UNIVERSITÀ DI TRENTO

Dipartimento di Psicologia e Scienze Cognitive

PHD OPEN DAY 2021

Doctoral course in Cognitive Science

21st June 2021

Palazzo Piomarta, Corso Bettini 84 - Rovereto

PHD OPEN DAY 2021

DOCTORAL COURSE IN COGNITIVE SCIENCE

University of Trento
21st June 2021
Palazzo Fedrigotti, Corso Bettini, 31, Rovereto

If you are considering applying for a PhD, the Open Day is an excellent opportunity to know more about the course program and the research opportunities within the PhD in Cognitive Science at the University of Trento.

Main Contents

The PhD Open Day includes:

(1) flash talks by current PhD students
(2) meetings with our current students
(3) opportunities to learn more about the lines of research within the PhD program and contacts with both PhD students and potential supervisors
(4) information about fundings, entry requirement and career perspective of the PhD
(5) tips and advice on how to get through the application and selection process

Information and Useful Links

Attendance is free of charge and registration is required:

PhD Open Day Website
PhD areas and courses
PhD application

For further information: phd.dipsco@unitn.it

Event Timetable

9:00	Welcome and today's program
	Flash Talks
9:45	First Session (3 parallel rooms)
10:30	Coffee Break
10:40	Second Session (3 parallel rooms)
11:25	Coffee Break
11:35	Third Session (2 parallel rooms)
12:20	Lunch Break
14:30	PhD in numbers
14:50	PhD tips and facilities
15:10	Coffee break
15:30	PhD Life: Q&A*

*During the Q&A sessions most PhD students will be available in presence and/or online to chat with you and answer your questions. If you wish to meet them online, you should contact them at their email address before the end of the event. You will receive a Zoom link via mail. You can find the email address on their Abstract page.

Flash Talks Program

Flash talks by PhD students will be divided in three sessions. During each sessions there will be three parallel rooms in which talks will be given simultaneously.

First Session
9:45 – 10:30

Room A: *Decision making, Visual Search and Replicability Crisis*

Room B: *Social Mind*

Room C: *Autism Spectrum Disorder*

Second Session
10:40 – 11:25

Room A: *Parenting*

Room B: *Psycholinguistics and Computational Linguistics*

Room C: *Consciousness, Creativity and Meditation*

Third Session
11:35 – 12:20

Room A: *Gamification*

Room B: *Emotions and Personalities*

First Session

Room A

Decision making, Visual Search and Replicability Crisis

Nicola Vasta - A strategy-based approach to measuring and training Executive Functions

Giulia Priolo - Normatively Irrelevant Affective Cues Affect Risk-Taking under Uncertainty: a physiological study

Paolo Frugarello - Those who hear find: cross-modal interactions on the visual search of threat

Francesca Freuli - The domino effect in psychological sciences: statistical strategies for identification and correction

A strategy-based approach to measuring and training Executive Functions

Nicola Vasta nicola.vasta@unitn.it

XXXVI cycle (Tutor: Claudio Mulatti)

Is it possible to accurately measure and train Executive Functions? Executive Functions (EFs) are a family of top-down cognitive processes we resort to when we have to concentrate and pay attention to reach a goal, while ignoring other distractions [1]. Although EFs are thought to be composed of several cognitive processes, currently there is no complete agreement on what these processes are, which makes measuring these functions much more challenging [2]. In addition, recent literature has shown that training of EFs is not truly effective. Particularly, it seems that EFs training effects do not usually generalize to domains different than those trained [3].

The aim of the present research project is twofold: a) new methods to assess EFs performance will be explored and b) new empirically driven training strategies will be developed and tested. From the point of view of the present project, it seems reasonable to think that people need to apply some useful strategies for maintaining correct goals and ignoring distractions. Similarly, it seems possible that people are able to learn and develop novel cognitive routines that control the sequence of cognitive processes required to perform different tasks [4]. Hence comes the goal of focusing on the assessment of strategies and cognitive routines to investigate EFs further, with the final aim of developing a tool capable of measuring and training them. By fulfilling this goal, the present project could make a crucial contribution to the study of EFs.

The first experiment will try to investigate the impact of inter-individual strategies on the performance in some cognitive tasks that are supposed to rely on EFs (two variants of Stroop task, a Go-Nogo and a Wisconsin Card Sorting Task). Tasks will be computerized and will be conducted remotely. Both reaction times and accuracy will be analysed to determine performance. The goal is to establish the extent to which subjects' inter-individual strategies impact on these tasks. Insights from this experiment will be used for planning further experiments.

Keywords: executive functions, reaction times, cognitive control, behavioural measures, strategies

References: [1] Diamond, A. Annu Rev Psychol, 2013, 64, 135-168; [2] Gratton, G., Cooper, P., Fabiani, M., Carter, C. S., & Karayanidis, F. Psychophysiology, 2018, 55(3); [3] Foster, J. L., Harrison, T. L., Hicks, K. L., Draheim, C. J Exp Psychol Learn Mem Cogn, 2017, 43(11), 1677; [4] Gathercole, S. E., Dunning, D. L., Holmes, J., & Norris, D. J Mem Lang, 2019, 105, 19-42

Normatively Irrelevant Affective Cues Affect Risk-Taking under Uncertainty: a physiological study

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XXXIV cycle (Tutor: Nicolao Bonini, Department of Economics and Management)

Being able to distinguish between safe and risky options is paramount in making functional choices. However, deliberate manipulation of decision-makers emotions can lead to risky behaviors. My Ph.D. project aims at understanding how affective reactions driven by normatively irrelevant affective cues can interfere with risk-taking. In two studies Good (i.e. advantageous/safe) and Bad (i.e., disadvantageous/risky) decks of the Iowa Gambling Task [1] have been manipulated to make them unpleasant through a negative auditory (Study 1) and a visual (Study 2) manipulation. Anticipatory skin conductance response (SCR), heart rate variability (HRV) and pupil dilation (Study 2) have been investigated in line with the Somatic Marker Hypothesis [2] as indexes of autonomic activation. Results from Study 1 (N=147) showed fewer selections from Good decks when they were negatively manipulated (i.e., Incongruent condition). No effect of the manipulation was detected when Bad decks were negatively manipulated (i.e., Congruent condition). This means that participants' choices in the Incongruent condition were systematically riskier than those of participants in the other two conditions. Higher anticipatory SCR was associated with Bad decks in Congruent condition. Slower heart rate was found before selections from Good decks in Control and Congruent condition and from Bad decks in Incongruent condition. Differences in heart rate between Bad and Good decks were also detected in Congruent condition. Preliminary analyses from Study 2 (N=140) which entails a negative disgusting visual manipulation confirm Study 1 trends. These findings show that the exploitation of affective reactions through the deliberative manipulation of affective cues of stimuli to guide decision-making can sometimes be misleading, as previously suggested [2,3,4]. It is therefore important to make decision-makers aware of this affective interference in their daily choices.

Keywords: decision-making, behavioural economics, risk-taking, somatic marker hypothesis, psychophysiology

References: [1] Bechara, A.; Damasio, A.R.; Damasio, H.; Anderson, S.W. Insensitivity to Future Consequences Following Damage to Human Prefrontal Cortex. Cognition 1994, 50, 7–15; [2] Bechara, A.; Damasio, A.R. The Somatic Marker Hypothesis: A Neural Theory of Economic Decision. Games Econ. Behav. 2005, 52, 336–372; [3] Slovic, P.; Finucane, M.L.; Peters, E.; MacGregor, D.G. Risk as Analysis and Risk as Feelings: Some Thoughts about Affect,Reason, Risk, and Rationality. Risk Anal. 2004, 24, 311–322; [4] Slovic, P.; Finucane, M.; Peters, E.; MacGregor, D.G. Rational Actors or Rational Fools: Implications of the Affect Heuristic for behavioural Economics. J. Socio-Econ. 2002, 31, 329–342

[1] This work has been done in collaboration with Marco D'Alessandro (Institute of Cognitive Sciences and Technologies, National Research Council, Rome), Andrea Bizzego (Department of Psychology and Cognitive Sciences, University of Trento), Laura Franchin (Department of Psychology and Cognitive Sciences, University of Trento) & Nicolao Bonini (Department of Economics and Management, University of Trento)

Those who hear find: cross-modal interactions on the visual search of threat

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XXXV cycle (Tutors: Remo Job, Elena Maria Rusconi)

Although humans have evolved to rapidly detect threats in the immediate visual environment, reliable recognition of threat items in X-ray images remains a demanding task. Objects are not as they appear in reality, they are not in their canonical position and some are unusual in daily life and therefore not known, since they lack important perceptual indices such as form, color, depth. Three image-based factors are claimed to influence X-ray detection performance [1]. Threat items can be more or less superimposed by other objects (effect of superposition). Since objects are often superimposed on each other in X-ray images, the degree of superposition can affect detection performance from the first two stages of visual object analysis [2]. Second, the number and type of other objects result in a lower detection probability (effect of visual complexity). Third, when objects are rotated away from the canonical view, they usually become more difficult to be recognized (effect of viewpoint)[3].
In addition to this, individual differences have been shown to interact with X-ray detection performance, since large differences is found in detection performance between screeners and novices, hence performance is not only determined by visual abilities but also by visual knowledge [1,3].
This research is therefore concerned with how to improve the process of perception in conditions of visual crowding or whenever objects are not fully recognizable.
Thus far, the literature has mainly reported benefits from crossmodal integration [4] in visual detection, though, there appear to be a shortage of studies on the influence of crossmodal interaction in the recognition of threats from objects.
Information processing in one sensory modality can be enhanced (or attenuated) by concurrent stimulation of another modality; when information in the two modalities is reliably associated, activity is enhanced in both systems regardless of which modality is task relevant. The enhancement is manifested at a behavioural level in the improvement of sensitivity in detecting a visual target [4,5], in shorter response times (RTs) and higher accuracy in response to a single sensory input. Here, we focus on interactions between vision and hearing in humans, aiming at investigate whether crossmodal interactions can lead to enhancement of visual perception when stimulus characteristics are particularly challenging.
Our investigation carries a potential applicative value in addition to that of expanding our basic knowledge of the mechanisms of visual perception.

