"TEARS OF TRUTH"

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1770, Denis Diderot describes in his famous *Paradoxe sur le comédien:* "Garrick sticks his head through a crack in the door and in the course of four or five seconds his facial expression changes from wild joy to moderate joy to calm, from calm to surprise, from surprise to amazement, from amazement to grief, from grief to dejection, from dejection to shock, from shock to horror, from horror to despair. From this last stage he climbs again to the starting point." (Diderot 1770; as cited in Wilson 1961). This is indeed an overwhelming act of acting and has often become a starting point for questioning the emotional conditioning, the "sensibilité" of actors. In the 20th century—from Konstantin Stanislavski's theoretical writings and practical approaches at the Moscow Art Theatre through Lee Strasberg, who commented that Diderot's analysis "has remained to this day the most significant attempt to deal with the problem of acting" (Strasberg 2012), or Bertolt Brecht, Jerzy Grotowski, Eugenio Barba, Sanford Meisner and many others—countless theories and practical approaches have referred to Diderot and his question about how actors can best perform an emotional scene in order to be credible, convincing, persuasive and truthful.

But how is credibility or "truth" to be measured and compared when talking about artificially produced emotions or rather deliberately produced emotional facial expressions? Does digital technology help or hinder distinguishing real from fake faces?

"Tears of Truth", an offshoot of the "Actor & Avatar" project, was conceived to systematically examine crying, blushing and other facial signals forming part of emotional expression from the perspective of production aesthetics. The aim was to develop a framework and extensive database in order to examine production mechanisms in professional acting and their underlying determinants. A close cooperation between several disciplines—acting, theatre studies, psychology and computer science—was started to investigate the production and reception of complex emotions like crying and blushing because of their cultural-historical importance.

Actors' access to and execution of emotional scenes are highly individual, making comparison a challenge, especially if we miss the opportunity to measure the emotion and ask about the subjective experience. Central in this investigation would be the expertise of professional actresses and actors. They would perform typical emotional states on a scale of increasing emotional intensity: joy, sadness, fear, anger and disgust, but also shame, pride, relief, as well as surprise, interest, pleasure, awe, triumph, and compassion, everything in fine gradation and convincing appearance. The coupling of theoretical, neuropsychological and practical expertise could help to better understand how professional actors perform a role and express feelings "on demand". "The mark of a good actor or actress is indeed the ability to cry on command" (Nochlin 2004). An investigation on facial expressions—both performed live and reproduced digitally—would help to model emotions along stringent

professional lines, with a resulting repository—a "data model of emotions"—aiming to raise awareness of how "true versus false faces" are made and how they influence audience perception.

Professional acting expertise has developed at least since the 1760s, when the rise of psychologically realistic, natural acting served the self-representation and self-assurance of the bourgeoisie (Kreuder 2005). But although acting is one of the dominant arts in popular culture, how professionals process and audiences understand acting is still largely under-researched. Most reception studies in psychology and related disciplines work with acted stimuli, but very few discuss the production aspect of acting (e.g. Goldstein and Filipe 2018). Little research exists on the artistic and creative sides of expressing emotional states, one is constantly thrown back to standard monographs and handbooks like Constantin Stanislavski's "An actor prepares", Uta Hagen's "Respect for Acting", Sanford Meisner's "Meisner on Acting" etc. Therefore, a practice-based research could bring together professional acting know-how with scholarly expertise from theatre studies and affective science. This combination would provide helpful material for the performing arts, anthropology, sociology, psychology, theatre and performance studies in understanding the mechanisms and cues underpinning the human processing of facial expressions. The role of the musculoskeletal mechanisms controlling the facial configurations supporting the recognition of prototypical or basic emotions, as well as of valence and arousal, in both spontaneous and voluntary expressions, has been studied, based on the concept of facial action units and addressing both static and dynamical parameters (e.g. by Cohn and Ekman 2005 or Cunningham/Dunfield/Stillman 2013). However, from a psychological point of view, the problem is multifactorial and concerns the following topics: a) inherent ambiguities and limited degrees of freedom in facial expressions per se: some visible movements can be produced by more than one muscle; naïve perceivers, for example, lack the terms of reference to clearly distinguish the diverse forms of smiling; b) artificial laboratory contexts in the constitution of databases, reducing the ecological validity of stimuli/expressions, including the composition of facial expressions that may not reflect genuine and sufficiently intense emotional states; and c) the focus on purely musculoskeletal mechanisms. Musculoskeletal mechanisms can largely be controlled voluntarily, leading to facial expressions that may or may not reflect actual emotional states, and which even attempt to hide emotional states, e.g. smiling in a social context when one is actually sad.

