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Recognition of Facial Expressions by Forensic Healthcare Nurses

Bachelor Thesis

Elilarasi Ratnalingam (s1790293)

First Supervision: Dr. ir. P.W. de Vries
Second Supervision: Dr. J.M. Gutteling
Co-Supervision: Dr. F. Fluttert

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Abstract

This study deals with the recognition of emotions in the face by forensic health care nurses. Current research gave input about how to read emotions in the face and how to use micro expressions in order to be able to evaluate a person's nonverbal facial behaviour. Since various incidents are reported where nurses are endangered, questions arise on how to reduce those. This study aims to find out whether nurses working in clinical practice have sufficient knowledge about nonverbal cues, especially facial expressions in order to use the knowledge in their work with forensic patients. Also, it was to discover if those nurses believe that a training done for this topic would be beneficial for their work. A qualitative interview study was done with 10 nurses from a forensic health psychiatry in the Netherlands. The results were evaluated with a content analysis. The outcome shows that the respective nurses do not have sufficient knowledge about facial expressions to apply it in their work. All of the participants support the invention of a training about emotions in the face for the sake of improvement of their work. More research in the clinical practice about emotions in the face should be done to further develop and improve the training of forensic health nurses.

Key words: forensic nurses, health care, emotions in the face, emotions, facial expressions, micro expressions, training, Early Recognition Method

Introduction

In forensic healthcare nurses deal with patients who are admitted to a hospital after physically harming people due to mental illness. While working with such patients, incidents occur where nurses are attending or being involved in patient's violence. In a forensic hospital in Finland during a period of three years 840 incidents of physical violence were reported (Kuivalainen, Vehviläinen-Julkunen, Putkonen, Louheranta, & Tiihonen, 2014).

As Charles Darwin implied, emotions in the face are crucial for humans to communicate visually and regulate social behaviour (Ekman, 2006). Darwin has shown how facial muscles react in certain situations and how the contractions are connected to express specific emotions. These muscles were found in different species from which he concluded that there are some basic emotions to be expressed in the face. With that research groundwork, studies about emotion expressed in the face became popular among researchers (Ekman, 2006). Paul Ekman did not only explore how emotions are expressed in the face, but he also figured out other facial behaviour concerning emotion. This includes micro expressions, lie detection and new definitions in emotion studies (Ekman, Friesen & Ellsworth, 2013).

It is experimentally studied within the fields of psychology, biology and evolution that emotions are linked to facial expression. Today's developed research concerns in a great part the neurological link between emotions and facial expressions. Parts of the brain responsible for certain emotional activities were found (Etkin, Büchel, & Gross, 2015). Whilst research of the late 20th century did the groundwork on accuracy, universality and definition of the emotion expressed by human and primates, today's research, including meta-analyses, aim to apply the knowledge into practice. Matsumoto and Hwang (2011) pointed out the importance of using knowledge of emotion expressed in the face as part of training for professionals. Thus, the exploration of the relation between facial character and respective emotions should be applied to the clinical practice of forensic Psychology. This counts in any kind of area since social interaction involves interpersonal nonverbal communication. More specifically, the link between

emotions and bodily reactions, including facial expressions, foster nonverbal social interaction. Employees who have to deal with criminal offenders, could use the expertise in facial expression to a significant extent. In the training of criminal investigators and interrogators facial and body language is already used in order to detect lies (Vrij, Edward, Roberts, & Bull, 2000; Otu, 2015).

The ERM (Early Recognition Method) is a risk-management strategy aiming to identify early warning signs which resulted in a significant decrease of the number and severity of violent incidents in an intervention study (Fluttert et al., 2010). This strategy is already used in the Netherlands forensic psychiatry. The ERM protocol includes parts that include nonverbal communication. Currently most nurses probably use the skills of early warning signs by means of facial expressions by general intuition regarding nonverbal communication. However, the current ERM-training of forensic nurses in applying ERM risk-management does not explicitly address the recognition of emotion in the face.

Psychopathic people are associated with having a lack of affection and impulsive behaviour (Dawel, Wright, Dumbleton, & McKone, 2018). In combination with those characteristics they have the ability to conceal their emotional facial expression and to prevent emotions to leak in their deviant behaviour. Still, they are not fully capable of hiding those leakages (Porter, ten Brinke, Baker, & Wallace, 2011). The question that follows in order to better secure nurses is how that deviant behaviour can be disclosed.

The usage of the recognition of emotions in the face could lead to a better management of patients' violence and the early recognition of early warning signs accordingly. Specifically, the early recognition of hostile intent and aggressiveness could contribute to successful management of these situations by the nurse. Since research about emotions in the face and forensic psychiatric setting is scarce, this study aims to investigate what forensic mental health care nurses know about emotion in the face, if knowledge is apparent the study figures how they use that information in clinical practice.

