

## Advanced FACS Methodological Issues

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The 12th European Conference on Facial  
Expression  
University of Geneva, Switzerland

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### Topics for Workshop I

- Events & Training
  - (Eva & Doris, Workshop II)
- Reliability
- Coding Challenges
- Computer Assisted Coding
- Working Toward Standard/Best Practices

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### Key Issues For Reliability

- Show that coders agree enough to allow you to address your research questions with FACS.
  - FACS Certification necessary but not sufficient
- Reliability an issue from the beginning
- What and When

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### Reliability: *What?*

- AUs
- Timing
- Intensity
- Events/ AU combinations
- Emotion categories

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### Reliability: *When?*

- Consistent with respect to number or duration of occurrences between subjects?
  - Pearson or intra-class correlation
  - Second best practice?
- In agreement on *when* things occur in time within subjects
  - % and Kappa?
  - Best practice
  - What we will talk about today

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### Approaches to Reliability

- Inter-coder Agreement
- *Agreement Index* from the FACS Manual Investigator's Guide:
  - For any two FACS descriptions of the same event:  
$$\frac{(\text{Number of AUs on which Coder 1 \& Coder 2 agreed}) \times 2}{(\text{Total number of AUs scored by Coder 1 and Coder 2})}$$

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## Agreement Index Approach

- Pros and cons
  - Widely used and easy
  - Restricted notion of reliability
    - AU presence/absence
    - Better: Calculate reliability on the features of interest, e.g., onset, offset, peak, . . .
  - The difference between typical agreement  $[A/(A+D)]$  and FACS formula  $[2A/(A+D)]$ .
    - # of agreements vs. # of individual codes in agreement
  - Fails to consider chance agreement between coders

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## Kappa

- Kappa accounts for chance agreement
  - $(O-E)/(1-E)$
  - More flexible
  - Weighted Kappa for use with intensity coding
  - Other chance corrected measures
  - No magic bullets

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## Reliability on Features of Interest

- What do you intend to analyze?
  - Apex
    - peaks
    - multiple peaks
  - Timing
    - Onsets and offsets
    - Duration
  - Intensity and changes in intensity
  - AU combinations/events
  - Emotion categories

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### Choice of coding approach has implications for reliability

- Coding dynamics of AUs versus coding events
- Reconstructing events from peaks
  - For reliability checks
  - For emotion interpretations

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	Stephen	Tony	Master	Brandon	Erika	Stephen	Tony
	P12		P12			12	
	P18		P18				
			P26	18	18	18 + 26	18
P18			P26				
			P18				
			P17				
	P24		P17	12 + 17	12	12 + 17 + 24	12 + 17
P12			P12				
			P17				
			P12				
	P7		P7		7	7	
P7							
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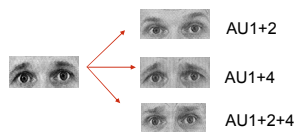
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### Reliability Issues in (Automated) Coding

- Closed set
  - Specific AUs
    - Easier
- VS
- Open set
  - Any/All AUs
    - Harder




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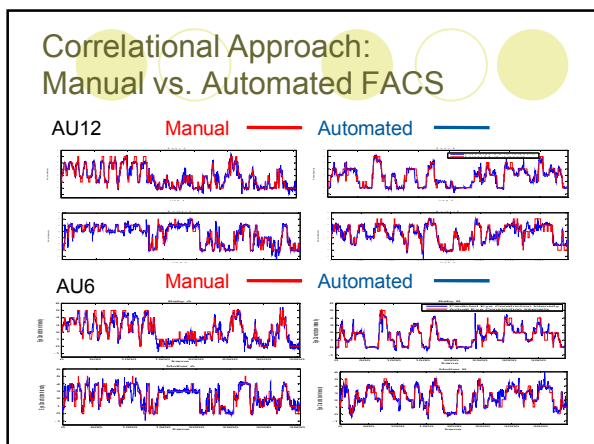
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### Resources on FACS Reliability

- Sayette, M. A., Cohn, J. F., Wertz, J. M., Perrott, M. A., & Parrott, D. J. (2001). A psychometric evaluation of the Facial Action Coding System for assessing spontaneous expression. *Journal of Nonverbal Behavior*, 25, 167-186.
  - [http://www.pitt.edu/~jeffcjohn/biblio/fulltext/2001/Sayette\\_Psychometric.pdf](http://www.pitt.edu/~jeffcjohn/biblio/fulltext/2001/Sayette_Psychometric.pdf)
- Shareware for reliability - *ICompare*

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### Coding Challenges/Reliability Challenges

- Subtle AUs
  - quick and slow:
    - Locating in time
  - Implications for reliability
    - Conservative coding
- Background events
  - Coding timing of each AU helps with this problem
- Coding during speech
  - Parsing speech movements from "other" movements

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## Computer Assisted Coding

- Benefits
- Shareware programs
  - Icode
  - DFACS
  - Continuous Measurement System (CMS)
- Commercial packages
  - Noldus Observer
  - Mangold

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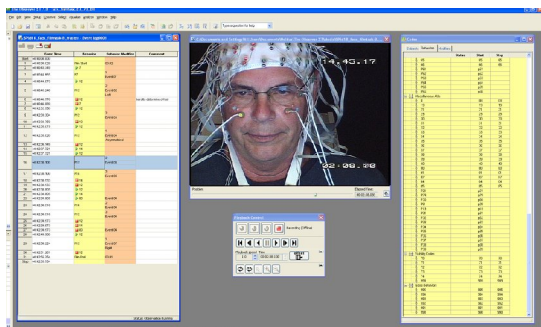
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## Noldus Observer




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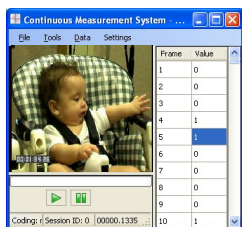
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## Continuous Measurement Software (CMS): Free Coding Software

<http://www.psy.miami.edu/faculty/dmessaging/dv/index.html>



- Easy Interface
- Frame-by-frame procession
- User-defined codes

Messaging, D.S., Cassel, T. Acosta, S., Ambadar, Z. Cohn, J. F. (2008). *Infant Smiling Dynamics and Perceived Positive Emotion*. Journal of Nonverbal Behavior, 32, 133-155. R21HD052062

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## Working Toward Standard/Best Practices

- Sharing method and resources

- methods

- approaches to reliability

- Resources

- data bases of coded video stimuli

- Kanade, T., Cohn, J. F., & Tian, Y. (2000). Comprehensive database for facial expression analysis. *Proceedings of the Fourth IEEE International Conference on Automatic Face and Gesture Recognition (FG'00)*, Grenoble, France, 46-53. [http://yasc.ri.cmu.edu/dsh/html/face/facial\\_expression/index.html](http://yasc.ri.cmu.edu/dsh/html/face/facial_expression/index.html)
- M. Pantic, M.F. Valstar, R. Rademaker and L. Maat. "Web-based Database for Facial Expression Analysis". Proc. IEEE Int'l Conf. Multimedia and Expo (ICME'06), Amsterdam, The Netherlands, July 2006. <http://www.mmfacesdb.com/>

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## Working Toward Standard/Best Practices

- Shared Resources

- Shareware (e.g., coding interfaces, reliability programs)

- Video databases and coded behavior: show us your faces!

- Updating the FACS Final Test

- Advanced Training

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