Business as usual for professional actors. But in order to study how an experienced emotion relates to expressive features, it would be important to be able to produce stimuli based on inducing and controlling emotional states. This can only be achieved with experienced actors, who are trained to use "enacted emotions", based on scenarios and invented situations, and coached by a director and a research partner. The distinction may seem evident from the outside, but the subjective difference between the controlled and the uncontrolled process is huge and only becomes steerable after years of intensive professional practice.

"The real good actor must act fully and completely, having laughter and tears and at the same time be so objective that you can absolutely see what your sister is doing in the first row of seats. That is real freedom on stage", Michael Chekhov stated in his 'Lessons for the Professional Actor'. It is this implicitness and prerequisite in a significant cultural industry which should be questioned. An investigation on mediated facial expressions, with a special focus on crying, blushing/skin colour, and mixed and masked emotions, as these are missing in available databases of emotional expressions. Faces are a small part of the human body, but a universe of communication.

Revealing, even joking on actors' means and efforts has become common on European stages. Onions, glycerine sticks and a variety of eye lubricants are popular little aids. Some make fun of tears and offer supposedly easy techniques for making them appear in any one's eyes (Schütz and Müller 2011, Schubert 2016). Strikingly, despite all these advice and supportive techniques, throughout the history of cinema, actors have repeatedly proven

capable of controlling facial expressions as tears like a language—often with adverse conditions on film sets or theatre stages. And although such expressions have been theoretically analysed in terms of their impact on audiences, they have not been systematically recorded in terms of applicable means and grades of modulation. Most research on acted emotions such as tears and blushing has focused on historical developments or the cultural-historical implications in the reception of emotional outbursts (e.g. Plessner 2003, Söntgen and Spiekermann 2008), or on psychological or medical factors (e.g. Vingerhoets and Cornelius 2012, Vingerhoets 2013; Wassiliwizky et al. 2017). Interdisciplinary attempts have been made to investigate the role of visual and emotional factors in expression recognition using technical methods such as fMRI, EEG and others (see Campagnoli et al. 2019, Jürgens et al. 2015, Schirmer and Adolphs 2017). However, the production of these processes by actors and professionals has scarcely been investigated: Do real tears differ from false ones?

Weeping is normally "linked to an explicit loss of control over oneself" according to Käte Meyer-Drawe (1999). Its course cannot be voluntarily controlled and largely eludes bodily control; it is an indication of the "fundamental unavailability of our bodily existence" (Meyer-Drawe 1999). So why are some people able to express false tears as if they were true? And why has the effect been investigated but not the cause, the deliberately produced art, the facial expertise? The human face is far from being fully discovered. It is the micro physiognomy of film that "distinguishes more finely and precisely than the most exact word, and thus it has not only an artistic but also an important scientific vocation" (Balázs 1980). So which factors influence the truthfulness and so-called authenticity of the tears, blushing, pupil dilatation or more generally facial expressions of emotions, produced by professional actors? Is it possible to test and compare these with empirical methods? A lab-like recording studio and a predifinite script should remain the same for all actors and actresses to start with. Then let them act, track and compare. And as an encore at the end the digital processing of the videos for asking what are the consequences of communicating increasingly through digital interfaces in today's society.

STILLS FROM TEST RECORDINGS WITH PROFESSIONAL ACTOR GOTTFRIED BREITFUSS.
ZURICH UNIVERSITY OF THE ARTS, 5 FEBRUARY 2020.

