Facial expressions are a universal symbol form of communication. Universal facial expressions include happy, sad, angry, boredom, disgust, and fear and are demonstrated by the way the facial features (i.e. mouth, eyes, nose, eyebrows) are positioned and structured (Kaufmann, Drevland, Wessel, Overskeid, and Magnussen, 2003; Langner, Dotsch, Bijlstra, and Wigboldus, 2010).

Facial expressions continue to provide individuals with information necessary to communicate in the modern social world (Langner et al., 2010). Current research involving facial expressions is conducted in psychology and criminal justice, more specifically the combined discipline of legal psychology. Legal psychologists and law enforcement personnel use facial expression research to help accurately and effectively produce lineups of criminal suspects for eyewitness identification procedures (Kaufmann et al., 2003). Eyewitness
misidentifications can be a leading cause of wrongful convictions (Flowe and Humphries, 2011). Using evidence-based research to develop valid and reliable photo lineups can help reduce inaccurate eyewitness identifications potentially decreasing wrongful convictions. Because facial expressions are universal, research on how facial expressions influence decisions and judgments of others has far-reaching implications.

Judgments about an individual based on emotional facial expression may have adaptive value (Pham and Philippot, 2010). For example, judgments regarding emotional facial expressions may help individuals avoid someone who appears threatening via their facial expressions (Flowe, 2012). On the other hand, such evaluations could inappropriately influence decision making by eyewitnesses in criminal identification lineups.

Previous research has demonstrated that facial expressions (e.g. angry, neutral, or happy expressions) influence perceptions and judgments of criminality (Flowe, 2012). These ratings can be influenced by the types of facial expressions being displayed, potentially resulting in higher ratings of criminality for individuals who are not actually criminals. In one study, angry faces were perceived as most criminal, followed by neutral faces and then happy faces (Flowe, 2012). Although angry facial expressions were rated as more criminal, an angry facial expression did not mean that an individual committed a crime. Since ratings for various characteristics, such as criminality are influenced by facial expressions, research regarding this influence can be used to decrease inaccurate assumptions made about an individual by providing insight into the negative effects facial expressions can have on people’s judgements of others, such as wrongful convictions of innocent individuals based on their facial expressions.

Facial expressions have also been studied for characteristics such as attraction, trustworthiness, and suggestibility (Langner et al., 2010; Nurmoja and Bachmann, 2014; Rule,
Krendl, Ivcevic, and Ambady, 2013). Results demonstrate that suggestibility and trustworthiness can have interacting effects on perceived emotional facial expressions based on morphed facial qualities, such as attractiveness/unattractiveness. In addition, research conducted by Rule et al. (2013) found that people demonstrate strong agreements in their perceptions of trustworthiness towards others’ untrustworthy behaviors such as committing corporate fraud and students who cheat on a test. Previous research has also focused on different populations, including strangers, spouses, and criminal psychopaths in order to examine judgments made by these individuals based on facial appearance or expressions (Petrician, Todorov, and Grady, 2014; Pham and Philippot, 2010). This previous research found that individuals who appeared more trustworthy received more positive personality evaluations from their spouses and strangers. Also, criminal psychopaths were found to be less accurate at detecting facial expressions of others compared to non-criminal psychopaths (Pham and Philippot, 2010). In addition to the characteristics and populations studied, previous research has investigated head orientation and eye gaze to determine if these affect ratings of facial expressions (Langner et al., 2010). Based upon the results of previous research, frontal head orientation and frontal eye gaze of the individuals photos in the database demonstrated strong agreements between the intended and chosen facial expression among raters for this particular head orientation and eye gaze. The majority of research in this area provides photographs to distinguish multiple facial expressions; however some research focuses on the varied pixilation of facial images in order to determine how individuals perceive criminality, trustworthiness, and suggestibility (Nurmoja et al., 2012). Results suggest that regardless of image pixilation, individuals are able to perceive and differentiate various facial cues for criminality, trustworthiness, and suggestibility. However, their perceptions of criminality and trustworthiness were more accurately demonstrated with
pixelated images than their perceptions of suggestibility were. Although the above variables have been studied in previous research, there is still much to be studied in regard to the judgments individuals make of others based on facial expressions.

