To appear in: Heaton-Armstrong, A. Shepherd, E., Gudjonsson, G. & Wolchover, D (eds.) *Witness Testimony; Psychological, Investigative and Evidential Perspectives.* Oxford: Oxford University Press.

Chapter 17

Forensic Facial Identification

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A. The rôle of mistaken identification in wrongful conviction

17.01 All criminal prosecutions rely on identifying the culprit. In some cases, it may be possible to establish identification through fingerprints, DNA or other forensic evidence. In other cases identification may not be disputed. Nevertheless, in many criminal cases identification by eyewitnesses is the only means of establishing a disputed identification. Concerns about the rôle of mistaken identification in wrongful convictions in England and Wales led eventually to the report of the departmental committee chaired by Lord Devlin.[1] Within a very short time the Devlin Report inspired a milestone judgment of the Court of Appeal which laid down an obligatory set of standard warnings to the jury on the dangers of eyewitness identification.[2]

17.02 Analysis of cases of known wrongful conviction has highlighted the rôle of mistaken identification in both the USA and the UK[3]. The most dramatic evidence comes form the work of the Innocence Project in the USA. At the time of writing 161 people who were wrongly convicted have been exonerated by DNA evidence that was not available at their trial[4]. Analysis of these cases has shown that mistaken eyewitness identification was the leading cause of wrongful conviction. Mistaken identification was a factor in the conviction of 61 of the first 70 exoneration cases (87%).[5] Inspired by the American project, innocence projects have been established in Australia and the UK.[6]

B. Introduction to identification procedures and technologies

17.03 Identification procedures have been relatively unregulated in the USA, where practice differs from one area to another. Identification from arrays of photographs is commonplace, with no minimum number of innocent foils in the array specified. Many photograph arrays comprise only 2 or 3 foils and a suspect.[7] Expert evidence from psychologists on eyewitness identification is admissible in American courts. This practice has encouraged a significant body of empirical

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[1] *Report to the Secretary of State for the Home Department on the Departmental Committee on Evidence of Identification in Criminal Case*s, HC 338, London: HMSO, 1976.
[2] *R v Turnbull* (1977) 98 Cr. App. R. 313.
[3] See *eg* Brandon, R. and Davies C., *Wrongful imprisonment. Mistaken convictions and their consequences*, London: Allen & Unwin, 1973; Huff, C. R., Ratner, A. and Sagarin, E., 'Guilty until proven innocent: wrongful conviction and public policy' (1986) 32 *Crime & Delinquency*, 518-544.
[4] Scheck, B. Neufield, P. and Dywer, J., *Actual innocence,* New York: Doubleday, 2000; http://www.innocenceproject.org, downloaded 9/8/2005.
[5] http://www.innocenceproject.org/causes/index.php, downloaded 12/8/2005.
[6] For the Australian Innocence network see http://www.gu.edu.au/school/law/innocence/network/network.html. For the UK Innocence network see http://www.innocencenetwork.org.uk/.
[7] Wells, G. L., ' Police lineups: data, theory and policy' (2001) 7 *Psychology, Public Policy and Law* 791-801.

research on American identification procedures[8]. As a result of the evidence from the Innocence Project the US Department of Justice has recently produced guidance on best practice.[9]

17.04 In contrast to the USA, the approach taken in England and Wales has been to regulate identification procedures, but not to permit expert evidence on eyewitness identification in court.[10] The assumption of the courts is that eyewitness identification is within the ordinary experience of the jury. Procedures are set down in code D of a code of practice required by the Police and Criminal Evidence Act (1984)[11] (henceforth PACE). Traditionally, identification evidence has been based on a live lineup or 'identity parade'. Minimum standards for the lineup are set out in the code of practice. For example, the code requires that there must be at least eight foils, who resemble the suspect in 'age, height, general appearance and position in life' and the witness must be cautioned that the person they saw may or may not be present. The most recent version of code D has changed the traditional reliance on live lineups in favour of requiring the lineup to be presented on video unless there is a reason why a live parade would be more appropriate. As a result of concern about the reliability of eyewitness identification, and development in the technology available, there is unprecedented interest and change in identification procedures in both the USA and the UK.

17.05 The difficulties inherent in eyewitness identification, may suggest that whenever possible it is better to rely on CCTV images for identification. Development of CCTV technology has had a particularly marked impact in the UK. CCTV has proved so popular with politicians and the public, that with an estimate of more than 4 million cameras, the UK is believed to have the highest density of CCTV cameras in the world.[12] The prevalence of CCTV means that images of either the perpetrators or the victims of crime are often available to police investigations. Recent psychological research has demonstrated, however, that the human ability to match the identity of unfamiliar individuals across video and photographic images can be highly error-prone even under ideal conditions and with high-quality images available (see paragraph 17.57 below).

17.06 A further technological step is to attempt to remove human judgement from the system entirely and use either computers to recognize faces from video images or use expert analysis of facial images (often referred to as facial mapping) to establish identification. Technological development has contributed to advancement in this area but an effective and efficient technical solution to the

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[8] For a recent view see Wells, G. L., Small, M., Penrod, S., Malpass, R. S. Fulero, S. M. and Brinacombe, C. A. E., 'Eyewitness identification procedures: recommendations for lineups and photospreads' (1998) 22 *Law and Human Behavior* 603-647.

[9] Technical Working Group on Eyewitness Evidence, *Eyewitness Evidence: A Guide to Law Enforcement*, Washington DC: US Department of Justice, 1999 (downloaded 20.1.2005 from http://www.ncjrs.org/nij/eyewitness/tech_working_group.html).

[10] It should be noted that, although expert testimony on eyewitness identification is not usually admissible, expert testimony on identification of faces from CCTV is often allowed.

[11] Police and Criminal Evidence Act (1984) codes of practice, edition of 2004, downloaded 20/1/2005 from: http://www.homeoffice.gov.uk/crimpol/police/system/pacecodes.html.

[12] McCahill, M. and Norris, C., 'Estimating the extent, sophistication and legality of CCTV in London,' in.Gill, M. (ed.), *CCTV*, Leicester: Perpetuity Press, 2003, pp. 51 - 66.

problem of facial recognition in the real world has continued to allude us (see paragraph 17.72 below).

C. Investigative use of eyewitness identification

(1) Investigative and evidential use of eyewitness identification distinguished

17.07 *Investigative* use of eyewitness identification can be distinguished from *evidential* use. The police may take steps to collect identification evidence, either to obtain an identification of a possible suspect (e.g. by releasing CCTV images to the media), or to obtain evidence that their suspect is indeed the culprit (e.g. by asking a witness to attend a video identification). In either case the witness identification may form part of the evidence against the defendant in court. This would constitute *evidential* use of facial identification.

(2) Investigative use generating a suspect

17.08 Another possibility is that the identification generates a suspect whom the police then investigate. As a result of the police investigation other evidence may be obtained, which forms the case in court. For example an identification of a suspect from CCTV may provide a reason to arrest a suspect and search their premises. A recent example of *investigative* use of identification from CCTV is provided by the wide publicity given to CCTV images of people suspected of carrying out the London bombing on 7th July and the attempted bombing on 21st July 2005. Information obtained through the publicity may have led the police to find incriminating material at an address linked to a possible identification. These investigations demonstrate an important investigative rôle for CCTV cameras. It remains to be seen whether any identification evidence from CCTV will be put to evidential use in these cases.

(3) When the identity of a suspect is unknown

17.09 The most common investigative use of witness identification is in cases in which the police have not identified a possible suspect. There are a number of procedures that can be used, depending on the circumstances of the case. The police may show a witness photographs of people who have previous convictions for similar crimes and whose appearance is broadly consistent with the witness's description. The procedure for showing photographs in this manner in specified in PACE code D.

(i) CCTV

17.10 If CCTV images are available a still image may be made available in the police station in the expectation that an officer may recognise the person depicted as somebody previously arrested. Recognition by police officers from CCTV is currently outside the scope of PACE code D. CCTV images may also be made available through the media in the hope that a member of the public will recognise the culprit. The degree of familiarity of the person recognised is a critical factor that determines the reliability of facial recognition from CCTV. This issue is discussed further in paragraph 17.57 below.

(ii) Street identifications (UK), confrontations (UK) and showups (USA)

17.11 PACE code D distinguishes between a 'street identification', which may be conducted in the immediate aftermath of a crime being reported when there is insufficient evidence to make an arrest, and a 'confrontation' when a single suspect, who has been arrested, is shown to a witness for the purpose of identification. Different procedures are set out in the PACE code D for street identifications and confrontations. This distinction is not made in the USA - the showing of a single suspect is referred to as a 'showup'. Showups are most commonly used when there is insufficient evidence to arrest a suspect without identification evidence.