Theoretical Framework

Basic emotions. After Ekman's work in the early 70s, basic emotions were known within the research field. Since various researchers found evidence for six universal basic emotions,

these have been investigated and critically reviewed in order to underline their existence (Ekman, 1992). The respective emotions are happiness, surprise, fear, sadness, anger and disgust. In the late 19th century researchers were not conclusive about the existence of basic emotions. Later, with neurological, ethnological and biological research, evidence strengthened the existence of those (Ekman, 1992). It is to point out that each of the basic emotions are expressed in the face and are universal for every person. Furthermore, expression of basic emotions are crucial for interpersonal nonverbal communication. Recognizing and interpreting those have been evolutionarily important for the human species. With the neural and muscular property of facial expressions science found ways to include these facts in various fields that include the human face.

Of the basic emotions, anger, sadness, fear and disgust can be differentiated as negative emotions. Withdrawal emotions include fear and disgust and are considered separately from the group of negative emotions such as anger and sadness (Davidson, Ekman, Saron, Senulis, & Friesen, 1990). Those emotions are thought to be mediated by the right hemisphere of the brain and thus expressed through the left hemiface. Also neurological studies were able to identify specific regions in the brain to be important for the expressions of the four emotions (Harmer, Thilo, Rothwell, & Goodwin, 2001). Recognizing anger and threat is associated to evolutionary neurobiological aspects concerning fight or flight situations (Damasio & Carvalho, 2013). Behavioural sciences also state the importance of anger recognition to react adaptively with certain behaviour (Fox, Lester, Russo, Bowles, Pichler, & Dutton, 2000). Additionally, Fox et al. (2000) found that angry faces are recognised more quickly than other expressions. The findings suggest that anger as an emotion is to a great part recognised passively and elicits a quick reaction of a person.

Since observation may be influenced by context and other factors, researchers focused on a set of facial parameters to most accurately identify the respective emotion expressed. That widely known method for such coding is the facial action coding system (FACS) by Ekman and Friesen (1977). The advantage of this method is that the observer is able to focus on facial parameters rather than the whole facial muscle behaviour. Researchers use the FACS to analyse automatic expressions of the face (Tian, Kanade, & Cohn, 2001). Bettadapura (2012) elaborated

on the action units (AU) which are the components of facial muscles that serve as a parameter to identify a facial expression. Those AUs are labelled and can refer to one single muscle movement or multiple that appear together. There are over 7000 different possible expressions of AUs that can be produced by the human face (Tian, Kanade, & Cohn, 2001). An example for the combination of action units is the expression of fear which can be composed of the three different action units (Bettadapura, 2012; Appendix A [retrieved from Tian, Kanade, & Cohn, 2001]). Furthermore, anger can be identified through narrowed lips but can also appear with the combination of other action units (Tian, Kanade, & Cohn, 2001).

FACS describes objectively what kind of movements appear in the face and what kind of emotions those movement possibly express. Other systems falsely first use emotion definitions to then describe expressions in the face (Cohn, Ambadar, & Ekman, 2007). It is important to illustrate the ambiguity of facial expressions with the FACS since some emotions share specific movements, as of the lips for example (Bettadapura, 2012).

Micro expressions. The introduction of micro expressions by Ekman and colleagues extended the professional use of and research on facial expressions. Those are short lasting expressions in the human face which indicate the actual emotions of a person (Ekman, Friesen, & Ellsworth, 2013). People are able to lie about and/or hide emotions to a certain extent but true emotions are expressed in the face for a few milliseconds. Micro expressions also come together with blends. A blend is defined as the rapid change from one emotional expression to another which resemble each other closely in the manifestation of one facial expression (Ekman, Friesen, & Ellsworth, 2013). These concepts are widely accepted and investigated. Especially recognition methods are developed and studied carefully in order to identify micro expressions (Matsumoto & Hwang, 2011). It is often argued that technological devices are more accurate than the sole observation of a professional (Bettadapura, 2012) since observations made by humans often involve the context of a situation and other sensory perceptions (Aviezer, Ensenberg, & Hassin, 2017).

For professionals the use micro expressions are applicable for example in the identification of liars. This is important in the interrogation field. Evidence was found that micro expressions lasting between 0.4 seconds and 0.5 seconds reveal distinction between truth tellers

and liars (Matsumoto, & Hwang, 2018). This study implicates that indeed micro expressions can be useful for professional use and also that it is possible for human observers to recognise those micro expressions, since the coding of facial expressions was done by facial coding experts.

