Identification accuracy of facial composites drawn by citizens

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Abstract

Citizens can support the police in finding and identifying a perpetrator by creating facial composites of the perpetrator. However, the success of facial composites created by compiling systems are debated until now. Can drawing a facial composite be included as a task in the Do It Yourself Policing program which includes citizens into tasks usually exclusively done by the police? Consequently, the aim of this study is to examine to what extent citizens can draw facial composites which can be used to find and identify a perpetrator. Furthermore, several studies have provided evidence for mood effects on decision making. Therefore, the effect of happy and sad mood conditions on decision accuracy was investigated.

To test the hypotheses that the identification accuracy for drawn facial composites will be lower than 20% and that happy mood choices will score more accurately than sad mood choices, an online questionnaire was compiled. The online questionnaire started with a mood induction where half of the participants received the happy condition and the other half the sad condition. The mood induction was followed by an identification task consisting of a facial composite drawn by volunteers and a lineup of possible suspects including the person drawn in the facial composite. The results showed an identification accuracy of 10.4% and no effect of mood on identification accuracy.

The results showed that drawn facial composites are generally not suited for police investigations since drawing facial composites that can be used in investigations requires a certain level of drawing skills. Future research should primarily focus on the required drawing skills and the further examining of mood effects like mood congruence.

Keywords: Do It Yourself Policing, citizens, facial composite, drawing, mood

Introduction

The so called Do It Yourself Policing (DIY Policing) refers to tasks usually exclusively done by the police which are now also done by citizens (Schreurs, Franjkić, Kerstholt, De Vries & Giebels, 2020). This a form of policing is a collaboration where citizens work together with the police in various tasks. DIY Policing includes different types of citizen initiatives but also active support in police investigation or suspect identification (Hofmann & Feltes, 2020; Kerstholt & Vries, 2018). This type of police support is mainly based on digital space and social media which enables easy and fast communication between both parties (Hofmann & Feltes, 2020). Examples for digital DIY Policing services are online neighborhood watch initiatives which are conducive for neighborhood surveillance and apps that can be used to recreate the perpetrators face (Schreurs et al., 2020).

But how are citizens able to support police investigations including finding and identifying a perpetrator? Creating facial composites of the perpetrator is one of the possibilities citizens can engage in. However, facial composites created by production systems are still argued to be consistently successful in representing a perpetrator (Lech & Johnston, 2011; Wells & Hasel 2007). An alternative to the facial composite production systems would be the creation of drawings by the eyewitnesses witnessing the perpetrator which act as facial composites. But are facial composites drawn by eyewitnesses even helpful regarding their quality? Consequently, the main focus of the current study is to investigate if citizens are able to draw a picture of a suspect and if this picture can be used as a facial composite alternative which helps to find and identify the perpetrator.

Facial composites

In order to answer the research question, it is important to understand facial composites and the connected issues. Facial composite images are images of the perpetrator and are usually done at the start of the investigation. These images are used to facilitate the first phase of the investigation which is finding the suspect and can also help in the identification phase (McQuiston-Surrett, Topp & Malpass, 2006). Although facial composites are frequently used, researchers still argue about its accuracy and success. Nowadays, facial compositions are mostly done with composite-production systems but their ability to produce a good picture of the target face is still doubted (Lech & Johnston, 2011). Research by Wells and Hasel (2007) on facial composite by eyewitnesses established that no composite-production system provides

enough facial feature to realistically recreate the physiognomy of the human face since systems have a limited capacity of facial features stored. Consequently, specific facial features of individuals cannot be represented by facial composite systems which results in poorer composites (Wells & Hasel, 2007). Furthermore, human processing of faces has been shown to be holistic meaning the focus on individual features of the face is low but rather on the face itself (Wells & Hasel, 2007). This might lead to the findings by Lech and Johnston (2011) whose study indicated that a description of the perpetrator is more useful than a facial composite in an identification process. Moreover, descriptions in combination with a facial composite are also less useful than only the description (Lech & Johnston, 2011). This shows that facial composite usage in police investigations is still not optimized and struggles to perform consistently.

Therefore, the question arises, whether witnesses are able to create a better facial composite by themselves compared to the composite-production systems. With regards to drawing itself, the value of drawing during forensic interviews is not totally identified yet but it was shown for children that drawing itself contributes to emotional release and organizing thoughts by building a coherent and more detailed story (Katz, Klages & Hamama, 2018). Research investigating the effect of drawing also concludes that under optimal circumstances drawing increases the retrieval of information without reducing accuracy. Overall, the study determines drawing as an aid for memory retrieval whereas richer drawing results in richer testimonies (Katz, Klages & Hamama, 2018). This is not only the case for children but also for adults, drawing provides an increase of memory functioning (Wammes, Meade & Fernandes, 2016). Although this was not specifically tested for facial descriptions, it suggests a positive correlation between drawing and memory functioning. Consequently, in a realistic setting witnesses drawing the perpetrators by themselves should enhance the information processing which could lead to more accurate memories of the perpetrator.