17.12 A typical street identification or showup may proceed as follows. Having taken a description of a street robber, the police may drive the victim around the area to see if they can identify the perpetrator. If the victim sees somebody who is recognised as the robber, they will be pointed out to the police. Alternatively, a description may be circulated by radio and other police officers driving into the area may stop somebody who matches the description. The police may set up a situation whereby the witness is able to see the suspect to establish whether an identification can be made. In essence a street identification or showup involves allowing a witness to see a single suspect and make a decision as to whether or not he or she is the perpetrator of a crime.

17.13 A street identification could be put to investigative or evidential use. The procedure is similar to a confrontation when a witness is allowed to see a suspect, who may have already been arrested, perhaps in a police station. In principle, a confrontation (or showup) could be conducted by showing a photograph (which can be used in the USA) or on video. PACE code D does allow a 'live' confrontation, although it is considered very much a last resort, only to be used if all other identification procedures are impracticable. Showing a single person in a photograph or on video, in a manner analogous to a live confrontation, is not included in PACE code D. A street identification can serve an important investigative rôle. For example, a suspect may be subsequently identified by forensic evidence. The most controversial aspect of street identification is its use as formal identification evidence. Therefore, street identifications are discussed further in paragraph 17.45 below.

(iii) Construction of facial likeness

17.14 A further method that can be used to find a suspect is to ask a witness to construct a facial composite from memory (for example by use of E-fit or similar systems). The first method employed was to use an artist to construct a likeness. In the 1970's paper-based systems were used to construct composite faces by slotting together individual facial features chosen from a selection of many different eyes, eyebrows, noses, mouths etc. Photo-fit, based on photographed facial features, was widely used in the UK. Identi-Kit, based on drawn facial features, was widely used in the USA. Subsequently computerised systems were developed that gave more control of the placement of features, and allowed the global configuration of the face to be manipulated. Computerised systems include E-fit, Pro-fit, Mac-a-Mug Pro and FACES. Evaluation of all of these systems has consistently shown that they perform poorly. Witnesses find the task of selecting individual features difficult. Often

composites constructed with a photograph present throughout the construction are not better than composites constructed from memory. This finding suggests that people have difficulty constructing good lookalike composite faces with these systems even when there is no need to rely on memory. The computerised systems are not reliably better than the systems they replaced. Both mechanical and computerised systems are less effective than a good police artist.[13]

17.15 A new generation of facial composite systems are currently under development which make use of a statistical model of facial appearance and a genetic algorithm to converge on the desired facial appearance under the guidance of the witness. Initially a set of random photographic-quality synthetic faces are generated by the software and displayed on the screen. The witness is asked to select the face that most resembles the culprit. The software then generates a new 'generation' of faces that use the witness' selection to guide the search through the range of facial appearance (or 'face space'). The software also introduces random variation to generate the new set of faces. This process continues repeatedly in an iterative manner. At first the faces are dissimilar and none may look similar to the culprit. Gradually the facial appearance of the culprit is selected for. With each successive generation the facial appearances converge on the desired appearance. Systems under development include Eigen-Fit and Evo-Fit.[14] The great advantage of these systems is that the witness only ever has to look at whole faces and does not have to select individual facial features. This is important because experimental evidence shows that face recognition is an holistic process and people find it very difficult to analyse a face into its constituent parts or features.

17.16 In early evaluations the new generation of facial composite systems do not out-perform current systems. However, the technology is still at a relatively early stage of development, and does show considerable promise. The new technology allows a number of innovations which are currently under development. A 3D facial model would allow the witness to rotate the head to see a three-quarter or profile view. Hand held devices could be used to allow rapid deployment for a witness to construct a facial likeness at the crime scene, within minutes of reporting the crime. The facial appearance generated under guidance by the witness could be used to search a database of known offenders while the police are still at the crime scene.

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[13] For a recent review of this research see Davies, G. M. and Valentine, T., 'Facial composites: forensic utility and psychological research,' in Lindsay, R.C.L. Ross, D.F., Read, J.D. and Toglia, M. P., *Handbook of eyewitness psychology* (2 vols.), Mahwah: LEA (in press), vol. 2, 'Memory for people.'

[14] Frowd, C., Hancock, P. J. B. and Carson, D., 'EvoFIT: A holistic evolutionary facial imaging technique for creating composites' (2004) 1 *ACM Transactions on Applied Psychology* 1-21; Frowd, C., Carson, D., Ness, H., McQuiston-Surrett, D., Richardson, J., Baldwin, H. and Hancock, P., 'Contemporary composite techniques: The impact of a forensically-relevant target delay' (2005) 10 *Legal and Criminological Psychology* 63-91; Gibson, S., Pallares Bejarano, A. and Solomon, C., 'Synthesis of photographic quality facial composites using evolutionary algorithms,' in Harvey, R. and Bangham, J. A., (eds.) *Proceedings of the British Machine Vision Conference 2003,* London: British Machine Vision Association, 2003, pp. 221-230.

D. Factors involved in the selection and design of formal methods of identification

17.17 A range of formal procedures have been or are currently in use for testing the ability of witnesses to make an identification: live identity parades; photospreads (in the USA and Canada); video identification; and 'group' identification (England and Wales), the last of which remains norminally available but is seldom used and will not be discussed here. The first three methods involve the placing of the suspect, either in person (live parade) or in image form (still photograph or moving image) among volunteer 'foils' in order to test whether the witness is able to pick out the suspect. The choice, design and reliability of these methods must be considered in the context of three topics: the distinction between estimator variables and system variables; whether to present the array simultaneously or sequentially; and whether to select the foils according to a culprit-description strategy or a suspect-resemblance strategy.

(1) Estimator and system variables

17.18 The outcome of an identification procedure can be affected by *estimator* variables and *system* variables.[15] Estimator variables are the factors associated with an individual witness and their view of the crime. For example, estimator variables include: the distance of the witness from the perpetrator, how much attention they paid, how long they viewed the suspect, the witness's age and eyesight, and whether the culprit was from a different ethnic origin to the witness. Estimator variables are generally not under the control of the criminal justice system. In contrast, system variables are under the control of the criminal justice system. System variables include the identification method selected (e.g. photospread, live identity parade, video identification, street identification), the method used to select foils, the similarity and number of foils, and the instructions given to the witness.

17.19 Any procedure needs to be both *sensitive* and *fair.* If the culprit is present, the procedure must be sensitive enough to allow a reliable witness to be able to make an identification. The procedure should also be fair enough to keep the possibility of a witness making a mistaken identification to an acceptably low level. The skill in designing identification procedures is to manipulate system variables that increase sensitivity while simultaneously maintaining or increasing fairness. It is relatively easy to increase sensitivity but decrease fairness (e.g. using foils who do not fit the description of the witness and are not similar to the suspect) or to increase fairness at a cost of sensitivity (e.g. a lineup of clones).[16]

(2) Sequential and simultaneous presentation compared.

17.20 In relation to photospreads it has been proposed that the array should be presented one at a time, in a sequential presentation, rather than

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[15] Wells, G. L., 'What do we know about eyewitness identification?' (1993) 48 *American Psychologist* 553-571.

[16] Concern with the issues of fairness and sensitivity of identification procedures is central in *R v Marcus* [2004] All ER (D) 351; [2005] Crim. L.R. 384.

simultaneously.[17] Traditionally photospreads have been presented as an array of photographs set out a single sheet, thus all faces were presented simultaneously. Under sequential presentation instructions, the witness is shown one face at a time. They are not told how many faces will be presented, but must decide whether each face is or is not the culprit before the next face is presented. The lineup administrator should be blind to the identity of the suspect to avoid any possibility of providing non-verbal cues.[18] The rationale is that when all faces are seen simultaneously, there is a tendency for the witness to identify the person who *most* resembles the culprit (i.e. to make a *relative* judgement). The use of relative judgements is believed to be a factor that makes identification evidence less reliable.[19] Sequential presentation prevents the witness from making a relative judgement, but instead requires an absolute judgement to each face of whether that person is the culprit.

17.21 The accuracy rates from sequential and simultaneous presentations of photograph lineups based on data from 9 published and 14 unpublished papers have recently been systematically compared.[20] With the culprit present in the lineup more witnesses identified the culprit from simultaneous than from sequential lineups (50% vs. 35% respectively). Incorrect rejections of the lineup (i.e. no identification of any lineup member) were less frequent from simultaneous lineups than from sequential lineups (26% vs. 46%). When the culprit was not in the lineup, there were substantially fewer correct rejections from simultaneous lineups than from sequential lineups (49% vs. 79%), and fewer incorrect identifications of a foil from sequential lineups (51% vs. 28%). In summary, sequential presentation reduces the rate of choosing from both culprit present and culprit absent lineups. The effect of sequential presentation is to provide some protection against mistaken identification from culprit absent lineups (i.e. to make lineups fairer), but it does so at a cost to the sensitivity of the identification procedure when the culprit is in the lineup.

