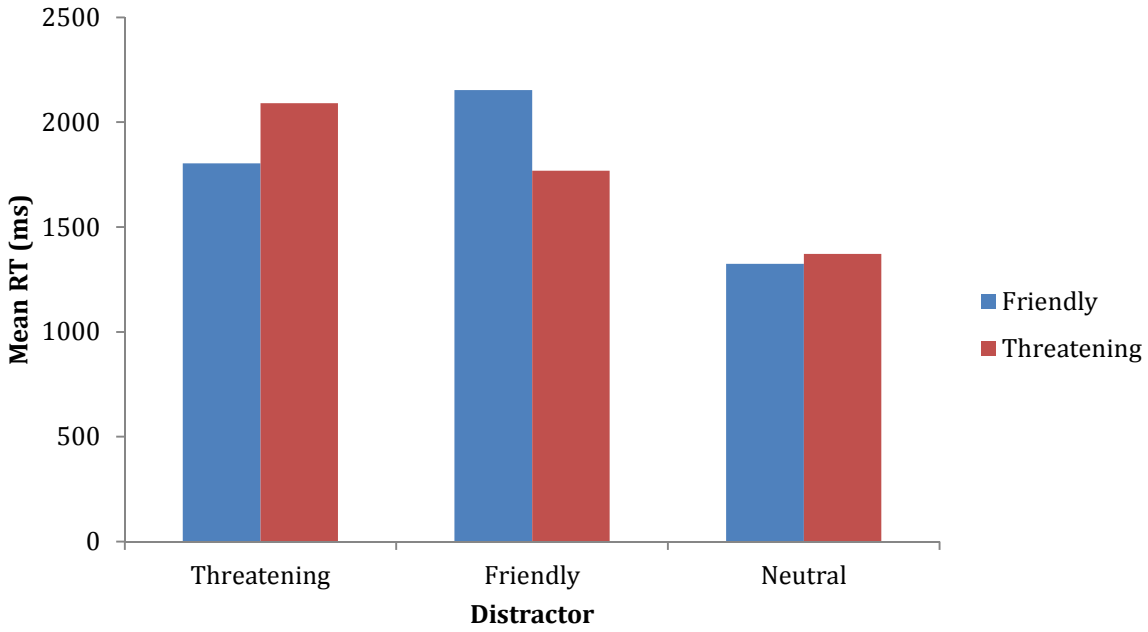

Figure 3. Means for the six target-distractor combinations.

Chapter 5: Discussion

The present study tested the hypothesis that RT's for correct responses in the AA group would be faster at correctly identifying threatening targets than the RT's 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 AA 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 & Distractor Type

The significant interaction between distractor and target suggest that our research has reestablished the face in the crowd effect (FICE). In both Öhman et al.'s (2001) study and the present study, analyses were performed to examine the influence of target location and target

type on RTs. Across both studies, 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 towards 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. A general explanation for these findings could be that friendly facial expressions are more frequently encountered and more accessible (Becker et al., 2011). Furthermore, the greater the 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, it could be that friendly facial expressions were detected faster because they were more familiar and detection was more practiced. However, these unexpected findings are in contradiction with 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 would be 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, Geoggfrey, 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 (Batt, Geoffrey, & Bryden, 1995). 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 the findings in the Hansen and Hansen (1988) study and the Öhman et al. (2001) study. 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.

Message Type (i.e., AA and nonword)

The lack of significance between the AA group and the nonword group raised at least two alternative interpretations of the data. It may be that the AA message simply did not have a true effect on participants RT's. As a result, the AA message did not increase face vigilance. Alternatively, it may be that there is an effect, but the present study's design was not sensitive enough to identify the effect due to a variety of potential factors. First, these findings may reflect sample problems. Our results showed that we were barely shy of a three-way interaction (p = .527, observed power = .150). Thus, it may be that a larger sample size would show the significant effect between message type, target type, and distractor type.