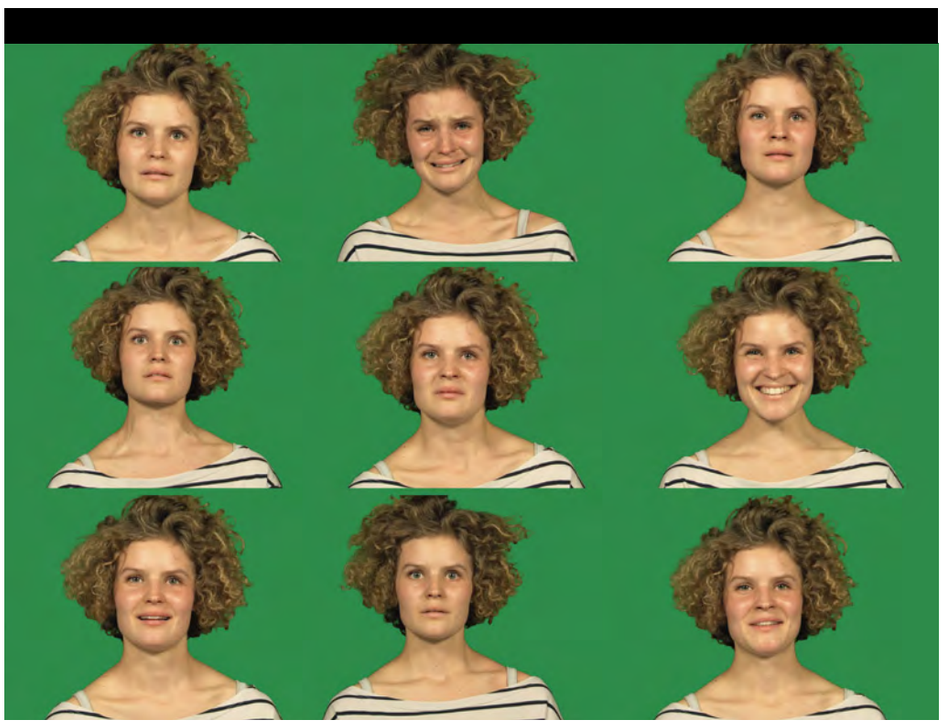
Crucial questions for the professional actor and actress on the forensic search for tiny signs, markings revealing the fake, the seams, sutures, hems, the pixels, the face a stage more than a "mirror". If masking an emotion implies emotion regulation, does faking an emotion regulate facial expression? Diderot's answer to where do an actor's tears come from was "from his brain" (Diderot 1994). But the brain is a wide expanse with plenty of space on the surface, and access is best when lead by the subject.

How we are perceived does not always tally with that we are attempting to show, as Goffman highlighted in his landmark "The Presentation of Self in Everyday life" (Goffmann 1959). The gap in reception between performer and spectator, which occurs in real life as much as in theatrical performance, underpins our interest in the artistic modelling

of the actor's alienation through an "avatarisation" of his or her face. How using different acting techniques can generate expertise in characterizing a virtual avatar. Results from the "Actor and Avatar" project show that, at least for fearful emotions, the brain's reaction to avatars and actors can be differentiated by fMRI (see Kegel et al. 2020) or EEG (see Sollfrank et al. 2021). Of potential clinical relevance, this differential response is modulated by an observer's history of temporal lobe epileptic seizures.

To fill this gap we miss a database with high-resolution video recordings of many professional actresses and actors taking diversity and demographic aspects into account, and possibly a number of acting students and non-professionals to compare the different levels of expertise, especially in producing complex emotions and the associated physiological processes.

The project should leverage knowledge and corresponding predictions about the relationships between emotions and ANS-mediated physiology. For instance, intense fear in the face of proximal danger increases sympathetic tone, inducing pupil dilatation and a pale face, while pleasure in a safe environment increases parasympathetic tone, inducing pupil contractions and making the face redder due to the influx of capillary blood in the skin. Moreover, some emotional states may induce a combination of increased sympathetic and parasympathetic tone, as in anger, where the heart rate can increase while the face becomes redder. These relationships enable defining conditions having diverse possible associations and dissociations, in which the musculoskeletal and ANS-related facial features corresponding to a given target emotion may be consistent, inconsistent, opposite or disconnected (cf. Tisserand/Aylett/Mortillaro/Rudrauf 2020).



STILLS FROM TEST RECORDINGS WITH STUDENT ACTRESS ALEXANDRA HUSS.
ZURICH UNIVERSITY OF THE ARTS, 5 FEBRUARY 2020.