The current body of research lacks study of educational interventions to mitigate the influence of expression on ratings. An educational intervention could be created in order to raise awareness of the bias facial expressions can have on ratings—criminality, violence, and trustworthiness. The present study aims to examine whether an educational intervention has an effect on the ratings of angry, neutral, and happy facial expressions for criminality, violence, and trustworthiness.

Secondly, previous research focuses on many facial expressions, including fearful, disgusted, and contemptuous (Langner et al., 2010). The present study chose to present angry, neutral, and happy facial expressions because they are common universal expressions (Langner et al., 2010). In addition, angry, neutral, and happy facial expressions have produced mixed results in previous research. Results of research conducted by Flowe (2012), suggest that participants rated angry facial expressions as more criminal and less trustworthy than neutral or happy facial expressions in standardized photos. Oppositely, results of research conducted by Todorov, Pakrashi, and Oosterhof (2009) focused on neutral facial expressions and trustworthiness; suggest that neutral facial expressions were rated as more untrustworthy. With angry, neutral, and happy facial expressions as the main expressions, the present study aims to replicate and extend the results of previous research.

The present study further aims to examine novel information, such as how ratings of photos are affected if participants’ are accused, convicted, or victims of a crime (Langner et al., 2010). Research by Langner et al. (2010) suggests that individuals are able to recognize
intended facial expressions, including angry, neutral, and happy expressions. With this recognition, the current study aims to examine whether being accused, convicted, or a victim of a crime is important in how individuals identify facial expressions for criminality, violence, and trustworthiness.

It is hypothesized that;

(1) participants will rate angry facial expressions as less trustworthy, more criminal, and more violent than neutral or happy facial expressions;

(2) participants in the intervention condition will rate angry facial expressions as less criminal, less violent, and more trustworthy than participants in the control condition;

(3) A. participants accused of a crime \((n = 46)\) will rate angry facial expressions as less criminal, less violent, and more trustworthy compared to participants not accused of a crime;

B. participants convicted of a crime \((n = 14)\) will rate angry facial expressions as less criminal, less violent, and more trustworthy compared to participants not convicted of a crime;

C. Participants who have been a victim of crime \((n = 103)\) will rate angry facial expressions as more criminal, more violent, and less trustworthy compared to participants who were not victims of crime.

Method

Participants

Participants consisted of 569 male and female undergraduate college students, randomly assigned to control \((n = 285)\) and intervention \((n = 284)\) groups. The age of participants in the control group \((M = 19.41, SD = 2.55)\) and in the intervention group \((M = 19.42, SD = 3.04)\) ranged from 19-23 years of age. Participants were predominately female in both the control (77.1%) and intervention groups (81.8%) and this percentage was not significantly different.
between groups. Participants were also predominately Caucasian ethnicity in both the control (81.9%) and intervention (80.3%) groups and this percentage was not significantly different between groups. Within the control group, 0.08% of participants were accused of a crime, 0.03% of participants were convicted of a crime, and 20.8% of participants were victims of a crime. Within the intervention group, 0.07% of participants were accused of a crime, 0.01% of participants were convicted of a crime, and 16.3% of participants were victims of a crime. These percentages were not significantly different between control and intervention groups.

**Demographic form**

Information regarding sex, age, and ethnicity were assessed in all participants via self-report within the online survey form. Questions regarding whether a participant was accused of a crime, convicted of a crime, or a victim of a crime were also assessed. These questions were assessed using self-report in which participants answered in yes/no format whether they have been accused, convicted, or a victim of a crime. It is important to note that there was no time frame for their status in criminality (*i.e.* the occurrence of the crime did not have to take place within a certain amount of time) and the accusations, convictions, and victimizations were not officially verified by the researchers. Participants who did not report to be accused, convicted, or a victim of a crime were still included in the data.