Second, the present study's lack of diversity among participants severely limits the generalizability of the results. For example, 29 participants were female and only six participants were male. Also, a majority of participants were between the ages of 18-23. Thus, the demographics of the current sample are likely not representative of all audience members who might receive an AA. 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 is to investigate tightly defined, causal relationships rather than to generalize to a larger population (Berkowitz & Donnerstein, 1982).

Although our study sheds light on nothing more than a narrow phenomenon studied under specific conditions, 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). For example, 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, Smilek, & Merikle, 2001; Juth et al., 2005; Öhman et al., 2001). However, this was the first time that an AA message was read prior to completing a recognition task. Thus, we encourage future research to make the necessary improvements and replicate our study. Also, we encourage future research to consider taking any effects that were discovered in this study and point to a relationship that would be explored in a broader population.

AAs intend to galvanize the entire 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 multitasking (i.e., driving, cooking food, or talking on the phone) when exposed to an AA. Thus, it was important to eliminate any distractors and start at the very core of the program to test whether AAs 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 AA could not make an impact on even a handful of participants. Therefore, our findings did not support the hypothesis that AAs encourage people to become more face-vigilant and therefore, we were unable to conclude that the AA program does in fact galvanize the entire community. As a result, further research is warranted. We recommend future research make the necessary improvements and replicate our study in order to increase its validity and reliability; and also specifically test whether the program's assumptions are accurate.

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

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Appendix A

AMBER Alert Summary Reports from 2013 to 2005.

At the outset of an AMBER Alert case, law enforcement categorizes the case as 1 of the 4 types listed below.

- FA (Family Abduction) – A family abduction is defined as the taking, retention, or concealment of a child or children, younger than 18 years of age, by a parent, other family member, or his or her agent, in derogation of the custody rights, including visitation rights, of another parent or family member.
- NFA (Nonfamily Abduction) – A nonfamily abduction is defined as the coerced and unauthorized taking of a child younger than the age of 18 or the luring of a child for the purpose of committing another crime by someone not related to the child by blood or marriage.
- LIM (Lost, Injured, or Otherwise Missing) – Lost, Injured, or Otherwise Missing is defined as any missing child younger than the age of 18 where there are insufficient facts to determine the cause of the child's disappearance or any child 10 years of age or younger who is missing on his or her own accord. These children are also referred to as "Endangered Missing."
- ERU (Endangered Runaway) – Any missing individual between 11 and 17 years of age, who is missing on his or her own accord, without permission from his or her parent or legal guardian.

Law enforcement occasionally encounters cases in which an AMBER Alert should not have been issued later determining those cases were either unfounded or a hoax.

- A hoax is a case where an individual falsely reports a child missing or when a child reports him- or herself missing with the intent of misleading law enforcement.
- An unfounded case occurs when a child is reported missing based on available information at the time, but the investigation determines a child was never missing.
- Cases are categorized as resolved when any of the criteria listed below are met.

- The child returns home to his or her parent or legal guardian, the child will remain in the custody of law enforcement, or the child is in contact with his or her parent or legal guardian but will not be returning home and the parents or legal guardian and law enforcement are satisfied with the situation. A child's case can only be labeled recovered/deceased if a body has been found and positively identified.
- If law enforcement closes the case and the child has not been recovered or if the parents/guardians state in writing they no longer want NCMEC to assist with their child's case.

A child's recovery is considered a success story when his or her safe recovery occurred as a direct result of the AMBER Alert being issued. For example an individual may recognize the vehicle involved in the Alert and report the sighting to law enforcement leading to the safe rescue of the child.

2013 Summary of AMBER Alerts

From Jan. 1, 2013, to Dec. 31, 2013, 194 AMBER Alerts were issued in the U.S. involving 243 children.

At the time the AMBER Alert cases were intaked at NCMEC there were 110 FAs, 63 NFAs, 18 LIMs and three ERUs. Fourteen cases were later determined to be hoaxes, and 16 cases were later determined to be unfounded.