To study the differential role of musculoskeletal and ANS-related parameters in the recognition of facial expressions of enacted emotional states and to focus on the role of consistent versus inconsistent musculoskeletal versus ANS-related parameters, relating to different degrees of hiding of emotional states in facial expressions, as often involved in social contexts; but also to analyse how changes in acting are linked to self-reported empathy. One should create an inventory of expressions (behaviour, signals) with repetitions and variations; to capture the complex visual signals involved in the physiological processes needed to express emotions and to ask whether actors can actually change their physiology and how human express these reliable "mussels", i.e. signals. To produce such a database with enough context information would include actor rehearsals, recordings and interviews, pursued along a script for the recording sessions and discussed with acting experts from the academic and collegial community in focus groups. The participating actors would perform to generate a set of typical emotional states (emotion factor), starting from a neutral face with increasing intensity (intensity factor), retaining a minimum of five to a maximum of nine target emotional states, depending on

time constraints related to actor availability and to successfully inducing emotional states. They would act basic and mixed emotions based on a fixed scenario. Samples and sessions would be recorded on high resolution video. If texts are needed, they would be based either on "pseudo-sentences", representing word emphasis with possibilities for voice modulation ("Kem bes belàm tebùl nikalibàm folìd…") or on so called vocalizations ("aah" sounds).

The professionals would perform along a catalog of keywords, triggers and imagination-helpers and evaluate their acting by completing a short questionnaire after each performance and a longer version following their session. The questionnaire would be developed on standardized measurements of empathy at the end of their session with questions and topics about the acting process such as: Did you feel "hot or cold"? Could you describe your body sensations connected to each emotional state? While watching the recorded expression (at the end of the session): Describe the method used regarding each emotion, condition and level of intensity? What were you thinking (e.g. mental imagery)?

Given the complex and demanding research design, a contingency plan could argue if actors do not succeed in independently and systematically controlling their ANS-related facial features, one can focus on mixed and contradictory emotions: e.g. trying to play nice by smiling when feeling deeply scared or sad, which might be easier to enact. Thus, for instance, actors' musculoskeletal facial features would express joy, while their ANS-related features would express distress (high pupil dilatation, paleness, tears). And if actors would not succeed in producing ANS-related facial features which would be sufficiently intense to be clearly discriminated, one could use image processing and virtual avatar manipulations to enhance their appearance and evaluate the extent to which, even under such artificial manipulations, ANS-related features may contribute to attributing emotional states to others.

This setup could lead to probable answers on how do avatars (i.e. digital masks) differ from realistic pictures and possibly influence the reception of (acted) emotions? Can the perceived emotional state attributed to avatars be manipulated based on ANS-related parameters? Can the specific practical knowledge of actors help to explain these processes?

- Does the method enacted or the recording distance etc. influence the degree of intimacy?
- Can the influence of instructions be measured and verified for specific scenes or actings?
- Are some acting methods more supportive to this kind of task than others?

The project could generate a unique database of stimuli that could be shared with different communities and contribute to other research in many fields. Performing emotions can be regarded as a dynamic neuropsychological and -physiological process. Actors are normally not aware of these processes and scientific reflections or even too much thinking can hinder simulating social interactions on stage or in front of a camera. The documentation and publication of such recordings could fill a gap by investigating interindividual similarity, comparing the measured data and clustering analyses to distinguish response patterns during acting; thematically, this would address the disciplinary and cross-disciplinary emphases of such a project: acting, programming and psychology.

Three perspectives and disciplines that would develop tools for experiencing complex emotions in production and reception, but also verifying and possibly establishing tools for falsifyingexpressions on screens. This study would likely foster a debate on acting traditions, bring together experts from various (applied and theoretical) sciences to discuss a core yet implicit topic and create deeper understanding of acting through comparison.

Last but not least, this research project on the relative contribution of acting and of musculoskeletal and physiological facial parameters to the perception and recognition of emotional states emotional states in others has not been done yet.

Is it not monstrous that this player here,
But in a fiction, in a dream of passion,
Could force his soul so to his own conceit
That from her working all his visage wanned,
Tears in his eyes, distraction in his aspect,
A broken voice, and his whole function suiting
With forms to his conceit? And all for nothing —
For Hecuba!

"Hamlet describes the physical consequences of feeling. The player's body is transformed by his passion, his intense emotion. (...) It is all a game, all pretend. But the tears are real." *(Taylor and Bouros 2016)*

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