~~17.22~~ The analysis by Steblay *et al*. (2001) provides a systematic assessment of the literature, but nevertheless some shortcomings in the literature should be noted. There are still only a few published studies that have tested the sequential presentation procedure. A large proportion of the studies analyzed were unpublished and almost 70% of studies were carried out at a single research laboratory. Studies published since the analysis was carried out have provided further evidence that the reduced rate of correct identifications from sequential culprit present lineups is a robust phenomenon.[21] Although

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[17] Lindsay, R. C. L. and Wells, G. L., 'Improving eyewitness identification from lineups: Simultaneous versus sequential lineup presentation' (1985) 70 *Journal of Applied Psychology* 556-564.

[18] *Ibid*.

[19] Gronlund, S. D. 'Sequential lineups: shift in criterion or decision strategy?' (2004) 89 *Journal of Applied Psychology* 362-368; Kneller, W., Memon, A. and Stevenage, S., 'Simultaneous and sequential lineups: decision processes of accurate and inaccurate witnesses' (2001) 15 *Applied Cognitive Psychology* 659-671.

[20] Steblay, N., Dysart, J., Fulero, S. and Lindsay, R. C. L., 'Eyewitness accuracy rates in sequential and simultaneous lineup presentations: A meta-analytic comparison' (2001) 25 *Law and Human Behavior* 459-473.

[21] Memon, A. and Gabbert, F., 'Unravelling the effects of a sequential lineup' (2003) 6 *Applied Cognitive Psychology* 703-714; Memon, A. and Gabbert, F., 'Improving the identification accuracy of senior witnesses: Do pre-lineup questions and sequential testing help?' (2003) 88 *Journal of Applied Psychology* 341-347; Memon, A. and Bartlett, J.C., 'The effects of verbalisation on face recognition' (2002) 16 *Applied Cognitive Psychology* 635-650.

sequential presentation was developed in the context of photospreads, it can be applied, in principle, to video identifications (see paragraph 17.40).

(3) Selecting foils by match to culprit description or by suspect resemblance

17.23 The PACE code of practice specifies that the foils for lineups must 'resemble the suspect …'. Therefore, the strategy used to construct lineups in the UK has been a suspect-resemblance strategy. It has been argued that a better strategy is to select foils who match the witness' description of the culprit.[22] Use of a culprit-description strategy has some practical implications. Foils must be selected separately for each witness if their descriptions differ. Special consideration must be made if the witness' description does not match the appearance of the suspect in any way. First, use of a culprit-description strategy will be considered in the situation where the witness has given a description that fits the appearance of the suspect in all attributes mentioned in the description.

(i) When the description of the culprit matches the suspect

17.24 At an identification parade the witness is asked whether any of the people in the lineup is the same person as the culprit. It is reasonable to assume that the witness can remember the description that he or she gave to the police. A witness may expect to identify somebody who matches the description they gave previously. Therefore, they may be inclined to disregard any foils that do not match their description, or conversely pay special attention to anybody who is a better match to their description than the rest. To be fair, all lineup members should match the witness's description of the culprit. Therefore, the witness' description should play a special rôle in selecting lineup members.

17.25 It does not introduce a bias against the suspect if lineup members differ on some feature that was not mentioned in the original description. For example, imagine a witness who described the culprit as "white, male, mid-forties, with long, dark hair". The suspect fits this description and has a pale complexion and prominent dark eyebrows. A culprit-description strategy would require that all lineup foils would be white males, say between 43 and 47 years old with long, dark hair. No attempt would be made to match the prominent eyebrows or the pale complexion. Indeed there should be a range of variability around these and other features not mentioned in the description (e.g. build, face-shape etc.). Heterogeneity of features not mentioned in the description will help a witness with a reliable memory to distinguish the culprit from the foils. If the police suspect is the culprit, the witness may be able to identify the suspect, because on seeing the lineup, she recognises the man with the pale complexion and prominent eyebrows. A lineup that consists of a number of people chosen because they closely resemble the suspect in all aspects of their appearance, will make it difficult even for a reliable witness to identify the culprit, if present. However, if the suspect was not the culprit, the pale complexion and prominent eyebrows are no more likely to trigger a mistaken identification than some other features on a foil (maybe thin eyebrows and an olive skin tone) because the witness has not seen the suspect before. A strategy

[22] This line of argument was first made by Luus, C. A. E. and Wells, G. L., 'Eyewitness identification and the selection of distracters for lineups' (1991) 15 *Law and Human Behavior* 43-57.

of suspect resemblance, which attempts to match all features including the pale complexion and the prominent eyebrows, will produce a procedure that is less sensitive than a lineup constructed of foils chosen to match the witness's description of the culprit. As the culprit description strategy does not introduce any systematic bias against the suspect both procedures should be equally fair.

17.26 When constructing a culprit description lineup it may be necessary to take account of default values in descriptions. Sometimes people may not describe the sex or race of the person. This may occur because the witness assumes a default value, rather than implying that the witness did not notice the sex or ethnicity of the offender. It is not recommended that people of different sex or ethnic background are put on the same lineup simply because sex or ethnicity was not mentioned in a description. Similarly people may neglect to say that somebody did not have a beard or was not wearing glasses.[23] If a description is taken carefully by the first police officer who interviews a witness the problem of missing descriptors can be minimised.

17.27 An experimental study reported by Wells, Rydell and Seelau (1993) supports the argument that foils selected to match the witness's description of the culprit produce more reliable identification evidence.[24] Students witnessed a live staged theft and were asked to identify the perpetrator from an array of photographs in an immediate test. There were more correct identifications from culprit-description lineups (67%), than from suspect-resemblance lineups (22%). When the culprit was not present in the lineup, there were fewer mistaken identifications of foils from culprit-descriptions lineups(32%) than from suspect-resemblance lineups (47%), but this difference was not statistically significant. Two further studies failed to find any statistically significant difference in the rate of correct or mistaken identification between culprit-description and suspect-resemblance lineups.[25] At present there is surprisingly little empirical evidence on which to base a recommendation that a match-to-description strategy is a superior method to construct a lineup than a suspect-resemblance strategy.[26]

(ii) When the description of the culprit does not match the suspect

17.28 A culprit description strategy is more problematic if the suspect does not match the witness' description in respect of some attributes. Taking the example given above, what should a lineup administrator do if the suspect is a white male with long, dark hair but is 30 years old, rather than in his mid-forties? Perhaps the witness simply made a mistake estimating his age, or perhaps the suspect is innocent. In cases such as this it is recommended that a suspect resemblance strategy should be used for the features that do not match the description. In the current example, the foils should match the age of the

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[23] Lindsay, R.C.L., Martin, R. and Webber, L., 'Default values in eyewitness descriptions: A problem for the match-to-description lineup foil selection strategy' (1994) 18 *Law and Human Behavior* 527-541.

[24] Wells, G. L., Rydell, S. M. and Seelau, E., 'The selection of distractors for eyewitness lineups' (1993) 78 *Journal of Applied Psychology* 835-844.

[25] Lindsay, Martin and Webber, cited at n. 23. Tunnicliff, J. L. and Clark, S. E., 'Selecting foils for identification lineups: Matching suspects or descriptions?' (2000) 24 *Law and Human Behavior* 231-258.

[26] Wells *et al*., (1998), cited above at n.8., p. 632.

suspect rather than the age in the description. The aim in constructing all lineups should be to ensure that the suspect does not stand out in any way that would draw extra attention from the witness.