Keywords: threat visual detection, X-ray images, visual complexity, crossmodal integration

References: [1] Schwaninger, Airport, 2003, 01, 22-23. [2] Marr, MIT press, 1982. [3] Schwaninger, Eds., Bern: Huber, 2004. [4] Calvert et al., MIT Press, 2004. [5] Frassinetti et al., Experimental Brain Research, 2002, 332-343

The domino effect in psychological sciences: statistical strategies for identification and correction

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XXXV cycle (Tutor: Luigi Lombardi)

The terminology of "*replicability crisis*" refers to the current crisis that all sciences, including psychology, are experiencing. Like a kind of scientific domino effect, the non-replicability of an increasing number of studies has led to the potential unreliability of their results and the future studies based on them [1]. The development and persistence of this crisis in part stem from some behaviours, called *Researcher Degrees of Freedom* (RDF) or *Questionable Research Practices* (QRPs), implemented by researchers to increase the probability of obtaining a significant result and, thus, the number of publications. One of the most common QRP is called questionable *interim analysis* [2]. In this regard, several analyses are carried out by the researcher during the data collection phase, adding, between the analysis sessions, a variable number of participants. This recruiting and analysis "cycle" ends only when a significant result is observed, increasing the likelihood to observe a false positive result [3].

In this work, we present a new probabilistic model to characterize the evidence that a statistically significant result is caused by the application of questionable interim analyses (which does not correct the p-value as a function of multiple analyses). This model uses convolution functions to reproduce the density curves obtained through questionable interim analysis. Comparing these curves with those obtained by the simulation model allows us to validate our analytical model.

The results show good consistency between the density curves obtained by the two methods and very good accuracy of the information provided (Jaccard indices between 0.9 and 1). Following additional validation checks, the application of the model in the literature could lead to greater control of the reliability of reported (already published) results.

Keywords: questionable research practices, interim analysis, replicability crisis

References: [1] Baker, Monya. Nature News. 2016. 533,7604. 452; [2] John, Leslie K., George Loewenstein, and Drazen Prelec. Psychol. Sci. 2012. 23,5 524-532; [3] Simmons, Joseph P., Leif D. Nelson, and Uri Simonsohn. Psychol. Sci. 2011. 22,11. 1359-1366.

First Session

Room B

Social Mind

Daniela Ruzzante - The timeline of mentalization: implicit and neural evidence of the underlying process of mind perception

Andrea Scatolon - Reducing Economic Inequality is "Just Right": Moral Conviction Promotes Support for Redistribution

Giulia Gaggero - Perceptual and cognitive facets of alexithymia

The timeline of mentalization: implicit and neural evidence of the underlying process of mind perception

Daniela Ruzzante daniela.ruzzante@unitn.it

XXXVI cycle (Tutor: Jeroen Andre Filip Vaes)

Mentalization is a complex cognitive phenomenon that happens when we perceive and attribute mental states to others. The capacity to reason about other minds is fundamental for understanding, predicting or anticipating another's behaviour. The process of mentalization has been studied extensively in recent years [1, 2], however little is known about its underlying processes.

The aim of this project was to deepen the mechanism underneath while also exploring the possible timeline of the mentalization process. With this in mind, we conducted two different studies in which we measured both participants' electrophysiological activity and their implicit stereotypes towards ingroup vs outgroup. In study 1 participants analysed Black and White human and doll-like faces labelled as "Italian" and "African". In study 2 human and doll-like faces were all Caucasian that differed only on the FWHR (facial-width-to-height ratio) and were labelled as "Italian" and "Romanian". At the end of both experiments, participants were asked to complete an Implicit Mind Attribution Test (IMAT), a measure of participants' implicit associations with the same human faces presented in the EEG and mind vs. body attributes. The IAT has been extensively used to measure people's implicit stereotypes towards a variety of targets learned over time, thus it is a measure determined by the complex relationship between perceptual and contextual processes. Correlating early and later ERP components with this external criterium allowed us to have a confirmative measure that allowed us to identify when differences in mind attribution in any of the ERP components becomes observable in an implicit behavioural measure. Results of both studies showed two different phases in the time course of the mentalization process. An early ERP component (N170) indicated a first detection of a mind from a face thanks to visual information of mindful targets (vs mindless targets). A later ERP component (P300) was instead representative of the second stage of mentalization, in which the dynamic interplay of perceptual and contextual factors finalizes the whole process. To corroborate this hypothesized differentiation between early and later stages, a positive correlation between the P300 and the IMAT was found, while no correlation with the N170 emerged.

Therefore, the timeline of the whole mentalization process is defined by an initial moment of mind detection, in which visual cues establish the first inferences about other's people mind, and a second phase of mind attribution, where implicit knowledge's dynamically finalize the extraction of a mind from a face.

Keywords: mentalization, EEG, neural evidence, timeline

References: [1] Deska, Jason C., E. Paige Lloyd, and Kurt Hugenberg, JPSP, 2018, 114(1):75–94; [2] Waytz, Adam, John Cacioppo, and Nicholas Epley, Perspect. Psychol. Sci, 2010, 5(3):219–32

Reducing Economic Inequality is "Just Right": Moral Conviction Promotes Support for Redistribution

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XXXV cycle (Tutor: Maria Paola Paladino)

As of today, research on economic inequality mainly focused on status-quo legitimization [1], but rarely on factors potentially increasing support for redistribution. To fill this gap, the main aims of our research are to investigate whether attitudes towards the Reduction of Economic Inequality (REI) can be experienced with moral conviction (i.e. intuitively perceived as grounded in the fundamental distinction between right and wrong; [2]), and if so, whether this predicts support for governmental policies promoting redistribution.

Sampling was carried out online across 3 studies held in Italy, with most of the samples being comprised of young individuals in favor of REI. In Study 1 (N = 138), levels of REI moral conviction were comparable to other highly moralized topics (e.g. euthanasia), and higher than lowly moralized topics (e.g. tattoos). In Study 2 (N = 325), REI moral conviction positively predicted support for redistribution across several governmental policies (e.g. tax redistribution, allocation of public funds), also when controlling for gender and age. Data also showed that moral conviction and economic system justification represent distinct but related construct: adding the latter to our analyses did not lead to any substantial change in REI moral conviction effects on support for redistribution. Finally, explorative mediation analyses found no evidence on the role of moral outrage, but a partial mediation effect of empathic concern for low (but not high) class individuals. Study 3 (N = 271) was devised as a conceptual replication aimed at extending previous results by (a) both focusing on individual income (rather than family wealth) inequality, and (b) implementing separated alternative measures to better discriminate different system justifying beliefs (i.e. economic system rightfulness and causal attribution patterns related to poverty and wealth). By doing so, we found that REI moral conviction positively predicted support for redistribution over and above both control variables and economic system rightfulness, while structural (but not individualistic nor fatalistic) causal attribution (concerning both poverty and wealth) partially mediated this relation. Empathic concern mediation effects however were not replicated.

Altogether, this research shows the importance of moral conviction connected to the reduction of economic inequality in predicting redistribution support, while at the same time shedding new light on the interplay of additional factors (above all, the role of causal attribution). Considering people's personal and ingrained conceptions of what they strongly believe is "just right" or "just wrong" of could therefore represent an effective way of driving people towards a change.

Keywords: economic inequalities, issue moralization, moral conviction, support for redistribution

References: [1] García-Sánchez, Osborne, Willis, & Rodríguez-Bailón, Brit. J. of S. Psyc., 2020, 59(1), 111–136; [2] Skitka, Hanson, Morgan & Wisneski (2021). Annual Review of Psyc., 2021, 72, 347-366.

[1] Project involves a collaboration with Enrico Perinellil, University of Trento (part of Study 2's data analysis).

Perceptual and cognitive facets of alexithymia

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XXXV cycle (Tutors: Sara Dellantonio, Gianluca Esposito)

The term “alexithymia” was introduced in the lexicon of psychiatry in the early ‘70s by Sifneos to outline the difficulties manifested by some psychosomatic patients in identifying and describing their own emotions [1]. Since then, the construct has been broadened and partially modified. Today, alexithymia describes a condition characterized by an altered emotional awareness that leads to difficulties in recognizing your own and others' emotions. Recently, it has also been suggested that alexithymia represents a general deficit in interoceptive ability [2]. A similar hypothesis was guided by evidence that alexithymia co-occurs with several clinical conditions characterized by an altered perception of bodily states (e.g. psychosomatic disorders, autism spectrum disorder, eating disorders). Indeed, among the main features of the construct there are the difficulties identifying feelings and distinguishing between somatic and affective states. However, testing the relationship between alexithymia and interoception has been extremely challenging because of issues in the operationalization of the two constructs. Consequently, the first aim of my PhD project consists in clarifying the relationship between alexithymia and interoception. To this purpose, we conducted a study, assessing several self-report measures of interoception and alexithymia in three non-clinical samples residing in different countries (n_{Italy}= 325; $n_{U.S.}$ = 250; $n_{Singapore}$= 239). Through correlation analysis and Machine Learning techniques, we could highlight a consistent (negative) relationship between self-reported interoception and alexithymia across the three samples. However, we also found evidence that, at least in the non-clinical population, the construct of alexithymia cannot be reduced to the one of interoception. Consequently, we decided to explore other cognitive factors contributing to the individual differences in levels of alexithymia found in the non-clinical population. Specifically, we hypothesized that differences in the externally-oriented thinking facet of the construct are highlighted by the person’s education and her broader socio-cultural capital [3]. A similar hypothesis will be tested measuring the above-mentioned variables on a sample stratified by years of education. If our hypothesis is confirmed, there is space to re-examine some of the assumptions made by the authors of the Toronto Alexithymia Scale, who initially suggested a lack of association between alexithymia, as measured by their instrument, and socio-demographic variables as SES and education. In conclusion, the results from this project are aimed at disentangling the cognitive and perceptual factors involved in the condition of alexithymia.

