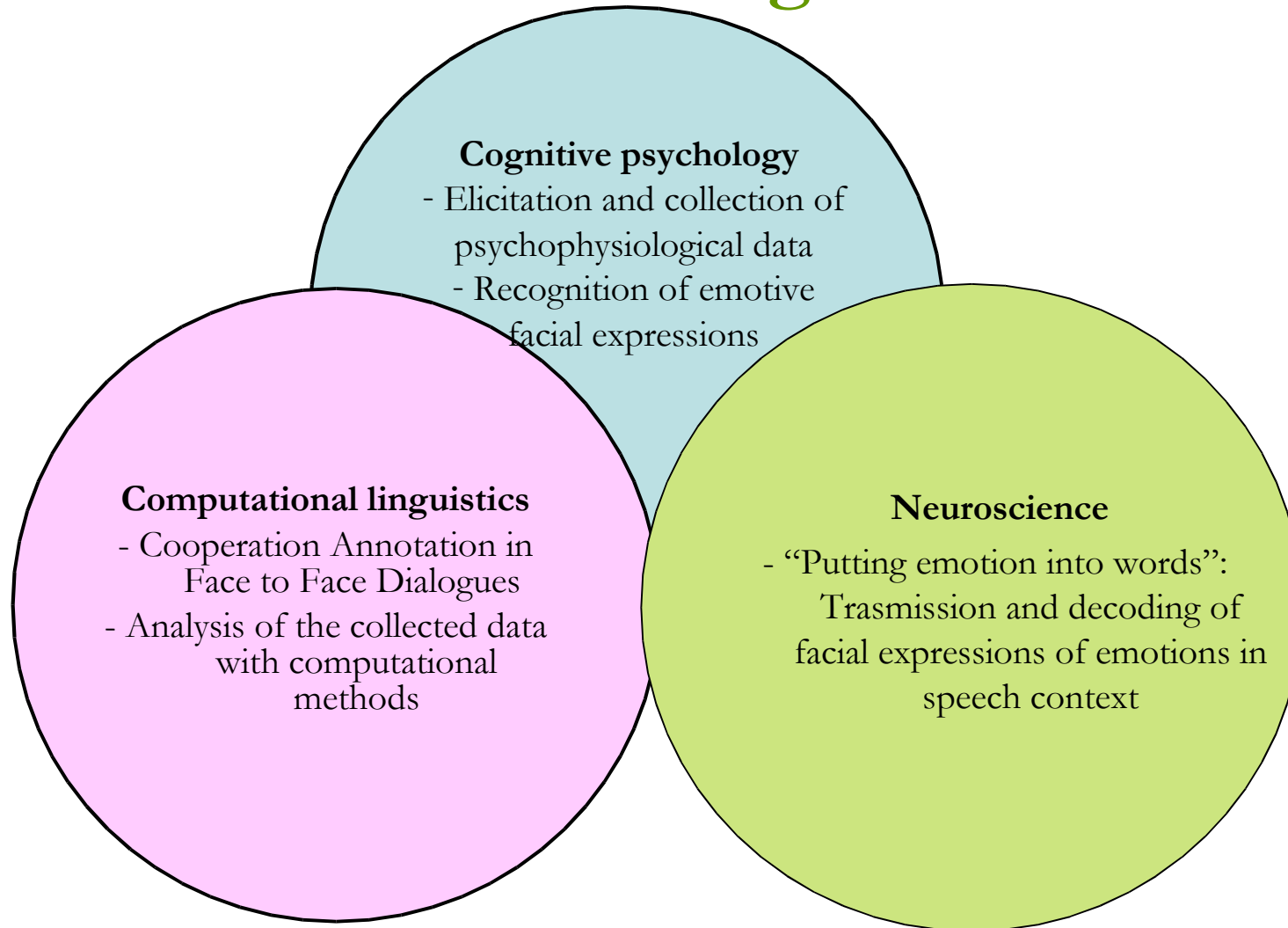
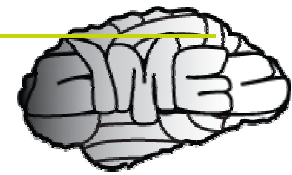