Importance of facial expression. Facial reanimation techniques make it possible for patients to attain facial expressions again (e.g. smiling). Research in that field suggests that facial muscles and nerves are important for facial expressions and these in turn show specific emotions in the face (Lenz, Kiefer, Dietrich, Stark, & Eisenhardt, 2019). Another domain that uses facial expressions and respective emotions is art. Faigin (2012) summarizes that the essence of a painting lays in the accurate illustration of mimicry in a piece of art.

Use of recognition methods. The utility of training to recognise emotions in the mental health was studied with schizophrenic patients. It was found using validated tests (PEAT & ER40) that a short training for emotion recognition improved the ability to recognise facial emotion expression by patients significantly (Silver, Goodman, Knoll, & Isakov, 2004). This kind of results indicate that emotion recognition in mental health could contribute to improved treatment including the better management of patients' violence behaviours. It is to identify whether nurses working with those patients could use the same improvement in order to enhance their working skills.

Recognition methods are presently used in some fields and additionally methods and systems are developed to apply knowledge about facial expressions and emotions. The FACS for instance is the most accepted system for human observers to use. There is discussion about the accuracy of human observation. Kinds of automatic recognition software use the same methods but are found to be more accurate and validated. The software presented by Wu, Shen, and Fu (2011) works completely autonomous in recognising faces and their micro expression in videos. The accuracy is found to be better than human observation. The same was found in other automatic recognition methods (Li, Hong, Moilanen, Huang, Pfister, Zhao, & Pietikäinen, 2017). Another study deals with a model for human facial recognition. It states seven different kinds of information that a face reveals and that is perceived by the observer. Furthermore, the research emphasizes the importance of contextual information when humans are recognising facial expressions (Bruce & Young, 1986).

In current forensic health care in parts of Europe methods are introduced to prevent patients in forensic health care to behave violently. This is achieved by using the early recognition method (ERM) developed and conceptualized in the Netherlands. The purpose of the ERM is to assess and thus manage violent behaviour by recognising the onset of aggression and intervene at the earliest stage of risk development (for an illustration see Appendix B). The ERM protocol for nurses describes moods, behaviour and feelings over weeks in different sessions. In those personal sessions, the protocol is treated with the patient together but as well from a subjective perspective. The protocol includes different assessment tools that need to be filled in with the patients and interpreted by the professionals. In sum, the method aims to enable nurses and patients themselves to be attentive towards triggers and signs of an outbreak of aggression ().

Risk assessment, developed from the second half of the 20th century onwards, went through different stages ordered into generations risk assessment. The first generation dealt with developing measurements that helped clinical assessors to identify how threatening the behaviour of a patient was. However the measurements were not accurate enough. In the late 70s then, the first structured measurement tools were used. With the second generation beginning shortly after, fixed items were used, likert scales were introduced and scores were counted by nurses and the aim was to figure the best instrument for risk assessment. Many of the instruments were of good validity and quality but the variable missing in the first two generations was the solid individual contact between nurse and patient. In the so-called ‘third generation risk assessment, research began to develop methods that included personal contact between professionally trained nurses and patients from the beginning of the 21th century. The Early Recognition Method is a risk-management strategy developed within the 3rd generation, emphasizing the interaction between FMH nurses and forensic patients. With this ERM-strategy risk can be formulated and acted according on. These risk formulations are being interpreted by the professionals rather than scored through static instruments. The concept of the early recognition method is aimed to have a personalized treatment for every patient.

The early recognition method is described in a protocol for the nurses in order to guide them how to apply ERM. Within this protocol the Forensic Early Signs of Aggression Inventory (FESAI) was developed. The FESAI is an inventory describing 44 early warning signs within 14

categories. This inventory was developed out of over 3000 descriptions of early warning signs and narrowed into 44 items that accurately define early warning signs of aggression. These items refer to feelings and behaviour and to specific changes in those observations (See Appendix C). Even though the protocol also involves observations, specific cues for emotions in the face or micro expressions are not mentioned. It is to suggest that recognising facial behaviour is not trained in the education of forensic health nurses.

In the current study, interviews will be conducted with nurses working in forensic healthcare. The interviews aim to explore the perspective of forensic health nurses with focus on whether nurses working in clinical practice have sufficient knowledge about nonverbal cues, especially facial expressions. Additionally, the study aims to discover if nurses believe that a training in the recognition of emotions in the face would be beneficial for their work.

