

Emotional reactions to crime across cultures

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Information about the emotions experienced by observers when they witness crimes would have important theoretical and practical implications, but to date no study has broadly assessed such emotional reactions. This study addressed this gap in the literature. Observers in seven countries viewed seven videos portraying actual crimes and rated their emotional reactions to each using 14 emotion scales. Observers reported significantly high levels of negative emotions including anger, contempt, disgust, fear and sadness-related emotions, and anger, contempt and disgust were the most salient emotions experienced by viewers across all countries. Witnesses also reported significantly high levels of positive emotions as well (compared to not feeling the emotion at all), which was unexpected. Country moderated the emotion ratings; *post-hoc* analyses indicated that masculine-oriented cultures reported less nervousness, surprise, excitement, fear and embarrassment than feminine cultures.

Keywords: Emotion; Crime; Eyewitness testimony; Culture; Masculinity.

The effects of mood on memory is a topic of long-standing inquiry (Bower, 1981; Bower et al., 1994), and one arena in which such studies occur today concerns the effects of emotions on eyewitness testimony and witness credibility. A number of studies, for instance, have demonstrated that individuals who witness a negative emotional event may have enhanced memory for the central details of the event but impaired memory for peripheral details (Reisberg & Heuer, 2004; Safer, Christianson, Autry, & Osterlund, 1998). Houston, Clifford, Phillips, and Memon (2013) showed observers either an emotional (mugging) or neutral (conversation) scenario and obtained eyewitness recall from them about the perpetrator, critical incident and environmental details. Emotionality improved completeness of perpetrator descriptions in a memory retrieval task but also impaired recognition of the perpetrators in a subsequent photo lineup. (The authors suggested that emotionality had differential effects on attending to “central” vs. “peripheral” details of an event.) Relatedly, several studies have also demonstrated a link between the consistency or inconsistency of the emotions displayed by victims when they recount their stories and judgements of their credibility (Dahl et al., 2007; Kaufmann, Drevland, Wessel, Overskeid, & Magnussen,

2003). And there is a small but growing literature examining the effects of mood and emotion on juror’s processing and judgements (e.g. Semmler & Brewer, 2002).

That witnessing a crime should produce strong emotions is not surprising, given that crimes themselves are not merely acts void of feeling, but are replete with a myriad of emotions, including anger, fear, disgust and even excitement and exhilaration (Canter & Ioannou, 2004; Canter, Kaouri, & Ioannou, 2003). Even what is known as cold or predatory aggression may not be entirely without emotion, as previously thought (Bushman & Anderson, 2001; Matsumoto & Hwang, 2014). It would not be surprising, therefore, that observers who witnessed a crime also felt strong emotions, as they did in Houston et al. (2013).

The question raised in this article concerns exactly which emotions are aroused when individuals witness a crime. Of the variety of emotions that individuals can report, it is not clear that the field has a good grasp on exactly what kinds of emotions are elicited when observers witness a crime. Houston et al. (2013) assessed irritation, annoyance, outrage, anger, happiness, sadness, sympathy, disgust, upset, fright, anxiety, relief and nothing, and reported elevations of sympathy, disgust,

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annoyance, irritation, anger, sadness, outrage and upset. Clearly these were sufficient to confirm the existence of “negative” emotions, which was the goal of that study. But that assessment may or may not have provided an accurate picture of the types of emotions elicited when people witness crimes. For example, it may be argued that annoyance, irritation, anger, outrage and upset are synonyms of each other that assess essentially the same qualitative emotional state. Some may also argue about whether or not “sympathy” is an emotion.

Research elucidating more specifically the types of emotional experiences observers have when witnessing crimes may have important theoretical and practical ramifications. For example, if memories are mood-dependent, then information about the specific types of emotions elicited when observing crimes may suggest different effects on eyewitness recall for different types of emotions. Future research on this topic would be enhanced by targeting more specific emotional states rather than general “negative emotions.” Such emotion-moderated effects would have practical implications for eyewitness testimony and juror processing.