Annotation of Emotion and Cooperation in Dialogue Tasks

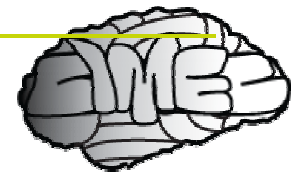
Federica Cavicchio, Massimo Poesio

CIMeC Università di Trento

Emotion and Cooperation in Dialogue



Research Question



- **HYPOTHESIS:** - negative emotion disrupts cooperation
- Seeing the other's face in interaction improves cooperation
 - **METHOD:** - use of an interactive cooperative task, the Map Task, to elicit cooperative behaviour
- elicitation of negative emotion (ex. anger) to elicit non cooperative behaviour
 - **EXPERIMENTAL CONDITIONS:**
 - Traditional Map Task
 - Modified (Giver or Follower Confederate) Map Task → elicitation of anger
 - Screen/short barrier condition (eye contact/no eye contact condition)
 - **RECORDED DATA:**
 - ECG, HR, GSR
 - Audio and video recording
-



Stazione degli autobus



vigneti



Maso Nichelini



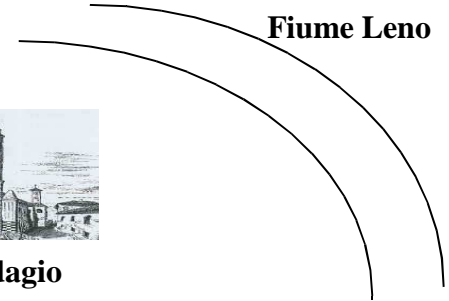
Monte Baffoni



vigneti



Chiesa dell'Adagio



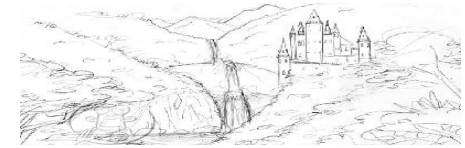
Fiume Leno



Monte Poldi



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Castello di Rovereto



Stazione degli autobus



Monte Zaffoni



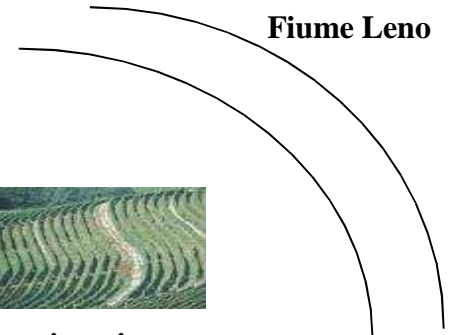
Monte Toldi



Maso Michelini



vigneti



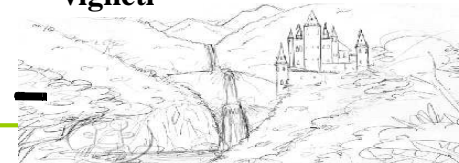
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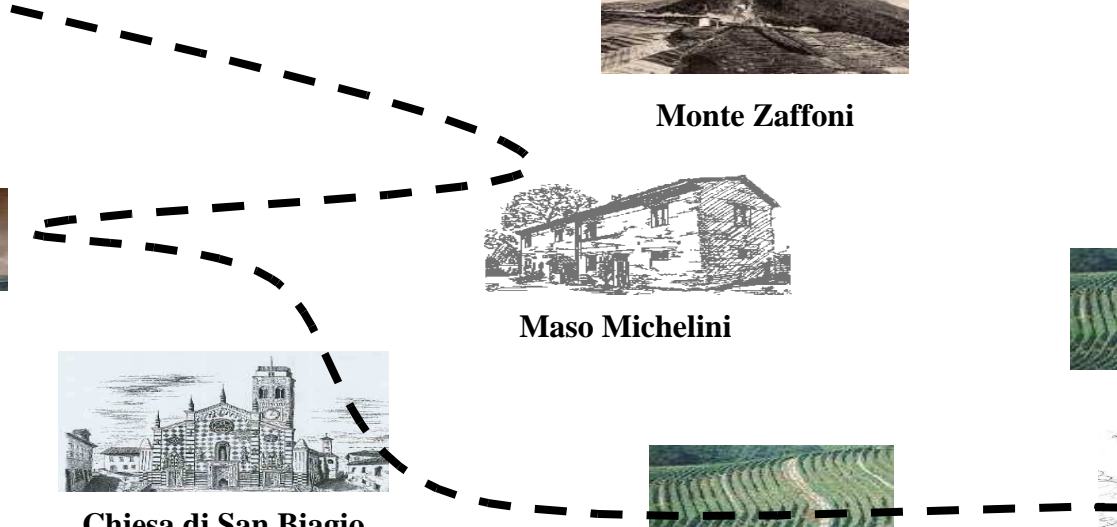
Chiesa di San Biagio