Methods

Setting

The study took place at the Forensic Psychiatric Hospital, FCP Dr. S. Van Mesdag, in Groningen, Netherlands. Within this FPC the study focussed on the nurses knowledge and their possible applications of patients' emotions in the face. Patients of various kinds of psychological disorders and different violent histories are admitted in the Mesdag clinic. Some nurses work with patients who have psychotic disorders, others with patients with antisocial personality disorder and some with sexual offenders.

Participants

A sample of ten forensic healthcare nurses from the Van Mesdag hospital in Groningen, Netherlands, were asked to voluntarily take part in an interview. Of all participants three were female and seven were male. All participants have between four and 10 years of experience being a nurse for patients of personality disorders, psychopathy and also patients with other disorders. By that experience, the in-depth reflection of their personal work experience was

ensured. The study aims to give future implications to the development of methods to increase the safety of forensic health care nurses. For that, the exploration of the communication and more importantly miscommunication between nurse and patient are of essence. Thus, the focus is on the information from nurses who were involved in an incident. Nurses who were not at all involved in an incident were excluded. Moreover, since the perception of the nurses is of importance when examining the face of a patient, participants with any kind of visual impairment were excluded from the sample. Lastly, the corporation with the Mesdag clinic produces a language barrier between the interviewer and some possible interviewees. For the sake of successful communication and interpretation only nurses who could speak English well enough to express themselves, were included in the study.

Design and Procedure

The current study is an observational explorative study which employed a qualitative interview method. The qualitative research strategy aimed to enlighten the nature of the topic under study, as in this study the knowledge and possible use of nurses of emotions in the face was investigated. Moreover, this method was the most useful since the inclusion of open-ended question allows a more in depth gathering of information. It was of importance that nurses reveal details about their work with forensic patients and explain their own working behaviour. Therewith, a correlation between the behaviour of the nurses and the use of facial recognition could have been discovered.

Since the nurses work in shifts and in different units of the hospital, the interviews took place in different rooms in the units. Overall, the rooms were provided with chairs for the interviewer, translation supporter and interviewee. Mostly the interviews were held in the units' working rooms for the nurses. Sometimes the rooms were places were the nurses have regular professional conversations with single patients and for one interview the conversation took place in a leisure room for patients. Still, all the interviews were conducted in a closed environment where the participants and interviewer were not disturbed by patients.

A semi structured interview contains an interviewing scheme with leading questions and probes that can be used during the interview. The duration of the conversation was about 12 to

21 minutes per participant. In order to lay focus on the theoretical concept, the introduction and general questions were reduced to a few simple questions, such as “how long do have you work here?” and “what kind of patients do you work with?”. Demographic questions about the nurses were excluded, since the sampling of the participants covered enough information.

After a communicative relationship was built, questions were immediately directed to the core topic. Namely, the incidents nurses were personally involved in. Questions like “could you describe a specific incident you were involved in, where a patient got violent?” lead to an illustration of different kind of incidents from the view of the nurse. In addition to that to gain a more personal perspective, questions about the feelings of the nurse during the interview were asked. Furthermore, the interview continued with questions regarding the ability of the nurse concerning the recognition of emotions in the face and general nonverbal behaviour of the patient. Asking “Do you know how to recognise emotions in the face?” focuses on the ability of the nurse and questions like “did you recognise facial expressions of the patient?” investigate the application of those abilities, if given. The complete interviewing scheme can be found in Appendix D. During the interview the flow of conversation was supported by probes. Probes have the intention to encourage the interviewee to proceed talking. In this interview probes like nodding and verbal probes such as ‘mhm’, ‘right’, ‘okay’ were used. Also, echo-probes, which are defined as repeating some parts of the sentence said by the interviewee, were used. In this setting filling sentences was also used since the participants were not native English and missed some words. Filling these word suggestions encouraged the narrative flow.

After exploring the perspective of the nurse, information about current research about emotions in the face was provided. This included the six basic emotions (Ekman, 1992), Action Units based on the FACS (Tian, Kanade, & Cohn, 2001) and micro expressions (Ekman, Friesen, & Ellsworth, 2013). After providing the information, the opinion about the usefulness of the research was asked. Additionally, the interviewee was asked if it would be helpful to include emotions in the face and micro expressions into the training of forensic nursing in order to underline the importance of the theoretical concept. Lastly, the already embedded ERM was talked about. Questions were asked if it would be useful to expand the FESAI with an extra

paragraph of 'emotions in the face' or 'micro expressions'. The interview was closed by thanking the nurse for participating and giving the opportunity to ask questions.