E. Methods of formal identification by witness selection

(1) Identity parades (live lineups)

17.29 A sound understanding of the sensitivity and fairness of identification procedures requires evidence from real witnesses of crime. A problem with interpreting such data is that there is no standard by which to ascertain which police lineups contained the culprit. However, analysing large data sets and testing to determine whether effects established in laboratory studies are replicated in field studies can add confidence to the interpretation of the data. Three studies of live lineups conducted in England and Wales under the PACE code of practice show remarkable consistency.[27] Approximately 40% of witnesses identified the suspect, approximately 40% of witnesses did not make any identification, either because they are not sure or because they judged the culprit not to be in the lineup, and 20% of witness made a mistaken identification of an innocent foil. The known mistaken identifications were made despite the witness having been cautioned that the person they saw may or may not be present in the lineup. Archival data collected by the police from 1, 776 identity parades showed that the suspect was identified in 48% of cases, but did not distinguish non-identifications from identification of a foil.[28] An archival analysis of 58 live lineups conducted in US criminal cases found that the suspect was identified in 50% of cases, a foil was identified in 24% of cases and the witness was unable to make an identification or rejected the lineup in 26% of cases.[29]

17.30 Valentine *et al*. (2003) examined the effect of a range of estimator variables on the outcome of identification attempts made by approximately 600 witnesses who viewed over 300 live lineups organised by the London Metropolitan Police during the investigation of criminal cases.[30] The suspect was more likely to be identified if the witness was younger than 30, the suspect was a white European (rather than African-Caribbean), the witness gave a detailed description, viewed the culprit for over a minute and made a fast decision at the lineup. There were no independent, statistically reliable effects of the use of a weapon during the incident, cross-race identification or of the delay before the identification attempt. However, the data did suggest that the proportion of witnesses who identified the suspect was higher for identifications made after a very short delay of less than one week after the

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[27] Slater, A., *Identification parades: A scientific evaluation*, London: Police Research Group (Police Research Award Scheme), Home Office, 1994; Valentine, T., Pickering, A. and Darling, S., 'Characteristics of eyewitness identification that predict the outcome of real lineups' (2003) 17 *Applied Cognitive Psychology* 969-993; Wright, D. B. and McDaid, A. T., 'Comparing system and estimator variables using data from real lineups' (1996) 10 *Applied Cognitive Psychology* 75-84.

[28] See Table 1 in Pike, G., Brace, N. and Kyman, S., *The visual identification of suspects: procedures and practice*, Briefing note 2/02, Policing and Reducing Crime Unit, Home Office Research Development and Statistics Directorate, 2002 (www.homeoffice.gov.uk/rds/prgbriefpubs1.html).

[29] Behrman, B. W. and Davey, S. L. 'Eyewitness identification in actual criminal cases: An archival analysis' (2001) 25 *Law and Human Behavior* 475-491.

[30] Valentine, Pickering and Darling (2003), cited above at n.27.

offence. Sixty-five percent of witnesses identified the suspect from lineups held after 0 – 7 days, while only 38% of witnesses identified the suspect in lineups held 8 days or more after the incident. Pike et al. (2002) also reported an effect of witness age, no effect of the use of a weapon during a crime, and no effect of cross-race identification on the outcome of live lineups.[31]

(2) Photospreads

17.31 Most research on eyewitness identification has focussed on the use of photographs to obtain formal identification evidence, because this procedure is widely used in the USA and Canada. The typical format is to present the witness with 6 photographs simultaneously arranged in two rows of three images in a single array. Behrman and Davey's (2001) archival analysis of eyewitness identification in American criminal cases, included an analysis of the outcome of 289 photographic lineups.[32] They found that 48% of witnesses identified the suspect. In common with the British studies cited above, there was no effect of the presence of a weapon in the crime on the likelihood of the suspect being identified. There was an effect of delay prior to the identification. Lineups held within 7 days of the incident produced a higher rate of identifications of the suspect (64%) than lineups held after 8 days or more (33%). Although Valentine *et al*. (2003) reported a non-significant effect of delay in the whole sample of live lineups in London, the delays involved were much longer. Most live lineups were held between 1 and 3 months after the event. As noted above, a comparison similar to that made by Behrman and Davey showed a similar effect of delay. However, in contrast to the British data, Behrman and Davey did find an effect of cross-race identification in their sample of US photograph lineups. Sixty percent of witnesses of the same ethnicity as the suspect identified the suspect, compared to 45% of witnesses of different ethnicity.

17.32 There is an extensive experimental literature of laboratory studies of identification from photospreads, which includes several comprehensive reviews.[33] The importance of using non-biased instructions has been demonstrated.[34] An example of good practice would be to include the warning to the witness, specified in the PACE code of practice, that 'the person you saw may or may not be present'. It has been recommended that the photospread should be administered blind. That is to say the administrator should not know who is the suspect in the lineup.[35] Not only is it good scientific practice to keep the administrator blind to the suspect's identity, but it removes all possible suspicion of police malpractice. In addition to these two principles of best practice, two significant methods to enhance the reliability of identification from photospreads have emerged from this literature. Reference has already been mde to the proposal that the photographs should be presented one at a time, in a *sequential presentation,* rather than simultaneously.[36] The argument that foils in a lineup should be chosen to match the witness's

[31] Pike, Brace and Kyman (2002), cited above at n.28.
[32] Behrman and Davey (2001), cited above at n.29.
[33] Wells (1993), cited above at n.15; Wells, *et al* (1998), cited above at n.8.
[34] Steblay, N., 'Social influence in eyewitness recall: A meta-analytic review of lineup instruction effects' (1997) 21 *Law and Human Behavior* 283-298.
[35] Wells, *et al* (1998), cited above at n.8.
[36] Lindsay and Wells (1985), cited above at n.17.

description of the culprit rather than selected to match the appearance of the suspect (i.e. a *culprit-description* strategy rather than a *suspect-resemblance* strategy) has also been outlined above.[37]

(3) Video identification

(i) VIPER and PROMAT

17.33 Video identification has become the primary method for obtaining formal identification evidence in the UK since the introduction of a new code of practice in 2004 (see paragraph 17.04 above). Two different IT systems are in widespread use in British police forces. VIPER™ (Video Identification Procedure Electronic Recording) was developed by West Yorkshire Police and is used by approximately half of the police forces in England and Wales and by all forces in Scotland.[38] PROMAT™ (Profile Matching) is used by approximately half of the police forces in England and Wales. Both systems produce similar formats of video lineup but use different databases of foils. In both systems lineups consist of 15 second clips of each lineup member shown sequentially. The sequence starts with a head and shoulders shot of the person looking directly at the camera, who slowly turns their head to present a full right profile to the camera. The person then slowly rotates their head to present a full left profile to the camera. Finally the person returns to looking directly into the camera in a full-face pose.

17.34 Each person is shown one at a time in a lineup with a minimum of eight foils. The witness must view the entire lineup twice before making any identification. As is the case for a live lineup, the foils should resemble the suspect, the witness must be cautioned that the person they saw may or may not be present and be told that if they cannot make a positive identification they should say so.

17.35 VIPER and PROMAT differ most in the nature of their databases. VIPER is run from a national centre. Images are collated and quality-checked to ensure that they meet stringent requirements of standardization. Currently there are approximately 12,000 images in the database, which are available to all users to select for inclusion in their lineups. The police forces that use PROMAT collect and share their own database of foils. Conditions for recording video images is standardized but the specifications are less stringent than for VIPER.

(ii) Research on VIPER

17.36 VIPER has been the subject of research which showed that VIPER video lineups from real criminal cases were fairer to the suspects than conventional 'live' lineups,[39] and that VIPER video lineups were equally fair to white European and African–Caribbean suspects.[40] In these studies, participants (known as 'mock witnesses') were shown a set of videos of VIPER lineups or a set of photographs of a live lineups held as part of the investigation of the

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[37] Luus and Wells (1991), cited above at n.21; Wells, Rydell and Seelau (1993), cited above at n.22.

[38] The Police and Criminal Evidence Act (1984), and therefore Code D covering identification procedures, does not apply in Scotland. Nevertheless, all Scottish police forces now have the VIPER system available in their area.

[39] Valentine, T. and Heaton, P., 'An evaluation of the fairness of police lineups and video identifications' (1999) 13 *Applied Cognitive Psychology* S59-S72.

[40] Valentine, T., Harris, N., Colom Piera, A. and Darling, S. 'Are police video identifications fair to African-Caribbean suspects?' (2003) 17 *Applied Cognitive Psychology* 459-476.

case. For each lineup they were given the first description of the offender made by the original witness. The mock witnesses were required to guess, on the basis of the witness' description, which lineup member was the suspect. Therefore, a 'mock witness' simulates a witness who (a) has no memory of the culprit at the time of the identification procedure; (b) can remember the description they previously gave to the police, and (c) nevertheless, makes an identification from the lineup. If the lineup is perfectly fair, and all members fit the description, the mock witness would have no basis on which to make their selection and would merely have to guess who is the suspect. Therefore, if a large number of the mock witnesses are asked to make a selection they would select the suspect on 11% of occasions (1 in 9) from each lineup, because the lineups all contained a suspect and eight foils. Using this procedure Valentine and Heaton (1999) found that 25% of mock witnesses (1 in 4) chose the suspect in the live lineups. The mock witnesses were able to identify the suspect in the live lineups more frequently than by chance (25% vs. 11%), notwithstanding the fact that, by definition, they had no memory of the culprit. Therefore, the structure of the live lineups (i.e. the selection of foils) showed some bias against the suspect. In comparison, 15% of mock witnesses selected the suspect from the videos of VIPER lineups, which also consisted of one suspect and eight foils. Statistical tests showed that the VIPER lineups were significantly fairer than the live parades (15% vs. 25%), and the VIPER lineups were not significantly less fair than expected by chance (15% vs. 11%).

