PROJECT

Supervisor:	Andrea Fossati
Title:	Neuropsychology of Disinhibition: Re-defining the measurement models and psychometric properties of the Stop Signal Task and Iowa Gambling Task
Curriculum:	Scienze Cognitive e Comportamentali/Cognitive and Behavioral Sciences
Link to the personal page of the University or relevant hospital site website:	https://www.unisr.it/docenti/f/fossati-andrea

Description of the Project (max 3,000 characters including spaces)

Background/gap of knowledge

Lack of inhibition/suppression is a common liability for a number of maladaptive behaviors (e.g., ADHD, Conduct Disorder, pathological gambling), research regarding the endophenotypes of impulsivity has the potential to inform our understanding of a broad range of psychopathology. Lab tasks often are intended to capture behavioral manifestations of underlying traits. However, the psychometric properties and measurement models of two widely used tasks, namely, the Stop-signal task (SST) and the Iowa Gambling Task (IGT) have been called into question. The SST has been extensively used to assess the fundamental cognitive-control function of inhibitory control over motor behavior. The critical behavioral parameter describing stopping efficacy is the Stop-signal response time (SSRT).

Rationale and hypothesis

It has been argued that SSRT estimates can be strongly distorted if participants strategically slow down their responses over the course of the experiment, resulting in the SSRT no longer reliably representing response-inhibition efficacy. Previous findings highlighted that different SSRT estimation procedures can strongly influence the distribution of SSRT values across subjects, which in turn can ramify into correlational analyses with other parameters, including

brain–behavior correlations. The IGT is one of the most popular experimental paradigms for comparing complex decision-making across groups. Most commonly, IGT behavior is analyzed using frequentist tests to compare performance across groups, and to compare inferred parameters of cognitive models developed for the IGT. Notably, a Bayesian alternative for comparing performance, and a suite of different complementary model-based methods for assessing the cognitive processes underlying IGT performance has been proposed. IGT modeling analyses consistently challenge the notion that individual differences in intuitive and deliberate decision styles have a broad impact on decision-making.

Objectives and specific aims

Against this background, the present research project would aim at testing the psychometric properties and measurement models of advanced versions of the IGT and SST in large (N>300) normative samples of community- dwelling adults and adolescents who will be recruited for the purposes of the present study.

Expected outcomes

The first year of the PhD program, will be devoted to the collection of participants' data and to the implementation of different SSRT/IGT advanced modeling methods. During the second year, the focus will be on to the evaluation of the assessment of the reliability and convergent/discriminant validity of the IGT and SST with respect to the go-no go task, CPT memory and verbal fluency tasks in the adult sample. Finally, the third year would be devoted to the comparison of SSRT/IGT advanced modeling methods across adolescents and adults in terms of reliability and validity.

Skills that the student should acquire (max. 600 characters including spaces):

Administering and scoring neuropsychological tasks for the assessment of impulsivity Design of studies for assessing the psychometric properties of neuropsychological tasks

Measurement modelling for impulsivity assessment

Multivariate statistical analyses

Sample size estimation and power analysis for multivariate studies. Randomization procedures

Experimental designs for psychometrics

Advanced reliability theory

Statistical software for advanced psychometric analysis and laboratory task development and administration (R, Mplus, Matlab)

References (max. 15)

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Jonas, K. G., & Markon, K. E. (2014). A meta-analytic evaluation of the endophenotype hypothesis: Effects of measurement paradigm in the psychiatric genetics of impulsivity. Journal of Abnormal Psychology, 123, 660- 675.

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