Analysis Plan

Within the conversation of the interviews the content needs to be interpreted and to be related to the research question. Therefore, a holistic content analysis was chosen for this study. A content analysis is possible to be executed in two ways. To discover the surface information and to repeat exact phrases from the interview transcription, a *manifest* analysis should be done. This type of analysis shows what the interviewees actually say. The other type is the *latent* analysis and requires a deeper conversation and involves interpreting the content of what was said (Bengtsson, 2016). Considering the valuable insight the nurses gave about a specific theoretical concept and regarding the research questions, a latent analysis in this study involves their interpretation of emotions in the face in the patients.

In the process of analysis, first the themes that were treated in the interview will be identified. After that, on a more detailed level, the interview topics will be categorized into domains about what was said and what the researcher interprets from it. For the first theme *'Worklife'*, two domains were chosen which are labelled as 'Disorders of patients' and 'Relationship with patients'. Secondly, the theme *'Incidents'* consists of the domains 'Illustration and nurse's feeling', 'Analysis of trigger' and 'Predictability'. The theme of *'Emotions in the face'* was categorized into 'General knowledge', 'Recognition of Emotions in the Face', 'Intuition' and 'Difficulties'. Furthermore, this theme has a fifth domain that is named 'Opinion about current research' in which the interviewer gave information about findings in current research about emotions in the face. After that, the participants were asked to give their opinion about the information. The last theme of '*Possible changes*' includes two domains of 'Training in emotions in the face' and 'ERM extension'.

Suiting quotes from interview transcriptions will be provided. The reasoning of interpretation will be deductive and be applied to the existing research questions and existing research.

Results

The interviewing scheme (Appendix D) present four themes that were used for the analysis. This includes the general worklife of the nurse, the incidents the nurses were involved in, knowledge about and application of emotions in the face and possible changes that could be done to enhance the work of nurses.

Worklife

Disorders of Patients. The nurses work with all kinds of patients in different units. Most of the participants explained that they worked with all kinds of patients: “All kinds of personality disorders, psychotic disorders, autism, antisocial.. basically anything you can think of, we have it here.” (Participant (P)1, Interview 1). Other pathologies that were mentioned are mental disabilities and emotional disorders. Furthermore, patients with these disorders have committed crimes. One interviewee also explained that some patients with disabilities have low intelligence (P9, Interview 9). and some patients have comorbid (co-occurring) psychological pathologies (P3, P6, Interviews 3,6).

Relationship with Patients. All nurses reported that they have regular contact with patients throughout the day and know them in that way appropriately. Still, some of the participants explained that they do not exactly know the patient very well, since the patients are still unpredictable: “[...] [I do] not [know the patients] that well, I think [...] you know the patients you are working with, but the behaviour is different all the time [...], unpredictable.” (P5, Interview 5); and sometimes are admitted recently (P3,P5, Interviews 3,5).

Incidents

Illustration and Nurse’s feeling. The interviewees illustrate situations where the patient got verbally and sometimes physically violent. Some situation resulted in security action. From most of the nurses the incidents described were perceived as unforeseen and tensioned (e.g. P1, Interviews 1). When the first question about incidents was asked, participant 3 said: “I have quite

some incidents, yeah [...]". In another interview incidents occurred that much that the interviewee had difficulties remembering a specific situation (P2, Interview 2). When asked about feelings, not many participants replied directly. However, one nurse explained: "I felt fear" (P6, Interview 6).

Analysis of trigger. Triggers for the violent action of the patient were mostly negative verbal information given by nurses, such as the expansion of the patients admission in psychiatry (P7,P10, Interviews 7,10). In some cases, the patient got aggressive because of bad mood or heated behaviour from another patient, according to the interviewees. Furthermore, nurses explained few patients have previous (negative) relationships with the nurses and showed tensioned behaviour before the incident occurred.

Direct triggers shortly before the violent act of the patient were sometimes not remembered or perceived. Few nurses claim to have seen general negative facial expressions such as angry faces or expression of fear.

Predictability. In many interviews, the participating nurses explained the unpredictability of forensic patients (e.g. P5, Interview 5).

Emotions in the Face

General Knowledge. The ability to see or read emotions in the face or nonverbal cues in general was perceived as possessed by all the participants. Still, some nurses have difficulties recognising those. Participant 6 claims to have difficulties when it comes to a certain group of patients with a "straight face" (P6, Interview 6).

Recognition of emotions in the face. Many interviewees demonstrated that they could see how the patient felt using nonverbal cues. A few also explained that it is usual for them to see expressions in the face, due to regular interaction: " [...] see each other everyday, you can see in my face, I can see on your face how [you] feel. I think at least while you are angry one can see it." (P2, Interview 2).