Even though the memory retrieval is increased during drawing, the focus in this study is on the recognizability of the drawings. Since Wells and Hasel (2007) stated that facial recognition is a holistic process, eyewitnesses might focus on the whole face of the perpetrator rather than individual features of the face in comparison to facial composite systems that use facial features to construct a face of a perpetrator. Therefore, drawing of faces could focus more on the face itself which results holistic drawings compared to the facial composites produced by systems which are recognized more easily.

Identification of the perpetrator

Even if eyewitnesses drawing facial composites might lead to a more holistic processing of the perpetrators face, eyewitness identification is impacted by further influences which can hardly be controlled. Misidentification of suspects is a persistent problem of eyewitness identification (Martschuk, Sporer & Sauerland, 2019; Pike, Kemp & Brace, 2000) although eyewitness identification of the perpetrator is still an important part of criminal investigations (Brewer & Wells, 2011; Sporer, Malpass & Koehnken, 2014). One of the reasons for misidentification is that eyewitness's identification is perception-based (Pike, Kemp & Brace, 2000). Generally, visual perception conforms to the actual reality which makes visual perception rather accurate. However, bad vision of the eyewitness, stress or lacking cognitive abilities interrupt that link and can result in incorrect visual perception (Carbon, 2014). A further reason for misidentification is that the witnesses are overwhelmed by the situation during the crime and by helping the police: Instructions given to them by the police, being able to see the perpetrator's face only a short amount of time during the crime and being exposed to similar faces have been shown to influence the decision of the witnesses negatively (Pike, Kemp & Brace, 2000). Furthermore, studies show that misidentification can occur and will occur in the future, especially when the witness displays a low level of confidence while deciding for a perpetrator (Martschuk, Sporer & Sauerland, 2019; Pike, Kemp & Brace, 2000). Despite similar face and level of confidence, further variables were identified affecting the identification process of eyewitnesses. Apparently, system variables including appearance of the robber and weapon visibility were shown to have an effect on the identification choices of eyewitnesses (Culter, Penrod & Martens, 1987) and reminder of peripheral details is associated with low identification accuracy. All the previous information show that identification of perpetrators is influenced by perception and memory which makes the identification rather difficult. This shows the necessity to be aware of these influences and the way they influence a police investigation to minimize the chance of misidentification or failure.

Mood effects on decision making

While various variables such as the conditions, cognitions and physical abilities play a role, also mood seems to affect the identification process. Mood affects memory, perception, learning and even social judgments (Riener, Stefanucci, Proffitt & Clore, 2011; Schmid & Mast, 2010; Bryan, Mathur & Sullivan, 1996). According to Forgas (1989), mood plays an important

role in the decision-making process as well which is supported by evidence of several studies (De Vries, Holland & Witteman, 2008). Different states of mood affected decision outcomes, decision latency, decision efficiency and information preference. Furthermore, the choice of a decision-making strategy and the outcome of these decisions have been shown to be influenced by mood states (Forgas, 1989). At least for recognition tasks, sad moods usually have a stronger effect on decision making than a happy mood since choices in a sad mood tend to be slower, less efficient, reward oriented and therefore different in quality. This can be explained by the low levels of self-confidence in sad mood decision makers compared to decision makers with happy moods (Forgas, 1989). However, this is just the case if the outcome is not personally relevant. This is in line with the findings of Sinclair & Mark (1995) who were working on the effect of mood states on judgmental accuracy. According to them, sad and happy people use different processing strategies which lead to different accuracies. Happy people process information non systematically and more passive compared to sad people who use an opposing process (Sinclair & Mark, 1995). The sad approach is systematic, active, and detailed which leads to a higher accuracy than the nonsystematic approach (Ambady, & Gray, 2002; Sinclair & Mark, 1995). A possible reason for this is that happy people display more self-confidence which leads to fast judgments because they do not care or overlook details (Sinclair & Mark, 1995; Forgas, 1989). However, the higher accuracy for sad mood decisions compared to happy mood only applies for analytic tasks. For intuitive and holistic decisions, happy mood decisions were more accurate than sad ones (Albrechtsen, Meissner & Susa, 2009). A possible explanation for this is the disruption of judgments by the analytical process where the sad decision maker analyzes reasons for their decision (Wilson, Kraft & Dunn, 1989; Wilson, Dunn, Kraft & Lisle, 1989).