One area of research that should inform this issue is the long history of scientific inquiry into the relationship between emotion and judgements of morality, because many studies have suggested that emotional reactions play an important role in mediating judgements of ethics and morality across cultures (Rozin & Fallon, 1987; Rozin, Lowery, Imada, & Haidt, 1999; Tangney & Fischer, 1995). In any society, crimes are acts that cross the boundaries of ethics and morality, break rules of social transgression and defy social norms. Crimes are harmful not only to individuals but also to the community or state, and are a public wrong and forbidden and punishable by laws or social norms. Thus, witnessing crimes should elicit strong emotional reactions.

Within this area of research, emotions such as shame and guilt have received much attention as moral emotions (Shweder & Haidt, 2000; Tangney & Fischer, 1995). Additionally, recent work has focused on the emotions of anger, contempt and disgust and their relationship with ethics and morality. Rozin et al. (1999) proposed that these emotions are often elicited by violations of three different types of moral codes originally proposed by Shweder, Much, Mahapatra, and Park (1997). According to Rozin et al. (1999), anger is linked to violations of individual rights and autonomy, contempt to violations of communal codes and hierarchy, and disgust to violations of purity and sanctity. Across four studies they showed that individuals in different cultures associated these emotions with specific examples of events that operationalised the proposed types of violations, with ratings of moral ethics violated by different types of situations, and with facial expressions of these emotions (Biehl et al., 1997). Participants in their studies also produced distinct facial

expressions of anger, contempt and disgust when reacting to violations of autonomy, community and divinity, respectively.

Hutcherson and Gross (2011) provided additional evidence that anger, contempt and disgust are associated with moral judgements. Three of their five studies demonstrated that these emotions were associated with different types of antecedent appraisals related to ethics violations and morality, with anger evoked by appraisals of self-relevance, contempt by judgements of other’s incompetence or lack of intelligence, and disgust by appraisals that others are morally untrustworthy. Two studies demonstrated that individuals differentiated these emotions in terms of beliefs about their social consequences; individuals strongly preferred anger to contempt and disgust, and each emotion was associated with unique response profiles and judgements of real-life events.

Recent studies have also suggested that the combination of anger, contempt and disgust is what fuels terrorist acts and political aggression, acts that transgress moral and ethical boundaries (Matsumoto, Hwang, & Frank, 2013, 2014a, 2014b). These studies examined the emotions expressed by leaders of ideologically motivated groups that subsequently committed either an act of aggression or an act of non-violent resistance against an opponent outgroup. Speeches of leaders as they talked about their opponent outgroups were obtained at three points in time leading to an identified act and emotions expressed in those speeches were examined both verbally and non-verbally. The source materials analysed in these studies spanned many different cultures and time periods. Leaders of groups that eventually committed acts of aggression expressed more anger, contempt and disgust towards their opponent outgroups; leaders of groups that engaged in non-violent resistance did not differ in their expressions of these emotions.

The studies described above make a strong case that anger, contempt and disgust serve a special function vis-à-vis ethics and morality, and they do so similarly across cultures. If emotional reactions play an important role in judgements of ethics and morality across cultures, and if anger, contempt and disgust are emotions related to morality and ethics, then these same emotions should be especially salient when criminal acts are viewed because criminal acts themselves are transgressions of laws of ethics and rules of morality in a culture. We posit, therefore, that witnesses will experience anger, contempt and disgust, and that these emotions will be the most salient emotions experienced.

But other emotions are also likely to be activated. When witnessing a crime, observers may feel threatened by the act or the perpetrator and fear for their own safety, either at that moment or later. Thus, we would expect that observers experience fear-based emotions such as being scared, anxious, nervous, worried or horrified. Observers

may also empathise with the victims of crime and experience sadness, concern, anguish or grief. Or they may lament the society in which they live and feel remorse or regret. For these reasons, we posit that observers would also feel negative emotions other than anger, contempt and disgust, but that these are not as salient.