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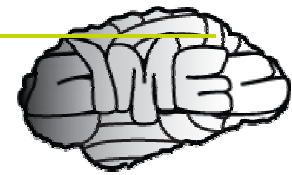


Castello di Rovereto



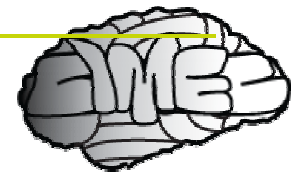
Rovereto Emotive Corpus

Description



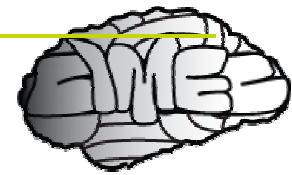
- Task lasts up to 15 mins
 - 32 dyadic interactions, 240 mins audio video and psychophysiological recordings
 - In the first part of the experiment we record participants baseline.
 - Then we record the psychophysiological outputs of task
-

Rovereto Emotive Corpus



Description

- The confederate at mins 5, 9 and 13 acts a script (negative emotion elicitation in giver)
 - *“You driving me in the wrong direction, try to be more accurate!”*
 - *“It’s still wrong, this can’t be your best, try harder! So, again, from where you stop”*
 - *“You’re obviously not good enough in giving instruction”*
 - The timing of emotion elicitation allow a full recovery of the psychophysiological state (Anderson et al., 2005)
 - Audiovisual and psychophysiological recordings are simultaneous
 - Participants describe the emotion they have felt during the task
-

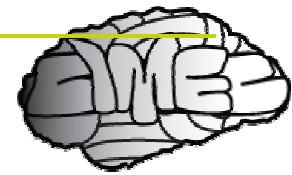


Cooperation in Dialogues

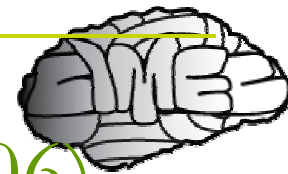
- Paul Grice (1975, 1989) describes the **cooperative principle**: how people interact is described in four maxims (quality, quantity, relevance, manner)
 - *"Make your contribution such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged."*
-

Cooperation in Dialogues

(Davies 2006 adapted)



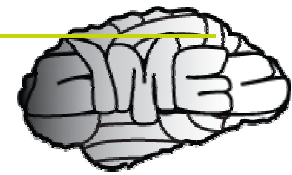
- Map task is considered a default cooperative task
 - In some Map Task recordings the “emotion factor” starts to be pointed out
 - Davies (2006, 2007) applies Gricean maxims in Map Task dialogue corpus computing cooperation
-



Computing Cooperation (Davies 2006)

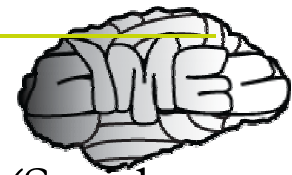
Cooperation level	Cooperation type
-2	No response to answer: breaks the maxims of quality, quantity and relevance
-2	No information add when required: breaks the maxims of quality, quantity and manner
-2	No turn giving, no check: breaks the maxims of quality, quantity and relevance
-1	Inappropriate reply (no giving info): breaks the maxims of quantity and relevance
0	Giving instruction: cooperation baseline, task demands
1	Question answering y/n: applies the maxims of quality and relevance
1	Repeating instruction: applies the maxims of quantity and manner
2	Question answering y/n + adding info: applies the maxims of quantity, quality and relevance
2	Checking the other understands (<i>ci sei? Capito?</i>): applies the maxims of quantity, quality and manner
2	Spontaneous info/description adding: applies the maxims of quantity, quality and manner