Although this topic did not receive much attention (Eich & Schooler, 2000), research showed that mood indeed influences decision making. Since mood has been shown to affect perception, memory and decision making, does mood also influence the decision of testimonies identifying a perpetrator from a selection of suspects?

The current study

The main aim of the current study is to determine the quality of facial composites drawn by citizens. The study contains an identification task where the identification accuracy will directly translate into the quality of the facial composites and to what extent they can be used in police investigations. Previous research showed low rates of identification accuracy using facial

composites: Lech and Johnston (2011) displayed a 20% accuracy rate for system composed facial composites which is somehow in line with Wells and Hasel (2007) who established a 25% accuracy rate for a four-alternative measure. This study identification accuracy is predicted to be lower than 20% but higher than the probability of chance (Calculating the Probability of Chance, 2017).

The reasons for slightly lower accuracy are that a certain level of drawing skills is required to create a good quality facial composite. Additionally, this identification task offers nine alternatives to the actual person presented in the facial composite which should decreases the accuracy rate compared to the research by Lech and Johnston (2011). Nine alternatives offer more room for a wrong decision and the probability of matching the facial composite is decreased which should influence the accuracy rate negatively.

Furthermore, this study aims to determine the effect of mood on the decision in an identification process. The focus is on a comparison between happy mood and sad mood and how this influences the accuracy in the identification task. For holistic processes the happy mood choices have been more accurate (Albrechtsen, Meissner & Susa, 2009) which leads to the prediction that happy mood decisions will be more accurate than sad mood decisions for the identification task.

Methods

Participants

The participants were recruited via *Utwente Sona-System* which recruits participants belonging to the University of Twente. Therefore, the used sampling method was Convenience sampling or known as Availability sampling where the data collection is based on a population which is conveniently available (Saunders, Lewis & Thornhill, 2012). The first step was to exclude cases which could not be used. This included cases with a progress score below 100 indicating that the participants did not completely finish the survey. Furthermore, participants were excluded who exceeded the duration of 600 seconds to complete the survey or finished the survey under the threshold of 150 seconds. This decision was based on the average duration needed for the participants to complete the survey which was 293.72 seconds. Therefore, 53 individuals completed the survey, however, 5 participants had to be excluded due to unfinished or invalid surveys and consequently, 48 answers could be used for the study. More detailed information on the sample is summarized in Table 1.

Table 1. Participants characteristics (N=48)

Characteristics	N (%)
Gender	
Female	40 (83.3)
Male	7 (14.6)
Other	1 (2.1)
Age group (years)	
<18 - 20	29 (60.4)
20 - 25	17 (35.4)
25 - 30	1 (2.1)
30 >	1 (2.1)
Profession	
Student	47 (97.2)
Working	0
Other	1 (2.1)
Nationality	
Dutch	11 (22.9)
German	30 (62.5)
Other	7 (14.6)

Design

This study used an experimental between-subjects design. The dependent variables were the identification accuracy and effect of mood where the participants were randomly assigned to a mood condition. Regarding the identification accuracy, the concept probability of chance is important to note. Probability of chance calculates the chances just by probability. In this case, it calculates the chance of guessing the correct suspect (Calculating the Probability of Chance, 2017), which is 10%.

Material

Questionnaire

Before creating and publishing the questionnaire the study was ethically approved by the BMS ethics committee of the University of Twente, request number 201240. Overall, six items were used in the questionnaire: The first item was a modification-check item which was measuring the mood manipulation done by the mood induction. The second item was measuring the accuracy of the participants in the identification task. Finally, four items were displayed measuring demographics.

Lineup picture

The identification task used facial pictures of ten male models whose faces look rather similar to each other regarding face structure and hair. These face pictures of models were compiled into a ten-face lineup picture which was used for the task and is shown in Figure 1.

Figure 1. Identification task lineup picture

Drawings

After the lineup picture was compiled, ten volunteers were asked to draw one of these faces by hand so that each face was drawn once. The volunteers received photos of the person which were different to the photos in the lineup. This can be explained by the assumption that the participants should identify the perpetrator because they recognize the person and not only the picture. Furthermore, in a realistic scenario the citizens might not have perfect sight of the perpetrators face. Therefore, the drawings are based on photos which not necessarily show the perpetrators full face and some photos even show the perpetrator with different hair styles or facial hair. Figure 2 shows the drawings and the picture of the identification task to illustrate the differences.