Intuition. When the sub question whether that ability was intuitive or active behaviour was asked, some of the participants said it was intuition, but also a few explained that it may be

both: "[...] I am not sure if it is only intuition because you have experience and you see certain things." (P1, Interview 1).

Difficulty. When it comes to the recognition of emotions in the face, the nurses indicated difficulties in estimating a patient's behaviour: "[...] if you don't recognise those things you can't read a person very well." (P2, Interview 2). Another nurse explained the general difficulty in recognising facial expressions. Namely, the personal emotions and thoughts. He says that it is difficult to use the learned if there is a lot of emotion and fear in that person or nurse (P1, Interview 1).

Opinion about current research. Moreover, after the information about current research was given. The answer of every nurse to the question, what the participants think about the information was that they rate it as useful. Statements like: "if we could recognise [the micro expressions] sure it would help of course." (P1, Interview 1), "Yeah, yeah. Definitely, yeah." (P5, Interview 5), "yeah, yeah, yeah, very useful!" (P6, Interview 6). Furthermore, almost every participant perceived information about micro expressions as complete new knowledge. When they were asked if they heard of the term, the participants mostly denied.

Possible changes

Training in emotions in the face. The nurses were unanimous in their opinion that a training for emotions in the face should be developed. They indicated situations where the proper expertise about micro expressions and basic emotions could have been beneficial in their current work.

ERM extension. All of the participants are willing to learn from current research. Additionally, some interviewees indicated the advantage of expanding the already existing ERM with another item about emotions in the face or micro expressions.

Discussion

The interviews had the aim to explore the perspective of forensic health nurses in order to find evidence for the research question. This study was first to discover whether nurses working

in clinical practice have sufficient knowledge about nonverbal cues, especially facial expressions in order to use the knowledge in their work with forensic patients. Also, it was discovered if those nurses believe that a training done for this topic would be beneficial for their work.

Revision Findings. The results of this study showed that nurses have some knowledge about nonverbal facial cues. However these are not sufficient enough to read the patient's facial behaviour or to recognise micro expressions. Especially knowledge about micro expressions was not present. They use the amount of knowledge they gained through work experience and little training in their daily work. It is to argue that this knowledge should be expanded in order for nurses to use the newly gained information in their work as well. In addition to that, a specific training for learning to read basic emotions in the face and micro expressions was suggested to the nurses which was positively regarded. Since the Early Recognition Method is already used in the forensic hospital, the current study gives the opportunity to extend the system with another item concerning basic emotions and micro expressions. Nurses working at the Mesdagkliniek welcome new skills in combination with the ERM.

Theoretical reflection. The discovery of the difficulties the nurses have with the unpredictability of patients includes psychopathic patients. Since psychopaths have the ability to suppress emotion-expression and default in affection towards other people, it is of essence for nurses working in forensic psychiatry to attain skills of micro expressions that show true emotions of patients with psychopathy. Nurses may perceive patients more predictable.

Since the participants claimed to have experienced a lot of incidents in their work-years the findings from Kuivalainen et al. (2014) are confirmed to be similar in Groningen, Netherlands. Steps need to be taken in order to decrease the number of incidents, since participants from this study also claimed to have feelings of fear during those incidents. Research illustrate that feelings of vulnerability emerge from victimization (Garofalo, 1981). This can affect the psychological well-being of a nurse. Therefore, handling the situation in the near future is of importance in order to reduce harm towards forensic hospital staff.

Limitations. In the application of the study, one major limitation may have inhibited full access to rich information from the nurses. Namely, the unavoidable language barrier. Some of the participants that were able to communicate in english visibly had difficulties talking fluently

and express themselves accurately enough. A translator was helpful in that situation, still expression in the mother language of the participants is recommended. Also, the reach of interview methods is to argue about. Since the nurses described their experience through memory the question arises whether those memories are accurate. Furthermore, it is questionable whether emotion recognition without conscious awareness is possible.

Future implications. The gap between the ability of nurses to recognise emotions in the face and the possible abilities current research states is too big to introduce immediately in the applied forensic field of Psychology. Research about basic emotions, micro expressions and facial recognition methods exist for years now but has not been adjusted sufficiently to the applied field. It is time to use the rich information gathered by respected colleagues in order to fasten the increase of the safety for forensic health nurses.