Emotion Annotation

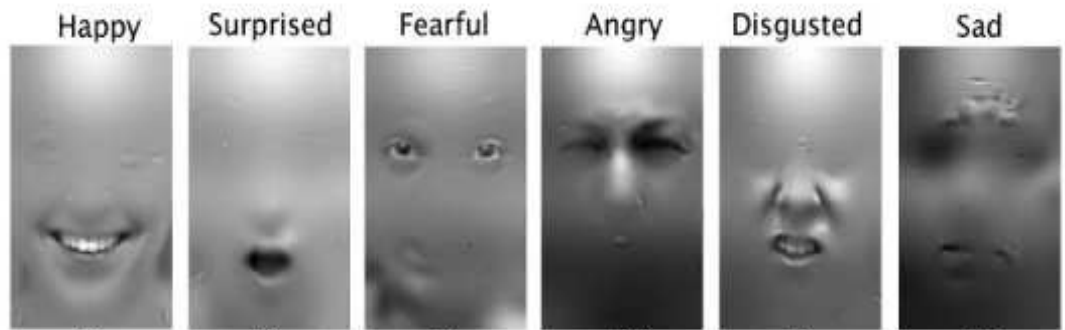


- We annotate emotive and non emotive markables to point out what happens to cooperation in normal task and when a negative emotion is induced
 - Problem → low kappa in emotion ratings (for a review Callejas and Lopez-Cozar, 2008)
 - 4 dimensions are needed to represent similarities and differences in the meaning of emotive words (Fontaine, Scherer 2007)
 - Expressions like pitch variations or facial expressions are components building up an emotion (arousal, evaluation, potency, unpredictability)
 - Unbiased hit rate (to avoid false alarms and biases in the use of response categories, specific for Non Verbal, Wagner 1994)
-

PCA Analysis of Emotions



- Human and Computer Emotion Recognition from Faces (Smith et al., 2005; Susskind et al., 2007)

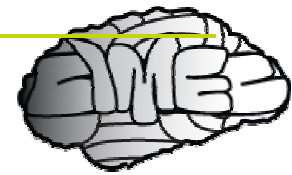


From Smith et al. 2005, *Psychological Science*

- Face (transmitter) sends expressions signals with a low correlation one another (upper *vs* lower)
 - Human filtering function decorrelates those signals in optimized inputs
 - Brain (decoder) responds to the inputs in different brain areas
 - Other statistical techniques (nNegative Matrix Factorization, Logistic Regression)
-

Emotive Facial Expression

Our Coding Scheme



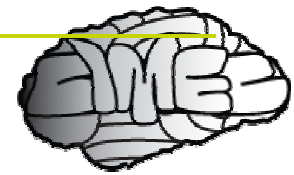
Mouth signals:

- **Open lips:** when the mouth is open, o
- **Closed lips:** when the mouth is closed, -
- **Corners up:** e.g. when smiling,); +) very happy ;
- **Corners down:** e.g. in a sad expression, (, +(very sad
- **Protruded:** when the lips are rounded, O

Eyebrow signals:

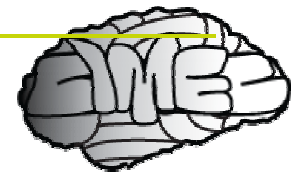
- **Normal shape:** when eyebrows are relaxed, --
 - **One eyebrow up:** 1up
 - **Eyebrows up:** up
 - **Eyebrows very up:** +up
 - **Eyebrows frowned:** fr
 - **Eyebrows very frowned:** +fr
-

Other Conversational and Emotional Indexes



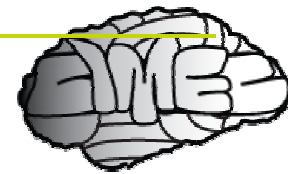
- Conversational turn management
 - Feedback (head nodding)
 - Gaze contact/ no gaze contact (even in full screen condition!)
-

Reliability of the Scheme



Kappa Agreement

- 6 annotators divided in two groups (screen vs. no screen conditions) analyzing 60 giver communicative turns
 - Fleiss Kappa is computed (the probability of an annotator classifies the markable m with a particular agreement level l chosen from a list)
 - Cooperation agreement (0.81) and upper/lower facial display (0.78 eyebrow, 0.83 gaze and 0.76 mouth)
-