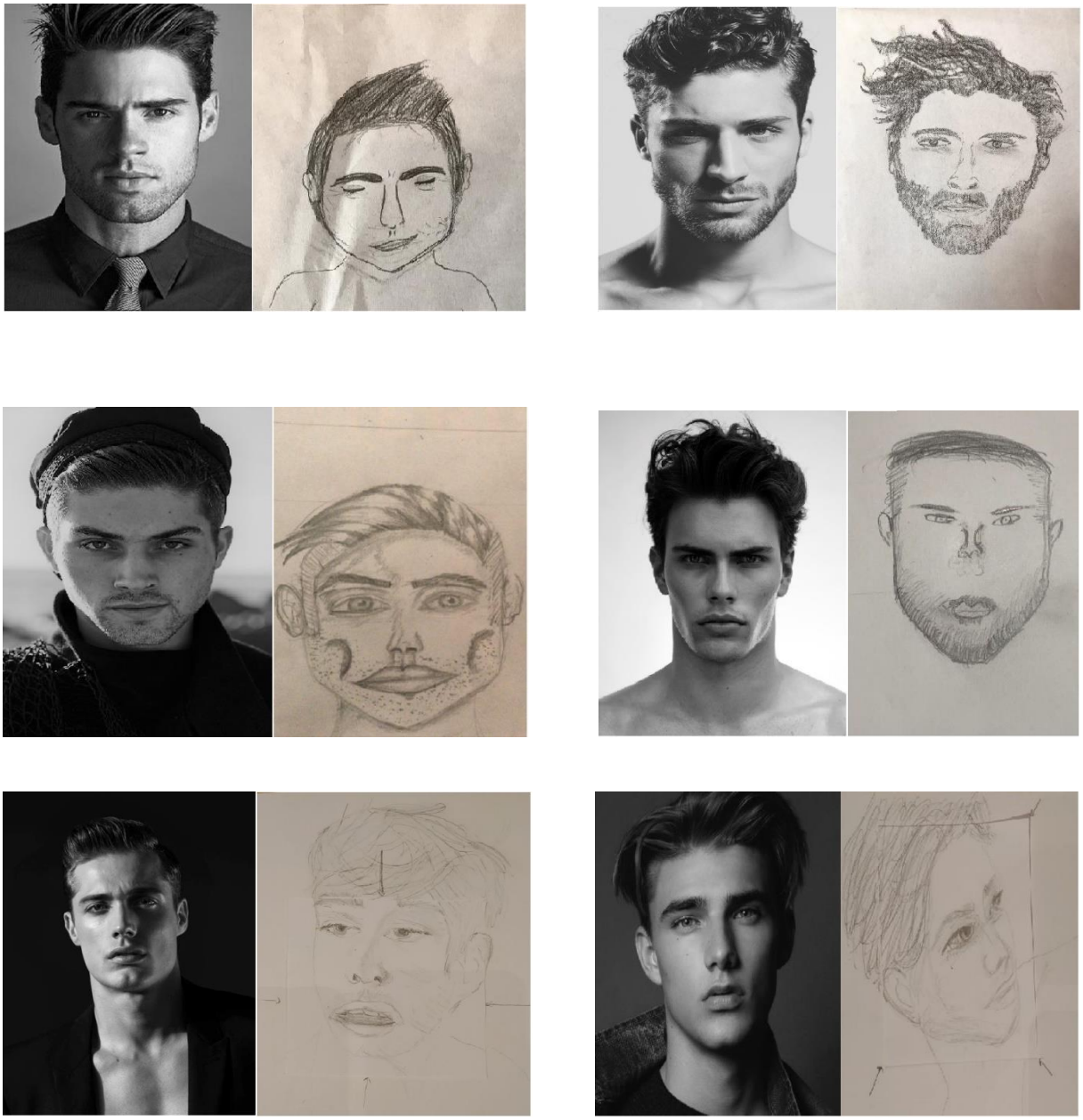

Figure 2. The suspects line up picture and the according facial composites are presented. On the left side are the suspects A, C, E, G, I and the right side displays B, D, F, H, J.

In the identification task these drawings were used as facial composites and the lineup picture as a lineup of suspects. Each participant got one random facial composite which was drawn by the volunteers and had to match this facial composite to one of the faces of the ten-face lineup picture. The facial composites were randomly displayed to the participants however, each facial composite was displayed with the same frequency of five times.

Videos

Two short videos were used in the online questionnaire which should induce a happy and a sad mood. The happy mood inducing video was a 64 second fragment of 'Happiness starts with a smile campaign' which was selected because it relies on the concept of happiness (Fowler & Christakis, 2008). The video aiming at inducing sad mood was a 163 second fragment of the movie 'Sophie's Choice' (1982) which was used in other studies as well (de Vries, Holland, Corneille, Rondeel & Witteman, 2012). After the videos, a modification-check item was

displayed which measured mood of the participants to check if the video had the intended effect on the participants.

