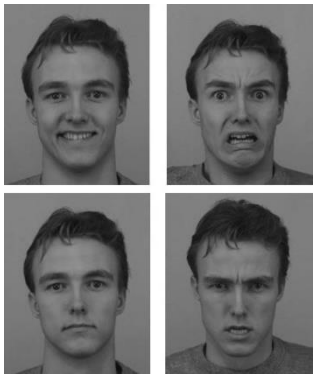
A 12-month research fellowship position will soon open at the University of Brescia (late November/early December 2024), with a monthly salary of approximately €1,429 (with the possibility of annual renewal), under the supervision of Prof. Giovanni Mirabella for a project titled:

"How do we respond to emotional stimuli in a virtual reality environment? A study of behavioral correlates and autonomic indices associated with the phenomenon of task-relevance of emotions"

PRIMARY RESEARCH QUESTION

How do we react to the sight of emotional stimuli? Despite the extensive research over the past 25 years, there is still no convincing answer to this question.



The prevailing theory suggests that emotional stimuli trigger automatic, fixed responses in the observer. However, recent studies conducted in my lab, in collaboration with colleagues from Parma and Trieste, reveal something more surprising: in healthy individuals, emotional stimuli influence motor behavior only when they are relevant to the observer's goals (Calbi et al., 2022; Mancini et al., 2020, 2022; Mirabella, 2018; Mirabella et al., 2024a; Mirabella et al., 2023; Mirabella et al., 2024b; Montalti and Mirabella, 2023, 2024). In other words, the positive or negative valence of a stimulus, such as a facial expression, only has an effect if the observer needs to respond to that face based on whether or not it expresses an emotion. If, on the other hand, the observer, while seeing the same images, needs to act based on the person's gender, the emotional valence effect disappears (a phenomenon known as task relevance). Learn more in this short cartoon: ***https://www.youtube.com/watch?v=0OJ0xYwRjds***.

The main limitation of these studies is that they used static stimuli, which are not ecologically valid by nature. It is therefore essential to repeat these experiments using more realistic stimuli.

CONCISE SUMMARY OF THE RESEARCH PROGRAM

For the first time, experiments will be conducted in an immersive virtual reality environment where subjects will interact with avatars, providing a level of realism that closely resembles everyday life. Eye movements will be tracked to observe where subjects focus their attention, and autonomic measures (such as heart rate and perspiration) will be recorded simultaneously. These autonomic indicators will provide essential data regarding stimulus arousal (the second dimension of emotional stimuli). Evaluating arousal will allow us to determine if, and to what extent, the observed effects in experimental tasks are dependent solely on valence. Together,

these data will offer crucial evidence to empirically support theories that suggest responses to emotional stimuli depend on the appraisal the observer makes in relation to the context and their motivations (Moors and Fischer, 2019; Scherer and Moors, 2019).

REQUIRED ACTIVITIES FOR THE COLLABORATOR

Programming the presentation of stimuli using common psychophysics software (e.g., OpenSesame, E-Prime, Presentation). Operating the virtual reality system. Collecting data from healthy subjects. Processing the collected data (using Matlab, R, or SPSS) and creating graphs to illustrate the results. Conducting literature reviews on the research topic and writing articles for peer-reviewed international journals.

CANDIDATE REQUIREMENTS

a) **Required Qualification**: A master's degree in neuroscience-related fields (psychology, medicine, neurobiology, neuroscience) or in bioengineering-related areas, or an equivalent qualification obtained abroad.

b) **Preferred Qualification:** A PhD in neuroscience-related fields (psychiatry, neurology, experimental psychology) or in bioengineering-related areas, or an equivalent qualification obtained abroad.

c) **Preferred Professional Skills for the Collaboration:**

1. Proficiency in Office Suite (Word, Excel) and statistical packages (SPSS, R, and JASP).
2. Experience with vector graphics software (Corel Draw, Adobe Photoshop).
3. Knowledge of programming languages for data analysis (e.g., Matlab, Python).
4. Knowledge of programming languages for psychophysical stimulus presentation control (e.g., OpenSesame, E-Prime, Presentation) and/or for designing virtual reality systems.
5. Ability to administer psychophysical tests to healthy subjects and to psychiatric or neurological patients.
6. Proficiency in English.

d) **Interpersonal Skills:** Ability to interact appropriately with other lab members to foster a positive and collaborative work environment.

If interested, please contact me at: giovanni.mirabella@unibs.it

Referenze

Calbi, M., Montalti, M., Pederzani, C., Arcuri, E., Umiltà, M.A., Gallese, V., Mirabella, G., 2022. Emotional body postures affect inhibitory control only when task-relevant. Front. Psychol. 13, 1035328.

Mancini, C., Falciati, L., Maioli, C., Mirabella, G., 2020. Threatening Facial Expressions Impact Goal-Directed Actions Only if Task-Relevant. Brain Sci 10, 794.

Mancini, C., Falciati, L., Maioli, C., Mirabella, G., 2022. Happy facial expressions impair inhibitory control with respect to fearful facial expressions but only when task-relevant. Emotion 22, 142-152.

Mirabella, G., 2018. The Weight of Emotions in Decision-Making: How Fearful and Happy Facial Stimuli Modulate Action Readiness of Goal-Directed Actions. Front. Psychol. 9, 1334.

Mirabella, G., Grassi, M., Bernardis, P., 2024a. The role of task relevance in saccadic responses to facial expressions. Ann. N. Y. Acad. Sci. 1540, 324-337.
Mirabella, G., Grassi, M., Mezzarobba, S., Bernardis, P., 2023. Angry and happy expressions affect forward gait initiation only when task relevant. Emotion 23, 387-399.
Mirabella, G., Tullo, M.G., Sberna, G., Galati, G., 2024b. Context matters: task relevance shapes neural responses to emotional facial expressions. Sci. Rep. 14, 17859.
Montalti, M., Mirabella, G., 2023. Unveiling the influence of task-relevance of emotional faces on behavioral reactions in a multi-face context using a novel Flanker-Go/No-go task. Sci. Rep. 13, 20183.
Montalti, M., Mirabella, G., 2024. Investigating the impact of surgical masks on behavioral reactions to facial emotions in the COVID-19 era. Front. Psychol. 15, 1359075.
Moors, A., Fischer, M., 2019. Demystifying the role of emotion in behaviour: toward a goal-directed account. Cogn. Emot. 33, 94-100.
Scherer, K.R., Moors, A., 2019. The Emotion Process: Event Appraisal and Component Differentiation. Annu. Rev. Psychol. 70, 719-745.