**Procedure**

The current study received ethical approval for the research of human subjects from Northern Arizona University’s Institutional Review Board. Participants were briefed on the study and their informed consent for participation was obtained electronically before beginning the study. After participants completed the informed consent, they were randomly assigned to either a control or intervention condition through a simulated virtual coin flip, in which
participants were asked to select a heads or tails option. Participants then read two different paragraphs depending on which condition they were randomly assigned, either the control condition or intervention condition. In order to measure whether the participants comprehended their assigned reading, they were required to answer one comprehension question to indicate what the main topic of their reading was. The data for incorrect answers were excluded from the analyses. Participants then rated 15 photographs consisting of five different men who each portrayed a happy, neutral, and angry facial expression (see Figure 1 for example question).

Figure 1. Sample question

7. Please rate the person in this photograph for the following items:

How criminal does this person appear?

How trustworthy does this person appear?

How violent does this person appear?
Included photos contained Caucasian male stimuli. Female faces were not included in the current study in order to focus on the ratings of male stimuli to start. The selected photographs were obtained with approval through the Radboud Faces Database (RaFD). The facial stimuli in RaFD were tested for validity in which results showed that each face had high recognition of the intended facial expression based on an 82% overall agreement rate between the intended and chosen facial expressions (Langner et al., 2010). Although this database had multiple facial expressions displayed by various men, the photos selected for this study were limited to happy, neutral, and angry facial expressions (see appendix A for photographs used). Participants rated these photographs for characteristics of criminality, violence, and trustworthiness based on the facial expressions displayed in the photos. Participants then rated the degree to which the faces expressed the characteristics on a seven point Likert-type scale (1 not at all to 7 completely; see Figure 1 for example rating scale). Lastly, participants completed the demographic form and were debriefed on the purpose of this study.

**Intervention**

Participants randomly assigned to the intervention group were instructed to read a paragraph describing past research regarding the effect facial expressions have on viewers’ perceptions of others. Also included was the adaptive value this may have in helping us avoid people who are physically threatening or the inappropriate influence this has on decision-making in criminal identification line-ups, leading to mistaken eyewitness identifications. The intervention reading consisted of statistics, including percentages to report past research on this issue. Participants randomly assigned to the control group were instructed to read an irrelevant paragraph describing sociocultural anthropology. The control and intervention readings were both balanced for approximate equal length and reading level. The sources that provided the
information in the intervention reading came from the Innocence Project website, 2013 and previous research conducted by Flowe, 2012 (see appendix B for reading). The source that provided the information in the control reading came from the American Anthropological Association’s website, 2013 (see appendix C for reading).

Variables

There were three independent variables in the current study, conditions, facial expression, and criminal status. The independent variable, conditions, consisted of either an intervention group or control condition. The facial expression variable consisted of angry, happy, and neutral facial expressions of the photos used from the RaFD database for facial stimuli. The criminal status variable consisted of three conditions in which participants were either accused, convicted, or a victim of a crime. The dependent variable being studied were ratings of criminality, violence, and trustworthiness based on the two independent variables, condition and facial expressions.

Analysis

Two-way repeated measures ANOVAs were used to analyze ratings data across facial expression. The data were analyzed using IBM SPSS Statistics 22 (Statistical Package for the Social Sciences). Multiple Pearson Chi-Square tests were completed to compare categorical demographic information between groups. The alpha level was constrained to $p < .05$ for all tests. Three separate analyses were run comparing what were essentially yes/no groups (*i.e.* accused to non-accused, convicted to non-convicted, and victim to non-victim). Hypotheses that were below the .05 level were rejected, however hypotheses with a significance level above .05 were not rejected.
Results

Hypothesis 1 was supported by the data as participants rated angry facial expressions as significantly less trustworthy, more criminal, and more violent than other facial expressions ($p < .05$ for each rating; see Table 1 for comparisons).