Procedure

The data for the research project was collected from 19th October to 10th November 2020**.** The online Qualtrics study started with the informed consent providing information on the study itself, rights of the participants, and how the data will be handled by the researcher (Appendix A). The participants could agree or disagree on the informed consent and if the participants agreed to the informed consent, the participants were able to start the questionnaire which consisted of 8 items. Otherwise, they were forwarded to the end of the survey.

This online study consisted of two parts: a mood manipulation by the video which were shown to the participants and an identification task. The drawings were created by volunteers beforehand. The online study started of with the mood manipulation. The videos were displayed to the participant where 50% of the participants were allocated to the happy mood video and the other half to the sad mood video. Due to exclusion of some cases, the allocation of the mood video was not perfectly balanced, see Table 2.

Table 2. Allocation of mood inducing videos (N=48)

	N (%)
Happy condition	25 (52.1)
Sad condition	23 (47.9)

After the videos were watched, the mood of the participants was measured. Then the identification task started with a short introduction to the topic which was followed by the drawn facial composite. The participants were encouraged to closely look at the facial composite before looking at the ten-face lineup picture which was presented below. Each face within the lineup picture was provided with a letter from A to J which was advised to focus on in order to simplify the identification process. When the participants were finished with investigating the facial composite and the lineup picture, an item was displayed asking if they recognized the person drawn in the facial composite and if they did, the item asked for a concrete identification, offering the possibilities from Suspect A to Suspect J. After finishing

the identification task, the participants were asked to state their age, gender, profession and nationality.

Results

Research question 1: Ability to identify perpetrators with the help of facial composites drawn by citizens

This research question can be answered by looking at the descriptive statistics since identification accuracy translates into ability to identify. Consequently, the accuracy rate will answer this part of the research. Table 3. shows that that the overall identification choice accuracy is 10.4% which is smaller than 20% but equal to the probability of chance. Consequently, the hypothesis that facial composites drawn by citizens are able to identify perpetrators in police investigations, is rejected.

Table 3. Identification choice accuracy (N=48)

	N (%)
Correct choice	5 (10.4)
Incorrect choice	32 (66.7)
Did not recognize	11 (22.9)

Moreover, Table 4. provides a more detailed overview of the results of the identification task. As can be seen, Suspect H was identified most accurately with an identification accuracy of 40%, followed by Suspect B with 25%. Suspect A and B scored 20%.

Table 4. Correct identification per suspect with display frequency N (N=48)

	N	Correct answers (%)
Suspect A	5	1 (20)
Suspect B	4	1 (25)
Suspect C	5	0
Suspect D	5	0
Suspect E	4	0
Suspect F	5	0
Suspect G	5	0
Suspect H	5	2 (40)
Suspect I	5	1 (20)
Suspect J	5	0
SUM	48	5 (10.4)

Research 2: Mood effects on identification accuracy

Secondly, it was tested if there is a difference in the variable accuracy when it is grouped by the two moods which were injected. To ensure that the two moods were induced correctly, an Independent Samples Test was conducted to test for a difference between happy and sad mood. The results of the item asking for *I am in a good mood* showed a statistically significant difference between participants who watched the positive mood induction (M=4.76, SD=.702) and the negative one (M=1.96, SD=4.76) with t(47)=10.469, p<.001. A statistically significant difference between positive (M=2.08, SD=.702) and negative mood (M=4.91, SD=.1.041) induction was established for the item asking for *I am in a bad mood* as well with t(47)=-11.136, $p < .001$.

After the difference between the mood conditions was established, an independent Samples T-test was conducted with *Accuracy* as the dependent variable and *Mood* as the grouping variable. There was no significant effect for mood, t(47)=-.699, p=.488. Consequently, the hypothesis stating that persons in a happy mood are more accurate is rejected.

Discussion

Previous research is inconclusive with regard to the efficiency of facial composites in police investigation and if they can be used to find and identify perpetrators (Lech & Johnston, 2011). Reasons for doubting the efficiency of facial composites are the number of negative influences on the decision maker during the coding as well as the identification and the probability of misidentification (Martschuk, Sporer & Sauerland, 2019; Pike, Kemp & Brace, 2000). Consequently, this experimental study mainly aimed at examining the quality of facial composites drawn by citizens with the intention to test if drawing facial composite can be included into Do It Yourself Policing (DIY Policing). A further aspect investigated in the current study is the influence of happy and sad mood on the decision maker while identifying suspects.