Keywords: economic inequalities, issue moralization, moral conviction, support for redistribution

References: [1] Sifneos, Psychotherapy and Psychosomatics, 1973, 22, 255–262 [2] Brewer, Cook & Bird, Royal Society open science, 2016, 3(10), 150664. [3] Bourdieu, "The Forms of Capital", 1986 in Handbook of Theory and Research for the Sociology of Education (ed. J. G. Richardson), New York: Greenwood, 241-258.

First Session

Room C

Autism Spectrum Disorder

Giulio Bertamini - The role of child-therapist interaction in ASD early intervention: quantitative approaches

Gabriele Osler – Typical and atypical development of Theory of Mind and attachment

Gianpaolo Alvari - Enhancing clinical practice by Computer Vision for behavioural analysis

The role of child-therapist interaction in ASD early intervention: quantitative approaches

Giulio Bertamini[1] giulio.bertamini@unitn.it

XXXV cycle (Tutors: Paola Venuti, Cesare Furlanello)

Observational research plays an important part in developmental research due to its noninvasiveness [1]. However, it has been hardly applied to investigate the role of the child–therapist interaction. In particular, the characteristics of the child–therapist interplay are thought to have a significant impact in NDBIs for children with Autism Spectrum Disorder (ASD) [2]. The high interindividual variability in treatment response highlights the importance of understanding "what works for whom, why it works and when it works better" [3]. Quantitative approaches may help to identify key intraction features during therapy, and may translated as clinical instruments [4]. As a core concept in our analysis, we consider interpersonal synchrony (IS), defined as the spontaneous, multimodal, rhythmic and temporal coordination of actions, emotions, thoughts and physiological processes [5]. Methods: n = 24 children with ASD were monitored from the time of the diagnosis (T0) and after about one year of early NDB intervention (T1). A novel observational coding system for behavioural micro-coding of multimodal interactive exchanges was applied to video recorded sessions of intervention in order to extract quantitative behavioural descriptors. We explored the coding scheme reliability together with its convergent and predictive validity. Further, we applied computational techniques to investigate changes and associations between interaction profiles, developmental outcomes and response trajectories. Results: Significant changes in interaction variables emerged with time, suggesting that a favorable outcome is associated with interactions characterized by increased synchrony, better therapist's strategies to successfully engage the child and scaffold longer, more complex and engaging interchanges. Interestingly, data models linked interaction profiles, outcome measures and response trajectories, highlighting the possibility of quantitatively studying response profiles with respect to interaction quality as well as other child's, therapist's and dyadic variables. Conclusion: Combining observational techniques with quantitative approaches may help in explaining interindividual variability in treatment response, disclosing successful features of interaction associated with better response trajectories, or to different ASD behavioural phenotypes that may require specific dyadic modalities. Interaction dynamics may be especially relevant in the perspective of early diagnosis and intervention to design interventions aimed at maximizing response trajectories. Combining low level feature extraction and higher level behavioural annotations may represent a promising and non-invasive strategy to approach the complexity of multimodal human interaction in the clinical context [6].

Keywords: ASD early intervention, interpersonal synchrony, response trajectories, observational research, quantitative approaches

References: [1] Anglemyer et al. (2014). Coch Data Syst. Rev, (4); [2] Minjarez, M.B.; Bruinsma, Y.; Paul H. Brookes Publishing Co, 2020; 21–42; [3] Vivanti, G.; Bottema-Beutel, K. Turner-Brown, L; Springer, 2020; [4] Frost, K. M., Brian, J., Gengoux, G. W., Hardan, A., Rieth, S. R., Stahmer, A., & Ingersoll, B.. (2020). Autism : the international journal of research and practice, 24(8); [5] Mayo O, Gordon I. Psychophysiology. 2020, 57(6); [6] Jacob, S., Wolff, J. J., Steinbach, M. S., Doyle, C. B., Kumar, V., & Elison, J. T. (2019). Translational psychiatry, 9(1)

[1] Affiliation: ODFLab – Data Science for Health (DSH), Fondazione Bruno Kessler (FBK).

Typical and atypical development of Theory of Mind and attachment

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XXXIV cycle (Tutor: Laura Franchin)

Theory of mind (ToM) is the ability to ascribe mental states to ourselves and others, and it allows us to communicate and interact efficiently whit other people [1]. Empirical evidence has well documented a lack of ToM by individuals affected with autism spectrum disorder (ASD; [1]). However, high-functioning autistic individuals (HFA), despite still showing great social interactions difficulties from their daily routine and clinical experience, incredibly pass experimental explicit tasks used to assess ToM skills, highlighting significant limitations in these measures [2]. Over the past decade, research on ToM has focused on the development of novel implicit tasks that, thanks to eye-tracker technologies, have allowed to assess this ability without the involvement of other linked cognitive skills. The use of these new paradigms revealed that HFA people have great difficulties in outperforming these tasks [3]. However, some limitations are currently documented, such as lack of convergent validity with explicit ToM measures and low degree of replicability [4].

In addition, further research has shown that the quality of the attachment relationship plays a crucial role in the development of ToM, suggesting a strong link between the two constructs (e.g., secure attachment style predicted higher ToM performances) [5]. In our knowledge, no study has yet investigated the link between attachment and implicit ToM.

In the present study, our aim is to investigate the relation between attachment and implicit ToM skills in adults with HFA, and in different groups of children, in order to outline also the typical developmental trajectory of this relationship. Through 2 different experiments, we propose a novel implicit ToM task by assessing participants' anticipatory gaze. Specifically, our goal is to investigate the spontaneous looking anticipation of a humanized geometrical figure behaviour, which could only have been predicted if participants have implicit ToM skills.

In the first experiment, we assessed whether people diagnosed as HFA, compared with a control group, could show implicit ToM. In addition, we investigated whether the attachment style can influence the participants' ToM performances in both groups.

In the second experiment, again using our new ToM task, we investigated whether typical development children from 2 to 6 years old (carefully divided into 4 different 12-month age groups) could show implicit ToM ability, and whether the type of attachment style could determine the children's ToM performance. The new ToM task, and initial results will be presented at the PhD open day.

Keywords: Theory of Mind, attachment, Autism Spectrum Disorder

References: [1] Baron-Cohen, S., Leslie, A. M., & Frith, U., Cognition, 1985, 21.1: 37-46; [2] Moran, J. M., Young, L. L., Saxe, R., Lee, S. M., O'Young, D., Mavros, P. L., & Gabrieli, J. D., P Natl A Sci, 2011, 108.7: 2688-2692; [3] Schneider, D., Slaughter, V. P., Bayliss, A. P., & Dux, P. E., Cognition, 2013, 129.2: 410-417; [4] Kulke, L., von Duhn, B., Schneider, D., & Rakoczy, H., Psychol Sci, 2018, 29.6: 888-900; [5] Dykas, M. J., & Cassidy, J., Psychol Bull, 2011, 137.1: 19-46.

Enhancing clinical practice by Computer Vision for behavioural analysis in ASD

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XXXIV cycle (Tutors: Paola Venuti, Cesare Furlanello)

Time is a key factor to consider in Autism Spectrum Conditions (ASC). Anticipating diangosis and starting intervention early significantly improves the outcome [1]. The implementation of Artificial Intelligence (AI) in autism research is growing exponentially. AI provides effective alternatives for non-intrusive behavior screening [2]. The research project aims to exploit the potential of AI-based frameworks to support the clinical setting in both screening and treatment, through an ecological and systematic measurement of behaviors. In our first study, we investigated facial expressions in 18 autistic and 15 typical infants during their first ecological interactions, between 6 and 12 months of age [3]. We employed Openface [4], an AI-based software designed to systematically analyze facial micro-movements in images in order to extract the subtle dynamics of Social Smiles in unconstrained Home Videos. Reduced frequency and activation intensity of Social Smiles was computed for children with autism. Machine Learning models enabled us to map facial behavior consistently, exposing early differences hardly detectable by non-expert naked eye [3]. In the second study, we developed an algorithm for screening ocular coordination episodes during assessment sessions in young (2-6 years) children with ASC. We combined Openpose for pose detection [5] and Gaze360 for gaze estimation in wild videos [6]. We then analyzed by unsupervised clustering the coordination data (duration and frequency) in combination with the clinical data collected during the assessment (ADOS score, IQ, age, etc.). Preliminary analyses revealed two distinct clusters consistent with high and low functioning autism phenotypes. Our exploratory findings suggest that coordination variables, measured in this manner, have the potential to serve as sensitive cues to spectrum heterogeneity. On this basis, we may eventually build an AI-based framework to measure these behavioural indicators during treatment sessions. The perspective is to elicit systematic and quantitative markers to support clinicians in assessing treatment outcome and potentially designing personalized intervention programs, based on individual variability.

Keywords: ASD early diagnosis, ASD heterogeneity, facial expressions, gaze coordination, computer vision, machine learning

References: [1] Rogers, S.; Talbott, M., Int. Rev. Res. Dev. Disabil., 2016, 50, 233–275; [2] Sapiro, G.; Hashemi, J.; Dawson, G., Curr. Opin. Biomed. Eng., 2019, 9, 14–20; [3] Alvari, G., Furlanello, C., & Venuti, P., JCM, 2021, 10(8), 1776; [4] Baltrusaitis, T., Zadeh, A., Lim, Y. C., & Morency, L. P., IEEE FG, 2018, 59-66; [5] Cao, Z., Hidalgo, G., Simon, T., Wei, S. E., & Sheikh, Y., IEEE TPAMI, 2019, 43(1), 172-186; [6] Kellnhofer, P., Recasens, A., Stent, S., Matusik, W., & Torralba, A., IEEE ICCV, 2019, 6912-6921.

[1] PhD in collaboration with DSH Lab (FBK).

Second Session

Room A

Parenting

Micol Gemignani - Do gender-dependent differences in parents truly demonstrate the whole truth?

Silvia Perzolli - Parenting and developmental trajectories of children with autism spectrum disorder

Diletta Mauri - The perspectives of care experienced parents: risks and protective factors

Andrea Bonassi - A multidisciplinary investigation of online and in-person social behavior

Do gender-dependent differences in parents truly demonstrate the whole truth?