Table 1. Summary of ratings

<table>
<thead>
<tr>
<th></th>
<th>Angry $n = 569$</th>
<th>Neutral $n = 569$</th>
<th>Happy $n = 569$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criminal</td>
<td>$4.18 \pm 0.86^*$</td>
<td>$3.26 \pm 0.73$</td>
<td>$2.41 \pm 0.82$</td>
</tr>
<tr>
<td>Violent</td>
<td>$4.39 \pm 0.89^*$</td>
<td>$3.24 \pm 0.73$</td>
<td>$2.36 \pm 0.81$</td>
</tr>
<tr>
<td>Trustworthy</td>
<td>$3.08 \pm 0.77^*$</td>
<td>$3.92 \pm 0.66$</td>
<td>$4.75 \pm 0.86$</td>
</tr>
</tbody>
</table>

Note: $^*p < .05$ Higher ratings for angry facial expressions vs. neutral or happy facial expressions.

Note: Ratings completed on a seven-point Likert-type scale (1 not at all to 7 completely)

Although it was not specifically predicted by Hypothesis 1, an interesting result emerged in which participants rated neutral facial expressions as more criminal, more violent, and less trustworthy compared to happy facial expressions.

Hypothesis 2 was not supported because there was no significant difference in angry facial expressions ratings between control and intervention groups (see Table 2 for comparisons).

Table 2. Summary of ratings for hypothesis 2

<table>
<thead>
<tr>
<th>Photo</th>
<th>Rating (Control $n = 285$)</th>
<th>Rating (Intervention $n = 284$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>$3.56 \pm 1.30$</td>
<td>$3.70 \pm 1.25$</td>
</tr>
<tr>
<td>33</td>
<td>$4.22 \pm 1.15$</td>
<td>$4.28 \pm 1.10$</td>
</tr>
<tr>
<td>28</td>
<td>$4.28 \pm 1.30$</td>
<td>$4.23 \pm 1.29$</td>
</tr>
<tr>
<td>30</td>
<td>$4.22 \pm 1.26$</td>
<td>$4.34 \pm 1.32$</td>
</tr>
<tr>
<td>15</td>
<td>$4.46 \pm 1.28$</td>
<td>$4.49 \pm 1.23$</td>
</tr>
<tr>
<td>All</td>
<td>$4.15 \pm 0.83$</td>
<td>$4.21 \pm 0.90$</td>
</tr>
</tbody>
</table>
Being accused or convicted of a crime had some effects on ratings of facial expression. One common theme that emerged in this group was higher ratings of criminality in neutral and happy facial expressions. Participants accused of a crime ($n = 46$) rated neutral and happy facial expressions as more criminal ($p < .05$; see Table 3a).

Table 3a. Summary of ratings for hypothesis 3

<table>
<thead>
<tr>
<th></th>
<th>Non-Accused ($n = 502$)</th>
<th>Accused ($n = 46$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Angry</td>
<td>Neutral</td>
</tr>
<tr>
<td>Criminality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.18 ± 0.87</td>
<td>3.24 ± 0.73a</td>
</tr>
<tr>
<td>Violent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.30 ± 0.90</td>
<td>3.22 ± 0.73</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.03 ± 0.78</td>
<td>3.92 ± 0.67</td>
</tr>
</tbody>
</table>

*a, b: Mean difference between non-accused and accused is significant at the 0.05 level.*

Participants accused of a crime did not differ from those not accused with respect to ratings of angry expressions; Hypothesis 3A was not supported by the data.

Participants convicted of a crime ($n = 14$) rated neutral and happy facial expressions as more criminal and violent than non-convicted participants (*i.e.* participants who were found to be not guilty by the criminal justice system in regard to a crime). They rate happy expressions as less trustworthy and angry facial expressions as more trustworthy than non-convicted participants ($p > .05$; see Table 3b).

Table 3b. Summary of ratings for hypothesis 3

<table>
<thead>
<tr>
<th></th>
<th>Non-convicted ($n = 535$)</th>
<th>Convicted ($n = 14$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Angry</td>
<td>Neutral</td>
</tr>
<tr>
<td>Criminality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.17 ± 0.87</td>
<td>3.25 ± 0.73b</td>
</tr>
<tr>
<td>Violent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.30 ± 0.89</td>
<td>3.22 ± 0.73c</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.04 ± 0.77a</td>
<td>3.92 ± 0.67</td>
</tr>
</tbody>
</table>

*a, b, c, d, e, f: Mean difference between non-convicted and convicted is significant at the 0.05 level.*
Participants convicted of a crime did not differ from those not convicted with respect to ratings of angry expressions; Hypothesis 3B was not supported by the data.

