Utilisation and usefulness of face composites in the South African Police Service — an evaluation study

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ABSTRACT

The current study investigates the degree to which face composites are utilised as an investigative tool in the South African Police Service. The article provides an overview of the conditions under which composites are produced by eyewitnesses to a crime, and points out constraints in terms of their usefulness and applicability. Composites were found to be produced after a longer delay than is recommended, and predominantly in violent and menacing crimes. Conviction rates for composite-related crimes were very low. However, more insight into actual use and case characteristics is needed before concluding on the usefulness of composites as an investigative tool or evidence. Directions for further research in this area are explored.

1. Introduction

South Africa is one of the countries in the world with a very high rate of violent crime.[1] These crimes predominantly involve one or more eyewitnesses, the victim itself and possibly bystanders. The memory of these witnesses is utilized by the South African Police Service during the investigation and serves later as evidence in court. In several scenarios, eg armed robbery on the street, the eyewitness evidence might even be the only evidence immediately available to the police. If there is no immediate suspect to the crime the witness can give a description of the suspect or compile a picture of his or her face.

These face composites, disembodied images of faces, are widely used in criminal investigations in South Africa and abroad. In recent times it even became the policy of several police forces that for each and every case where the witness feels capable of remembering the face of the suspect, a composite has to be produced by the witness and a trained police officer.

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1   L Meintjes-Van der Walt 'Towards victims empowerment strategies in the criminal justice process' (1998) 11 *SACJ* 157; A Pillay and C Sargent 'Psycho-legal issues affecting rape survivors with mental retardation' (2000) 30 *South African Journal of Psychology* 9.

The composite is then used to help in finding the suspect, eg by showing it to informants or other police stations, or making it accessible to a wider audience via the media.

In South Africa this task is part of the Local Crime Record Centre Unit, a specific unit of the South African Police Service dealing with forensic evidence. In this unit specially trained police officers compile the face on a computer screen according to the instructions of the witness. These composites are subsequently given back to the investigating units, to be used in the investigative process and occasionally as additional evidence in court. Though composites are produced in South Africa and occasionally published in newspapers or screened on TV, little is known about prevalence of their use and effectiveness. This study tried to determine under which conditions composites are produced, and what role they play in the investigation.

2. Literature review

Producing a good quality composite is the intended outcome. In the process of reaching this outcome the police operator and witness have to overcome several problems inherent in the method used.

For one it doesn't seem to be easy for a witness to recall a face in order to recreate this image on a screen. The witness is required, with more or less help from its environment, to mentally go back to the crime, remember the face of a specific perpetrator and communicate this knowledge to the police operator. The police operator now has to be trained in interviewing and in the use of specific software which provides him with tools to build the face on the screen. The limitations of the software used and the quality of interaction between police operator and witness will determine the composite quality.

Currently used mechanical software systems present the witness with a choice of single facial features, and the witness has to choose and rearrange these features to arrive at a composite which resembles the suspect. This procedure of building a face piece by piece might not match the retrieval processes of witnesses, which seem to focus on whole faces rather than disembodied parts. Supporting this view, witnesses could, in a study by Koehn and colleagues,[2] recognize a seen suspect in a line-up, but produce only composites of poor quality. For the line-up identification of the suspect they needed to recognize the whole face as the one they've seen before, a passive process in which the to-be-remembered item, the face, is given to the witness. In contrast to that witnesses in the face composition task had to retrieve the face without seeing it in front of them, choose single parts of the face, like a nose, resize it and place it into

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[2]   D Canter and L Alison *Psychology and Criminal Detection* (1997) 41.

a face. Thus, current composite software confronts the witness with a much more difficult task than the mere recognition of a seen face.

On the other hand, in cases where no suspect was identified the police have to rely on face composites as the only available visual image of the suspect. Two studies compared computer-based systems with sketch artists' composites, and the latter performed at least equally well (if not better).[3] This raises the question if there is a software system yet which can replace sketch artists, and is adequate for that task. Despite these reservations the above mentioned software systems are in place in the majority of countries utilising face composites, including South Africa.

