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КРИМІНАЛІСТИЧНІ ВИДИ СУДОВИХ ЕКСПЕРТИЗ

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THE IDENTIFICATION OF EMOTIONS AND JURY DECISION MAKING

This study investigated the impact of a defendant's emotions, expressed through gait and displayed through video footage, on jury decision making. The degree of state empathy and the case-related judgements of the mock jurors were assessed using a questionnaire. The results of the study suggest that the emotions being portrayed by a figure in a piece of video footage can be identified by viewers, and that careful consideration needs to be given to the potential ramifications of playing video footage in court and the subsequent impact on collective jury decision making.

Key Words: *Gait, emotion perception, jury decision making.*

Introduction. The expression and perception of emotion is a sophisticated skill, necessary to regulate social interactions, and make accurate and reliable

judgements about the emotions of those around us [1]. While the majority of emotion expression research has focussed on signalling channels such as facial expressions [2], emotions can be identified by their expression through other mechanisms including gait [3, 4]. Darwin considered emotions to be adaptations that improve survival potential by modifying behaviour [5]. Emotions are evolutionary based adaptive resources, that inform individuals of the significance of events to their well-being, and prepare them for rapid adaptive action, co-ordinating behavioural, physiological and psychological processes to improve the chances of survival [6, 7]. It is therefore possible that the emotions of a perpetrator during a crime, expressed through their gait and captured by closed circuit television (CCTV), may be subconsciously identified by jurors and influence their decision making. However, there may be variations in the human ability to perceive and interpret such information correctly, and in the case of jurors this could lead to erroneous effects on decision making. At a trial jurors are expected to make accurate judgements and decisions regarding a defendant [8], which is potentially problematic in view of the fact that experienced professionals can on occasion incorrectly attribute emotions to defendants [9]. As jurors' perceptions of a defendant's emotions could affect their decision making and therefore the outcome of a trial [10], it is important to understand how emotions are perceived by observers and how the perceptions of emotions are used in decision making in the context of a jury.

Key to the impact of emotion identification from gait on jury decision making is the concept of empathy. Empathy is the cognitive ability to understand others, take the perspective of others and have an emotional response to the emotions of others [11]. Trait empathy is a personality characteristic that remains relatively stable across situations, while state empathy is comparatively temporary and can be induced by situations [9]. Inducing state empathy in jurors is a recognised tactic that is utilised by lawyers, who suggest that state empathy can be manipulated to the lawyer's advantage through statements and cross-examinations [12]. Given that the research suggests that state empathy can be induced in the courtroom, it is unsurprising that state empathy has received far more research attention than trait empathy in this context [9].

Research using mock jurors has demonstrated that when jurors empathise with the defendant, the crime is often considered to be the result of situational factors rather than dispositional factors [13]. In these instances, jurors attributed less responsibility to the defendant and made fewer judgements of guilt [14]. However, the majority of such research tends to involve serious offences, such as homicide [15], that may elicit stronger emotions on the part of the perpetrator, and are therefore easier to utilize [9]. It is therefore necessary to develop research that uses less serious and less emotive crimes in order to identify whether emotions still play a key role in jury decision making [9].

Gait is the manner or style in which a locomotor activity, such as walking or running, is undertaken [16]. Information regarding gait can often be gained from relatively poor quality video footage, and even in these circumstances it has been suggested that information regarding emotion can be gained [17]. It has also been suggested that in the context of crimes that are frequently

captured by CCTV, such as violent assaults in city centres at night, gait information could help to determine the intentions of protagonists [18]. Video footage that has been used for the purposes of forensic gait analysis is often played at some length and repeatedly during trial proceedings, which prolongs the exposure of jurors to the inherent information regarding the emotional state of the figures shown in the footage. Montepare, Goldstein and Clausen (1987)[19] investigated the ability of observers to identify emotions from gait and their results suggested that observers were able to correctly identify happiness, sadness, anger and pride at better than chance levels. Birch et al. (2016)[3] also concluded that observers were able to correctly identify the same emotions, with the addition of a neutral state, at better than chance levels. However, the results of both investigations also suggested that some emotions were more readily identified than others, possibly related to the concept of innate primary emotions [3, 6, 20-23], and that there were differences in individuals' ability to identify emotions [3, 19].