In order to implement future options, recognition methods need to be tested with nurses in clinical practice. Their ability to obtain the skill of reading faces needs to be researched and argued. Even though plain assessment of micro expressions and basic emotions in the face is strengthened through technological devices and parts of facial behaviour are almost always assessed, human observation is preferable if performed by experts. Talking to the patient directly, the expert is able to consider the context of the situation, the conversation and the patients position. Thus, the expert is able to read the facial behaviour in combination with the overall behaviour of the patient. It is not likely that individuals, especially in forensic healthcare, can be assessed by technological devices because of the dynamic nature of nurse-patient contacts. The Early Recognition Method includes in its protocol the person-to-person contact between nurse and patients. Which is why technological devices would pose difficulties. Lastly, if the nurse would be able to use technological devices, the patient would be put into a stressful situation which cannot be controlled. This might lead to involuntary mixed emotions and expression of micro emotions that are not accurate. As a human observer the conversational style and skill can counter this obstacle.

Nevertheless, technological devices can still be useful to work with in the facility itself. Surveillance cameras with installed recognition systems might help improve the quick reaction to

specific emotions of the patients. This method would increase the safety of nurses as well. To be able to use this, technological softwares need to be developed and tested in clinical settings.

With this study new evidence in the forensic health nursing was found. Besides that, this is the first attempt to apply knowledge about micro expressions in the forensic clinical psychiatry in order to enhance the skills of nurses and further decrease incidents. This study also gives opportunities to implement different kinds of training. With the implementation of that training, the validity of that training needs to be tested. Also, the clinical forensic field lacks in evidence about the usefulness of facial recognition techniques. In order to have a basis for enabling the practical use, significant research in this field needs to be done. The opportunities in this study were restricted in access towards recognition tools. In order to be able to accurately link specific facial behaviour to emotions, access for tools such as the FACS needs to be given.

Ethical consideration might restrict the abilities to work with forensic patients directly, still to argue in that direction, first this current study needs to be replicated and widespread in different countries in order to increase reliability and generalisability of the findings in this study. Additionally, this study deals with basic emotions and supports the general use of emotion recognition. Applied to the forensic clinical practice, it is of importance to also specify those expressions and behaviours to negative emotions, i.e. hostile intent, fear and aggressiveness. Also, other nonverbal behaviour should be further studied in future research, since a combination of facial recognition and body language could increase safety to a significant extent.

In final words, it is of great importance to increase research in the topic of applied methods of emotions in the face in clinical settings since for this study there was not sufficient information to compare findings and procedures with.

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Appendix A

Upper Face Action Units and Some Combinations

NEUTRAL	AU 1	AU 2	AU 4	AU 5
				
Eyes, brow, and cheek are relaxed.	Inner portion of the brows is raised.	Outer portion of the brows is raised.	Brows lowered and drawn together	Upper eyelids are raised.
AU 6	AU 7	AU 1+2	AU 1+4	AU 4+5
				
Cheeks are raised.	Lower eyelids are raised.	Inner and outer portions of the brows are raised.	Medial portion of the brows is raised and pulled together.	Brows lowered and drawn together and upper eyelids are raised.
AU 1+2+4	AU 1+2+5	AU 1+6	AU 6+7	AU 1+2+5+6+7

Table 1: FACS Action units Retrieved from Tian, Kanade, & Cohn, 2001.

Appendix B

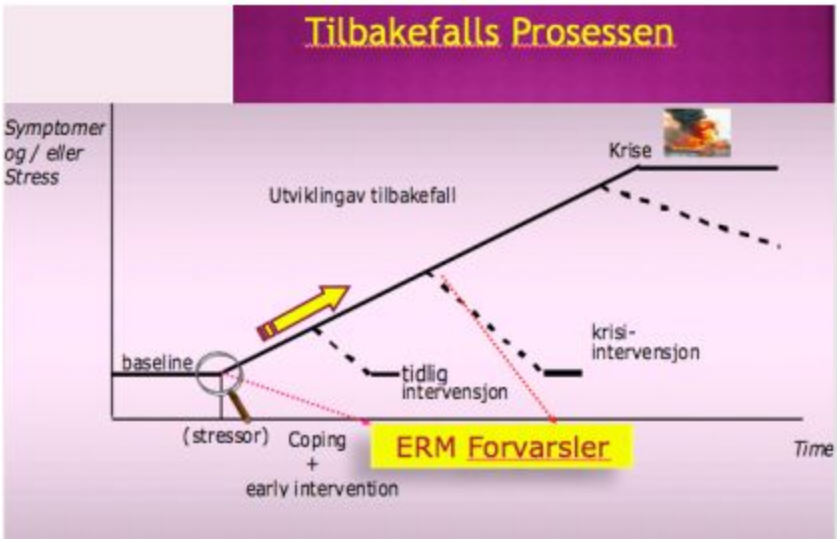

Figure 1. ERM graph showing the different stages where ERM should be used. Retrieved from "Risk management and risk assessment strategies in (forensic) Mental Health Nursing" by F. Fluttert, Molde University College, 2011. [Dutch version]

Appendix C

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Forensic Early Signs of Aggression Inventory [FESAI]

- The FESAI could be applied in phase 2 of the ERM-protocol when nurse and patient discuss and list patient' early warning signs.
- In exploring patient' early warning signs, e.g. after an incident occurred, the occurrence of these signs could be recorded in the third column.