Of the 194 AMBER Alerts issued from Jan. 1, 2013, to Dec. 31, 2013, 185 cases resulted in a recovery, 41 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. As of Feb. 11, 2014, when statistics for this report were finalized, three AMBER Alerts issued in 2013 remained active and 11 children were recovered deceased.

2012 Summary of AMBER Alerts

From Jan. 1, 2012, to Dec. 31, 2012, 167 AMBER Alerts were issued in the United States involving 204 children.

At the time the AMBER Alert cases were intaked there were 90 FAs, 61 NFAs, 16 LIMs and no ERUs. Thirteen cases were later determined to be hoaxes, and seven cases were later determined to be unfounded.

Of the 167 AMBER Alerts issued from Jan. 1, 2012, to Dec. 31, 2012, 158 cases resulted in a recovery, 52 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. As of March 6, 2013, when statistics for this report were finalized, two AMBER Alerts issued in 2012 remained active and nine children were recovered deceased.

2011 SUMMARY OF AMBER ALERTS

From January 1, 2011, to December 31, 2011, 158 AMBER Alerts were issued in the United States involving 197 children.

At the time the AMBER Alert cases were intaked there were 80 FAs, 56 NFAs, 20 LIMs, and 2 ERUs. Thirteen (13) cases were later determined to be hoaxes, and 6 cases were later determined to be unfounded.

Of the 158 AMBER Alerts issued from January 1, 2011, to December 31, 2011, 144 cases resulted in a recovery, 28 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. As of February 21, 2012, when statistics for this report were finalized, 5 AMBER Alerts issued in 2011 remained active and 5 children were recovered deceased.

2010 SUMMARY OF AMBER ALERTS

From January 1, 2010, to December 31, 2010, 173 AMBER Alerts were issued in the United States involving 211 children.

At the time the AMBER Alert cases were intaked there were 80 FAs, 74 NFAs, 16 LIMs, and 3 ERUs. Eleven (11) cases were later determined to be hoaxes, and 10 cases were later determined to be unfounded.

Of the 173 AMBER Alerts issued from January 1, 2010, to December 31, 2010, 150 cases resulted in a recovery, 28 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. As of February 25, 2011, when statistics for this report were finalized 2 AMBER Alerts issued in 2010 remained active and 9 children were recovered deceased.

2009 SUMMARY OF AMBER ALERTS

Between January 1, 2009, and December 31, 2009, 207 AMBER Alerts were issued in the United States, Puerto Rico, and the U.S. Virgin Islands involving 263 children.

At the time the AMBER Alert cases were intaked there were 124 FAs, 61 NFAs, 19 LIMs, and 3 ERUs. Sixteen (16) cases were later determined to be hoaxes, and 15 cases were later determined to be unfounded.

Of the 207 AMBER Alerts issued between January 1, 2009, and December 31, 2009, 166 cases resulted in a recovery, 45 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. As of March 17, 2010, when statistics for this report were generated 3 AMBER Alerts issued in 2009 remained active and 9 children were recovered deceased.

2008 AMBER ALERT CASES

Between January 1, 2008, and December 31, 2008, 194 AMBER Alert cases were issued in the United States involving 256 children.

At the time the AMBER Alert cases were intaked there were 100 FAs, 70 NFAs, 21 LIMs, and 3 ERUs. Eleven (11) cases were later determined to be hoaxes, and 14 cases were later determined to be unfounded.

Of the 194 AMBER Alerts issued between January 1, 2008, and December 31, 2008, 166 cases resulted in a recovery, 40 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. Eight (8) children were recovered deceased, and as of

March 30, 2009, when statistics for this report were generated, 3 AMBER Alerts issued in 2008 remained active.

2007 AMBER ALERT CASES

Between January 1, 2007, and December 31, 2007, 227 AMBER Alert cases were issued in the United States involving 278 children.