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XXXVI cycle (Tutor: Simona De Falco)

Gender-dependent differences have been thoroughly discussed in parenting research, with evidence showing heterogeneous brain-hormone-behavior pathways among male and female parents [1]. As an illustration, differential activations of subcortical and cortical areas have been interpreted as reflecting genuine differences between mothers and fathers, and variations in the hormonal up- and down- regulations have been similarly discussed in terms of distinctions by gender [2][3]. However, it should be acknowledged that some differences between parents may not be only due to their stable attributions (i.e., their sex), but they might be ascribable to changeable environmental factors. Accordingly, caregiving involvement - such as the quantity of time parents positively engage with their child and are responsible for their care - has proved to modulate both neural and hormonal responses [4][5], with these underlying nurturance behaviors independently on caregivers' sex [6]. Thereby, it may be the case that established gender-dependent differences in parents has been a consequence of fathers being traditionally less committed to child care in years gone by, with current socio-cultural changes stressing the importance of reconsidering the past evidence [7]. In this brief talk, I will present our work investigating the key role of caregiving involvement by first exploring the state-of-art evidence, its conceptualization, and measurements, and then moving into its influence on both cognitive and neurobiological responses in parents. Regardless of gender, we expect that caregiving involvement would be associated with several aspects of parenting, thus proving of significant value in this research field. Noteworthy, our results would encourage researchers to think over gender differences related to parenthood through the lens of caregiving involvement, as well as guiding future efforts on clarifying major gaps in the theoretical framework. As a more relevant implication, our research line would eventually provide new insights into the importance of parents' engagement with infant care independently on caregivers' sex.

Keywords: caregiving, brain, hormones, parent-child interactions, childcare

References: [1] Feldman, R. Infant Ment. Health J. 2003; 24: 1-23; [2] Rajhans P, Goin-Kochel RP, Strathearn L, Kim S. J Neuroendocrinol. 2019 Sep;31(9):e12721; [3] Atzil S, Hendler T, Zagoory-Sharon O, Winetraub Y, Feldman R. J Am Acad Child Adolesc Psychiatry. 2012 Aug;51(8):798-811; [4] Mascaro JS, Hackett PD, Rilling JK. Proc Natl Acad Sci U S A. 2013 Sep 24;110(39):15746-5; [5] Mascaro JS, Hackett PD, Gouzoules H, Lori A, Rilling JK. Soc Cogn Affect Neurosci. 2014 Nov;9(11):1704-12; [6] Abraham E, Hendler T, Shapira-Lichter I, Kanat-Maymon Y, Zagoory-Sharon O, Feldman R. Proc Natl Acad Sci U S A. 2014 Jul 8;111(27):9792-7; [7] Bakermans-Kranenburg MJ, Lotz A, Alyousefi-van Dijk K, van IJzendoorn M. Child Dev Perspect. 2019 Dec;13(4):247-253.

Parenting and developmental trajectories of children with ASD

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XXXIV cycle (Tutor: Paola Venuti)

Core symptoms of Autism Spectrum Disorder (ASD) dramatically impact on the child 's ability to interact with parents, showing less responsiveness and the tendency to reject or ignore the caregivers' social initiative [1]. This leads to caregiver-child maladaptive interactive circuits that need to be restored in order to guarantee effective emotional exchanges [2]. For this reason, parental involvement during intervention seems to be extremely important to guarantee a better adaptation to child's difficulties and impairments [3,4]. Most of the studies on parental interaction with children with ASD focused on mothers even though fathers and children with ASD can form close and supportive relationships leading to unique effects on child development [5,6]. In line with this, the first aim of the project is to investigate mother-child and father-child dyads with emphasis on the paternal role which has been particularly unexplored in the context of ASD. We found out that mothers and fathers display similar levels in the affective domains during exchanges with their children. However, considering linguistic properties some differences emerged, indicating fathers' peculiar characteristics of speech directed to their young children with ASD. Given a detailed profile that considers both caregivers' characteristics it is possible to maximize the involvement of both in intervention settings. From this arises the second purpose of project that aims to explore the impact of a parental based intervention with pre-post assessments over time. Considering mothers, we found out increased awareness of child timing, increased quantity of interaction and more following of child's intentionality. Children, in turn, showed increased responsiveness, involvement through different communicative strategies (e.g., eye-contact, body positioning) and more symbolic play. At this point it is fundamental to identify mechanisms of change that moderate the impact of intervention. Considering the child, the sub-components of the general intelligence were investigated to identify markers of better developmental trajectories. Considering caregivers, individual traits (e.g., stress, empathy, symptomatology, personality) and dyadic features (e.g., affective quality, structuring abilities, language and play with the child) are analyzed to study their impact on child's developmental process during treatment.
In conclusion, the project may have important implications. From a theoretical perspective it enhances knowledge about caregiver-child interactions and about child's and caregiver's predictors of change during intervention. From a clinical standpoint, it allows to identify important target areas to be addressed during intervention and help planning individualized intervention programs.

Keywords: parent-child interactions, fathers, observational research, ASD early intervention, response trajectories

References: [1] Adamson, L. B., Deckner, D. F., & Bakeman, R. (2010). *Journal of autism and developmental disorders*, *40*(6), 665-676;[2] Kasari, C., Gulsrud, A. C., Wong, C., Kwon, S., & Locke, J. (2010). *Journal of autism and developmental disorders*, *40*(9), 1045-1056;[3] Green, J., Aldred, C., Charman, T., Le Couteur, A., Emsley, R. A., Grahame, V., ... & Taylor, C. (2018). *Trials*, *19*(1), 1-13;[4] Pickles, A., Le Couteur, A., Leadbitter, K., Salomone, E., Cole-Fletcher, R., Tobin, H., ... & Green, J. (2016). *The Lancet*, *388*(10059), 2501-2509;[5]. Rankin, J. A., Paisley, C. A., Tomeny, T. S., & Eldred, S. W. (2019). *Clinical child and family psychology review*, *22*(4), 458-477;[6]. Hirschler-Guttenberg, Y., Golan, O., Ostfeld-Etzion, S., & Feldman, R. (2015). *Journal of Child Psychology and Psychiatry*, *56*(5), 530-539.

The perspectives of care experienced parents: risks and protective factors

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XXXVI cycle (Tutors: Silvia Fargion, Simona De Falco)

The aim of my research project is to investigate the relationship between family problems in childhood and the assumption of a parental role, taking into account both risk factors and strategies aimed at breaking the intergenerational transmission of deprivation, mistreatment and disadvantage. For this reason, I'm going to carry out a systematic study of representation of parental role by care-experienced adults, that is mothers and fathers who, as children, have been placed in out-of-home care. Care-experienced people are exposed to the long-term impact of traumatic events and conditions undergone during childhood or adolescence [1]. I will examine the group that have become parents, to find out how they live their parental role, how they give meaning to their experience, how they connect it to the past, which coping strategies they have addressed it or are facing it with.

Scientific literature shows that research in this area is mainly concerned with mothers, especially in the early years of their motherhood, and the risk factors connected with the negative experience during childhood [2]. The aim of my project is to better understand the agency of care-experienced parents, while not denying the vulnerability on which most of the scientific literature is focused. Widespread knowledge about vulnerable parenthood has developed, but perceptions and subjective experiences are still a dark area [3]. This will be the focus of my research, including the point of view of fathers, a group often not considered in previous research.

The research strategy, qualitative and participatory, aim to provide an in depth understanding of the parenthood of care-experienced people and not only to describe it [4], I therefore intend to use constructivist Grounded Theory [5].

My research aims to provide useful elements for professionals engaged in support of parenthood and for policies aimed at protecting and supporting children and families. In addition, I want to contribute to the scientific debate on how the environment and life experiences affect the parental role, especially in relation to the negative experiences in childhood. I would like to highlight what is perceived as supporting and the factors that parents consider breaking the intergenerational transmission of deprivation, mistreatment and disadvantage.

Keywords: parenting of care experienced, child protection system, protective factors, intergenerational transmission, parents' experience

References: [1] Stein, M. Child Fam Soc Work, 2006, 11, 273–279; [2] Svoboda, D. V., Shaw, T. V., Barth, R. P., & Bright, Child Youth Serv Rev, 2012, *34*(5), 867–875; [3] Afifi, T. O., & MacMillan, H. L. Can J Psychiatry, 2011, *56*(5), 266–272; [4] Strauss, A., & Corbin, J. London: Sage Publications, 1994, 273–285; [5] Charmaz, K. London: Sage Publications, 2006.

Effect of genetic predispositions and parental bonding on social and affiliative behaviours

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XXXIV cycle (Tutors: Gianluca Esposito, Bruno Lepri)

Social experiences affect human development throughout a lifetime. Nowadays, individual differences are observed in the quality and the frequency of online and in-person social interactions. At a psychological level, early relationships with the caregivers represent the first meaningful patterns of social exchange. Caregivers play a crucial role in child development and foster a less or more adaptive social environment. For instance, high levels of care and lower overprotection embody the ideal parental practices. At a biological level, affiliative and social behaviours are mainly regulated by the oxytocin and serotonin systems. This research investigated how caregiving propensities inferred by the recalled parental bonding and the pivotal genetic factors could shape adult social attitudes during online (studies 1, 2) and in-person interactions (studies 3, 4, 5). Through different studies across the world, participants filled the self-reported questionnaires Parental Bonding Instrument and Experiences in Close Relationships-Revised (ECR-R), respectively measures of perceived quality of relationship with parents in childhood and expectations on close relationships in adulthood. Buccal mucosa samples were collected, and the polymorphisms of the Oxytocin Receptor Gene (OXTR) rs53576, rs2254298, the promoter region of the Serotonin Transporter Gene (5-HTTLPR) and the adjacent upstream rs25531 were analyzed. Three measures of the online social activities on Instagram were collected using a Python algorithm: number of followers, number of posts, and number of followed users ("followings"). Furthermore, the "Social Desirability Index" (SDI) was computed as the followers to followings ratio. As regards Instagram behavior, Study 1 (N=57; Singaporean) highlighted a combined effect of OXTR/rs2254298 and paternal care on Instagram number of posts [1]. Moreover, both the interaction between OXTR/rs2254298 and maternal overprotection (study 1) and the interaction between rs25531 and maternal care (study 2; N=57; Singaporean) predicted the SDI [1,2]. No effect of OXTR/rs53576 was observed on the Instagram variables. As expected, study 3 (N=313; Italian and Singaporean) revealed a differential susceptibility of genotype OXTR/rs53576 to the recalled parental bonding between Western and Eastern groups on the levels of felt anxiety and avoidance towards the partner [3]. However, study 4 (N=314; Italian and Singaporean) found OXTR/rs2254298 explained a limited portion of the variance in the ECR-R dimensions. Following previous works [4], study 5 (N=65; Italian) confirmed that the interplay between 5-HTTLPR and maternal overprotection experienced in childhood modulated avoidance in adulthood [5]. These studies provide evidence of the multifactorial nature of social behavior under a multidisciplinary perspective.