The quality of composites is dependent on many factors, only one of them being the software system. Composite quality seems to decrease with time between crime and construction, with a witness being a different race or age group than the suspect, and with perceptual opportunity.[4] In other words, if the crime occurred long ago, and if the witness saw a suspect of a race and age group which she is not familiar with and if the viewing condition weren't good in the first place, it is highly unlikely that the composite will have a close resemblance to the suspect. Recognition is one of the techniques with which the composite quality is determined: a 'judge' is given the composite as the only information about the person and she has to recognize the real person. Most studies on the quality of face composites find floor level performance for composites.[5] So if recognition of the target is the intended goal, composites seem to fail. In fact, some researchers even reject face composites as having not only limited forensic value, but contaminating later recognition of the suspect in an identification parade.[6]

However, before condemning face composites as a whole, one has to have a closer look at the conditions under which those results were obtained. Most results on the quality of face composites were obtained under laboratory conditions. Davies and Valentine[7] state that most experiments on Photo-Fit and Identikit, the two most popular mechanical

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[3]   CD Frowd, D Carson, H Ness, J Richardson, L Morrison, S McLanaghan and PJB Hancock 'A forensically valid comparison of facial composite systems' (2005) 11 *Psychology, Crime & Law* 33; G Davies and D Christie 'Face recall: an examination of some factors limiting composite production accuracy' (1982) 67 *Journal of Applied Psychology* 103.

[4]   RC Linsay, DF Ross, JD Read and MP Toglia *Handbook of eyewitness psychology. Volume 2: memory for people*

[5]   Canter op cit (n2) 41.

[6]   F Jenkins and GM Davies 'Contamination of facial memory through exposure to misleading composite pictures' (1985) 70 *Journal of Applied Psychology* 164; GL Well, SD Charman and EA Olson 'Building face composites can harm line-up identification performance' (2006) 11(3) *Journal of Experimental Psychology: Applied* 147.

[7]   Linsay op cit (n4).

software programs,[8] were done with a relatively short exposure time to the target and photographs rather than the real person, thus not allowing for elaborative encoding of the face. It is not clear if these factors contribute to poor performance, since on the one hand Davies and Valentine[9] refer to several studies in which varying both factors had no effect. On the other hand in face recognition research these factors are perceived as having a major impact on the later result, and recent experiments increasingly use video clips of a mock crime or a life event as stimuli to adapt encoding to a real witness situation.[10]

A second point of concern is the discord about what a good quality composite has to achieve. The face composite should as a minimum contain individuating characteristics that make it usable for including or excluding persons as suspects in the investigation. But do the police need a high likeness to enable someone to recognize a specific person, or is the composite rather an aid to exclude suspects from further investigation and to give the investigating officer rough visual guidance? Penry[11] intended his emerging system, later called Photo-Fit, to provide an image with a type-likeness of the suspect, and not a photo-quality impression. The SAPS states in its police paper regarding facial identification[12] that a facial likeness has to be established, without specifying further use or precisely how this likeness has to look. In fact this discrepancy between intended purpose and quality evaluation could be one reason for its bad reputation, and it is not quite clear what the composites are really used for, and thus how they have to be tested in the laboratory.

One of the few examples of giving guidelines on how to evaluate face composites is a survey done by the British Home Office.[13] Following up on 729 cases in which face composites were constructed in 1976, investigating officers reported that in one quarter of the solved cases the face composite, then constructed with the first version of Photo-fit, were very helpful in the investigation. Asked about how the composites were put into use, officers reported that only 10% were given to the media, whereas a larger percentage of the composites produced was shown to informants and to people in the community where the crime happened or

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8   DE McQuiston and RS Malpass 'Use of facial composite systems in US law enforcement agencies' (2000). Poster presented at the 2000 Biennial Meeting of the American Psychology-Law Society, Division 41 of the American Psychological Association, New Orleans, LA.

9   Linsay op cit (n4).

10 RS Malpass and PG Devine 'Guided memory in eyewitness identification' (1981) 66 *Journal of Applied Psychology* 343; C Krafka and S Penrod 'Reinstatement of context in a field experiment on eyewitness identification' (1985) 49 *Journal of Personality and Social Psychology* 58.

11 J Penry *Looking At Faces and Remembering Them* (1971).

12 Internal policy paper of February 2006, supplied to H Schmidt.

13 A Kitson, M Darnbrough and E Shields 'Let's face it' (1978) 30 *Police Research Bulletin* 7.

that were in some way involved in the investigation. The composites were, in accordance with the 'father' of mechanical face composite systems, Jacques Penry,[14] also used to eliminate suspects in contrast to identifying a specific suspect as perpetrator.

In the further progress of developing a software system Bennett[15] published another assessment of its use and acceptance among police in Britain. According to his perception police officers have little faith in the use of Photo-Fit images, and regard their use more as an exercise in public relations. One reason he sees is, beside the inability of the system itself, the lack of consistent training of the operators in dealing with the witness, both in terms of memory processes and interview technique.