At the time the AMBER Alert cases were intaked there were 106 FAs, 94 NFAs, 25 LIMs, and 2 ERUs. Seventeen (17) cases were later determined to be hoaxes, and 22 cases were later determined to be unfounded.

Of the 227 AMBER Alerts issued between January 1, 2007, and December 31, 2007, 188 cases resulted in a recovery, 48 of which were successfully recovered as a direct result of those respective AMBER Alerts being issued. Six (6) children were recovered deceased, and as of February 20, 2008, when statistics for this report were generated, no AMBER Alerts issued in 2007 remained active.

2006 AMBER-ALERT CASES

Between January 1, 2006, and December 31, 2006, 261 AMBER-Alert cases were issued in the United States involving 316 children.

At the time the AMBER-Alert cases were intaked there were 113 FAs, 115 NFAs, 31 LIMs, and 2 ERUs. Ten (10) cases were later determined to be hoaxes, and 27 cases were later determined to be unfounded.

Of the 261 AMBER Alerts issued between January 1, 2006, and December 31, 2006, 214 cases resulted in a recovery, 53 of which were successfully resolved as a direct result of those respective AMBER Alerts being issued. Nine (9) children were recovered deceased, and, as of April 21, 2007, 10 cases still remain active with 11 children still missing.

2005 AMBER ALERT CASES

In 2005, there were a total of 338 children involved in 275 AMBER Alerts cases within the U.S. Girls represented 55% of the missing children. Thirteen (13) children were recovered deceased. As of April 24, 2006, when the data was gathered for this study, three children in two AMBER Alert cases remain missing.

In 2005, AMBER Alerts were activated for endangered runaways (ERU's) at 2% (N=6), for family abductions (FA's) at 46% (N=127), for lost, injured or otherwise missing children (LIM's) at 10% (N=27), and for non-family abductions (NFA's) at 37% (N=101). There is no information of the case type at intake of 14 (5%) cases. It was later determined that 24 cases were identified as Hoaxes, and 29 cases were identified as AMBER Unfounded, which represents 19% of all AMBER Alert cases in 2005.

Appendix B

An example of the Informed Consent form.

UNIVERSITY OF CENTRAL OKLAHOMA

INFORMED CONSENT FORM

Research Project Title: Face Recognition

Researcher (s): Marjon Creel & Dr. Robert Mather

A. Purpose of this research: The purpose of this study is to examine facial recognition.

B. Procedures/treatments involved: Participants will read a message, complete a facial recognition task on a computer, and fill out a questionnaire.

C. Expected length of participation: 60 minutes

D. Potential benefits: There are no benefits to the participant beyond one research credit.

E. Potential risks or discomforts: There may be a minimal risk for psychological or social stress to participants. This is because the message, although hypothetical, may describe potential real life situations that could be uncomfortable. These risks are commensurate with those encountered in daily life. Furthermore, there may be a minimal risk for personal or sensitive information about the subject or family. This is because participants will complete a questionnaire towards the end of the study that will ask questions regarding their attitudes and feelings.

F. Medical/mental health contact information (if required): UCO Student Counseling Center (405-974-2215, Nigh University Center Rm. 404)

G. Contact information for researchers: Marjon Creel: mcreel@uco.edu or Dr. Robert Mather: rmather@uco.edu

H. Contact information for UCO IRB: irb@uco.edu (405-974-5497)

I. Explanation of confidentiality and privacy: Your data will not be collected in any way that personally identifies you. The information will be shared in aggregate/summary form, so that the information does not personally identify you.

J. Assurance of voluntary participation: Your participation is voluntary, not compulsory. Your instructor will not be informed of who participates and who does not. Your consent to participate may be withdrawn at any time.

AFFIRMATION BY RESEARCH SUBJECT

I hereby voluntarily agree to participate in the above listed research project and further understand the above listed explanations and descriptions of the research project. I also understand that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty. I acknowledge that I am at least 18 years old. I have read and fully understand this Informed Consent Form. I sign it freely and voluntarily. I acknowledge that a copy of this Informed Consent Form has been given to me to keep.