Among participants who were victims of a crime ($n = 103$) ratings of criminality, violence, and trustworthiness for the facial expressions were not significantly different from ratings by non-victims. There was no relationship between being a victim of a crime and ratings of angry facial expressions; Hypothesis 3C was not supported by the data (see Table 3c).

Table 3c. Summary of ratings for hypothesis 3

<table>
<thead>
<tr>
<th></th>
<th>Non-Victim ($n = 434$)</th>
<th>Victim ($n = 103$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Angry</td>
<td>Neutral</td>
</tr>
<tr>
<td>Criminality</td>
<td>4.19 ± 0.87</td>
<td>3.26 ± 0.73</td>
</tr>
<tr>
<td>Violent</td>
<td>4.32 ± 0.89</td>
<td>3.23 ± 0.74</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>3.04 ± 0.78</td>
<td>3.92 ± 0.67</td>
</tr>
</tbody>
</table>

Discussion

The current study examined the effects of educational intervention and being accused, convicted, or a victim of a crime on ratings of criminality, violence, and trustworthiness for angry, neutral, and happy facial expressions. Altogether, the results of this research are consistent with previous research in that differences in ratings of criminality, violence, and trustworthiness exist among angry, neutral, and happy facial expressions (Flowe, 2012).

The current study’s findings are consistent with previous research in that angry facial expressions were rated as more criminal, more violent, and less trustworthy as expected (Flowe, 2012). Angry facial expressions may elicit a negative connotation as depicted through higher ratings for negative characteristics (Flowe, 2012). The consistency in results provides support for previous research in that facial expressions can influence our perceptions of others, particularly angry facial expressions (Flowe, 2012; Langner et al., 2010).
The current study also contributes new ideas to this line of research. For example, previous research lacked information regarding the effects of an educational, awareness-raising intervention on rating facial expressions. Although there were no significant differences found between ratings of facial expressions between the control and intervention groups, the current study contributed this new idea for future research to continue. The intervention may not have worked as hypothesized due to lack of strength or persuasiveness in the intervention paragraph. Including more autobiographical information from individuals directly affected by mistaken eyewitness identifications due to facial expression judgments in the educational intervention paragraph may have strengthened the intervention. For example, providing personalized stories of individuals accused or convicted of a crime by eyewitness misidentifications may demonstrate a greater and more obvious impact of this eyewitness misidentification issue. Also, the intervention may not have been strong enough for the facial expressions used in the current study (e.g. angry, neutral, or happy). Providing more background information in the intervention regarding facial expressions, such as the impact specific facial expressions have on our thoughts, feelings, and behaviors towards others, may have strengthened the educational component of the intervention by informing people to a higher degree the influence facial expressions can have on us. For example, information specific to the perception of angry facial expressions may have a selective effect on ratings of angry faces only.

Previous research lacked consideration of information related to potentially influential characteristics of participants, such as being accused, convicted, or a victim of a crime. The present study provided results suggesting that individuals who have been accused or convicted of a crime may perceive neutral or happy facial expressions differently, rating these facial expressions as more criminal. It is important to consider whether or not the participants were a
part of the criminal justice system, and how they were involved in the criminal justice system (i.e. accused, convicted, or a victim of a crime). Individuals who have been accused or convicted of a crime may possess a negative viewpoint toward the criminal justice system, potentially influencing their perceptions of facial expressions for criminality, violence, and trustworthiness.

**Limitations**

One limitation of this study may have been the construction of the intervention reading. It is possible that the reading was not persuasive or salient to the reader, or that the reading length was too short to have an effect. The reading was a general summary of statistics; perhaps including a personal narrative account of an experience of bias would have been more meaningful to the participants in the intervention group.

A second limitation of this study was the small sample size for participants that reported themselves convicted of a crime ($n = 14$). This small sample size limits generalization. Also, the types of crime participants reported themselves as being either accused, convicted, or victims were not accounted for. Depending on the seriousness of the crime and how that individual was involved in the crime may have influenced how they rated the angry, neutral, and happy expressions as well.