Beside these attempts to shed light onto the use of face composites in the police force no other study to date has investigated the utility of face composites and the conditions under which they are produced in practice. That is even more astonishing since one can find many examples of the notion of ecological validity and adhering to police practice while conducting laboratory research.[16]

What is noticeably absent in published research is objective data on how important eyewitness testimony is in terms of investigative proceedings and court decision making. Are composites used as evidence in court? Do they contribute to the investigative process? How do the conditions under which they are produced differ from the police policy of the respective country? How do the conditions differ from conditions replicated in laboratory studies? No scientific study has yet investigated the situation under which face composite evidence is collected and is treated by police and court. Surely one can argue that research should not only aim to find the ideal conditions under which eyewitness evidence can be obtained, but also to investigate the impact actual practice and policy guidelines have on the quality of this evidence.

The only way to ultimately determine the use and usefulness of face composites produced under real-life conditions is to evaluate real-life conditions. In this article we report the findings of an archival study that attempted to determine crime and witness characteristics for cases in which face composites were constructed.

3. Study Methodology

To determine which factors might be influential to eyewitness performance we leaned our methodology on the few archival studies

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[14]   Penry op cit (n11).

[15]   P Bennett 'Face recall: A police perspective' (1985) 5 *Human Learning* 197.

[16]   Frowd op cit (n3) 33; V Bruce, H Ness, PJB Hancock, C Newman and J Rarity 'Combining face composites yields improvements in face likeness' (2002) 87 *Journal of Applied Psychology* 894.

done on eyewitness recognition performance in the United States and Great Britain. Several studies[17] utilised police files to gain information on crime and witness characteristics and subsequent line-up performance, successfully retrieving nearly all required information from the archives. Behrman and Davey[18] chose a more active approach and analysed cases (over a period of eleven years) they were either involved in or followed while the investigation was under way. All studies attempted evaluating factors they considered important due to an effect in laboratory research, and determined if the same is true for police practice.

In line with Levi and Almog's[19] study on composites done by the Israeli police, a conviction was seen as the strongest indicator that the suspect is in fact the perpetrator of the crime in question. The composite in these cases, it can be assumed, depicts the convicted person and as such should have a reasonable likeness. The quality of the composite, produced in a real crime situation, can now be assessed by comparing it to the face or photograph of the convicted and assessing it with means found in the laboratory setting, for example similarity rating or identification tasks.

To ensure that the majority of cases have already been settled in court, cases processed by the Local Crime Record Centre face compilation unit in Cape Town in the year 2002 were sampled, resulting in a time interval of 2.5-3.5 years between composite production and sampling. In total 520 cases in which one or more face composites was produced were used for further analysis.

A survey form for the Record Centre was constructed, with which information on crime type, witness and composite number, delay between crime, requesting the composite and complying with the request by compiling the face composite with the witness, was collected. Data from the Centre was collected first, including the information on police station and case number for each case. Only cases were included where at least one composite had been produced, so-called 'positive' cases. These cases were clustered according to responsible police station, and lists were sent out to each station, requesting information on the case status. For cases in which a conviction had been reached further information on the usefulness of the composite and availability of other evidence would have been requested.

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[17] DB Wright and AT McDaid 'Comparing system and estimator variables using data from real line-ups' (1996) 10 *Applied Cognitive Psychology* 75; P Halford, R Milne and R Bull 'The identification performance of forensic eyewitnesses exposed to weapons and violence' (2005) an unpublished paper presented at the 15th European Conference on Psychology and Law held in Vilnius, Lithuania, 29 June – 2 July 2005.

[18] BW Behrman and SL Davey 'Eyewitness identification in actual criminal cases: an archival study' 25 *Law and Human Behavior* 475.

[19] AJ Levi and J Almog 'Police Composites: Do They Contribute to Convictions?' (1996) unpublished paper, Jerusalem, Israel.

The data was collected in person in the Centre, and data from the 74 police stations involved was collected via fax, telephone or in person between May and August 2005. Response rate was 100%.

4. Study results

Before reporting on the results of this survey we want to mention the problems accompanying field research. Sampling can, due to practical constraints, only be done in a clustered (thus not completely random) manner, in our case only one year of only one Local Crime Record Centre office. Furthermore, the data evaluation is limited to information that can be found in the files, and subjected to the honest information given by participating police members being honest. All following results are reported in a purely descriptive manner, judging their implications and relations to other research in the discussion section.

The crime type of cases in which face composites were requested can be viewed in Table 1. The information was clustered according to broader categories than were found in the Record Centre files. In cases where two complaints were made (for example abduction and murder), the more severe category in terms of legal sentencing was used to categorize the case. One can see that nearly half of the cases where a composite was produced were armed robberies, followed by simple robbery and rape/sodomy.