Research would suggest that emotions can be identified from gait. However, if or how that information is subsequently utilised by the observer in the context of jury decision making is currently not clear. This study investigated the impact of a defendant's emotions, expressed through gait and displayed through video footage, on jury decision making.

Method. Ethical approval for the investigation was sought and granted by the Psychology Research Ethics Committee of the University of Kent. Twenty-four male (24%) and seventy-six female (76%) participants, with a mean age of 35.26 years (SD = 14.05), were recruited from the general population and from the University of Kent student population by convenience sampling.

Video footage was recorded showing a male, playing the part of the defendant, wearing black clothing and a balaclava, to hide facial expressions and ensure their gait was the only aspect being analysed. Five written scenarios intended to elicit anger, fear, happiness, pride, and a neutral emotional response were presented to the defendant prior to and during the filming of them walking. The scenarios were modified versions of those used by Montepare et al. (1987)[19]. The filming took place in a plain, naturally lit studio approximately 11.85m long by 5.45m wide. The video footage was recorded using three high definition digital cameras, from three angles (frontal, sagittal and oblique), and was edited using Final Cut Pro 7 software. This footage served as video evidence relating the mock defendant to the crime, and was shown to the study's mock juror participants.

Data collection with mock jurors was achieved using Qualtrics, allowing the online distribution of information, forms, video footage and questionnaires to the participants for completion at a time most convenient for the participant. Participants were first presented with information regarding the investigation, and informing them of their rights during and after the experimental procedure. They were then required to complete a consent form prior to further participation. Having given consent, the participants were presented with a demographic and juror eligibility questionnaire to complete. The study used an experimental design with participants taking part in one of the five conditions. Each participant viewed video

footage showing the walker, playing the part of the defendant, portraying one of the emotions: anger, fear, happiness, pride, or a neutral emotional state. The participants were shown the video footage and then given a written copy of a vignette, modified from that used by Braun and Gollwitzer, (2012)[24], describing the context of the footage, which was presented as video evidence relating the defendant to the crime. The vignette described the details of the crime committed, and explained that the footage showed the defendant walking during the perpetration of the crime. Having seen the footage and read the vignette, the degree of state empathy and the case-related judgements of the participants were assessed using a questionnaire. The questionnaire consisted of seventeen questions, eight relating to state empathy and nine to case-related judgements. The questions covered perception of defendant remorse, level of responsibility, recommended punishment, belief regarding future offending and agreement with case verdict (the defendant was found guilty), and required a combination of Likert scale, “Yes” or “No” and open-ended responses. The questions were based on the work of Wood et al. (2014) and Haegerich and Bottoms (2000)[9, 14].

Finally the participants were asked to identify what emotion they believed the defendant to be portraying. No guidance was given on which emotions could be identified, and no list of emotions was provided. This approach was somewhat different to that taken in the studies of Montepare et al. (1987) and Birch et al. (2016) [3, 19], in which participants were asked to identify the emotion from a list of options, four in the case of Montepare et al., and five in the case of Birch et al. Once the questionnaires had been completed, the participants were presented with a debrief form, a link to request a copy of the debrief form, and the contact details of the researchers.

The complete data set was entered into an excel spreadsheet, then an SPSS spreadsheet for analysis.

Results. To determine the reliability of the state empathy, defendant remorse and defendant responsibility responses, a Cronbach’s Alpha test was performed on each. Results were 0.79, 0.73 and 0.74 respectively, showing that the responses were reliable.

Table 1 shows the state empathy scores associated with each of the emotions portrayed by the defendant in the five pieces of video footage.