Lastly, the sample sizes for participants who reported being accused, convicted, or a victim of a crime may have been underreported. Participants who chose to not answer these demographic questions or answered untruthfully may have reduced the sample size for these questions, which may have influenced whether there was an effect on being accused, convicted, or a victim of a crime and ratings of criminality, violence, and trustworthiness.
Future directions

Although the results of this study do not support the second and third hypotheses, this area of research merits further exploration. In order to enhance this study in the future, a stronger intervention that focuses more on the negative effects that people’s judgments have on others influenced solely by facial expressions should be implemented. As an extension of the research completed by Flowe (2012), future research may include evaluating sex differences to determine if intervention has any effect of ratings between sexes. Since the current study only presented stimuli as photographs of males, future research could also include female stimuli in the photographs.

The current study did not investigate the relationship between participant ethnicity and ratings. In addition to ethnicity of the participants, future research can incorporate different ethnicities of actors in the photographs demonstrating angry, neutral, and happy facial expressions. Although angry, neutral, and happy facial expressions are universal forms of communication, how an individual perceives these facial expressions for certain characteristics, such as criminality, violence, and trustworthiness may differ based on participant and/or stimuli ethnicity, since there is still many differences between ethnicities. Lastly, in a replication and extension of Langner et al. (2010), future research could include different head orientations and eye gazes of the stimuli presenting the facial expressions to see if this influences participant’s ratings of facial expressions as well. In summary, future studies can include the above directions in order to see if sex, ethnicity, and head orientation and eye gaze of have an effect on ratings of violence, criminality, and trustworthiness for angry, neutral, or happy facial expressions between the control and intervention groups.
Future research may also include other universal facial expressions, such as disgust and fear to see if an intervention has an effect on people’s perceptions of these facial expressions. Although the intervention had no effect overall on angry, neutral, or happy expressions, it is unknown whether an educational intervention would elicit significant differences in ratings of criminality, violence, and trustworthiness for other universal facial expressions.

References


Appendix A
Appendix B

A 2004 Gallup public opinion poll asked respondents if they think the criminal justice system is "very fair, somewhat fair, somewhat unfair or very unfair" in its treatment of accused criminals. As a whole, most Americans think the criminal justice system is either "very fair" (18%) or "somewhat fair" (48%). However, mistaken eyewitness identifications contributed to approximately 75% of the 301 wrongful convictions in the United States that have been overturned by post-conviction DNA evidence. Research shows that eyewitnesses tend to choose a lineup member based upon a relative judgment (i.e. who looks most like a perpetrator?), rather than based on his or her own mental image of the perpetrator (Innocence Project, 2013).

Research has also shown that facial expressions (e.g., happy, neutral or angry expressions) influence our perceptions and judgments of people. Different emotion displays can affect the ratings that observers make about criminality, with angry faces perceived as the most criminal, followed by neutral faces and then happy faces. Judgments about criminal appearance based on emotional facial expressions may have adaptive value in that they may help us to avoid someone who is physically threatening. On the other hand, such evaluations could inappropriately influence decision making in criminal identification lineups. Additional research is needed to discover whether and how people can avoid making evaluations regarding criminality from a person’s facial appearance (Flowe, 2012).
Appendix C

Sociocultural anthropologists examine social patterns and practices across cultures, with a special interest in how people live in particular places and how they organize, govern, and create meaning. A hallmark of sociocultural anthropology is its concern with similarities and differences, both within and among societies, and its attention to race, sexuality, class, gender, and nationality. Research in sociocultural anthropology is distinguished by its emphasis on participant observation, which involves placing oneself in the research context for extended periods of time to gain a first-hand sense of how local knowledge is put to work in grappling with practical problems of everyday life and with basic philosophical problems of knowledge, truth, power, and justice. Topics of concern to sociocultural anthropologists include such areas as health, work, ecology and environment, education, agriculture and development, and social change (American Anthropological Association, 2013).