We have little reason to believe that observers would feel positive emotions when witnessing a crime (regardless of the fact that criminals themselves may feel positive emotions when committing crimes). And there is little reason to believe that the predictions described above will be moderated by country or culture, as all of the research described above documenting the relationship between emotion and judgements of morality and ethics have demonstrated similar effects across very disparate countries. This makes sense, as emotions are universal phenomena, and people of all cultures experience the same set of basic emotions regardless of race, culture, ethnicity or nationality (Ekman, 1999; Izard, 2007; Matsumoto & Hwang, 2012). Although there are likely to be cultural differences in the absolute levels to which emotions are experienced, there is little reason to believe that witnessing a crime would not elicit negative reactions such as anger, contempt, disgust, fear and sadness, or that anger, contempt and disgust would not be the most salient.

This study addressed this gap in the literature. Participants in seven countries sampled by convenience viewed videos portraying actual crimes and rated their emotional reactions. We tested the following hypotheses, centred on the following research questions:

- 1 Which emotions do observers experience when witnessing a crime?
 - i Hypothesis 1a: Witnesses will report significantly elevated (i.e. non-zero) levels of anger, contempt and disgust.
 - ii Hypothesis 1b: Witnesses will also report significantly elevated (i.e. non-zero) levels of fear- and sadness-related emotions.
- 2 Which emotions are most salient?
 - i Hypothesis 2: Anger, contempt and disgust will be more salient—that is have higher mean ratings—than other emotions when perceiving criminal acts.

We do not offer a prediction about the elevation of positive emotions because there is no reason to believe they would be significantly non-zero. And because the relationship between emotion and judgements of morality and ethics described above have occurred across cultures, we do not offer a prediction about the cultural moderation of the hypotheses, as we believe the emotion differences described above will occur across countries.

METHODS

Stimuli

We searched the Internet for open-source videos of actual crimes in different cultures. Surprisingly we found many such videos, many of which were posted by local police departments requesting the aid of the public in identifying persons of interest in the videos. Different types of crimes were represented including animal cruelty, armed robbery, arson, assault and battery, ATM theft, auto theft, burglary, hit and run, kidnapping, mugging, shooting, police brutality, shoplifting, pick pocketing and vandalism. Our search resulted in obtaining an initial pool of 371 videos.

We then excluded videos that included any language in the video—either audio or written (subtitles)—because such commentary may have biased observers' reactions. We also excluded videos that were part of news reports (thus moderated by a newscaster) or that had technical difficulties (e.g. extremely low resolution). This resulted in a smaller pool of 94 videos from the United States or England, 48 from China, 6 from the Middle East and 10 from Central or South Asia.

Although all videos were identified as “crime videos,” in many cases it was not clear that a crime had been committed unless the viewer had background information about the action in the video. For example, a video of an auto theft of a person unlocking a car and driving off may seem innocuous unless the viewer knows that the driver is not the owner of the car. Because it was important to use videos that were clear that a crime was committed just by the observation of the contents of the video and not requiring any such background information or assumptions, two coders coded whether a crime had clearly been committed on each of the videos using a 5-point scale ranging from 1 (*not clear at all*) to 5 (*very clear*).

Additionally, we wanted to use videos that were relatively balanced in the amount of time devoted to the portrayal of the incident and before (prologue) and after (epilogue) the incident. An “incident” was defined as the act or event when the individual's behaviour in that situation deviated from the norm. For this reason, we also had coders log the time from the start of the video that the incident occurred and when the incident ended. Knowing these video times allowed us to calculate the amount of video times dedicated to the prologue, incident and epilogue.

Videos were then selected for use in the study if the video had a crime rating of 5 from both coders, and the percentage of the video dedicated to the prologue and incident was each at least 30% of the entire length of each video. This resulted in the final selection of seven videos (country of origin of the video in parentheses):

- Video 1: Guy breaks into a car (China)

- Video 2: A woman shoplifts in a beauty supply store (United States)
- Video 3: A woman gets caught stealing from a store (United States)
- Video 4: Bangalore hit-and-run accident on the highway (India)
- Video 5: Guy throws brick into a car (England)
- Video 6: Burger King robbery at gunpoint (United States)
- Video 7: Animal cruelty—dog gets beaten to death (China)

We also selected one video to use as practice (motorcycle theft) for observers prior to their observing and rating the seven target videos. Thus, eight videos were used in the study.