Explanation of the results

The identification ability of facial composites drawn by citizens was determined by the percentage correct among the participants. Based on previous research which established an accuracy rate of facial composite systems of 20% to 25% (Lech & Johnston, 2011; Wells & Hasel, 2007), the accuracy of the current study was expected to be lower due to variations in the facial composite creation and other conditions. The results displayed an overall accuracy of 10.4% which is not even half of the accuracy rate published in other research articles (Wells & Hasel, 2007). The results conform the hypothesis in one way since it is below 20%, however it is almost equal to the probability of chance which is 10%. This means that the accuracy rate in this study is equal to the probability of guessing (Calculating the Probability of Chance, 2017). Consequently, the accuracy rate is rather low and could be pure coincidence. However, considering that 25% identification accuracy was scored in a four-alternative measure (Wells & Hasel, 2007), 25% is equal to the probability of chance as well which makes the study in this aspect comparable.

Reviewing previous literature showed that although facial composite systems are not optimal and sketches by hand were shown to be recognized more easily (Frowd et al., 2005), these findings show system compiled facial composites are more accurate than citizen drawn facial composite. Drawn facial composite or facial composite sketches have been used for police investigation before, however these drawings were designed by forensic sketch artists and not random citizens (Hu Han, Klare, Bonnen & Jain, 2013). Consequently, a certain level

of drawing skills is required to create an accurate facial composite sketch which is only attained by a large amount of training (Hu Han, Klare, Bonnen & Jain, 2013). This is also in line with further results from the identification task where Suspect H was identified twice whereas the rest of the identified perpetrators were only identified once. This can be traced back to a higher quality drawing by the citizen although there might be a different explanation applying here like Suspect H provided more recognizable facial features (Tang & Wang, 2004).

In light of these findings, should drawings be used for police investigations? Looking at the percentages, they are approximately half as good as system compiled facial composites, however the identification rate when using facial composites was even lower until recently (Zahradnikova, Duchovicova & Schreiber, 2016). Before the facial composite creation system approach was changed to a holistic one, the identification rate reached from a maximum of 20% and even went down to 5% and below which is quite inconsistent (Zahradnikova, Duchovicova & Schreiber, 2016) since facial recognition is a holistic process. Consequently, this study's facial composite would be comparable to the older approach. An assumption of this study was that the drawing increases the holistic processing since it was expected to focus more on the face itself and not on individual features. This assumption was not confirmed which can be explained by the lack of quality of the drawings which made it difficult to recognize the person, regardless of processing style. These percentages show that drawings are generally not suited for police investigations nowadays however, this does not mean they are completely worthless.

The second part of the study tested the difference between a sad and a happy mood condition in a lineup identification task. Sad and happy moods have been shown to influence decision making and its outcomes. As mentioned earlier this paper, the happy mood was expected to score higher although the sad mood decisions tend to be more analytic and detailed (Sinclair & Mark, 1995; Forgas, 1989). This only applies to analytic decisions, but happy decisions are generally more accurate in holistic and intuitive decision scenarios (Albrechtsen, Meissner & Susa, 2009). The current study results could not confirm these expectations for an identification decision although the mood manipulation was successful. This research showed no difference between the sad and the happy mood condition which means that happy and sad mood did not influence decision accuracy.

This contradicting result can be based on the difference between the pictures the facial composites are based on and the actual lineup pictures. Those pictures were different in position and sometimes even in hair style or facial hair which could have given misleading information to the participants. Since the participants did not witness the suspect committing a crime, they did not have any memories and could only decide based one the facial composite. Misleading

information can be resisted by strong memories (Forgas, Laham & Vargas, 2005) which was not the case since no memories existed. Consequently, the confidence in their choice decreased and negated the higher confidence happy decision should provide.

A further explanation for the lack of mood effect can be explained by the quality of the facial composite drawings. Since the match between the composite and the line-up picture is not quite obvious, the analytical approach might have been required either way regardless of mood. Research has shown that the analytical decisions are way more accurate for complicated tasks (Sinclair & Mark, 1995; Forgas, 1989). Although the happy mood condition should promote intuitive decisions, the difficulty of the task might have required an analytical approach. Concluding, the quality of the facial composites negated the effect of mood on decision making.

Comparing it to further research turned out to be rather difficult since the specific topic of positive or negative mood influences on decision making in an identification process did not receive much attention (Forgas, Laham & Vargas, 2005). Nevertheless, Greenstein and Franklin (2020) investigated the effect of anger on lineup identification which resulted in an association between anger and lower confidence accuracy and increased misidentification. This is in contrast with this study's results where negative emotions did not produce reduced accuracy decisions, or any other difference compared to positive mood. Although anger is considered a negative mood, it is important to note that anger is not a classical negative mood since it is more risk-seeking than classical negative moods like sadness (Lerner & Keltner, 2001). Further literature provides a different perspective although Sinclair & Mark (1995) and Forgas (1989) agreed on a view of negative and positive mood influencing decision making. Stroessner & Mackie (1992) and Ellis & Ashbrook (1988) stated that both moods, negative and positive, impaired processing capacities. Additionally, some researchers reported that positive mood is enhancing decision making success (Bless, Mackie, & Schwarz, 1992) which shows a whole spectrum of perspectives on mood effects influencing decision making. Forgas et al. (2005) even predicted in their study that negative mood induced decisions are more accurate compared to positive. This diversity in opinions on mood effects shows that many variables influence mood effects on decision making and that no straightforward explanation exists until now.