17.37 Previous data from real cases suggested that live lineups may be less fair to ethnic minorities than to white Europeans.[41] Therefore, Valentine, Harris, Colom Piera and Darling (2003) compared the fairness of VIPER lineups of African–Caribbeans and of white Europeans using equal numbers of mock witness from both ethnic backgrounds. The VIPER parades were found to be equally fair to suspects of both ethnic groups, with very similar measures of fairness to Valentine and Heaton's data for VIPER lineups.

(iii) Benefits of video identification as against live parades

17.38 Video identification has a number of important benefits compared to live lineups. First, use of video can dramatically reduce the delay before an identification can be organized. Live lineups have been subject to long delays to enable a selection of appropriate foils to be available to stand on a lineup (typically of 1 – 3 months).[42] In contrast VIPER can produce a video lineup for most suspects and transmit it via a secure network within two hours of request.

17.39 Second, approximately 50% of live lineups are cancelled, for example, due to failure of a bailed suspect to attend, failure of the witness to attend, or lack of suitable volunteers. Cancellations contribute to a further increase in delay before the witness can view a lineup. Since the introduction of video identification, the proportion of procedures cancelled has fallen to around

[41] Wright and McDaid (1996), cited above n. 27.
[42] Valentine, Pickering and Darling (2003) cited above at n.27.

5%.[43] Third, availability of a large database of video clips from which to select foils can make lineups fairer to the suspect as demonstrated in the research discussed above. Fourth, use of video is less threatening to victims, who no longer have to attend an identification suite where their attacker may be physically present. A further advantage is that video equipment can be taken to a witness who is unable to attend the police station. In a recent case, Abigail Witchalls, a victim of an attack who was left paralyzed, was able to view a video lineup from her hospital bed, and a suspect was eliminated from the enquiry as a result.[44]

(iv) Naturally sequential presentation

17.40 Video identification naturally yields a sequential presentation. Sequential presentation can reduce mistaken identifications when coupled with appropriate viewing instructions (see paragraph 17.20). Under sequential viewing instructions the witness is required to make a decision after viewing each person as to whether he or she is the culprit. However, the current PACE code of practice does not allow any advantage of sequential presentation to be realized because it requires witnesses to view the entire lineup twice before making any decision. Thus, the question arises of whether video identification procedures could be improved by allowing strict sequential viewing instructions to be used.

17.41 My colleagues and I have examined this issue in a current research project[45]. When combining the sequential viewing instructions with culprit-absent VIPER video lineups, there was a reduction in mistaken identifications of foils, but the effect was not statistically significant. However, there was a significant reduction in the number of correct identifications from culprit-present video lineups with sequential viewing instructions. The sequential instructions appear to reduce the rate of choosing from witnesses overall, and therefore suppresses correct identifications as much, if not more so, than incorrect identifications. In conclusion, we do not recommend combining sequential viewing instruction with video identification.[46]

(v) Moving images compared with stills

17.42 As part of the same project we have also investigated whether the moving images used in video identification contribute to its success compared to single full-face images, as frequently used in American photospreads. Intuition suggests that witnesses may be more likely to be able to identify a culprit from a moving image that allows the face to be seen from a variety of angles. However, results from a staged-incident experiment using VIPER lineups showed that this was not the case. The rate of correct identification from culprit-present video lineups was the same for moving clips (as described in paragraph 17.33 above) and for static full-face images presented on a monitor.

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[43] Pike, G., Kemp, R., Brace, N., Allen, J. and Rowlands, G., 'The effectiveness of video identification parades' (2000) 8 *Proceedings of the British Psychological Society* 44.
[44] http://www.guardian.co.uk/crime/article/0,2763,1473862,00.html, downloaded 31/8/2005.
[45] We acknowledge funding from the Nuffield Foundation for this project.
[46] Valentine, T., Darling, S. & Memon, A., 'Do sequential viewing instructions and moving images increase the reliability of police video identification procedures?' (in preparation).

When the culprit was not in the lineup, there were fewer mistaken identifications of foils from moving clips than from still images. Thus the use of moving video clips improves the fairness of lineups without affecting the sensitivity of the procedure.

(vi) Research comparing selection of foils by culprit description and by suspect resemblance

17.43 A final aspect of this project is to investigate whether video identifications can be improved by using a culprit-description strategy rather than a suspect-resemblance strategy to select the foils. This work is continuing, but early results suggest that both strategies tend to result in similar lineups being selected from the VIPER database.

F. Non-selection modes of identification

(1) Street identifications, showups and confrontations

17.44 In both the USA and the UK a person detained in an area where a crime has been recently reported (e.g. within a few hours) and who fits a general description given, may be shown to the witness to enable an identification to be made (see paragraph 17.11 above). This procedure is known as a showup in the USA and a street identification in the UK. A showup or street identification is used when there is insufficient evidence to arrest the suspect without a positive identification. In England and Wales, if the suspect has been arrested any identification must follow the PACE code of practice, and a video identification procedure would usually be carried out. Following a positive street identification, a video identification should normally be used to obtain identifications by any other witnesses. In effect, a street identification is a confrontation between the witness and a potential suspect. A confrontation, in which a witness is allowed to see a single suspect who has been arrested, is available under PACE code D as a method of last resort. A confrontation may be used if the suspect refuses to co-operate with any other method of obtaining formal identification evidence.

(i) Street identification and PACE Code D

17.45 If there is only one witness, a positive street identification may provide the main evidence against a suspect. Therefore, a question arises over the reliability of street identifications. The procedure can be highly suggestive, as the witness may be aware that the police suspect the person they see. Furthermore a street identification provides no test of witness memory as there is no possibility of a witness making an identification that is demonstrably mistaken, as may occur if a witness picks a foil from a video identification. PACE code D (2004) contains guidance for conducting street identifications, including the instruction that "care should be taken not to direct the witness' attention to any individual unless, taking into account all the circumstances, this cannot be avoided." (paragraph 3.2). It is not clear how this recommendation is implemented when the police have already stopped a

suspect. In *K v Director of Public Prosecutions*[47] a conviction for robbery was overturned on the grounds that a street identification was suggestive. A police officer held a suspect close to a car window for the victim of a street robbery to identify him. The court took the view that there were sufficient grounds for arrest prior to the street identification and an identity parade should have been held instead of a street identification.

(ii) Research

17.46 There is very little research on street identifications or showups, despite evidence that these procedures are often used by the police. American estimates suggest that showups account for between 30% and 77% of all identification procedures.[48] I am not aware of any formal estimate of the frequency of street identifications in the UK. Field data from the USA gives a conflicting picture of the outcome of showups conducted by the police. Gonzalez, Ellsworth and Pembroke (1993) report that from a sample of 224 identification procedures recorded by a police officer, 172 were showups and 52 were photospreads. An identification was made in 22% of the showups and 56% of the photospreads.[49] They also found in laboratory studies that the identification rate from showups was lower than from photographic lineups. In contrast Behrman and Davey (2001)[50] found higher identification rates from showups than from photospreads in their archival study of identification in cases in the USA. From 284 photographic lineups, 48% of witnesses made an identification. From 258 showups, 77% of witnesses made an identification. Laboratory studies of showups, which with the exception of the study by Gonzelez *et al*. (1993) involved presentation of a photograph in the showup, generally found lower rates of identification from showups than from photospreads (27% vs. 54%).[51]

17.47 The comparison between showups and photospreads reveal conflicting results in the few data that are available. However, the important issue to appreciate is that all identifications in showups are forensically significant. The person identified is always the suspect, will often not have an alibi by virtue of the fact that they have been detained in the relevant area shortly after a crime has been committed, and will fit a general description provided by the witness. In contrast we know that mistaken identifications frequently occur from photospreads and live lineups, because many are identifications of a foil which are known to be a mistake on behalf of the witness and have no consequences for the person identified. In summary, evidential use of street identifications should be treated with caution. However, the reliability of street identifications is an issue that would benefit from further research data.