Table 1

Participants’ mean state empathy scores associated with each of the emotions being portrayed by the defendant

	Anger	Fear	Happiness	Neutral	Pride
Mean (SD)	2.73 (.70)	3.11 (.80)	2.40 (.85)	2.60 (.50)	2.59 (.66)

A between-subject’s one-way ANOVA showed there to be a statistically significant difference between these scores ($F(4, 95)=2.75, p=0.03$). In order to identify more specifically which emotions demonstrated differences, a Ryan-Einot-Gabriel-Welsch post hoc test (REGW-Q) was then undertaken. The results showed a statistically significant ($p<0.05$) difference between the state

empathy scores associated with fear and happiness, participants recording higher state empathy scores when the defendant portrayed fear than when they portrayed happiness.

The question regarding the emotion described as being displayed by the defendant provided a rich variation of emotion descriptors. In order to categorise these descriptors, Parrott's (2001) hierarchical structure of emotions was used on the basis that it provided a categorisation closest to that utilised in previous work in this area. Five of the six categories of emotions described by Parrott (anger, fear, joy, love and sadness) were used in this investigation, with the addition of 'neutral' and 'uncategorised' categories. Parrot's sixth category 'surprise' was considered not to be relevant, and was therefore not used. Table 2 shows the mean state empathy scores associated with each of the emotions perceived by the observers as being portrayed by the defendant.

Table 2

Participants' mean (and standard deviation) state empathy scores associated with each of the emotions perceived by the participants as being portrayed by the defendant

	Anger	Fear	Joy	Love	Neutral	Sadness	Uncategoris ed
Mean (SD)	2.63 (.59)	2.78 (.74)	2.48 (.60)	3.07 (.10)	3.10 (.96)	2.80 (.78)	2.29 (1.82)

A between-subject's one-way ANOVA showed that there was no statistically significant difference between these scores ($F(6, 93)=1.45, p=0.20$).

Table 3 shows the participants' mean case-related judgement scores associated with each of the emotions being portrayed by the defendant.

Table 3

Participants' mean (and standard deviation) case-related judgement scores associated with each of the emotions being portrayed by the defendant

	Anger	Fear	Happiness	Neutral	Pride	ANOVA (p value)
Remorse	2.30 (.70)	2.58 (.69)	2.05 (.69)	1.93 (.99)	1.95 (.84)	0.05
Responsibility	3.88 (.22)	3.65 (.38)	3.85 (.28)	3.60 (.45)	3.85 (.33)	0.03
Punishment	2.10 (1.12)	1.55 (.83)	2.90 (1.37)	1.70 (1.17)	1.65 (.88)	0.001
Future Offending	3.50 (.89)	3.30 (.73)	4.05 (.94)	3.95 (.94)	3.60 (.68)	0.03

A between-subject's one-way ANOVA showed there to be statistically significant differences between the scores. A REGW-Q post hoc test showed statistically significant differences between the punishment and future offending case-related judgements associated with the emotions. The punishment case-

related judgements associated with happiness were significantly different to those associated with fear, neutral and pride, with participants recording higher punishment scores when the defendant portrayed happiness than when they portrayed any of the other emotions. The future offending case-related judgements associated with happiness were significantly different to those associated with fear, with participants recording higher future offending scores when the defendant portrayed happiness than when they portrayed fear.

Table 4 shows the participants' mean case-related judgement scores for each of the emotions perceived by the participants as being portrayed by the defendant.

Table 4

Participants' mean (and standard deviation) case-related judgement scores for each of the emotions perceived as being portrayed by the defendant

	Anger	Fear	Joy	Love	Neutral	Sadness	Uncategoris ed	ANOVA (p value)
Remorse	1.82(.50)	2.36(.60)	2.09(.81)	3.25(1.06)	2.08(.79)	2.29(.95)	2.50 (2.12)	0.24
Responsibility	3.83(.31)	3.69 (.33)	3.83(.30)	3.50 (.71)	3.58(.51)	3.77(.35)	4.00 (.00)	.290
Punishment	2.36(1.60)	1.71(.99)	2.00(1.20)	1.00(.00)	1.83(1.19)	2.11(.99)	1.50(.71)	.65
Future Offending	3.86 (.95)	3.79(.70)	3.57 (.90)	4.00(1.41)	3.92 (.79)	3.58 (.96)	3.00 (.00)	0.67

A between-subject's one-way ANOVA showed there to be no statistically significant differences between these scores.