Keywords: social behavior, attachment, parenting, gene-environment, Instagram

References: [1] Bonassi, A., Cataldo, I., Gabrieli, G., Foo, J. N., Lepri, B., & Esposito, G. *Int. J. Environ. Res,* 2020, *17*(19), 7232; [2] Bonassi, A., Cataldo, I., Gabrieli, G., Tandiono, M., Foo, J. N., Lepri, B., & Esposito, G. *PsyArXiv,* 2020, *https://psyarxiv.com/dkvnf/*; [3] Cataldo, I., Bonassi, A., Gabrieli, G., Foo, J. N., Lepri, B., & Esposito, G. *Brain Sci.,* 2021, *11*(4), 496; [4] Bonassi, A., Ghilardi, T., Truzzi, A., Cataldo, I., Azhari, A., Setoh, P., Shinohara, K., Esposito, G. *Data in Brief,* 2017, *13*, 742-748; [5] Bonassi, A., Cataldo, I., Gabrieli, G., Lepri, B., & Esposito, G. *Preprints,* 2021, *2021040685*

[1] This work has been done in collaboration with Fondazione Bruno Kessler.

Second Session

Room B

Psycholinguistics and Computational Linguistics

Giuseppe Di Dona - Dealing with variability during speech perception: abstraction, learning and retrieval

Stefano Bannò - Automatic scoring of spoken language proficiency

Pietro Mingardi - Psychological aspects of pragmatics of negation

Anna Teresa Porrini - Conversational Implicatures in pre-school children

Dealing with variability during speech perception: abstraction, learning and retrieval

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XXXIV cycle (Tutors: Simone Sulpizio, Michele Scaltritti)

Albeit linguistic and vocal information are naturally intertwined in the speech signal, these two types of information can be selectively extracted to achieve different goals. Indeed, we can understand what is being said irrespectively of who is saying it, but we can also identify who is speaking regardless of what she/he is saying. Although, this task is apparently effortless as much as it is cognitively demanding as linguistic and vocal information are represented by multiple overlapping dimensions of the speech signal, which are characterized by considerable amount of physical variability. In 3 different experiments we studied different cognitive mechanisms that could help listeners in dealing with physical variability across the vocal and the linguistic dimension: abstraction, learning and retrieval. Abstraction refers to the process by which listeners can grasp rules or statistical regularities about specific features of the speech signal to facilitate perception in highly variable contexts. This mechanism may help listeners in building information-specific representations which are invariant to changes along irrelevant dimensions. Previous studies showed that listeners pre-attentively form abstract phoneme representations which are invariant to changes in the talkers' voices [1]. In a first EEG study, we showed that listeners can also form abstract voice representations which are robust against changes in phonological information. Another possible mechanism that listeners may deploy to face physical variability is perceptual learning. Talkers have their idiosyncratic ways of producing phonemes or marking suprasegmental structures, but listeners understand what they say, regardless. Previous studies showed that listeners can learn how different talkers produce phonemes through learning protocols and use this information to facilitate speech perception in subsequent encounters with the talkers [2]. In a second behavioural study, we showed that listeners may apply the same mechanism to learn how talkers differently mark lexical stress in Dutch and use this information during word recognition. In addition, when listeners must deal with variability in unfamiliar contexts, they might retrieve familiar information to ease perception. In fact, being familiar with the talker's voice facilitates word recognition [3] as well as talker recognition is facilitated when our native language is being spoken [4]. In a third EEG study we showed that familiarizing with the talker's voice, or with new phonemes leads to the activation of content-specific memory retrieval processes.

Keywords: speech perception, voice perception, psycholinguistics, EEG, oscillations, Behavioural Measures

References: [1] Jacobsen, T., Schröger, E. & Alter, K. Psychophysiology, 2004, 41, 654–659; [2] Zhang, X. & Holt, L. L., J Exp Psychol Human, 2018, 44, 1760–1779; [3] Nygaard, L. C., Sommers, M. S. & Pisoni, D. B. Psychol Sci, 1994, 5, 42–46; [4] Perrachione, T. K. & Wong, P. C. M. Neuropsychologia, 2007, 45, 1899–1910.

[1] This work has been done in collaboration with different researchers at the Donders Centre for Cognition and the Max Planck Institute for Psycholinguistics in the Netherlands.

Automatic scoring of spoken language proficiency

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XXXV cycle (Tutors: Massimo Zancanaro, Marco Matassoni)

Automatic scoring of language proficiency is becoming a point of growing interest and importance in the field of second language assessment because the number of English as a second language learners (ESL) has been steadily increasing worldwide and therefore it has become necessary to develop advanced techniques for assessing proficiency automatically [1]. A common issue in this field is the lack of publicly available data specifically designed for automatic assessment, especially as regards spoken data, despite the fact that learner corpora have increasingly become a staple for training automatic scoring models [2]. Another typical problem is the lack of consistency and coherence in human assessment, as it frequently relies on proficiency indicators that often have biases and are not clearly generalizable, therefore not easily transferable into automatic scoring systems [3]. Although second language proficiency cannot be assessed on the mere basis of the presence of errors in learners' written and spoken productions, this aspect is highly consistent and plays a major role in language assessment by human experts [4]. Nevertheless, to our knowledge, the impact of errors has not been thoroughly investigated yet, whereas other types of feature-based assessment have been more widely studied and explored [5]. In our project, we address the task of automatically scoring written and spoken responses of ESL learners by means of error-based approaches and seek to investigate the extent to which state-of-the-art applications of neural networks to second language assessment achieve noticeable results for this task. In order to do so, we make the following contributions: a) we investigate the performance of ALBERT-based models on a publicly available dataset containing error annotations, that we employ as features; b) we automatically extract and correct the errors in our main unreleased dataset using the open-source spelling and grammar checker LanguageTool; c) we investigate the performance of our models on the written data of our dataset by means of two alternative approaches, i.e. feeding the test-takers' responses and a one-dimensional error-rate feature and feeding the test-takers' responses and a four-dimensional feature containing the word count and a number of errors; d) we investigate the performance of our models trained on the written data testing them on the spoken responses of our dataset; e) we fine-tune such models on a small spoken training set.

Keywords: automatic speech scoring, second language assessment, automatic essay scoring, grammatical error detection

References: [1] K. Zechner & K. Evanini (eds.), *Automated Speaking Assessment.* New York: Routledge, 2019; [2] D. Higgins, C. Ramineni & K. Zechner, "Learner corpora" in S. Granger, G. Gilquin & F. Meunier (eds.), *The Camb. Handb. of L. Corp. Res*. Cambridge: Cambridge University Press, 2015, pp. 587-604; [3] M. Zhang, *R&D Connections*, 2013, 21, pp. 1-11; [4] J. Hawkins & P. Buttery, *Eng. Prof. Journ.l*, 2010, vol. 1, no. 1, pp. 1-23; [5] H. Craighead, A. Caines, P. Buttery & H. Yannakoudakis, in *Proceed. 58th ACL*, 2020, pp. 2258-2269.

Psychological aspects of pragmatics of negation

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XXXIV cycle (Tutors: Chiara Finocchiaro, Francesco Vespignani)

With negative sentences, within truth-judgment task, it is often found a result known as polarity by truth-value effect [1]. This effect shows that if affirmative true sentences are evaluated easier than affirmative false sentences, with negative sentences is the opposite, and so false sentences (e.g. “Biden is not the president of the USA”) are evaluated easier than true ones (e.g. “Johnson is not the president of the USA”). Some models [1, 2], explain this interaction as due to the fact that in order to interpret a negative sentence the system must pass through a first moment in which the affirmative counterpart meaning of the sentences is accessed, and that the actual meaning of the negative sentence is derived only in a second stage. For example, to interpret a sentence like “the door is not open” these models assume that the system initially activates the representation of an open door, and that only subsequently it accesses the representation of a closed door.

Other studies, however, finding that in some cases also for negative sentences, true sentences are easier to evaluate than false ones, challenged this view [3, 4]. These studies explained their results as due to the fact that in their experiments, differently from the previous ones, negative sentences were uttered and interpreted within a pragmatic context that make the negative sentences felicitous, informative. The authors of these studies proposed that when a negative sentence is uttered in a pragmatic context that makes it felicitous, it is possible to access immediately its actual meaning. Despite the interest of these results, it is not really clear which were the pragmatic factors in these studies that defined the felicity of the negative sentences (but see [5]). So, to bring further support to this proposal, we investigated if two pragmatic factors that in the literature are reported as factors that define a negative sentence as felicitous enable to access immediately its actual meaning. These pragmatic factors we tested are the use of the negation to refer about a minority [6] and the use of the negation to describe nonexistence [7]. To test our hypotheses, we implemented three sentence-picture verification experiments. In no one of our experiments we found clear evidence that our pragmatic factors enable to access immediately the actual meaning of the negative sentences.