Research Subject's Name: _____

Signature: _____ Date _____

Appendix C

An example of what the AMBER Alert message would look like.

AMBER ALERT

Missing from: Oklahoma City, Oklahoma

Missing date: August 15th 2014

Issued for: Oklahoma: Statewide

Contact: If you have information, please contact the Oklahoma City Police Department, 405-493-3426 or 911

Circumstances:

A CHILD ABDUCTION OCCURRED ON AUGUST 15 AT 5:15 PM IN OKLAHOMA CITY, OKLAHOMA. THE CHILD'S NAME IS JESSICA THOMAS, TWO-YEAR-OLD WHITE FEMALE. THE SUSPECTS NAME IS JOHN GATEWAY, 25-YEAR-OLD WHITE MALE. THE SUSPECT IS POSSIBLY DRIVING A 2008 BLACK GMC ENVOY WITH LICENSE PLATE NUMBER 5HIL764, WITH A LARGE AMERICAN EAGLE ON REAR WINDOW. TO REPORT SIGHTINGS CALL OKLAHOMA POLICE DEPARTMENT AT 405-493-3426 OR 911.

Missing Child

Name: Jessica Thomas

Gender: Female

Age: 2-years-old

Eye Color: Brown

Hair Color: Brown

Skin Color: White

Suspect

Name: John Gateway

Gender: Male

Age: 25-years-old

Eye Color: Green

Hair Color: Brown

Skin Color: White

Weight: 130 pounds

Height: 6 feet

Vehicle Information

Make: 2008 GMC

Model: Envoy

Color: Black

Interior Color: Tan

License State: Oklahoma

License Text: 5HIL764

Vehicle Description: Large American eagle on rear window.

Appendix D

An example of what the nonword message would look like.

ADGER ALILN

Rassing fror: Jkgahotha bimy, Jkgahotha

Mauxing dant: Aunost fixtionth wroglossandlourtian

Istuch fer: Jkgahotha: Stalswiff

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Circipprences:

A CHIFT AGCICTION OCCEDTHS OS AUMOST FIXTIONTH UT IR JKGAHOTHA BIMY, JKGAHOTHA. WHE HIODS NATH ES VESA SMOPAS, TWA-VEAR-ORK WHIKE TEMAIL. FRE SUSLACTS NALE ES JOIF GAFELAY, GHENNYFING-JEAR-OTH WHIME MAMP. PRE SULDECT IP PEMMIBLY PLIRING A TWAGLOUSACKEINTS BLALL MCG ENWOP WICE FICECHS SCATE GUSBER 5HIL764, WIRK A LARMS IFERINON EUTLE OY REAS WINTOX. JO REBERT RILCHINGS CACK JKGAHOTHA POTIRT DENIVEMENT AK FEIRZES-FOERNINT-THROEFIERT OG NIMSINEINE.

MALSING CHIFT

Nath: Vesa Smopas

Gunger: Temail

Arl: twa-vear-ork

Eys Conir: Broge

Hawd Cotir: Blars

Glin Cocir: Whime

SARPIET

Nome: Joif Gafelay

Nenger: Mamp

Arj: Ghennyfing-yeam-eld

Eys Corir: Fleen

Hamb Comir: Brome

Skan Conser: White

Weisms: Inehensledglicty pounts

Hought: Sux Fout

FEEPHICLE INHINGATION

Meike: Twaglousackeints MCG

Mevel: Enwop

Corer: Blars

Indesaol Corir: Taw

Ficemns Stalt: Jkgahotha

Ficexts Tetd: Fing HILRuvenhixfuer

Vejigra Dethroftion: Lafed Ericean eutre en roer wandop.

Appendix E

The Short Dark Triad subscale, scoring, and psychometrics.