Strengths and limitations:

Although this research could not confirm the expectations, it displays certain strengths. The main strength of this research is the investigation of a literature gap. These specific topics have not been investigated before which makes this research unique. Regarding the study design, the experimental design of the study allowed the researcher to reduce the number of influences during the identification process and to focus on one of them particularly. A further strength was the mood manipulation which worked well according to the modification-check item. The negative video induced almost exclusively a sad mood and the positive video a happy mood. Lastly, the online questionnaire used to gather the data was short and uncomplicated which lead to almost no excluded cases. The research questions could be answered easily since the applied analyses were straightforward and easy to apply. This leads to a low probability of error and makes the results easy to understand and interpret. However, this can only be considered as a minor strength.

There are some limitations that need to be mentioned and considered when interpreting this study findings. One of the strongest limitations is that only a low number of participants identified each suspect. Consequently, the results are prone to error and the estimations of values are not strong which makes the result not generalizable. A further limitation influencing the study results is the lack in realism of the current study. The volunteers drawing the facial composites received a picture of the suspect and had unlimited time to draw them. This leads to better quality facial composites compared to a realistic setting since the condition are usually not that optimal. Therefore, this study results are probably higher and not generalizable. Finally, the unbalanced sample can be considered a limitation which provided 83% of female participants. Research showed that mood can influence decision rules for men and women differently (Fehr-Duda, Epper, Bruhin & Schubert, 2011). The consequence is that the result of this study cannot be generalized since there is only limited data for men.

Future research

With regard to the future, it would be interesting to research eyewitness identification further to improve its accuracy and success in police investigations. This study can be replicated to get some more insight into the quality of the facial composite and how the quality of the composite is correlated with accuracy rate. In order to examine the required skill level, drawn facial composites from different skill levels ranging from low to high skill have to be included. It is

important to label them with the according skill level to determine the threshold of skill. This way the exact required skill level can be determined. However, this requires more data and a long-term study which includes presenting multiple facial composites in the identification task to every participant. The results would give more information on which facial composite was most successful. This should be followed by a quality assessment of the drawing.

Additionally, the mood effects on the accuracy of the eyewitness identification provides research potential. Burriss, Ayers, Ginsberg, and Powell (2008) showed an effect of strong negative emotions on the identification accuracy. A longitudinal study inducing stronger emotions into the participants could bring insight into how these emotions affect the identification process and how this can be used by the police to increase the success of investigations. Same with mood congruence. There is already literature about mood-congruence (Matlin, 2005; Rounding, 2010), however, not many studies have been conducted. A more complex designed study creating a more realistic eyewitness scenario and inducing realistic moods can show how mood can be used more effectively during investigations. This can be done by imitating the same mood which was experienced during witnessing the perpetrator during the identification.

Conclusion

The current study aimed at examining if citizens are able to draw facial composites that can be used in police investigations in order to find and identify a perpetrator. Furthermore, the influence of mood on the identification accuracy was tested, the focus was on happy and sad mood. The results of the study showed that both hypotheses were not confirmed: the accuracy rate equal to chance level, and there was no difference between sad and happy mood when it comes to identification rate. These results gave insight in the importance of drawing ability in the creation of facial composite. Furthermore, the results showed that only drawn facial composites are not suited for police investigations. Future research should focus on the effect of mood congruence on identification accuracy and the effect of drawing skill on accuracy.

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Appendix

Appendix A: Informed consent

Dear participant,

Thank you in advance for your participation. The purpose of the current study is to examine the usefulness facial composites created by eyewitnesses. The following questionnaire will take approximately 10 minutes.

Participation in this study is completely voluntary and anonymous. If you decide to participate, you may stop participating at any time, without any penalty or consequences.

The researchers will maintain the confidentiality of the research data, all data will be stored safely. The data will be used for research purposes.

By submitting this form, you are indicating that you understand the purpose and nature of the study, are over the age of 18, and you agree to the terms as described above.

If you have any question or concerns regarding this study, feel free to contact the researcher:

Name: Erik Schmilgus

Email: e.schmilgus@student.utwente.nl

I declare that I have read the above and agree to participate in this research study.

Appendix B: The online questionnaire

1.

Dear participant,

Thank you in advance for your participation. The purpose of the current study is to examine the usefulness facial composites created by eyewitnesses. The following questionnaire will take approximately 10 minutes.