(2) Dock identifications

17.48 Under Scots law an identification of the defendant in the dock made by a witness called to give evidence at the trial can constitute formal identification

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[47] [2003] EWHC Admin 351.
[48] Steblay, N., Dysart, S., Fulero, S. and Lindsay, R. C. L. 'Eyewitness accuracy rates in police showup and lineup presentations: A meta-analytic comparison' (2003) 27 Law and Human Behavior 523-540.
[49] Gonzales, R, Ellesworth, P. and Pembroke, M. 'Response biases in lineups and showups' (1993) 64 *Journal of Personality and Social Psychology* 525-537.
[50] Behrman and Davey (2001), cited above at n.29.
[51] Steblay, Dysart, Fulero and Lindsay, cited above at n 48.

evidence. Identification evidence, however, requires corroboration under Scots law. The use of dock identifications was recently challenged in *James Holland v. HMA*.[52] James Holland was convicted on two charges of assault and robbery. In both cases he was first identified from photographs shown to a witness by the police. Subsequently, at the direction of the court in a preliminary hearing, an identity parade was organised. There was one principal witness in each case, both of whom were the victims of an assault. In the first offence the witness identified two foils from the lineup. The police told her that she 'had not done too well'. However, the victim's son, whose arrival home prompted the robbers to flee, identified James Holland at the identity parade. In the other offence, the witness picked a foil but was unaware that he had made a mistaken identification. At the trial both witnesses, who had failed to identify the accused at the identity parade, were invited to identify the accused in the dock. Both made positive identifications, on which the prosecution case relied.

17.49 James Holland's conviction was upheld at the first appeal. Subsequently he appealed to the Privy Council on the grounds that he had been denied a fair trial. In the judgement the principle of using dock identifications was upheld, but the appeal was allowed on the grounds that the prosecution failed to disclose exculpatory information.

G. The relationship between eyewitness confidence and accuracy

17.50 Evidence shows that the confidence of a witness is probably the most important factor that determines whether an identification will believed by a jury.[53] In the past psychologists have argued, from the available experimental evidence, that the confidence of an eyewitness bears little or no relationship to their accuracy. Recent research has given us a more sophisticated understanding of the confidence-accuracy relationship in eyewitness identification, and enabled conditions to be identified which optimise the confidence-accuracy relationship.

17.51 Many studies have examined the confidence-accuracy relationship amongst a group of participants who all viewed the same simulated crime or event in an experiment, and therefore all experienced similar viewing conditions. More recently, it has been discovered that if the participants experience a wide range of different viewing conditions, their confidence shows a moderately strong positive relationship with the accuracy of their eyewitness identification.[54]

17.52 It has been found that the relationship between confidence and accuracy is considerably higher amongst witness who identify somebody from a lineup than it amongst people who make no identification from a lineup. For non-

[52] [2005] UKPC D1.
[53] See Wells *et al* (1998), cited above at n.8, for a brief review of this evidence.
[54] Lindsay, D. S., Read, J. D. and Sharma, K., 'Accuracy and confidence in person identification: The relationship is strong when witnessing conditions vary widely' (1998) 9 *Psychological Science* 215-218.

choosers the confidence-accuracy relationship is close to zero, but choosers show a moderately strong positive relationship.[55]

17.53 The two findings described in the paragraphs above suggest that the confidence of an eyewitness in court may be more diagnostic of identification accuracy than psychologist have previously believed. However there are still some very important reasons for caution. It should be stressed that the confidence-accuracy relationship is only moderate (a correlation coefficient of approximately 0.5). Therefore, confident but mistaken eyewitnesses may be encountered fairly frequently.

17.54 In a real investigation, the police routinely ask a witness when taking an initial statement whether they would recognise the man if they saw him again. A witness who expresses doubt at this stage is unlikely to attend an identification procedure. However, confidence measured before an attempted identification is not as predictive of accurate identification as confidence measured immediately after the identification attempt.[56] This is one reason why it is good practice to take a clear statement of confidence from the witness immediately after the identification attempt and before the formal procedure has ended.

17.55 A very important research finding is that witness confidence is changeable and is influenced by information that the witness acquires after the original incident. Receiving feedback that the suspect has been identified, or that somebody else made the same identification will increase the witness' confidence in their identification. Not only does confirming feedback tend to make the witness more confident in their identification, but it also tends to inflates estimates of a range of testimony including how long the culprit was seen for, how close they were, how much attention the witness paid etc.[57] Furthermore, confirming post-identification feedback tends to make eyewitnesses over-confident. That is, they express more confidence in their identification that is warranted[58]. By the time a witness gives evidence in court they will have received confirming feedback, if only by virtue of the fact that they have been called upon to give evidence. The witness is unlikely to be asked to attend court if they had identified the wrong person. The effect of confidence malleability is particularly important in the cases that rely on dock identifications.

H. Identification by viewing CCTV footage

17.56 CCTV images can be used in a number of ways for investigative and evidential purposes. One use, which we are all familiar with, is the release of CCTV to the media, in the hope that a member of the public will recognise the person in

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[55] Sporer, S., Penrod, S., Read, D. and Cutler, B. L., 'Choosing, confidence and accuracy: A meta-analysis of the confidence-accuracy relations in eyewitness identification studies' (1995) 118 *Psychological Bulletin* 315-327.

[56] For a review of pre-identification confidence and accuracy see Cutler, B. L. & Penrod, S. D. 'Forensically-relevant moderators of the relationship between eyewitness identification accuracy and confidence' (1989) 74 *Journal of Applied Psychology* 650-652. For a review of post-identification confidences and accuracy see Bothwell, R. K., Deffenbacher, K. A., and Brigham, J.C., 'Correlations of eyewitness accuracy and confidence: Optimality hypothesis revisited' (1987) 72 *Journal of Applied Psychology* 691-695.

[57] Wells G. L. and Bradfield, A. L., '"Good you identified the suspect": Feedback to eyewitnesses distort their reports of the witnessing experience' (1998) 66 *Journal of Applied Psychology* 688-696.

[58] Semmler, C, Brewer, N. and Wells, G. L., 'Effects of postidentification feedback on eyewitness identification and nonidentification confidence' (2004) 89 *Journal of Applied Psychology* 334-346.

the CCTV as somebody they know. The results of psychological studies show that this can be an effective use of CCTV because people are extremely good at recognising a highly familiar person across a variety of viewing and lighting conditions. Familiar people can be recognised from poor quality CCTV images with over 90% accuracy.[59] David Copeland, the London nail bomber was caught in 1999 after being recognised by a work colleague from broadcast CCTV images.[60]

(1) Matching identities from CCTV

17.57 A more controversial, and scientifically less sound use of CCTV, is to use a CCTV image as identification evidence of a suspect who is not well known to the witness who makes the identification. Thus CCTV images may be presented in court with the prosecution case being that it is an image of the defendant. The defence case may be that the defendant is not the person in the CCTV. However, the defendant will not be familiar to the members of the jury, with whom a decision of whether the CCTV depicts the defendant ultimately lies. Psychological science shows that we are surprisingly poor at matching images, taken by different cameras, of an otherwise unfamiliar person. For example, Bruce *et al.* (1999) asked participants to choose the face from an array of ten high-quality photographs that they thought matched a target face.[61] The photograph of the target was taken from a studio video recording made on the same day as the still photographs in the array. The available set of faces from which the arrays were selected consisted of 120 young, male, clean-shaven Caucasian police trainees supplied by the Home Office. The arrays consisted of faces judged to resemble each other so that selections could not be based on substantial differences in hairstyle, weight or age. When the viewpoint and facial expression of the target and the correct image in the array matched (i.e. a comparison is made under ideal conditions), participants only made the correct selection in 79% of the arrays. Bruce *et al.* conclude "The implication of these findings is that courts must be aware that caution should be used when the impressions of resemblance are used to establish the identity of unfamiliar people, *even when the quality of video tape is high*." (emphasis as in the original).

17.58 The forensic implications of a separate study of recognition of faces from a poor-quality video, typical of that recorded by a commercial security CCTV system, was summarised as follows: "…identification of these types of video sequences is very unreliable, unless the viewer happens to know the target person" (Burton *et al*., 1999)[62]. Referring to the performance of participants unfamiliar with target faces, Burton *et al*. state: "Although there were reliable differences on the judgements between the targets that were present and those that were not present, differences were comparatively small." Furthermore, Burton *et al's* study showed that police officers, with experience in forensic

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[59] Bruce, V., Henderson, Z., Newman, C. and Burton, A. M., 'Matching identities of familiar and unfamiliar faces caught on CCTV images' (2001) 7 *Journal of Experimental Psychology: Applied* 207-218; Burton, A. M., Wilson, S., Cowan, M. and Bruce, V., 'Face recognition in poor quality video: evidence from security surveillance' (1999) 10 *Psychological Science* 243-248.