The results for the question regarding the case verdict showed that ninety-nine of the participants agreed with the verdict of guilty and one participant disagreed. A logistic regression analysis showed no significant relationship ($p=.52$) between the emotion being portrayed by the defendant and the agreement with the guilty verdict, and no significant relationship ($p=.76$) between the emotion described by the participants as being portrayed by the defendant and the agreement with the guilty verdict.

Discussion. The ANOVA results showed a statistically significant difference between the state empathy scores associated with the emotions portrayed by the defendant, the REGW-Q post hoc test highlighting the fact that participants empathised more when fear was portrayed by the defendant than when happiness was portrayed. The ANOVA results also showed a statistically significant difference between the case-related judgement scores associated with the emotions, the REGW-Q post hoc test highlighting higher punishment and future offending scores when happiness was portrayed by the defendant. This would suggest that individuals have the ability to identify emotions from gait, and use this information to inform their jury decision making. The results suggest that where the participants perceived the defendant to be exhibiting happiness, on the basis of their gait, while perpetrating the crime, they concluded that the defendant was more likely to re-offend and should be given a harsher punishment. However, there were no statistically significant differences between the state empathy, or the case-

related judgement scores, based on the descriptions of the emotions given by the participants as being portrayed by the defendant. This would suggest that while the participants were able to identify the emotions, as suggested by previous studies [3, 5, 6, 19], they were less able to describe or communicate the emotions accurately [25-27].

Participants were not, in this study, given a list of emotions to choose from (e.g. anger, fear, happiness, neutral and pride) before viewing the videos. Birch et al. (2016) and Montepare et al. (1987) [3, 19] showed that untrained participants were able to correctly identify emotions from gait, with the participants choosing the emotion being displayed from a list. In the present study the participants were required to identify and record the emotions using their own lexicon and understanding relating to emotions. The statistically significant differences found in the present study would seem to support the findings of the previous studies, in terms of the ability of the participants to identify the emotions correctly. However, the results appear to have identified another aspect of emotion identification: the difference between being able to identify an emotion using implicit cognition, and then being able to describe the emotion using explicit cognition. The relationship found between the perception of happiness being exhibited by the defendant and higher punishment and future offending scores, would therefore seem to be a result of implicit cognition rather than reasoned explicit cognition.

Even if the identification by a juror of an emotion displayed during walking is correct, the results of this study suggest that the juror may have difficulty in accurately describing the emotion in a way that is meaningful or recognisable by the other jurors. The results suggest that the identification of the emotion does input into the decision making of the individual in a relatively predictable manner. However, the results would also suggest that how the emotion identification achieved by each of the individuals might contribute to a discussion based collective decision made by a jury is less predictable.

The incongruity between the emotion seen and the language used to describe it could be the result of a number of factors. The debated concepts of emotional intelligence and emotional literacy [28-33] relate to the ability to understand one's own emotions, and in doing so be able to understand and empathise with those of others. This requires reflection on the lived experience, and learning based on that reflection. The participants may simply not have had the emotional literacy, and/or the lexicon, to convert the identification of the emotion taking place without thought, into language, requiring thought. They may also not have invested the cognitive effort required in this stage of the process. It is also possible that there are simply variations in the ability of individuals to process information, as suggested by Locke (2005)[33], and therefore identify emotions, although the level of correct identification shown by previous studies mitigates against this explanation [3, 19]. Whatever the root of the mismatch, an ability of jurors to identify emotions from the gait of a defendant, but a subsequent inability to describe accurately and communicate the emotions to their fellow jurors, may affect the way other jury members perceive the defendant, which may lead to changes in decision making.