Category	Early warning signs The change described in the individual item below can be perceived by the patient or observed by others.		Score yes/no
Change in daily activities	a)	Change in day-night rhythm	a) _
	b)	Decreased activity	b) _
	c)	Increasing boredom	c) _
	d)	Difficulties complying with agreements, daily structure	d) _
Social isolation, decreased social contact	a)	Increasingly superficial contact	a) _
	b)	Avoidance of eye contact	b) _
	c)	Increasing isolation, withdrawal	c) _
	d)	Walks away from conversation or other activities	d) _
Change of selfmanagement	a)	Declining self-care and/or care for surroundings	a) _
	b)	Decreased problem solving skills	b) _
	c)	Increasing financial problems	c) _
Physical changes	a)	Increasing physical complaints	a) _
Changed substance needs (alcohol, drugs, medication)	a)	Decreasing medication compliance	a) _
	b)	Increasing involved in substance abuse (alcohol and/or drugs)	b) _
Cognitive changes	a)	Increasing difficulties in thinking, recalling, concentrating	a) _
	b)	Increasing associative disturbances or chaotic thinking	b) _

Dejection and anxiety	a)	Increasing worries	a) _
	b)	Increasing loneliness	b) _
	c)	Increasing low self-esteem	c) _
	d)	Increasing feelings of sadness and/or desperateness	d) _
	e)	Increasing feelings of,being hurt, offended and/or rejected	e) _
	f)	Increasing behaviours of self-harm or considering it	f) _
	g)	Increasing anxiety	g) _
	h)	Increased nightmares	h) _
Tension, agitation, anger	a)	Less open to other's ideas, thoughts or ways of behaving	a) _
	b)	Increased experience of stress	b) _
	c)	Increased anger, frustrations and/or tensions.	c) _
	d)	Increasingly responding in a verbally/physically aggressive manner	d) _
	e)	Increased suppression of emotions	e) _
Antisocial behaviour	a)	Increasingly breaking other's boundaries, humiliating and/or cynicism/sarcasm	a) _
	b)	Increased failure to take responsibility	b) _
	c)	Increasingly being unreliable or lying.	c) _
	d)	Increased splitting behaviour, setting people up against each other	d) _
	e)	Provoking conflict(s), coercive, demanding	e) _
Disinhibition and impulsivity	a)	Increasingly chaotic, restless and/or impulsive	a) _
More (extreme) sexual fantasies, needs, behaviour	a)	Increasingly having extreme sexual fantasies, needs and/or behaviour.	a) _
Criminal behavior	a)	Absconding or considering it	a) _
	b)	Criminal contacts and/or criminal activities	b) _
Irrational ideas, perceptions	a)	Increased paranoid thoughts or feeling threatened.	a) _
	b)	Hallucinations.	b) _
	c)	Delusions, irrational convictions.	c) _
Very specific changes of behaviours	a)	Idiosyncratic behaviour	a) _
	b)	Changing eating/drinking habits, patterns	b) _
	c)	Speaking in a different manner.	c) _
Other early warning signs	a)	...	a) _

Table 2: FESAI from the ERM, retrieved from ERM-Protocol, FAJ Fluttert, 2010.

Appendix D

Interview Scheme

Participant number:

Informed consent:

Introduction:

- About me (Bachelor, interested in forensic health psychology)
- About the study (emotions in the face, recognition of facial expressions, increase ability and thus safety, decrease incidents)

Worklife

- What kind of patients do you work with?
- How long do you work here?
- How often do you communicate with your patient in one day?
- How well do you know the patients?

Incidents

- Can you describe the incident you were involved in?
- What kind of feelings did you have during the incident?
- do you have an idea, what the trigger was when the patient showed violence/ had an outburst?
- Could you tell that the patient is going to showed violence/going to have an outburst?

Emotions in the face

- Do you have experience with the recognition of emotions in the face?/Do you have knowledge about nonverbal cues?
    - Do you think you do that actively/consciously?
    - Did you know.. à what do you think about that?

Possible changes

- Do you think involving facial expressions into the training of nurses would be beneficial?

- Could you elaborate why?

Questions and thanking

- Do you have any questions regarding the interview, study or myself?
- Thank you very much for participating in my study
- Questions about me after the interview