Keywords: negation, sentence processing, pragmatics of negation, behavioural measures

References: [1] Clark, H. H., & Chase, W. G., Cogn. Psychol., 1972, 3, 472-517; [2] Kaup, Yaxley, Madden, Zwaan, & Lüdtke, Q J Exp Psychol A, 2007, 60, 976-990; [3] Nieuwland & Kuperberg, Psychol. Sci., 2008, 19, 1213-1218; [4] Dale, R., & Duran, N. D., Cogn. Sci., 2011, 35, 983-996; [5] Tian, Breheny & Ferguson, Q J Exp Psychol, 2010, 63, 2305-2012; [6] Wason, J Verbal Learning Verbal Behav,1965, 4, 7-11; [7] Nordmeyer, A., & Frank, M. C., In CogSci., 2015

Conversational implicatures in pre-school children

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XXXIV cycle (Tutors: Luca Surian)

Conversational implicatures are inferences on the implicated meaning of a sentence, which are based on the addressee's assumption that the speaker is obeying to certain conversational maxims, or at least to a principle of cooperation. The research project for my PhD is mainly centred around conversational implicatures during language acquisition, and its broader aim is to investigate both the mechanisms that allow for derivation of these implicatures and the pragmatic abilities of pre-school children. In particular, we are now working on an experiment meant to investigate the derivation of a specific type of implicature, called ad-hoc implicature, in pre-school children aged 2 to 5 years old. Contrary to scalar implicatures, for which alternatives are conveyed through certain lexical items that pertain to an informativeness scale, ad-hoc implicatures are implicatures for which the alternatives are construed ad-hoc in the context of utterance. Pre-school children demonstrate a certain degree of ability in deriving ad-hoc implicatures [1] [2], and previous literature on the matter suggests that these are easier for children to derive as compared to scalar implicatures [3] [4]. There is however some doubt as to whether pre-school children actually do derive ad-hoc implicatures or perform a simpler type of inference, which allows them to succeed in the task without appealing to conversational maxims or cooperation principles [5]. The aim of this research is to investigate this issue by combining implicature derivation with Theory of Mind, testing children's ability with ad-hoc implicatures in a False-or True-Belief environment. The main research question will not be at what age children start succeeding in ad-hoc implicature tasks, but whether young children's successes can really be linked to pragmatic reasoning on intended meaning. The participants will be typically developing, mother tongue children between the ages of 2 and 5, who will be tested through a referent selection task in the form of a game.

Keywords: experimental pragmatics, language acquisition, psycholinguistics, Theory of Mind.

References: [1] Stiller, Goodman, & Frank, Lang Learn Dev, 2015, 176–190; [2] Yoon & Frank, J Exp Child Psychol, 2019, 99-116; [3] Foppolo, Mazzaggio, Panzeri & Surian, J Child Lang, 2020, 350-372;[4] Horowitz, Schneider & Frank, Child Dev, 2017, e572–e593; [5] Sullivan, Davidson, Wade, & Barner, J Child Lang, 2019, 733–759.

Second Session

Room C

Consciousness, Creativity and Meditation

Gabriele Penazzi - Effects of rhythmic nasal epithelium stimulation on functional connectivity and consciousness state

Clara Rastelli - MEG alpha power decodes creative vs non-creative stories

Irene Laudanna - Meditation and attention: thinking modes and ocular responses

Effects of rhythmic nasal epithelium stimulation on functional connectivity and consciousness state

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XXXIV cycle (Tutor: Nicola de Pisapia)

Several meditation techniques and mindfulness-based protocols are founded on the attention on a slow-paced breathing acted through the nose [1]. Recent findings suggest that the rhythmic passage of airflow through the nostrils is able to activate specific mechanical receptors located on the nasal vault, triggering a respiratory entrainment phenomenon [2]. The stimulation of these receptors modulate the activity of the olfactory bulb, a structure highly connected with a large number of other areas of the central nervous system, both cortical and subcortical [3] . The rhythmic passage of airflow through the nostrils appear to be crucial to reach a meditative state, playing a role in slow breathing practice [4]. Here, we investigate the effects elicited by slow nasal epithelium stimulation, slow nasal breathing or slow mouth breathing.

Resting-state fMRI of 15 subjects has been collected after 4 different 15-minutes conditions (within-subjects): (1) normal rest with closed eyes and natural uncontrolled breathing; (2) slow artificial stimulation of the nasal epithelium through an electronic device (frequency 0.05 Hz, cycle 20 s, continuous air stimulation 8s, constant pressure of 1.1 bar); (3) slow mouth breathing (8s inspiration,12s expiration through mouth, no breath holding); (4) slow nasal breathing (8s inspiration through nose, 12s expiration through mouth, no breath holding).

After each session, BOLD fMRI was collected using a 3T Siemens Prisma device with 2D EPI gradient echo sequences (TR 1000 ms, acquisition time 10 min and 10 sec). Structural images were also acquired (TR 2290 ms, acquisition time 6 min and 06 sec). After each scan acquisition, we administered the 53-item self-report questionnaire, the Phenomenology of Consciousness Inventory [5]. With repeated ANOVA and paired t tests we compared PCI results in the various conditions. We then performed a functional connectivity analysis (preprocessing, seed-to-voxel analysis and ROI-to-ROI analysis) using the CONN Toolbox [6] in conjunction with Statistical Parametric Mapping.

The results show that slow-paced stimulation of the nasal epithelium can be a bottom-up trigger able on his own to modulate the state of consciousness of the participants. These results are of great interest in the explorations of the mind/brain effects due to breathing exercise as adopted, for example, in meditation practices.

Keywords: breathing, consciousness studies, neuroimaging, functional connectivity

References: [1] Zaccaro, A., Piarulli, A., Laurino, M., Garbella, E., Menicucci, D., Neri, B., & Gemignani, A. Front. Hum. Neurosci., 2018 12: 353; [2] Zelano, C., Jiang, H., Zhou, G., Arora, N., Schuele, S., Rosenow, J., & Gottfried, J. A., J. Neurosci., 2016, 36(49), 12448-12467; [3] Sobel, N., Prabhakaran, V., Desmond, J. E., Glover, G. H., Goode, R. L., Sullivan, E. V., & Gabrieli, J. D., Nature, 1998, 392(6673), 282-286; [4] Piarulli, A., Zaccaro, A., Laurino, M., Menicucci, D., De Vito, A., Bruschini, L., ... & Gemignani, A., Sci. Rep., 2018, 8(1), 1-17; [5] Pekala, R. J., Springer, Boston, MA, 1991, 127-143; [6] Whitfield-Gabrieli, S., & Nieto-Castanon, A., Brain Connect., 2012, 2(3), 125-141.

[1] This work has been done in collaboration with Andrea Zaccaro, Danilo Menicucci, Andrea De Vito, Andrea Piarulli, Luca Bruschini, Angelo Gemignani (University of Pisa)

MEG alpha power decodes creative vs non-creative stories

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XXXV cycle (Tutors: Nicola de Pisapia, Chiara Finocchiaro)

Creative cognition enables us to generate original and useful solutions [1]. From a neurocognitive perspective, creativity seems to emerge from the interplay of two distinct neural mechanisms underpinning spontaneous (internally focused) and controlled (goal-directed) thinking [2,3]. Since pioneering work of [4], creativity has been related consistently to alpha power in EEG studies [5,6]. Particularly, researchers reported that frontal alpha power might reflect the involvement of goal-directed thought. Posterior parietal alpha band, on the other hand, appears to reflect a more internally directed attentional mechanism [7]. However, it has been poorly investigated how alpha activity is related to the sub-processes of creative thinking. In this study, we used MEG and multivariate decoding analysis to investigate the specific contributions of spontaneous and controlled processes to the modulation of alpha activity.

Eighteen healthy individuals (9 females, mean age= 26.16, SD= 5.74) participated in the study. Voluteers generate a total of 18 stories, according to 3 instructions (Ordinary, Random and Creative), each varying on the inclusion of originality and appropriateness. During each trials, 3 stimulus word were presented and participants had 30 sec to ideate the story in their mind. Afterwards, they vocally report the story. MEG data (275 channels, sampling rate 1172.9 Hz) were preprocessed by removing the DC offset, downsampled to 100 Hz, and detrended using the robust polynomial detrending method. Extended infomax algorithm (ICA) was performed to get rid of artifacts. Finally, we baseline-corrected the data low-pass filtered at 20 Hz. After preprocessing, we applied spectral analysis by extracting the power of the alpha band (7-13 Hz). Then, we ran decoding analysis using the Kernel Fisher Discriminant Analysis model and 10-folds cross validation with 5 repetitions. We ran the model to discriminate between all binomial combinations of the conditions using all channels as features. Statistical significance of the performance was assessed against empirical chance level (permuted) using t-test (α=0.05). When the result of multivariate decoding was significant, we ran searchlight analysis to establish the spatial location of the effect.

Results showed that alpha band discriminated Creative vs Random (acc=56%, $p<0.01$) and Creative vs Ordinary (acc=59%, $p<0.01$), while not Random vs Ordinary. Searchlight analysis evidenced fronto-parietal channels as the most relevant features for classifying between the significant pairs of conditions. Our findings are in line with previous results in literature. Crucially, they suggest that alpha activity might act as a specific biomarker of creativity, intended as the combination of spontaneous and controlled processes.

Keywords: creative cognition, MEG, alpha band, spontaneous process, controlled process, MVPA

References: [1] Stein MI., J. Psychol, 1953, 36:311–22. [2] Beaty RE, Benedek M, Kaufman SB, Silvia PJ, Sci Rep, 2015, 5:1-14. [3] De Pisapia N, Bacci F, Parrott D, Melcher D, Sci Rep, 2016, 6:39185. [4] Martindale C, Mines D, Biol Psychol, 1975, 3:91–100. [5] Fink A, Benedek M., Neurosci Biobehav Rev, 2014, 44:111–23. [6] Stevens CE, Zabelina DL, NeuroImage, 2020, 116990. [7] Abraham A, Hum Brain Mapp, 2016, 37:4197–211.