Not providing the participants with a list of emotions from which to choose yielded an interesting dimension to the results of the study, but also inevitably presented a challenge in terms of the variety of emotion descriptors used. The use of Parrott's (2001)[34] hierarchical structure of emotions was adopted in anticipation of this challenge, and provided an appropriate solution. However, even the extensive nature of the Parrot classification could not accommodate all the descriptors used by the participants. While the addition of 'neutral' and 'uncategorised' classifications helped the classification process, the process still, in a limited number of cases, relied on an element of decision making by the researchers and therefore introduced a degree of error.

The fact that ninety-nine of the one hundred participants agreed with the verdict of guilty is not surprising as the vignette made it clear that the defendant was guilty. Why the remaining participant disagreed with the verdict is not known, although their decision may have been influenced by the circumstances outlined in the vignette, which described the defendant as "currently living with his girlfriend and three children in what is considered a dangerous and poverty stricken part of town."

This study used video of a single walker portraying each of the five emotions, the participants being shown only one piece of footage, showing the walker portraying a single emotion. The results could therefore have been a consequence of the ability of that walker to portray the emotion, which may be at variance with the way in which others might portray the same emotion. A second possible influence of the methodology used is the fact that participants were unable to compare different emotions being portrayed by the walker, and were therefore not able to make comparison based judgements. Nevertheless, the fact that the results show a statistically significant difference between both the state empathy and the case-related judgement scores associated with the emotion being portrayed would suggest that the identification of the emotion being portrayed was not an issue.

Playing video footage in court has become a common method of presenting evidence, and in the case of forensic gait analysis, a standard part of expert testimony. The core intention is to demonstrate to the jury the features of gait noted by the expert, and relied upon by the expert in reaching their conclusions. More recently the protracted and repetitive playing of footage in court has become a tool favoured by defence counsels, in the hope of generating opportunities for cross examination. What needs to be considered is what information are the jury actually deriving from the footage beyond that being reported by the expert witness, and how is this information being utilised? Information that is consciously collected and explicitly processed by the jurors in reaching a decision is somewhat different in nature from information that is being derived subconsciously, and processed implicitly. Explicit processing of information gained consciously can be utilised within the context of possible error. A juror may be shown two pieces of video footage, and may conclude that both pieces of footage show the same person, but they can do so understanding that they could be mistaken. If information is gained subconsciously, processed implicitly, and utilised to reach a decision

without the recipient even being aware that they have received the information, there would seem to be little or no consideration for the possibility that the information has been gained in error.

Caruso et al. (2016) found that the playing of video evidence of violence in slow motion rather than at normal speed, can result in viewers perceiving the violent action to be more intentional [35]. Furthermore, they found that while playing footage at both normal and slow speeds reduced this effect, it did not remove it. Montepare et al. and Birch et al. have shown that people are able to identify emotions correctly from gait, and this investigation has shown that an emotion seen through gait is related to state empathy and case-related judgements [3, 19]. This investigation has also shown that people are inconsistent in their ability to describe the emotion seen, and therefore presumably less able to engage in an informed discussion regarding the emotion and its implications for the case in hand. Caruso et al. noted in their paper that “any benefits of video replay should be weighed against its potentially biasing effects” (page 9293), and although this was in the context of serious crime, the results of this study would suggest that the presentation of video-based gait evidence in court also needs some degree of consideration [35].

Conclusion. The use of video footage in court, associated with a variety of sources of evidence, appears set to increase, particularly in view of the increase in the use of body worn cameras by police officers. Video footage offers a particular source of engagement by the jury with the offence or associated events. Its use is usually predicated on the demonstration of a particular type of evidence. However, video footage has the potential to provide the jury with collateral information, the resulting effect of which on the jury may not have been considered, and may not as yet be fully understood. The results of this study, consistent with those of previous investigations, suggest that the emotions being portrayed by a figure in a piece of video footage can be identified by viewers. Furthermore, the results suggest that that information is implicitly used by the viewer to inform empathy and judgements. However, the results also suggest variability in the ability of viewers to describe accurately the information gained. Careful consideration therefore needs to be given to the potential ramifications of playing video footage in court and the subsequent impact on collective jury decision making.