[60] http://www.guardian.co.uk/bombs/Story/0,2763,338345,00.html, downloaded 1/9/2005.

[61] Bruce, V., Henderson, Z., Greenwood, K., Hancock, P., Burton, A. M. and Miller, P., 'Verification of face identities from images captured on video' (1999) 5 *Journal of Experimental Psychology: Applied* 339-360.

[62] Burton, Wilson, Cowan, and Bruce (1999), cited above at n.59.

identification and an average of over 13 years service, perform as poorly as other participants unfamiliar with the targets. A police officer is no more likely to correctly identify somebody from video than anybody else who has a similar level of familiarity with the target.

17.59 A study conducted in our laboratory examined people's ability to match video images of a person to somebody physically present in the room.[63] This comparison occurs when the jury watches a video sequence in a court in the presence of the defendant. Participants (n = 198) matched a previously unfamiliar actor filmed on high-quality video with a single live 'defendant'. The video, which lasted 40 seconds, displayed views of each actor's face and body from a number of different angles. In half of the trials the defendant was not the person in the video. The overall error rate was approximately 20% (22% target present; 17% target absent). That is, one in five participants was mistaken under ideal conditions when there was no requirement to remember the culprit's face, and there was no time pressure. The video sequence could be played up to 3 times or until the participant made their decision. Error rates varied considerably across different actors. In one case 44% of participants (7 out of 16 participants) incorrectly judged an 'innocent defendant' to be the actor in the video sequence. Inspection of the photographs of the two men involved in this comparison shows that they have similar hair length, hair texture and face shape, however they do not closely resemble each other.

17.60 Other studies have found similarly high error rates in identifying previously unfamiliar persons from CCTV. Davies and Thasen (2001) report identification accuracy between 15 – 30% with false alarm rates between 60 – 65%, showing that people are particularly prone to making a mistaken identification when the person they expect to identify is not present. [64]

17.61 Why is recognition of familiar faces so robust but recognition of previously unfamiliar faces so vulnerable? It is known that familiar faces are better recognised from their internal features (eyes, nose, mouth). When looking at unfamiliar faces more reliance is placed on the external features (hair, face shape).[65] The configuration of the internal features is a more reliable cue to identity across different views and lighting conditions. When recognising unfamiliar faces we are more likely to rely on superficial similarities that are changeable (e.g. hairstyles, hairline).

(2) Identification by police officers

17.62 Images from CCTV are often circulated amongst police officers in the expectation that the person to be identified may previously have had some contact with the police and may be recognised. This practice has obvious investigative value in suggesting an identity for an unknown suspect. However, use of an identification obtained in this manner as evidence in court, raises the issue of how reliable it would be. The first point to be made is that in England

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[63] Davis, J. & Valentine, T. (in preparation).

[64] Davies, G. and Thasen, S., 'Closed-circuit television: How effective an identification aid?' (2000) 91 *British Journal of Psychology* 411-426; Henderson, Z., Bruce, V. and Burton, A. M., 'Matching the faces of robbers captured on video' (2001) 15 *Applied Cognitive Psychology* 445-464.

[65] Ellis, H. D., Shepherd, J. W. and Davies, G. M., 'Identification of familiar and unfamiliar faces from internal and external features: some implications of theories of face recognition' (1979) 8 *Perception* 431-439; Young, A. W., Hay, D. C., McWeeney, K. H., Flude, B. M. and Ellis, A. W., 'Matching familiar and unfamiliar faces on internal and external features' (1985) 14 *Perception* 737-746.

and Wales identification by a police officer from CCTV is outside the scope of PACE code D. A record of the formal identification is usually kept and is available to the court. However, typically there is no record of when the police officer first saw the CCTV or a still taken from it, why the officer was asked to make a formal identification in the case, whether an identity was suggested to the officer prior to their 'identification' or whether the identification has been discussed with colleagues prior to the formal identification. All these issues are highly relevant to evaluating the reliability of the identification.

17.63 A police officer is unlikely to be highly familiar with the person he or she recognises from CCTV. Typically, the identified person may have been stopped on one or two occasions, perhaps interviewed for 30 minutes once or twice and may have been seen during a court appearance. These encounters may occur over a period of a year or more. The science tells us that matching unfamiliar facial identities from CCTV can be error-prone. On the other hand, we know that a reliable identification of a familiar person (e.g a work colleague) can be made even from poor quality CCTV. Where within this range of reliability does identification by a police officer, in the circumstances described above, lie?

17.64 There is little direct evidence of how familiar one has to be with a face to recognise the person reliably from CCTV. Bruce *et. al.* (2001) looked at matching performance for faces that had been familiarised by 30 seconds or 1 minute's exposure of a wide range of different views of the face immediately before performing the matching task.[66] The task required matching of a target photograph to an array of 8 –10 photographs. In half of the trials the target was not present in the array. There was little benefit of prior familiarisation, except when two participants viewed the faces together and were encouraged to discuss the faces during familiarisation. In these circumstances when matching *good quality images in the same view*, participants who had received the prior 'social' familiarisation identified 98% of targets and correctly rejected 68% of 'target absent' arrays. This compares to 81% and 39% respectively for participants who received no prior familiarisation. In conclusion, prior brief social familiarisation can enhance matching under ideal conditions with no memory load. However, even under these ideal conditions (good-quality video images in the same view) there is a substantial false alarm rate when the 'target' is not present in the array (32% of responses). The conditions of familiarisation (i.e. brief exposures immediately prior to identification) are very different from familiarisation in the real world (longer exposures with very long delays). These differences make the research findings described difficult to generalise to the real world.

(3) Facial comparison by experts

17.65 In a case of disputed identification, can the identity of a person in a CCTV image be determined by an objective analysis of the facial image? The question often arises of whether a facial image captured by CCTV is of the same person as a photograph of the suspect (e.g. an arrest photograph). In contrast to the situation in relation to identification by eyewitnesses, expert evidence is admissible in English courts in relation to analysis of facial images

[66] Bruce, Henderson, Newman and Burton (2001), cited above at n.59.

from CCTV.[67] There is no single method with an agreed procedure to compare the identity of two facial images. Facial image comparison (often referred to 'facial mapping') refers to a number of techniques adopted by experts from a variety of different backgrounds[68]. The methods differ substantially in their approach, and scientific rigour.

17.66 No method of facial comparison can give absolute certainty that two images are of the same person. For example, in the extreme it would be impossible to distinguish between identical twins from typical CCTV images. The major problem for anybody comparing facial images is that faces of different people can look very similar and yield very similar measures of facial proportions. The issue is made even more difficult because images of the same person can look very different under different lighting conditions and measurements are sensitive to slight differences in pose. In addition the quality of CCTV images available for comparison is often very poor. Thus, similarity cannot establish absolute identification, especially when the images to be compared are limited in the views available and in their quality. However, significant differences between facial images may provide exculpatory evidence.

17.67 There are three main approaches to facial comparison. Morphological comparison, anthropometric comparison and video superimposition. Morphological comparison involved categorising facial features according to their type or shape and counting the number of similar categorisations across the comparison images. For example, the face shape may be classified as elliptical, round, oval, etc. The facial profile may be jutting, forward curving vertical etc.[69] The method is based upon subjective judgements of facial features. Anthropometric comparison involves comparing measurements of distances and angles between facial landmarks. Video superimposition involves wiping from one video image to another that has been scaled and rotated to provide the best match. Video superimposition can provide compelling graphics in court and is presented by expert witnesses in English courts. Its weakness is that it requires a human judgement of similarity with no treatment of error or of possible matches between faces of different people.

17.68 Any sound method of facial comparison should include three features. First, a formal treatment of the error of measurement that arises due to the quality of the images, the reliability of the measurement process, differences between measurements taken by different people, error due to minor changes in pose, changes in lighting etc. Second, comparison of the differences in measurements, or other data taken from the comparison images, with comparable data from an appropriate database of facial images. Are the differences between the two images in question less than the differences between the CCTV image and the faces in the database, who are known to be of a different person? Third, evaluation of the comparison between the images that is informed by both the error of measurement and comparison with the

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[67] *Attorney General's Reference* (No. 2 of 2002) [2003] 1 Cr. App. R. 321.

[68] For a brief description of methods of facial image comparison used by expert witnesses see Association of Chief Police Officers (ACPO) *National working practices in facial imaging 2003* http://www.acpo.police.uk/asp/policies/Data/garvin_facial_imaging_guidelines.doc downloaded 30/9/2005

[69] Iscan, M. Y., 'Introduction of techniques for photographic comparison: potential and problems,' in Iscan, Y. K. and Helmer, R. P. (eds), *Forensic Analysis of the skull: Craniofacial analysis reconstruction and identification*, New York: Wiley, 1993, pp. 57-70.

relevant database. Few facial comparisons presented by expert witnesses in English courts have all of these features.