Observer participants

A convenience sample of 555 observers from the United States ($n = 63$, $M_{\text{age}} = 33.55$, $SD_{\text{age}} = 13.37$, $n_{\text{females}} = 31$), India ($n = 143$, $M_{\text{age}} = 30.68$, $SD_{\text{age}} = 9.54$, $n_{\text{females}} = 54$), Ecuador ($n = 34$, $M_{\text{age}} = 29.15$, $SD_{\text{age}} = 12.02$, $n_{\text{females}} = 15$), Mexico ($n = 44$, $M_{\text{age}} = 29.80$, $SD_{\text{age}} = 9.97$, $n_{\text{females}} = 27$), Bolivia ($n = 30$, $M_{\text{age}} = 29.17$, $SD_{\text{age}} = 10.32$, $n_{\text{females}} = 19$), China ($n = 209$, $M_{\text{age}} = 22.98$, $SD_{\text{age}} = 8.61$, $n_{\text{females}} = 165$) and South Korea ($n = 32$, $M_{\text{age}} = 26.06$, $SD_{\text{age}} = 11.39$, $n_{\text{females}} = 23$) participated. They all self-reported as being born and raised their respective country and their first language corresponded to the language of their country. Local assistants recruited all observers from Ecuador, Mexico, Bolivia, China and South Korea in country; the U.S. Americans participated in our laboratory in Berkeley, CA. The Indians were recruited using Amazon Mechanical Turk.

Judgement tasks and procedures

All survey materials were presented online and participants were provided the following instructions:

The information gathered will be used for research examining cultural differences in perceptions of criminal acts. You will view several video scenes of acts, such as shoplifting, theft, etc. After each video, you will be asked some very basic questions about your thoughts about what you saw, such as ratings of believability, realism, probability of actual occurrence in your culture, the meaning of the act and its perceived legality, whether you have actually witnessed such an act in the past or heard about an actual event. You will also be asked basic demographic questions such as age, ethnicity and language. You will NOT be asked your name anywhere.

After providing implied consent, participants were then shown the practice video. They were told to click

the play button when ready, that they can enlarge to full screen by clicking the box [] at the bottom right of the video box and to click ESC to return when done viewing.

After the video played, they were asked to rate how the video made them feel by indicating the extent to which they were currently experiencing any or all of the following emotions on a scale labelled 0, *did NOT feel ANY of that emotion*, to 8, *an extreme amount of that emotion*: guilt, fear, anger, embarrassment, worry, contempt, excitement, disgust, amusement, nervousness, surprise, interest, sadness and pride. These emotion categories were selected in order to assess a broad range of qualitatively different emotional states, including qualitatively different positive and negative emotions.

Observers then rated the videos on 11 questions related to their beliefs about the crime. These ratings were not germane to this study and will not be mentioned further.

After completing the ratings, observers were shown the actual videos used in the study and given the same instructions as above for the practice video. The videos were shown in the order described above, from Video 1 through 7, because we considered them to be ordered in terms of emotional intensity, from least to most. We reckoned that ordering them in this fashion minimised the impact of emotional videos influencing the ratings of subsequent videos.

After the completion of the ratings for all videos, participants provided basic demographic information. Completion of their demographics marked the end of their participation in the study.

Computation of emotion scales

To reduce the 14 emotion ratings to a more manageable number of variables we computed a principal component analysis on the emotion ratings summed across videos, first for the entire sample. The analysis produced an interpretable three-factor solution that accounted for 74.13% of the total variance. The first factor accounted for 48.61% of the total variance and included anger, contempt and disgust; we labelled this factor ANCODI. The second factor accounted for an additional 19.27% of the variance and included excitement, amusement, pride and interest; we labelled this factor Positive Emotion. The third factor accounted for an additional 6.25% of the total variance and included fear, embarrassment, worry, nervousness, surprise, sadness and guilt; we labelled this factor Anxiety. We then computed scale scores for each of the three factors; Cronbach alphas were high and acceptable for each (.92, .87 and .81, respectively).

