

Learning to Recognize Facial Emotions: Psychologists vs. Artists

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Outline

- **Facial expressions**
 - What is meant by “understanding a face”
- **Two specific learning approaches**
 - METT/SETT and DrawTheFeeling
- **Methods of comparing two approaches**
 - Emotion research, learning theory, etc
- **Symbolsys 210 course**
 - Course being offered next quarter

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Psychology Approach to Understanding Expressions

- **Seven universal emotions (Ekman & Freisen, 1971)**
 - Anger, happiness, surprise, fear, disgust, sadness, contempt
 - Have universal expression across cultures
 - Facial expressions are hardwired into the brain
- **Facial Action Coding System – (Ekman & Freisen, 1978)**
 - Relates muscular action to facial appearance
 - Provides a syntax for facial behavior
 - 43 independent facial muscles, approx 10,000 expressions

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Artist Approach to Understanding Expressions



Rembrandt
Self Portrait, 1661

Da Vinci
Mona Lisa, 1502

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Training Approach of Psychologists

- **METT/SETT (Paul Ekman, 2003-2006)**
 - Micro Expression Training Tool
 - Micro expressions in images occur for less than 40msec
 - Training uses classified images of faces
 - Subtle Expression Training Tool
 - Feature set variations are defined for each emotion
 - Happy 4, sad 10, surprise 6, fear 7, anger 7, disgust 4, contempt 2
 - Training and validation sets of faces

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METT/SETT Training Example Fear versus Surprise



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Training Approach of Artists

- **Draw the Feeling (Pam Davis Kivelson, 2005-07)**
 - Use of live models (engages attention & emotions)
 - Hand-eye-body process (engages neural circuitry)
 - Model holds pose (duration of facial expression)
 - Modify evolving sketch (short term memory)
 - DF drawing process is selective (critical features)

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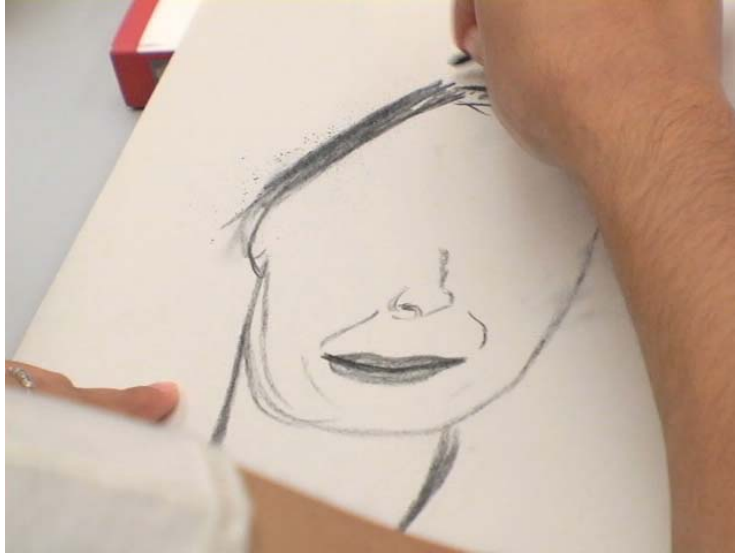
DF Model Posing a Sad Facial Expression



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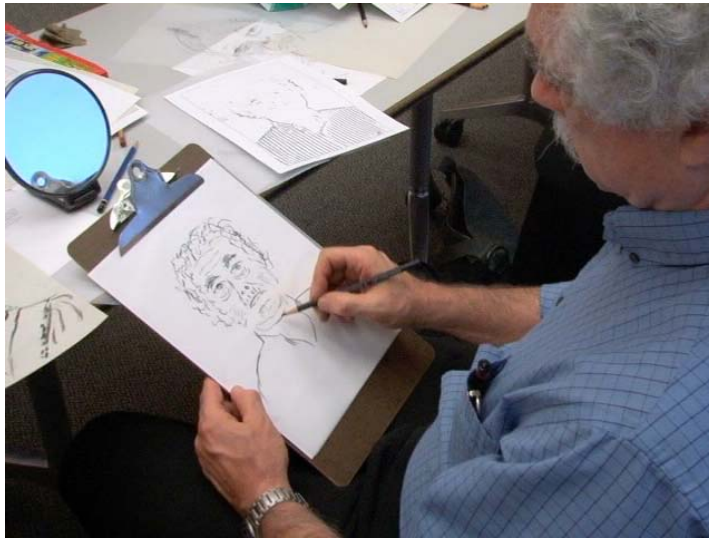
DF Facial Sketch in Progress



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Self Sketch and Feature-Extracted Head



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The “Draw the Feeling” Approach

- **Partial sketch sometimes given**
 - Less essential features: hair, neck, outline face, ...
- **Model poses a neutral interest expression**
 - eyes, lips, nose, eyebrows, lines around eyes, ...
- **Model poses universal emotions**
 - happy 4, sad 10, surprise 6, fear 7,
 - anger 7, disgust 4, contempt 2

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Comparison Dimensions

- **Stages of expression processing**
- **Degree of expression complexity**
- **Special subject populations**
- **Various learning dimensions**

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Comparison Dimensions

- **Stages of expression processing**
 - Recognition of facial emotion
 - Feeling an appropriate response
 - Expressing of appropriate response
- **Degrees of expression complexity**
 - Universal emotions
 - Other emotions
 - Personality and character

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Subject Populations

- **Age groups**
 - with verbal or non-verbal challenges
 - Elderly (slow parsing faces), young children
- **Learning disabilities**
 - Non-verbal: Aspergers, autism
- **Social settings**
 - Physician-patient
- **Cross-cultural**
 - Facial recognition differences

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Learning Theory

- **Modeling the facial expression training process**
 - Learning rate
 - Learning accuracy
 - Learning retention
 - Learning transfer
 - Speed of facial recognition

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Combining Two Approaches: METT/SETT and DF

- **Combination Approach**
 - Dividing training time between METT and DF
- **Human-Computer Interaction Approach**
 - Create immersive environment that supports both

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Learning Facial Emotions: Art versus Psychology *SymbSys 210*

- **Provides**
 - Training in METT/SETT and DrawTheFeeling
 - Opportunity to do research
- **Ideal student**
 - Has a course in learning, emotions, teaching, or HCI
 - Prerequisites: one of: Psych 161, CS 121 or 147, consent
 - Class size limited to 15 because of studio component
- **Main course requirement**
 - Term paper on a comparison measure
 - Example measures: mindfulness, learning retention, emotion regulation, disability subpopulation, age subpopulation, ...

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Summary and Conclusions

- **Psychologists and artists**
 - Have strong interest in facial expressions and emotions
 - Very different approaches to training
 - Open question as to relative effectiveness
 - SymbSys 210 course continues exploration



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