Table 1: Type of crime (clustered)

	Frequency	%
Murder/manslaughter	27	5.2
Attempted murder	12	2.3
Armed robbery	259	49.8
Rape/sodomy	57	11.0
Abduction	7	1.3
Robbery	92	17.7
Assault	16	3.1
Theft/corruption/fraud	50	9.6
Total	520	100.0

Three dates were gathered in the Record Centre files: the date of the crime, date of requesting the compilation from the Centre, and date the composite was done. Since delay between receiving the request and responding to it is more an administrative than a memory issue Table 2 reports only the time delay between the witness encountering the crime and reconstructing the suspects' face.

Table 2: Time interval between crime and face compilation

N valid	520
Mean (days)	33.93
Median (days)	18.00
Std. Deviation (days)	72.87
Minimum (days)	0
Maximum (days)	1271

The average time interval between crime and registration of the case was 18 days. The majority of cases took three days (median). The average delay is higher since some cases took much longer (up to 530 days); this has a big impact on the average. The average time delay between crime and composite construction was 34 days, with a median of 18 days.

Face composites were done with one or more witnesses attending the compilation session, compiling one or more composites of suspects. Table 3 reports the number of witnesses who constructed the composite(s), and Table 4 the number of composites per case. The number of composites done does not necessarily relate to the number of involved suspects, since only the faces of suspects who could be remembered well enough were compiled.

Table 3: Number of witnesses per case

No. witnesses		Frequency	%
Valid	1	429	82.7
	2	58	11.2
	3	21	4.0
	4	6	1.2
Total		514	98.8
Missing		6	1.2
Total		520	100.0

Table 4: Number of composites per case

No. composites		Frequency	%
Valid	1	349	67.2
	2	134	25.8
	3	31	6.0
	4	4	0.8
Total		518	99.6
Missing		2	0.4
Total		520	100.0

Of all the data originally intended to be collected from police files and the administrative computer system only information on the legal status of each case could be acquired reliably for all cases. Out of the 520 cases including face composites, 45 were still open (either in court or under investigation). In two cases the information wasn't accessible. The remaining 91% of cases were closed, as can be seen in Table 5. Out of the 473 closed dockets 4 were closed with a conviction. The others were closed undetected or withdrawn.

Table 5: Legal status of cases

Case status		Frequency	%
Valid	open	45	8.6
	closed undetected/withdrawn	469	90.2
	closed with conviction	4	0.8
Total		518	99.6
Missing		2	0.4
Total		520	100.0

Data on the distribution of the face composites as well as data on other evidence was not consistently available throughout the files. In personal conversation with several investigating officers it was repeatedly mentioned that only when the distribution of a composite leads to new evidence that can be used in court, would the successful use of the composites be mentioned in either the witness statement or the investigating officer's report. In the cases where a conviction was reached, no such information could be found in the police files.

5. Summary and future research directions

Utilizing the available information from the Local Crime Record Centre brought interesting aspects of face compilation in practice into light. These will be discussed before focussing on the shortcomings of this research approach and recommendations for future research.

   Concluding from the Centre files, time delay between the crime and compilation of the face composites, even when considering only the median value of 18 days, was considerably longer in practice than in most laboratory studies.[20] Field studies on identification parades found that these time delays[21] decreased performance of witnesses in terms of hit rates and false alarms. The same effect was found in laboratory research on face recognition, where performance decreased with increasing

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[20]   Linsay op cit (n4).
[21]   Behrman op cit (n18) 475.

time delay.[22] These could imply that the same might be true for face compilation, where a longer delay between seeing the suspect and constructing the composite might result in the witness being less able to remember and thus reconstruct the face. If this is true, and future research finds such an effect, suggestions could be made to decrease this interval in practice, making it for example compulsory to construct the composite within two days after the crime happened.[23] Curiously, several studies on older versions of Photo-Fit and Identikit found no decrease in composite quality, which might have been due to the insufficient renditions of these versions.[24]

Assuming that newer software is able to produce better quality composites, the authors expect that such a time effect could be found, supporting the view that the witness will experience difficulties remembering the face of the suspect for composite compilation the longer ago the crime took place. The South African policy paper[25] states that the composite should be requested from the investigating officer within 24 hours after the incident happened, acknowledging that the actual construction within the Centre might take much longer due to various administrative reasons such as limited resources and availability of the witness.