To establish the cross-cultural equivalence of the scale scores, we also computed the same analyses separately for each of the countries. The same factor structures were obtained. Reliability estimates were also acceptable for each of the scales separately for each country

TABLE 1

Means and standard errors for the emotion scales separate by country

Country	ANCODI	Anxiety	Positive emotions
United States	5.94 (.22)	4.08 (.21)	3.52 (.21)
India	5.31 (.14)	4.84 (.14)	3.89 (.17)
Ecuador	3.90 (.42)	3.35 (.32)	1.75 (.13)
Mexico	6.16 (.32)	4.27 (.28)	2.12 (.17)
Bolivia	6.56 (.37)	5.13 (.31)	2.23 (.17)
China	5.51 (.13)	3.63 (.12)	1.61 (.08)
South Korea	6.62 (.28)	5.16 (.27)	3.33 (.18)

(.95 > α > .86, .91 > α > .69 and .97 > α > .77 for Anxiety, Positive Emotion and ANCODI, respectively).

RESULTS

Hypotheses 1a and 1b: Which emotions do observers experience when witnessing a crime?

We computed descriptive statistics for each of the emotion scale scores, separately for each country (Table 1). To examine if the emotion scale scores were significantly greater than zero (i.e. compared to “not feeling the emotion at all”), we computed one sample *t*-tests on each.¹ As predicted, the ANCODI and Anxiety scale scores were all high and significantly non-zero for the entire sample as well as for each country individually, $4.25 > d > 1.56$, and $3.33 > d > 1.78$, respectively. Thus as predicted witnesses experienced elevated levels of anger, contempt and disgust as well as fear and sadness-related emotions, supporting Hypotheses 1a and 1b.

Interestingly the means for Positive Emotions were also significantly non-zero for the entire sample as well as for each country individually, and were associated with substantial effect sizes, $3.28 > d > 1.45$. To decompose the unexpected positive emotion effect, we examined whether the individual emotion ratings for excitement, amusement, interest and pride were significantly non-zero for the entire sample and for each country separately using one sample *t*-tests. All four emotions were significantly greater than zero and associated with large effect sizes, $2.83 > d > 1.16$, $2.13 > d > 1.17$, $2.34 > d > 1.27$ and $2.45 > d > 1.15$, respectively. Thus, it

was apparent that not only did the witnesses experience the intended negative emotions, but they also experienced non-trivial amounts of positive emotions while watching the crime videos as well.

Hypothesis 2: Which emotions are most salient?

To examine differences among the emotions, we computed a mixed Country (7) by Video (8) by Scale Type (3) analysis of variance (ANOVA) on the emotion ratings with Scale Type treated as repeated measures. The Scale Type main effect was significant, $F(2, 6012) = 539.59$, $p = .000$, $\eta_p^2 = .52$, indicating that in general the emotion scale scores differed from each other. We followed this main effect by computing a set of orthogonal difference contrasts. ANCODI ($M = 5.56$, $SE = .08$) had significantly higher ratings than Anxiety ($M = 4.18$, $SE = .08$), $F(1, 554) = 486.71$, $p = .000$, $\eta_p^2 = .47$, whereas Positive Emotions ($M = 2.55$, $SE = .07$) had significantly lower ratings than the combined ANCODI and Anxiety, $F(1, 554) = 797.19$, $p = .000$, $\eta_p^2 = .59$. Thus, Hypothesis 2 was supported. Note the sizable effect sizes.

The above interpretations were qualified by a significant Country by Scale Type interaction, $F(12, 1002) = 18.21$, $p = .000$, $\eta_p^2 = .18$. We computed the same difference contrasts among the emotions separately for each country. The same comparisons were significant for all countries (separate listing of *F* tests available from authors). Observers in all countries gave the ANCODI the highest ratings, followed by Anxiety and then Positive Emotions.