Our Coding Scheme Implemented in ANVIL

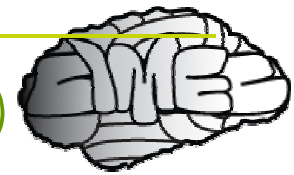
The screenshot displays the ANVIL software interface, which is used for analyzing video and speech data. The interface is divided into several windows:

- edit element:** A window for editing elements, showing a list of types such as "giving instruction", "repeating instruction", "checking instruction", "spontaneous info/description adding", "yes-answer", "no-answer", and "yes-answer + adding".
- Track: Speech analysis.Cooperation type:** A window showing the current specification and a timeline for the speech analysis track. The current specification is "its and Settings\if.cavicchio\Desktop\newset.xml" and the time is "00:00:08" (frame 2).
- Annotation: map task giver 1.anvil:** A large window showing a timeline of annotations. The timeline is divided into several sections: "Speech analysis", "Mouth movements analysis", "Pitch analysis", "Intensity analysis", "Right hand gesture analysis", "Left hand gesture analysis", and "Both hands gesture analysis". The "Speech analysis" section includes tracks for "Giver Transcription", "Follower Transcription", "Giver Transcription Eng", "Follower Transcription Eng", and "Cooperation type". The "Right hand gesture analysis" section includes tracks for "Signal description", "Gesture type", "Trajectory", "Repetition number", "Fluidity", and "Gesture Expansion".

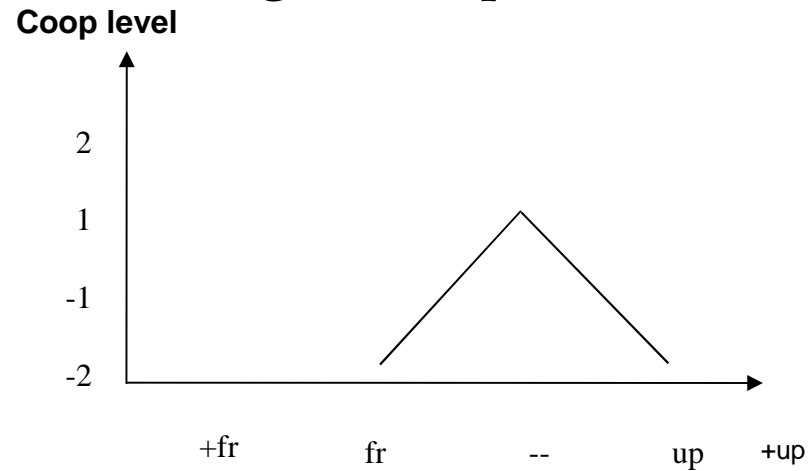
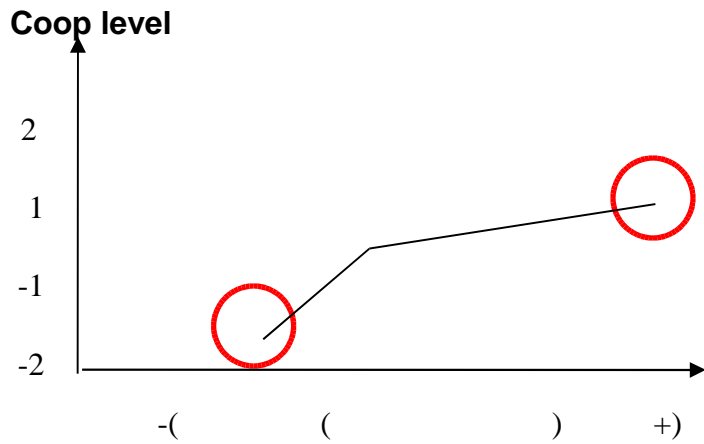
The main video window shows a person sitting at a table, interacting with a map. The person's face is obscured by a white circle. The video is playing, and the timeline shows the current time is 00:00:08.