[1] This work has been done in collaboration with MEG Center, University of Tübingen, Germany

Mindfulness and attention: Thinking modes and ocular responses

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XXXIV cycle (Tutors: Nicola de Pisapia, Massimo Zancanaro)

Neuropsychological research found evidence of several positive effects in individuals practicing mindfulness meditation [2]. In particular, some studies highlighted a better performance in sustained attention activities and a reduced attitude to distraction [4]. Separate neuropsychological research showed a link between both pupillary and blinking responses on one side and attentional states on the other [3] [1]. Given these premises, the aim of the current study was to examine the ocular correlates of attentional focusing and fluctuations during different type of attention tasks in novice meditators. To this end, we adopted pupillometry as indicator of the attentive states in meditators, during meditative states as well as during mind-wandering. The association between ocular responses and different attentive states was examined in four different conditions. Participants were involved in four conditions, namely two focussed meditation tasks, a mental arithmetic task and a free thought (i.e. mind-wandering) task, while monitoring their pupil responses and blinking. In one of the meditation conditions, we presented participants with auditory thought probes to determine if they were on focussing or not. Across the four conditions, we found an increase in both blink number and pupil diameter and a decrease in blink duration in response to mental effort, and a decrease in both blink number and pupil size and an increase in blink duration during meditation, with mind-wandering in an intermediate position. The goal of this study was to provide alternative methods to investigate the attentional abilities in novice mindfulness practitioners.

Keywords: meditation, attention, Eye Tracking, Mind-Wandering

References: [1] Alnæs, D., Handal Sneve, M., Espeseth,T., Endestad, T., van de Pavert, S.H.P., Laeng, B. (2014). *J. Vis.*, 14 (1), 1-20; [2]De Pisapia, N., Grecucci, A. (2017). *G. Ital. di Psicol.,* 2, 249-270; [3] Laeng, B., Sirois, S., Gredebäck, G. (2012). *Perspect Psychol Sci*, 7 (1), 18–27;[4] Lutz, A., Slagter, H. A., Rawlings, N. B., Francis, A. D., Greischar, L. L., & Davidson, R. J. (2009). *J. Neurosci*, *29*(42), 13418–13427.

Third Session

Room A

Gamification

Federico Bonetti - Designing games to crowdsource linguistic annotations

Simone Bassanelli - Adaptive personalized game-based motivational systems

Angela Cattoni - The use of gamification for the improvement of learning and motivation in children with typical development and with SLD

Designing games to crowdsource linguistic annotations

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XXXIV cycle (Tutors: Sara Tonelli, Massimo Zancanari)

Since recent advances in natural language processing (NLP) have benefited from deep learning techniques, which usually require large corpora for training, linguistic annotation of large amounts of data is of paramount importance not only for comprehensive linguistic studies but also to ensure good performance of such classification models [3]. However, expert annotation is expensive both in terms of time and of cost, and crowdsourcing through platforms such as Amazon Mechanical Turk does not always guarantee high-quality annotation. Therefore, games with a purpose (GWAPs) [6] have become more and more used for linguistic annotation, obtaining encouraging results both in terms of annotation quality and overall cost [2, 5]. A widely known example is Phrase Detectives [2], a game for anaphora annotation. In Phrase Detectives, players have to tell whether a highlighted word or expression has been mentioned before in the text, and whether two highlighted expressions are related. As many other games in this field, it makes use of extrinsic motivators like cosmetic rewards, points and leaderboards. However, this implies that the game is essentially an annotation task, split into smaller tasks, and enhanced with extrinsic motivators. To further merge the game mechanics and the annotation task together, some researchers have tried to explore so-called disjoint design, exemplified by OnToGalaxy [1], a space game where users annotate the relationship between concepts by shooting spaceships carrying labels. This kind of design often takes advantage of orthogonal game mechanics [4], such as aiming, of primary importance in commercial video games, which can however be detached from the core task and can potentially oppose or challenge the task accuracy. We developed High School Superhero, a 3D role-playing game for abusive language annotation, and Spacewords, a shoot ‘em up space game for synonymy annotation, to explore the benefits of different strategies based on disjoint design and orthogonality.

Keywords: games with a purpose, game design, natural language processing, game mechanics, crowdsourcing

References: [1] Krause, Takhtamysheva, Wittstock, and Malaka, Proceedings of the ACM SIGKDD Workshop HCOMP, 2010, 22–25; [2] Poesio, Chamberlain, Kruschwitz, Robaldo, and Ducceschi, Proceedings of ACM TiiS, 2013, 3 (1), 1–44; [3] Pustejovsky and Stubbs, 2012, O’Reilly; [4] Tuite, Proceedings of FDG, 2014; [5] Vannella, Jurgens, Scarfini, Toscani, and Navigli, Proceedings of ACL, 2014, 1, 1294–1304; [6] von Ahn, Computer, 2006, 39 (6), 92–94.

[1] This work has been done in collaboration with Fondazione Bruno Kessler.

Adaptive personalized game-based motivational systems

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XXXVI cycle (Tutors: Annapaola Marconi, Massimo Zancanaro)

Traditional teaching methods usually lack attracting the full attention of learners, bringing a decrease in interaction, engagement and learning outcome [4]. However, the implementation of gamified components in learning environments can improve users' motivation, engagement and learning outcomes, creating a relaxed environment, providing feedback on the performances, and leading to a reduction of the drop-out rate [3]. Mainly, the success of these processes relies on engaging experience and accurate feedback to the users.

Despite the numerous evidences in literature, learning and motivational outcomes using gamification are not always up to expectations. A possible explanation is the lack of personalization for feedback [1] and gamified components [3] that are implemented.

The main problem about the selection and personalization of feedback and gamified components comes from users' individual differences [5]: while some users are motivated by achievement-related gratification, some are motivated by roleplay, storytelling, social aspects, points, challenges or by a combination of these elements [3].

A first attempt to analyze the individual differences in users of video games, serious games and gamified software has been the utilization of a gaming profile [2] based on gaming preferences. However, the main problem to use this strategy is that we cannot rely only on gaming preferences, since they are a dynamic component that changes over time and even during the game itself.

This project aim is to create a gaming profile based on both gaming and individual preferences, able to help in selecting the appropriate feedback and gamified components, following the users' preferences. Later, this model should be implemented in a gamified software with a learning purpose. Performance monitoring through instructors and algorithms can give a real-time feedback about the effectiveness personalization, allowing an on-line modification of components. We expect that this implementation could improve users' motivation, engagement and learning outcome to a greater extent than using a not-personalized gamified software or a traditional teaching method.

Keywords: gamification, feedback, learning, education, gamified component

References:[1] Awais M., Habiba U., Khalid H., Shoaib M., Arshad S., IEEE Access, 2019, 7, 1-9; [2] Ferro L. S., Walz S. P., Greuter S., ICPS, 2013, 7, 1-6; [3] Koivisto, J., & Hamari, J., Int J Inf Manage, 2019, 45, 191-210; [4] Lamrani R., Abdelwahed E.H., ComSIS, 2019, 17, 339-356; [5] Manero, B., Torrente, J., Fernàndez-Vara, C., Fernàndez-Manjòn, B., IEEE TLT, 2017, 10, 236-246.

[1] This work has been done in collaboration with Fondazione Bruno Kessler.

The use of gamification for the improvement of reading and writing abilities and motivation in children with typical development and children with Special Educational Needs

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XXXVI cycle (Tutor: Paola Venuti)

One of the main ways in which children learn skills, such as reading and writing, and develop creativity and sociability, is through play [1]. Researchers are thus exploring gamification, namely the use of typical game elements in different and non-gaming contexts, including the educational one [2]. Gamification is a methodology that originates from computer and serious games, and aims at redesigning activities to be more engaging, thus also developing intrinsic motivation [3]. Furthermore, gamification has proven effective both with typically developing children and with children with Special Educational Needs (SEN) [4].

Given that the current situation firmly indicates the need to engage and captivate learners, the present research aims to investigate whether gamification can improve motivation and reading and writing skills, in 8-to-10-years-old children. The design consists in comparing the effects of gamified Applications to that of equivalent, traditional pen-and-paper activities, in mixed and non-specific school groups. Furthermore, the effects are compared to those of an individualised clinical treatment for children with Specific Learning Disorders (SLD) — Developmental Dyslexia (DD) and Dysorthography in particular — using the same gamified Applications. In fact, although the neurocognitive causes of Developmental Dyslexia and Dysorthography are still hotly debated, researchers agree that the main challenge consists in the intervention, that is how to improve children's reading and writing fluency and accuracy.

Consequently, the research consisted of two studies. In the first study (Study A), a 12-hour gamified training at school was compared with an equivalent pen-and-paper training, both aimed at exploring the efficacy of gamified Applications and traditional activities purposefully designed to enhance linguistic skills (i.e., reading accuracy, reading speed, and writing accuracy). The results of this study showed improvements in linguistic skills and motivation for both groups, but not an interpersonal significant difference.

The second study (Study B) aimed to explore whether improvements, after the use of gamified Applications, differ among typically developing children, children with SLD, children with unspecified Neurodevelopmental Disorders, and bilingual children. Assessments upon training completion indicated greater improvements in linguistic efficiency in children with SLD, suggesting that an individualised and personalised training, designed on specific difficulties, leads to major results.

Overall findings highlighted promising effects of the training programs on children's linguistic skills and grade of engagement, emphasising the importance of integrated training and opening to future studies investigating the effects of gamified Applications on other skills and motivational aspects.

Keywords: gamification, primary school, Specific Learning Disorders, motivation

References: [1] G. Barata, S. Gama, J. Jorge, D. Gonçalves, Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications, 2013, pp. 10-17; [2] S. Deterding, D. Dixon, R. Khaled, L. Nacke, Proceedings of the 15th International Academic MindTrek Conference: Envisioning future media environments, 2011, pp. 9-15; [3] S. Rigby, R. M. Ryan, Glued to games: How video games draw us in and hold us spellbound, 2011, AbC-CLIo; [4] P. Dymora, K. Niemiec, Informatics, 2019, 6(4), pp. 48-71.

[1] This work has been done in collaboration with ODF Lab .