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ВИЯВЛЕННЯ ЕМОЦІЙ І ПРИЙНЯТТЯ РІШЕННЯ КОЛЕГІЄЮ ПРисяжНИХ

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Виявлення і сприйняття емоцій – це навик, необхідний людям для регулювання соціальної взаємодії та інформування про прийняття рішень і поведінки. Дослідження показали, що дослідники можуть правильно визначати емоції пішохода по його ході, що записана на відеозаписі. Однак на даний момент не зовсім зрозуміло, чи буде ця інформація використана дослідником у контексті прийняття рішення колегією присяжних і яким чином. У цьому дослідженні вивчався вплив емоцій обвинуваченого, що виражаються у ході й відображаються на відеозаписі, на прийняття рішень колегією присяжних. Відеозапис ходи чоловіка, що зображає одну з чотирьох емоцій (гнів, страх, щастя або гордість) або нейтральний емоційний стан, було представлено 100 псевдо присяжним разом з контекстною інформацією. Їх попросили визначити, які емоції, на їхню думку, зображує людина, що йде ходою та їхню впевненість у цьому ототожненні. Ступінь стану емпатії і судження псевдо присяжних у справі оцінювалися за допомогою анкети. Результати дослідження показують, що емоції, які зображує постать на фрагменті відеозапису, можуть бути ідентифіковані спостерігачами. Крім того, результати показують, що ця інформація неявно використовується спостерігачами для обґрунтування співчуття і суджень. Однак результати також припускають варіабельність у здатності спостерігачів точно описувати отриману інформацію. Тому необхідно уважно розглянути можливі наслідки відтворення відеозапису в суді й подальший вплив на прийняття рішення колегією присяжних.

Ключові слова: хода, сприйняття емоцій, прийняття рішення колегією присяжних.

ВЫЯВЛЕНИЕ ЭМОЦИЙ И ПРИНЯТИЕ РЕШЕНИЯ КОЛЛЕГИЕЙ ПРисяжНЫХ

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Выражение и восприятие эмоций – это навык, необходимый людям для регулирования социальных взаимодействий и информирования о принятии решений и поведении. Исследования показали, что исследователи могут правильно определять эмоции пешехода по его походке, записанной на видеозаписи. Однако в настоящее время не ясно, будет ли эта информация использована исследователем в контексте принятия решения коллегией присяжных и каким образом. В

этом исследовании изучалось влияние эмоций обвиняемого, выраженных в походе и отображаемых на видеозаписи, на принятие решений коллегией присяжных. Видеозапись ходящего мужчины, изображающая одну из четырех эмоций (гнев, страх, счастье или гордость) или нейтральное эмоциональное состояние, была представлена 100 псевдо-присяжным вместе с контекстной информацией. Их попросили определить, какие эмоции, по их мнению, изображает ходящий, и их уверенность в этом отождествлении. Степень эмпатии и суждения псевдо-присяжных по делу оценивались с помощью анкеты. Результаты исследования показывают, что эмоции, которые изображает фигура на фрагменте видеозаписи, могут быть идентифицированы наблюдателями. Кроме того, результаты показывают, что эта информация неявно используется наблюдателями для обоснования сочувствия и суждений. Однако результаты также предполагают вариативность в способности наблюдателей точно описывать полученную информацию. Поэтому необходимо внимательно рассмотреть возможные последствия воспроизведения видеозаписи в суде и последующее влияние на принятие решения коллегией присяжных.

Ключевые слова: походка, восприятие эмоций, принятие решения коллегией присяжных.

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**OPTICAL PROFILOMETRY AS A METHOD FOR DETECTING
INDENTED WRITING**

The current methodology for indented writing detection involves electrostatic detection apparatus (ESDA) processing and oblique light. While commonly used in forensics analysis, ESDA has several drawbacks, including its unsuitability for documents of certain shapes and densities, the damage it occasionally causes to evidence, its need for prior humidification in order to process documents, and the ozone it creates. In this study we evaluated optical profilometry as an alternative to ESDA. We tested several optical profilometer brands and showed their capacity for