The interpretation of the Scale Type effect was also qualified by a significant three-way interaction. Examination of the Scale Type differences on each of the videos separately for each country indicated that the same differences (i.e. ANCODI > Anxiety > Positive Emotion) occurred on each video across all of the countries. Thus, the significant three-way interaction referred to differences in degree not direction.

The above findings were based on scale scores derived from the factor analyses described earlier. It was entirely possible that the means for anger, contempt and disgust each individually were not higher than the means of the other emotions. To examine this possibility we also computed an Emotion Type (14) by Country (7) two-way mixed ANOVA using the original emotions rated (see Table 2). The Emotion Type main effect was significant, $F(13, 6877) = 282.98$, $p = .000$, $\eta_p^2 = .35$. Anger, contempt and disgust did indeed receive the highest mean ratings across countries ($M_s = 6.15, 5.46$ and 5.54 ,

¹ The use of one sample *t*-tests against a population mean of zero raises interesting questions concerning assumptions about the normality of the distribution of the population mean and its hypothetical sampling distribution, which may affect the validity of the *t*-test. Readers are cautioned to interpret the results with this caveat.

TABLE 2
Descriptive statistics (means and standard errors) for each of the emotions, separately for each country

Emotion	Country						
	United States	India	Ecuador	Mexico	Bolivia	China	South Korea
Anger	6.18 (.27)	5.82 (.18)	4.18 (.33)	6.76 (.29)	6.94 (.35)	6.42 (.13)	6.95 (.35)
Contempt	5.38 (.31)	5.23 (.21)	3.86 (.39)	6.08 (.34)	6.85 (.41)	3.90 (.16)	7.12 (.40)
Disgust	6.38 (.29)	5.35 (.20)	3.67 (.36)	5.65 (.32)	5.89 (.38)	6.23 (.15)	5.85 (.38)
Guilt	3.18 (.28)	4.54 (.19)	2.02 (.34)	2.29 (.30)	1.74 (.36)	2.20 (.14)	3.15 (.36)
Fear	4.31 (.29)	4.75 (.20)	3.43 (.36)	4.28 (.31)	4.72 (.38)	3.96 (.14)	5.22 (.37)
Embarrassment	3.27 (.30)	4.92 (.20)	3.20 (.37)	4.33 (.33)	5.08 (.40)	2.63 (.15)	5.72 (.39)
Worry	4.72 (.28)	5.39 (.19)	4.08 (.34)	6.01 (.30)	6.90 (.37)	4.55 (.14)	6.52 (.36)
Nervousness	4.22 (.29)	4.79 (.19)	3.53 (.35)	3.83 (.31)	5.09 (.37)	3.97 (.14)	5.58 (.37)
Surprise	4.72 (.29)	5.01 (.20)	3.56 (.36)	4.31 (.32)	6.15 (.38)	4.54 (.15)	6.51 (.38)
Sadness	4.43 (.29)	5.27 (.20)	3.59 (.36)	4.84 (.31)	6.21 (.38)	3.37 (.15)	3.61 (.37)
Excitement	3.40 (.23)	4.22 (.15)	1.61 (.28)	1.63 (.25)	1.72 (.30)	1.77 (.11)	5.65 (.29)
Amusement	3.28 (.20)	4.22 (.14)	1.66 (.25)	1.46 (.22)	1.30 (.27)	1.59 (.10)	1.72 (.26)
Interest	4.63 (.26)	4.13 (.18)	2.33 (.32)	4.15 (.28)	4.66 (.34)	1.75 (.13)	4.85 (.34)
Pride	2.89 (.20)	3.37 (.13)	1.39 (.24)	1.25 (.21)	1.25 (.26)	1.32 (.10)	1.00 (.25)

respectively). Of these the lowest rated emotion (contempt) was still significantly higher than the next highest rated emotion (surprise), $F(1, 529) = 16.53, p = .000, \eta_p^2 = .03$. Thus, the findings reported using the scale scores derived from the factor analyses represented findings using the individual emotions rated as well.