Section	Track	Description
Speech analysis	Giver Transcription	esatto allora attraversi il quel vigneto
	Follower Transcription	
	Giver Transcription Eng	exactly so you cross the that vineyard
	Follower Transcription Eng	
	Cooperation type	
Right hand gesture analysis	Signal description	index and thumb in round shape / middle finger tracing a line between two poi. / pointing with middle finger to an object
	Gesture type	deictic / deictic / pointing
	Trajectory	
	Repetition number	
	Fluidity	
	Gesture Expansion	

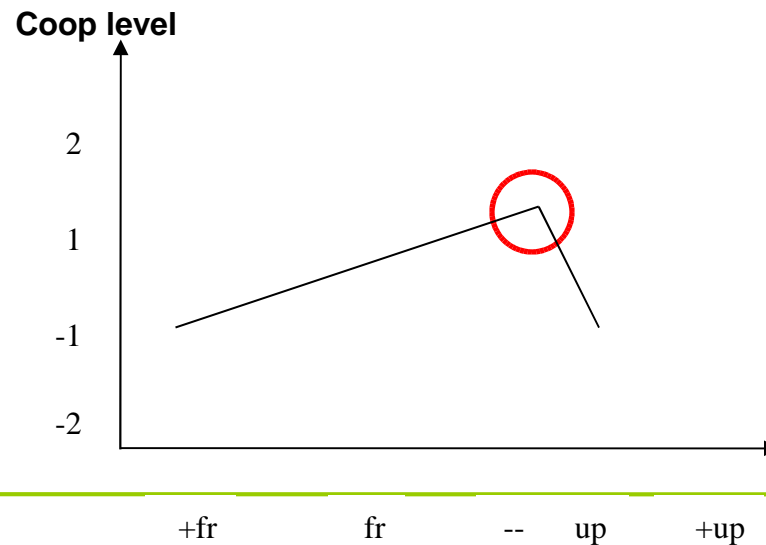
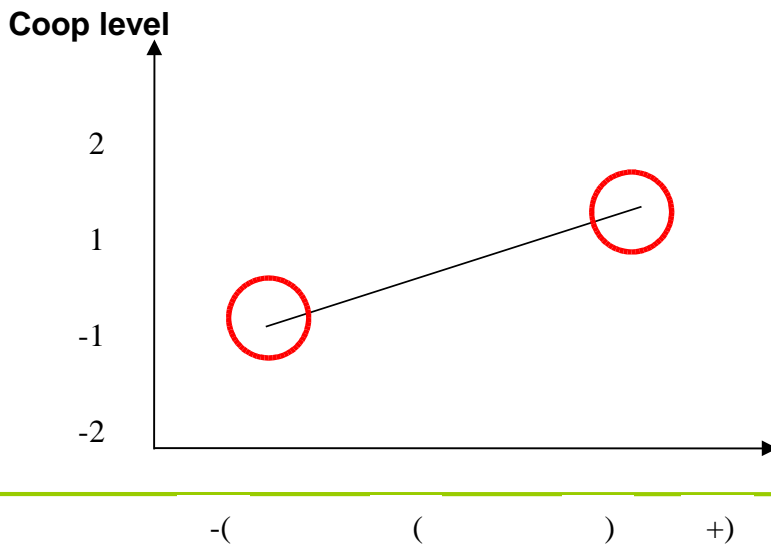
Face Data from Pilot (Follower Confederates)



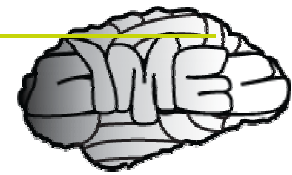
- Full screen condition: mouth configuration, frowning and cooperation:



- Short barrier condition: mouth configuration, frowning and cooperation:

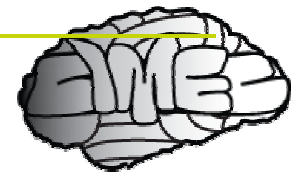


Future Investigations: Emotion and Linguistic Context



Feldman Barret et al., Trends in Cognitive Sciences, 2007

- Emotion words and conceptual contents help recognition of facial behaviour and emotion recognition (Feldman Barret et al., 2007)
- Investigate emotion recognition in the context of language: how language influences emotion perception and labelling?



Thanks for Your Attention