Third Session

Room B

Emotions and Personality

Parisa Ahmadi - Neural correlates of cognitive reappraisal and acceptance: a meta-analytic comparison of two clinically relevant emotion regulation strategies

Sara Sorella - The Role of the Right Inferior Frontal Gyrus in the Perception and Experience of Emotions: a meta-analysis on anger

Helga Ballardini - On my Way! G1 and G2 Teenagers. Learning and Resilience Strategies in Italian Compulsory School. A comparison between Trentino and Lombardy

Alberto Casciano - The role of résumés' biodata in the explication of individual attributes and prediction of future organizational outcomes

Neural correlates of cognitive reappraisal and acceptance: a meta-analytic comparison of two clinically relevant emotion regulation strategies

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XXXVI cycle (Tutors: Alessandro Grecucci, Michele Scaltritti)

Emotion regulation has emerged as a core construct of neurobiological models of affective disorders [1] and their therapy [2] [3]. Reappraisal and acceptance are both considered adaptive strategies in reducing negative emotions [4] and associated physiological activation, although they are very different, and may rely on separate neural circuits. Neuroimaging studies on the emotional control strategies such as reappraisal led some authors to propose a dual-process model by which a prefrontal "top-down", control system modulates subcortical "bottom-up" emotional reactivity. Interestingly, this emphasis on the involvement of high-executive processes to modulate emotional responses have been questioned in recent neural investigations on acceptance-based strategies. Indeed, acceptance-based strategies seems to rely mostly on subcortical areas. To provide evidence on this claim, here we sought to summarize and contrast the existing neuroimaging literature on reappraisal and acceptance to investigate similarities and differences in the neural bases of these two emotion regulation strategies. In the current study, the Activation Likelihood Estimation [5] technique was used to obtain a quantitative summary of previous fMRI (functional Magnetic Resonance Imaging) studies of acceptance and reappraisal to compare the brain mechanisms of both strategies. The meta-analysis of the contrast between reappraisal (> control) versus acceptance (>control) and the conjunction analysis between reappraisal (>control) and acceptance (> control) was conducted. The contrast Reappraisal more than Acceptance resulted in a large network including the superior, middle, and medial frontal gyri. No result for the contrast Acceptance more than Reappraisal was visible. The conjunction analyses revealed a network including the Inferior Frontal Gyrus and the Insula

The results of contrast analysis of Reappraisal > Acceptance are in line with previous studies and support the idea of cognitive change strategies based on "top-down" modulation. The conjunction analysis revealed a partial overlap between strategies despite their differences. This region may be related to instructions or inhibitory processes involved in both strategies.

Keywords: Meta-analysis, acceptance, reappraisal, emotion regulation

References: [1] Stephan F. Taylor, Israel Liberzon APA. - 2007. - Vol. 11. - pp. 413-418; [2] Grecucci Alessandro, Messina Irene, Amodeo Letizia, Lapomarda Gaia, Crescentini Cristiano, Dadomo Harold, Panzeri Marta, Theuninck Anthony, Frederickson Jon Front. Psychol.. - 2020. - Vol. 11. - p. 930; [3] Beauregard Mario Prog Neurobiol. - 2007. - Vol. 81. - pp. 218-36; [4] Gross James J. Cognition Emotion. - 1999. - Vol. 13. - pp. 551-573; [5] Eickhoff SB Laird AR, Grefkes C, Wang LE, Zilles K, Fox PT Hum Brain Mapp. - 2009. - Vol. 30. - pp. 2907-26.

The role of the right inferior frontal gyrus in the perception and experience of emotions: a meta-analysis on anger

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XXXIV cycle (Tutor: Alessandro Grecucci)

The ability to understand emotions in others plays a key role in our interpersonal interactions, indeed different studies investigated this topic. However, fewer studies focused on the common brain areas that are activated during both the perception of emotions in others and the personal experience of the same emotion.
To better understand this issue we performed an activation-likelihood-estimation meta-analysis of human neuroimaging studies. In particular, we took into account the neural basis of anger, an emotion whose neural bases are still under debate.
We identified 61 anger-related studies from a PubMed search, 26 involving the subjective experience of anger and 35 involving the perception of angry stimuli (faces or voices). We used Ginger ALE (http://www.brainmap.org) to perform our analyses. Stimuli ALE maps were thresholded at the cluster level (P-value 0.05) using 1000 permutations with a voxel-level uncorrected P- value of 0.001. The minimum cluster size was set to 200 mm3.
Our results showed that anger perception involved the amygdala, the right superior temporal gyrus, the right fusiform and the right inferior frontal gyrus. On the other hand, the experience of anger involved bilateral activations of the insula and the ventrolateral prefrontal cortex. Moreover, the conjunction analysis between the perception of this emotion in others and its subjective experience showed brain activity in the right inferior frontal gyrus.
We propose that this region could be responsible of a first conceptualization of anger that is shared when the emotion is perceived in others or subjectively experienced [1; 2]. This process can be followed by other well-known mechanisms that characterize the inferior frontal gyrus, such as the regulation of the emotional experience (e.g. reappraisal) and behaviors (e.g. inhibition).

Keywords: anger, meta-analysis, emotion perception, emotion experience, neural bases

References: [1] Sorella S, Grecucci A, Piretti L, Job R, NeuroImage, 2021, 230:117777; [2] Lieberman MD, Eisenberger NI, Crockett MJ, Tom SM, Pfeifer JH, Way BM., Psychol. Sci., 2007, 18(5), 421-428.

On my Way! G1 and G2 Teenagers. Learning and Resilience Strategies in Italian Compulsory School. A comparison between Trentino and Lombardy

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XXXVI cycle (Tutors: Paola Venuti, Remo Job)

The Italian school system has been undergoing a profound cultural change for more than thirty years: the protagonists are students with a migratory background characterized by multiple cultural profiles reflected on the social level of the school population through the implementation of training courses, of scholastic and extracurricular orientation, of inclusion or exclusion both towards the peer groups of other immigrant students and those of Italian origin [1].

The issue of identity unites migratory experiences and adolescence: since the school is the natural environment of coexistence among adolescents, mirroring much more complex processes, the present research investigates students' emotions and feelings within the paradigm of Inclusion and Special Needs Education.

The main purpose of the research conducted with a mix-method is the investigation of the resilience processes that first and second generation adolescents face in the training and educational path, in particular their own perception of risk or protection factors connected to the school system which can determine inclusion or exclusion from the social system, educational and professional success or failure, cohesion or deviance towards other peer groups. Furthermore, through an experimentation on the metacognitive strategies used in the second language learning the students will evaluate which teaching methodologies respond more adequately to their needs and to the purposes of linguistic acquisition.

The three dimensions of Inclusion perception, Resilience and Learning to Learn strategies will be represented using the new DIMoR Model of Resilience, a dynamic interactive model for education and learning context with a holistic and analytical approach [2].

The research conducted empirically through students' voices aims to compare two different approaches within the same model of the italian inclusion paradigm: ordinary schools in the province of Trento and that of the CPIAs in the province of Mantua, seeking for differences in the resilience strategies, emotions, expectations and school orientation choices.

Keywords: education, inclusion, Italian as second language, learning, resilience

References: [1] Colombo, M., Santagati, M., Besozzi, E., Bonanomi, A., Nelle scuole plurali. Misure di integrazione degli alunni stranieri, Franco Angeli, Milano 2014, 260, p. 159; [2] Ahmed Shafi, A., Templeton, S., Middleton, T., Millican, R., Vare, P., Pritchard, R., & Hatley, J. Towards a dynamic interactive model of resilience (DIMoR) for education and learning contexts. Emotional and Behavioural Difficulties, 2020, 25(2), 183-198.

The role of résumès' biodata in the explication of individual attributes and prediction of future orgainizational outcomes

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XXXVI cycle (Tutor: Lorenzo Avanzi)

Resumes are still one of the most common used selection practices to perform the first applicants' screening (Mishra & Venkatesan, 2021). The information contained in the resumes is called biodata (i.e. biographical data). Even if there is no univocal definition of this word (Breaugh, 2009), most authors agree with Mael's (1991) definition of biodata: biographical information represents work and extra-work (life) domains' historical events and experiences, that might have shaped the identity and, consequently, behavior of individuals. Moreover this definition fits well with one of the main models in the field of biographical data: the "Ecology Model for Biodata" (Mumford, Stokes and Owens, 1990) which, briefly synthesizing, supports the influence role of life events on individual characteristics (like motivations, personality traits and abilities).

Even before the contribution of Mumford and colleagues, recruiters were familiar with the use of applicants' biodata as a selection practice. Previous literature is dense of evidence supporting the good criterion validity of biodata in predicting organizational outcomes (like job performance and turnover behaviors). One still open question is about how to interpret the prediction of organizational outcomes, in terms of psychological constructs. In this concern Weaver (2017) stated that "In the case of biodata and resumes, we do not know exactly which applicant characteristics are driving performance — all we know is that something is driving it". Most of the times, indeed, human resources specialists focus on the predictive role of biodata toward organizational outcomes (e.g. job performance), without achieving any structured investigation on the meaning of these relations.

Therefore the aim of the present project is to study the relations between biodata and, both, personality traits and future organizational outcomes of applicants. Cole, Field and Giles (2003) have already confirmed the possibility to infer applicant personality traits from their resumes and there is a considerable amount of literature supporting the possibility to predict applicants' future performance from their previous life experiences (e.g. Barrick and Zimmerman, 2005). This project aspires to answer to the call for convergent validity studies in selection research and practice and aims to provide first-hand instruments and insights to recruiters and organizations.

Keywords: personnel selection, resume screening, biodata (biographical information), personality traits, organizational outcomes

References: [1] Mishra H., Venkatesan M.J., Organ. Chang. Manag., 2021, 34, 525-542; [2] Breaugh J.A., Hum. Resour. Manag. Rev., 2009, 19, 219–231; [3] Mael F.A., Pers. Psychol. 1991, 44, 763-792; [4] Mumford M.D., Stokes G.S., Owens W.A., Hillsdale, NJ. Lawrence Erlbaum Associates (1990); [5] Weaver J., PhD Thesis. Seattle Pacific University, 2017; [6] Cole M.S., Feild H.S., Giles W.F., Appl. HRM Res. 2003, 8, 51-62; [7] Barrick M.R., Zimmerman R.D. J. of Appl. Psychol., 2005, 90, 159–166.

Keywords index