Post-hoc analyses

The overall ANOVAs reported above also produced a significant Country main effect, $F(6, 501) = 19.62, p = .000, \eta_p^2 = .19$, as well as the interactions reported earlier. To examine potential cultural differences in the emotion ratings, we computed country-level rank order correlations between the emotion marginal means and each country's score on Hofstede's (2001) five cultural dimensions—Individualism, Power Distance, Masculinity, Uncertainty Avoidance, and Long-Term Orientation. (Cultural dimension data for Bolivia did not exist.) The only cultural dimension that approached significance was Masculinity, $\rho(6) = -.771, p = .072$,

indicating that masculine-oriented cultures reported less emotions overall compared to feminine-oriented cultures. Rank order correlations separate for each emotion also indicated that Masculinity was negatively correlated with nervousness, surprise, excitement, fear and embarrassment, $\rho(6) = -.925, p = .008$; $\rho(6) = -.882, p = .020$; $\rho(6) = -.924, p = .009$; $\rho(6) = -.772, p = .072$; and $\rho(6) = -.767, p = .075$, respectively.²

DISCUSSION

As predicted witnesses reported significant amounts of different types of negative emotions when viewing the crimes. Of these, anger, contempt and disgust were the most salient emotions experienced by viewers across all six countries. Although country moderated the differences in the emotion effects, these referred to differences in the degree of difference, not direction, as anger, contempt and disgust had the highest means in each of the countries sampled, followed by fear and sadness-related emotions, and then positive emotions. Witnesses also

² Because of the different sex ratios in the different countries, we recomputed the *post-hoc* analyses separately for males and females. With only one exception (the correlation between Masculinity and fear for males), all other rank order correlations were high and negative ($-.60 < \rho < -1.00$).

reported significantly non-zero levels of positive emotions as well, which was unexpected.

These findings were not produced without limitations, one of which concerned the samples. On the one hand, because they were solely a convenience sample they did not represent a systematically chosen range of countries with which to test cultural differences and this may have contributed to our relative lack of country differences. On the other hand, the countries that were sampled represented distinct world regions and a broad range on standard cultural values scales (Hofstede, 2001; Schwartz & Bardi, 2001). In any case, readers should be cautioned in interpreting the country differences vis-à-vis the limitations in the sampling.

Another limitation concerned the sampling of the crime videos. Although we started with a fairly large pool of potential videos to use, we ultimately used a limited set of videos. They certainly did not represent the gamut of the types of crimes that occur in most societies nor did they reflect culture-specific crimes. Thus, the findings reported above were limited to the crimes presented and it was entirely possible that different types of crimes may have produced different emotional reactions.

Another limitation concerned the sampling of emotions. Although the emotions we used assessed a wide range of affective experiences, it was possible that the assessment of other emotions may have produced different results. For example we did not assess shame, which has been linked to morality (Tangney & Fischer, 1995), although we did assess embarrassment. Future studies utilising different emotion scales and different methods to assess emotions (e.g. facial expressions, physiological responses) may produce different results than what we report.

A final limitation concerned the laboratory-based nature of the data collection procedures. Witnessing a crime committed by strangers on strangers on a video played on a computer screen in a laboratory setting is very different than witnessing a crime in real life involving people one knows. In real life, such an observation would involve raw emotions and sensory details such as smells or sounds (Johnson, 1988; Johnson & Raye, 1981). Witnessing crimes replayed on video in the sterile confines of a laboratory undoubtedly influenced the nature of the emotions experienced, and future studies should examine emotional reactions in more real-life settings.