Summarizing the type of crimes that were committed, one can see that the majority are crimes in which violence/physical harm, or at least the threat thereof, was present. This could, following critical consideration of laboratory-based research, result in a different quality of event memory. Looking at photos of faces and then being asked to retrieve this information simply isn't 'the same as being a victim of a rape or an attempted murder[26].' Not only is the incident different to the one experienced by participants of a study, the consequences differ as well. Real witnesses know that the identification of a person as suspect might lead to his/her conviction, thus being much more severe. On the other hand, even critical voices[27] agree on the fact that too little is as yet known about the effects of traumatic experiences on eyewitness testimony. Creating a more realistic setting, researchers increasingly use mock crimes, such as thefts enacted in lectures or robberies on video, as stimulus material for their experiments.

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[22] PN Shapiro and S Penrod 'Meta-analysis of facial identification studies' (1986) 100(2) *Psychological Bulletin* 139.

[23] As is for example the policy of the British Home Office, Frowd op cit (n3) 33.

[24] CD Frowd, D Carson, H Ness, D McQuiston, J Richardson, H Baldwin and PJB Hancock 'Contemporary Composite Techniques: the impact of a forensically-relevant target delay' (2005) 10 *Legal & Criminological Psychology* 63.

[25] South African Police Service paper 'Policy regarding the facial identification section' (2003) Pretoria, Divisional Commissioner, June 2003.

[26] EB Ebbeson and VJ Konecni 'Eyewitness memory research: Probative v. prejudicial value' (1997) 5 *Expert evidence: The international digest of human behaviour, science, and the law* 2.

[27] Ibid.

Here it is important for laboratory research to have a thorough knowledge of the circumstances under which witnesses perceive the incident in order to judge whether this might influence memory processes, and to adapt research conditions accordingly.

An interesting finding is that in one out of five cases more than one witness helps in constructing the composite. To date, only one study has investigated the quality of individual composites and joined computer-merged composites,[28] and no study has specifically investigated inhibition and/or support processes between witnesses in the composite construction process. In terms of police practice this might be a minor concern since several composites of the same suspect cannot be processed, and there might not be time to interview each witness separately. Nevertheless it is necessary to have knowledge about these processes in order to judge the outcome appropriately.

Regrettably it must be said that not all of the objectives of the study could be fulfilled with the study design employed. The use of face composites once they left the Centre could not be assessed, nor can any conclusion be drawn on the quality of the face composite. Information could be obtained regarding crime and construction process, but in order to answer the question of the effectiveness of face composites in the investigation a different research design should be chosen. As was utilised in another study[29] it might be necessary to collect data during investigation in a more active manner, thus not having to rely on available data in the archives. In the case of this study this data was predominantly not available, giving no indication if the composite was used at all, much less if it contributed to the investigation.

The guilt criterion for the suspect might also be a problem. In our sample the conviction rate equalled 0.7% of all cases involving face composites. In contrast to this a similar study in Israel[30] found a conviction rate in eyewitness cases in Israel of 21%. Since 2002 the utilisation of the face composite service picked up on average by 10% per year,[31] but the conviction rate for the whole of South Africa didn't change significantly in the last decade, giving little hope on using conviction as a good requirement to estimate the similarity between composite and suspect, even if the photograph of the suspect could be obtained. Further studies would have to consider another measure as criterion, using other forensic evidence against the suspect as guilt-criteria.[32]

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[28] Bruce op cit (n16) 894.
[29] Behrman op cit (n18) 475.
[30] Levi op cit (n19).
[31] Information obtained by H Schmidt from internal Local Crime Record Centre statistics, in December 2005.
[32] As was for example done by Halford op cit (n17).

Concluding, the authors consider it as necessary to further try and evaluate police practice in order to enhance this very practice, and in order to adapt research accordingly. Several scholars in the legal and psychological setting have complained about the lack of ecological validity and inapplicability of research into the real-world setting. Yet no attempts have been made towards solving this dilemma, even though, as this study and the subsequent recommendations for further research show, it is possible. Doing this in the South African Police Service seems to be quite possible, since the persons involved in this study were accommodating and supportive. It is most certainly useful, since research should be done in a relevant manner. It is important to investigate ideal eyewitness conditions, eg the perfect time delay between crime and composite construction. But it is also important to know the effects of a much longer delay, thus being able to estimate the possible quality of the composite and if it could be of any use in the investigation. In order to do so one had to have knowledge of the real-life witness conditions, to adapt laboratory research to gather data under controlled conditions, but also to be able to give recommendations on how practice should be changed and if it is worthwhile changing it. This study, even though it didn't reach all objectives, could already show that there might be a difference worthwhile considering.