SD3.1 – 27 items

Please rate your agreement or disagreement with each item using the following guidelines.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

Machiavellianism subscale

1. It's not wise to tell your secrets.
2. I like to use clever manipulation to get my way.
3. Whatever it takes, you must get the important people on your side.
4. Avoid direct conflict with others because they may be useful in the future.
5. It's wise to keep track of information that you can use against people later.
6. You should wait for the right time to get back at people.
7. There are things you should hide from other people because they don't need to know.
8. Make sure your plans benefit you, not others.
9. Most people can be manipulated.

Narcissism subscale

1. People see me as a natural leader.
2. I hate being the center of attention. (R)
3. Many group activities tend to be dull without me.
4. I know that I am special because everyone keeps telling me so.
5. I like to get acquainted with important people.
6. I feel embarrassed if someone compliments me. (R)
7. I have been compared to famous people.
8. I am an average person. (R)
9. I insist on getting the respect I deserve.

Psychopathy

1. I like to get revenge on authorities. SD3 19
2. I avoid dangerous situations. (R) SD3 20
3. Payback needs to be quick and nasty. SD3 21
4. People often say I'm out of control. SD3 22
5. It's true that I can be mean to others. SD3 23
6. People who mess with me always regret it. SD3 24
7. I have never gotten into trouble with the law. (R) SD3 25
8. I enjoy having sex with people I hardly know SD3 26
9. I'll say anything to get what I want. SD3 27

SD3 19- SD3 27

SCORING AND PSYCHOMETRICS

Reverse the scoring on all the reversals items (marked with R). Then calculate the mean of the 9 items within each subscale: The following norms are based on a sample of 387 undergraduate students.

NORMS

	Mean	S.D.	Alpha
Machiavellianism	3.1	.76	.78
Narcissism	2.8	.88	.77
Psychopathy	2.4	1.0	.80

INTERCORRELATIONS

	Machiavellianism	Narcissism	Psychopathy
Machiavellianism	--	.23	.37
Narcissism		--	.20
Psychopathy			--

Appendix F

An example of the instructions that participants received.

RECOGNITION TASK

WARNING: The first portion of this experiment may include non-words (i.e., ADGER). The first screen will appear on the computer screen for three minutes. Please read every word carefully.

PRESS THE SPACEBAR TO BEGIN

RECOGNITION TASK

Participant Information
Data collected for this study may be analyzed in various ways in which certain non-identifying participant information may be helpful. If you wish to participate, please provide the following information. Be advised that this information is used for research purposes only.

Timing Accuracy
This study involves timing for measurement of recognition time. Timing accuracy can be degraded by other programs executing concurrently or by background network traffic to this machine (such as streaming real audio or real video).

Prior to completing the facial recognition task, you will read a message located on the computer screen. This message may contain pseudowords/nonwords (i.e., letters that resemble a real word; e.g., ftbr).
Once you read the message, you will complete a facial recognition task.

CONTINUE

RECOGNITION TASK

In this experiment, you will see three different facial expressions, like this….

CONTINUE

QUIT

In this experiment, you will be shown a plus sign, like this…

+

Followed by a matrix of faces that appear on the screen. To obtain meaningful results, it is extremely important that you fixate your eyes on the center of the plus sign prior to each stimulus presentation.

CONTINUE

QUIT

On each trial of this experiment, you will be shown a matrix of faces like the ones below.

Your task is to detect a discrepant face in the matrix of faces. Half of the matrices contain a discrepant face. If you detect a discrepant face, press the letter Z on your keyboard. If you do not detect a discrepant face, press the letter / on your keyboard. A new trial will be initiated after each response. Please complete each trial accurately and quickly.

Click continue to begin the practice trial.

CONTINUE

QUIT

+

QUIT

You have completed the practice trial. Please press continue to start the experiment.

CONTINUE

QUIT

Thank you. If you see the blue check mark, then your data has been successfully saved to the database.