Regardless of these limitations, the findings contributed to the literature in several ways. First these data document the very diverse kinds of emotional experiences witnesses of crimes may experience, and as such may give clues into the minds of witnesses and the nature of memory recall. In particular, the data suggest that observers experience several qualitatively different types of “negative emotions” when witnessing a crime, and surprisingly positive emotions as well. Reporting high levels of anger, contempt and disgust was not surprising, given

previous research on the relationship between these emotions and judgements of violations of ethics and morality. As mentioned earlier, these emotions have received special attention in terms of their sociomoral functions (Hutcherson & Gross, 2011; Matsumoto et al., 2013, 2014a, 2014b; Rozin et al., 1999). The current findings lend further credence to the notion that these emotions are especially important in understanding ethical and moral transgressions. They are the most salient emotions elicited when viewing ethical transgressions represented by crimes, thereby providing an emotional basis by which judgements of those transgressions are made.

That witnesses also reported experiencing elevated levels of fear and sadness-related emotions, including guilt, embarrassment, worry and nervousness, was also not surprising, but are new to the field. These emotions are elicited by appraisals of threat and loss (Lazarus, 1991), and suggest that when witnessing a crime, observers may feel threatened by the act or criminal and fear for their own safety, either at that moment or later. Witnesses may have also empathised with the victims of the crimes and thus experienced sadness, concern, anguish or grief.

That witnesses experienced significant, non-zero levels of positive emotions was unexpected and also new to the field. To be sure, these emotions may have occurred because of the laboratory nature of the task, and participants may have approached the task much like a video game. Or the elevation of these emotions may have reflected something about the human mind and its intrinsic interest for watching bad things happen to others, perhaps reflecting a *shadenfreude* type of response. Future studies will need to examine this interesting twist on the findings.

We did not predict, nor did we find, that country moderated the differences among the emotions because previous research has demonstrated cross-cultural similarities in these emotional reactions vis-à-vis moral transgressions (Hutcherson & Gross, 2011; Rozin et al., 1999). But the *post-hoc* analyses did indicate that masculine-oriented cultures reported less emotion overall, and less nervousness, surprise, excitement, fear and embarrassment than feminine cultures. This finding was unexpected. Masculine cultures are those that value achievement, heroism, assertiveness and material rewards for success, whereas feminine cultures value cooperation, modesty, caring for the weak and quality of life (Hofstede, 2001). It is possible that the emotional reactions of the observers in more masculine cultures were tied into some sort of *machismo*, hero orientation in which ratings of fear-based emotions were deamplified. Future research examining a wider range of cultures on this dimension will need to examine this possibility more thoroughly.

The findings from this study suggest that observers may experience many different emotions when witnessing crimes, especially qualitatively different types of

“negative emotions,” and perhaps also some types of positive emotions. These findings provide greater insights into the minds of eyewitnesses, and imply that further research differentiate the effects of qualitatively different types of elicited emotions on memory rather than classifying them in the general categories of “positive” or “negative.” Because mood congruent effects on memory has a long documented history in the literature, the present findings suggest that different emotional experiences will lead to different effects on memory in eyewitness recall and juror processing.

Understanding the emotions experienced by witnesses of crime also has implications for practitioners. Knowing the range of emotions that witnesses may report, and knowing that witnesses can and should report emotions in their statements about what they witnessed, should help practitioners in ferreting out true and false witness reports. Knowing exactly which emotions were experienced would provide investigators with a bridge to access memories, because mood binds memories and recall is easier when mood during recall is consistent with the mood during memory encoding (Bower, 1981).

Future research will need to examine emotional reactions to a wider range of moral and ethical transgressions in a wider range of cultures systematically chosen to operationalise relevant cultural dimensions, with special consideration to masculinity. Future research will also need to examine more carefully the role and function of anger, contempt and disgust in perceptions of crimes and other transgressions, and how these emotional reactions may be related to attitudes, values and beliefs about laws, punishment and social norms in general. It may very well be the case that anger, contempt and disgust play a special role in the establishment and maintenance of cultural norms, and that one function of norms and punishments is to ameliorate levels of anger, contempt and disgust among group members to prevent retribution and social chaos. Such research will serve to contribute to knowledge about the sociocultural functions of emotions in general and about anger, contempt and disgust in particular. Finally, future studies will need to delve into the interesting question of whether different types of emotional experiences produce differential effects on memory recall in eyewitnesses.

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