Participation in this study is completely voluntary and anonymous. If you decide to participate, you may stop participating at any time, without any penalty or consequences.

The researchers will maintain the confidentiality of the research data, all data will be stored safely. The data will be used for research purposes.

By submitting this form, you are indicating that you understand the purpose and nature of the study, are over the age of 18, and you agree to the terms as described above.

If you have any question or concerns regarding this study, feel free to contact the researcher:
Name: Erik Schmilgus
Email: e.schmilgus@student.utwente.nl

I declare that I have read the above and agree to participate in this research study.

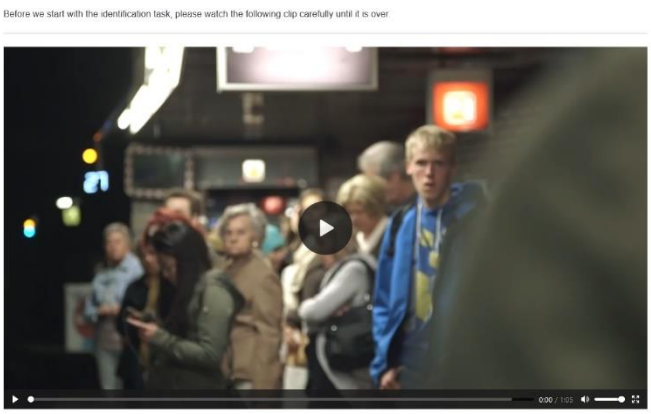
- ○ I agree to participate.
- ○ I disagree and I do not want to participate.

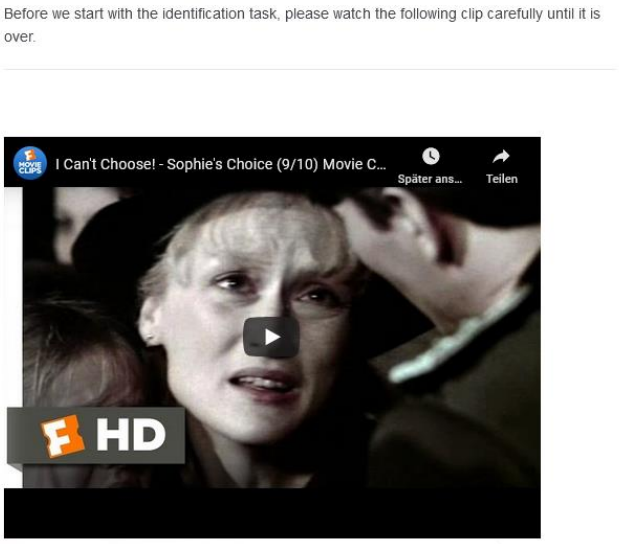
2.

Now some more information on this research and its background. This research is contributing to the concept "Do It Yourself Policing" which means that citizens can support police work by doing task usually done exclusively by the police. This study is examining what citizens can do to assist the police with focus on facial composites drawn by eyewitnesses. The goal is to assess if the quality of drawn facial composites are sufficient enought to make identifications.

→

3.





4.

UNIVERSITY OF TWENTE.

What is your current mood?

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
I am in a bad mood.	○	○	○	○	○	○
I am in a good mood.	○	○	○	○	○	○

5.

UNIVERSITY OF TWENTE.

The next page will contain a facial composite created by eyewitnesses and a line up of possible suspects. Keep in mind that the facial composite was drawn by eyewitnesses who were observing the crime. Consequently, the eyewitnesses did not have perfect sight on the perpetrators face.

→

6. One out of ten of the possible facial composites is presented.

This is the facial composite drawn by an eyewitness.

This is the line up of possible suspects. Look at them closely.
Try to match this facial composite to one of the suspects.

When you think you identified the perpetrator, memorize the related letter (RED LETTER IN RIGHT BOTTOM CORNER). Keep that letter in mind and proceed to the next page.

7.

Did you recognize the person in the drawing?

- (●) Yes
- ( ) No

If yes, which one

- ( ) Suspect A
- ( ) Suspect B
- ( ) Suspect C
- ( ) Suspect D
- ( ) Suspect E
- ( ) Suspect F
- ( ) Suspect G
- ( ) Suspect H
- ( ) Suspect I
- ( ) Suspect J

8.

Thank you for participating in this study! Lastly, I would ask you to give information on your demographics.

What is your gender?

- ○ Male
- ○ Female
- ○ Other

What is your age?

- ○ 18 - 20
- ○ 20 - 25
- ○ 25 - 30
- ○ 30 +

What is your nationality?

- ○ Dutch
- ○ German
- ○ Other

What is your profession?

- ○ Student
- ○ Worker
- ○ Other