PROJECT 1

DoS: Anna Lucia Ogliari

Title: Multiple neural, cognitive-behavioral and emotional endophenotypes as developmental precursors of substance use disorders: homotypic or heterotypic continuity?

Link to OSR/UniSR personal page:
http://www.unisr.it/persona.asp?id=6089&linguacv=english

Project description (Number of characters, including spaces: 2.000 - 3.000):

Longitudinal studies among adolescents have shown that early impairments in neurocognitive domains linked to emotional dysregulation and impulsivity are involved in the development of substance use disorders (SUDs) in adulthood (Hill & O’Brien, 2015). The study of endophenotypes has also highlighted that modification of electrophysiological brain activity (e.g., P300, error-related negativity) should be considered as developmental antecedents of SUDs (Bertoletti et al., 2014; Euser, et al., 2012). However, the functional relationships among these levels of functioning is still unclear, especially considering different developmental trajectories of SUDs (i.e., homotypic and heterotypic continuity). Therefore, this project aims to 1) investigate different potential endophenotypes of SUDs (i.e., emotional and neuro-cognitive functioning, brain activity); 2) clarifying how these mechanisms interact with each other in explaining patterns of homotypic and heterotypic continuity linked to the onset of SUDs.

This project could be implemented in light of an integration of multiple assessment methods, a well-recognized approach in neuroscience research. Specifically, self-report trait-based measures could be associated to task-oriented evaluations of neuropsychological domains, together with high temporal resolution records of brain activity (e.g., electroencephalography [EEG] and ERP too). Furthermore, a genetic assessment might be included focusing on genes related to reward processing (e.g., DRD1, DRD2, DRD3, DRD4, and DRD5) and compulsive drug-seeking behaviors (e.g., GRIN2C, GRM7 and GRM8) (Prom-Wormley et al., 2017).

Patients will be recruited from Alcohol Dependence Treatment Unit of San Raffaele Hospital (Ville Turro site). The project will include 30 treatment-seeking individuals who met DSM-5 criteria for SUDs per year. During the first psychiatric clinical interview, patients will be asked the participation of their children (healthy first degree) in this project.

The project will be developed in the 3-years PhD program.

During the first year, the student will acquire skills to build experimental paradigms and administer related tasks. Particularly, the student will review theoretical principles of experimental methods in neuroscience and developmental psychopathology. Furthermore, the student will develop technical skills for the use of...
specific devices in order to administer experimental tasks and collect data. Therefore, the first year will be dedicated to the definition of appropriate experimental procedures to empirically investigate the aims of the project.

The second and the third year will be dedicated to data collection and analysis. Considering the investigation of endophenotypes of SUDs, data extracted from individuals with SUDs and their healthy first degree relatives will be compared to one revealed in a balanced age- and gender-matched healthy control group. Particularly, the functioning of parents affected from SUDs and their children (N ~ 120: −30 patients and their children per year 2 and 3) will be compared to healthy control parent-child dyads (N ~ 120 30 healthy control and their children per year 2 and 3).

The third year will be also focused on writing the final dissertation.

The results of this project might significantly improve the knowledge of developmental antecedents of SUDs through the empirical investigation of different endophenotypes. Furthermore, this project could represent a relevant contribution in identifying key neuro-cognitive and emotional targets for effective substance abuse prevention programs.

**Skills to be acquired by the student:**

- deep knowledge of research methods in developmental psychopathology
- deep knowledge on core psychopathological mechanisms of SUDs
- data collection and analysis, processing of neurophysiological signals
- competencies in statistics and related statistical software
- competencies in programming

**References** (max. 3)