17.69 Anthropormetric measurement offers the best potential to meet these requirements. Measurements can be taken from a set of images agreed to be of the same person (e.g. different frames in a CCTV clip) by more than one operator. These data can be used to estimate the error of measurement. Differences between the facial images for comparison can be determined and their significance assessed in the light of the error estimate. Differences between the faces to be compared can be evaluated by comparing the disputed facial image (from CCTV) to a database of facial measurements, restricting the comparison to facial landmarks that could be measured in the forensically relevant comparison. If it is possible to find a match with a face from the database which is as good or better than the match between the CCTV and the defendant, it would suggest that either the defendant is not the person in the CCTV or the measurements that can be taken for comparison are not adequate to distinguish faces of different people.

17.70 The reliability of expert evidence on facial comparison was recently considered by the Court of Appeal in *R v Gray*.[70] A conviction for robbery was based partially on the evidence of a facial comparison expert who stated that facial characteristics of the accused provided "strong support" for the identification of the robber from CCTV as the accused. At appeal the conviction was overturned. In the judgement, the court noted that there is no national database of facial characteristics or any accepted formula from which conclusions of the probability of occurrence of facial characteristics or their combinations can safely be drawn. In their absence estimates of probability or expressions of degree of support provided by a facial comparison expert must only be the subjective opinion of the witness. The court expressed doubt that, in the absence of a national database or agreed formula, opinions of probability or the strength of evidential support from a facial comparison should ever be expressed by an expert witness.

17.71 Subsequently, *R v Gardner*[71] the Court of Appeal considered another case which concerned expert evidence on a facial comparison from CCTV images Notwithstanding, the judgement in *Gray* and despite quoting a long passage from it, the court held: 'There is no rule […] that in cases such as the present an expert witness cannot go further than saying "there are the following similarities," leaving the ultimate decision to the jury, as opposed to the expert witness actually giving a view to the degree of probability of the images being the same.' In conclusion, the manner in which the courts treat expert evidence on facial comparison appears somewhat confused and will require further consideration.

I. Biometric use of facial images

17.72 The events of 11th September 2001 and subsequent terrorist attacks around the world have heightened concerns about personal identification especially for international travel. The UK government has commissioned trials of the feasibility of using facial images as a biometric in passports. The face is unique as a biometric because a facial image can be obtained remotely without the

[70] [2003] EWCA Crim 1001.
[71] [2004] EWCA Crim 1639. [2004] JCL 372

knowledge or co-operation of the person concerned. From November 2005 new biometric passports will be issued in the UK. The only biometric information they contain will be a digitised photograph.

17.73 Media reports can give the impression that face recognition by computer has reached a level of development that makes it highly reliable. However, the reality is very different. The state of the art in face verification (i.e. is this the same person as in the photograph?) is about 90% accurate verification with a 1% false acceptance rate.[72] This means that 10% of airline passangers would not have their identity confirmed. Even if a failure rate of only 1% could be obtained in face verification, it would still pose severe practical difficulties in screening international airline passengers at a busy airport. Face identification (is this person one of the targets on a wanted list?) is even more problematic. With a small database (800) under favourable conditions about 85% correct identification can be achieved. However, this rate falls in direct proportion to the size of the database to be searched. Changes in illumination and pose between images, and images obtained under outdoor illumination pose particular challenges to machine face recognition.[73] Although pose and lighting might be controlled to some extent in passport photographs and at the airport check-in, an additional problem will be to verify and identify faces from images that may be several years out of date.

17.74 In practice automatic face recognition systems may be used to screen large numbers of facial images, leaving the final decision to a human operator. The weakness of such a system is that the psychological science demonstrates that humans are prone to error in matching facial identity of unfamiliar people from images taken with different cameras. We do not yet have the technology to take the human error out of facial recognition. It is debatable whether a facial image alone will ever provide sufficient information to support reliable automatic recognition. For this reason, a current research area is to combine automatic face recognition with some other biometric such as voice or gait.

J. Conclusions and recommendations

17.75 Mistaken identification has a long and dishonourable tradition in the criminal justice system. In England and Wales some legal safeguards have been introduced, principally through the Police and Criminal Evidence Act (1984) and its associated and updated code of practice for identification (Code D). In the USA, where there is strong evidence of many wrongful convictions from mistaken identification, the first very tentative steps towards introducing some safeguards are only just beginning. Examples of poor practice are still commonplace in both the USA and the UK. Widespread evidential use of street identifications (or showups) is a matter for concern. Continuing judicial support for dock identifications in Scotland contradicts 35 years of intensive scientific study of eyewitness identification.

17.76 Technology for facial identification has developed rapidly in the last 5 years. The adoption of video identification procedures in England, Wales and Scotland provided a good example of best practice, which was informed by research findings. Video identification will improve the reliability of

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[72] Zhao, W., Chellappa, R., Phillips, P.J. and Rosenfeld, A., 'Face recognition: A literature survey' (2003) 35 *ACM Computing Surveys* 399-458
[73] *Ibid*.

eyewitness identification evidence because it makes available a larger database of appropriate foils, and can dramatically reduce delay prior to an identification attempt. However, technology also brings with it an increased risk of mistaken identification. Evidential use for identification of images from ubiquitous CCTV cameras in the UK creates new possibilities of mistaken identification. In England, a case of disputed identification from CCTV has already been overturned on appeal.

17.77 Development of identification procedures should be informed by relevant experimental evidence. The current code of practice should be extended to include procedures for identification from CCTV by police officers or other witnesses who may be able to make an identification because the suspect is known to them.

17.78 Wells *et al.* (1998)[74] made two recommendations that could easily be accommodated within revisions to the PACE code of practice. First, the lineup administrator should not know the identity of the suspect. Second, a clear statement of confidence should be obtained from the witness immediately after they make their response to the lineup.

17.79 Use of live lineups made it difficult in the past for the lineup administrator to be 'blind' to the identity of the suspect.[75] However, now that most identification procedures are conducted on video it would be easy to implement blind testing. We routinely use blind testing in our laboratory when administering VIPER lineups. In the presence of the accused's legal representative, the witness could choose at random from a number of DVDs that have the lineup recorded with the suspect in a different positions on each. This is current best practice. Therefore, nobody present will know in which position the suspect will appear. The witness watches one screen. Everybody else present watches a different screen. The two monitors should be placed back to back, so that nobody can see more than one screen. The operator's screen is covered so that only the number identifying which position in the lineup is being presented and any on-screen controls can be seen. The lineup is administered in the normal way. The legal representative can see that the lineup administrator cannot see when the suspect is on screen. Any possibility of anybody giving any non-verbal cues to the identity of the suspect is eliminated. When the witness makes an identification or rejects the lineup a clear statement of confidence is obtained and recorded in the presence of the legal representative. Only after this statement is recorded and the witness has left the room, should the cover obscuring the image on the operator's screen be removed. The legal representative can see the image and the outcome of the identification should be recorded in his/her presence. This procedure would very cheap and easy to implement, it would demonstrate to all concerned that there is no possibility of unconscious bias in the administration of the lineup, and would record a clear statement of witness confidence before there was any possibility of influence from post-identification feedback or other information. The case from psychological science for amending the PACE code of practice in this minor way is compelling.

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[74] Cited above at n.8.
[75] Davies, G. M. and Valentine, T., 'Codes of practice for identification' (1999) 7 *Expert Evidence* 59-65.

Further reading

Scheck, B., Neufeld, P. and Dwyer, J., *Actual innocence: Five days to execution and other dispatches from the wrongly convicted*, New York: Doubleday, 2000.

Wells, G. L., Small, M., Penrod, S., Malpass, R. S. Fulero, S. M. and Brinacombe, C. A. E.., 'Eyewitness Identification Procedures: Recommendations for line-ups and photo spreads' (1998) 22 *Law and Human Behaviour* 603-653.

Valentine, T., Pickering, A. and Darling, S., 'Characteristics of eyewitness identification that predict the outcome of real lineups' (2003) 17 *Applied Cognitive Psychology* 969-993

Valentine, T. and Heaton, P., 'An evaluation of the fairness of police lineups and video identifications' (1999) 13 *Applied Cognitive Psychology* S59-S72.

Bruce, V., Henderson, Z., Newman, C. and Burton, A. M., 'Matching identities of familiar and unfamiliar faces caught on CCTV images' (2001) 7 *Journal of Experimental Psychology: Applied* 207-218