

Sensory Processing Sensitivity and drug use recovery pathways

STANDUP



START: Sept 2017

- Judith Homberg - Nijmegen**
- Fabio Fumagalli - Milan**
- Boris Quednow - Zurich**
- Maria Melchior - Paris**



Evolutionary emergence of responsive and unresponsive personalities

Max Wolf[†], G. Sander van Doorn[‡], and Franz J. Weissing^{†§}

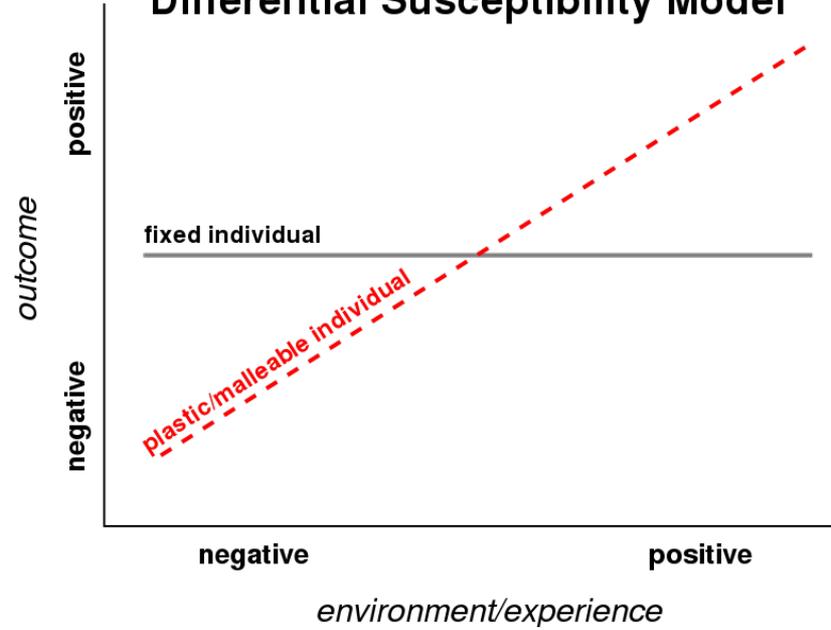
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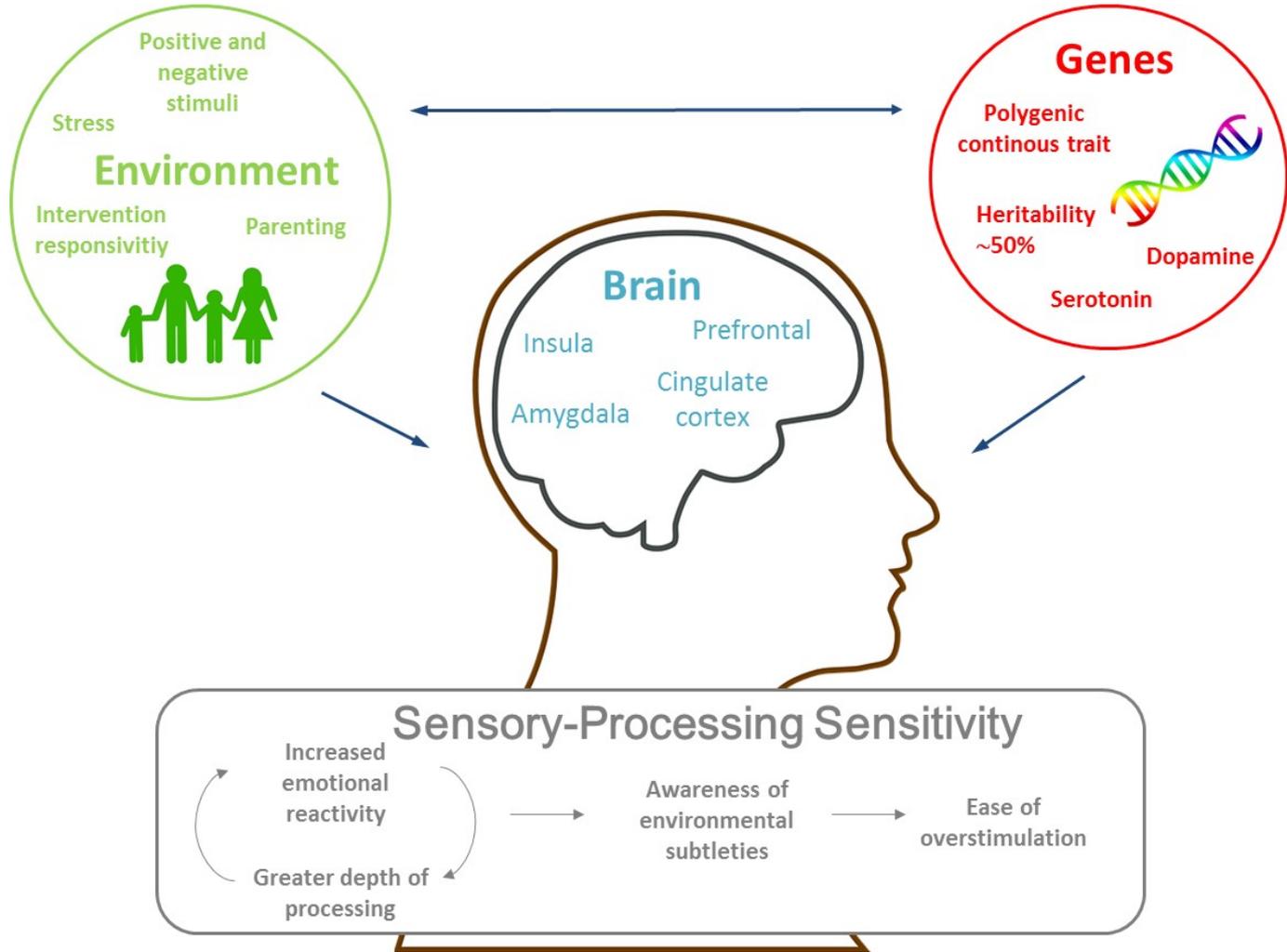
Two types of behavioral responses to new or threatening situations can be observed:

- Some individuals are bold, aggressive and impulsive; they quickly form a routine and are not influenced by (minor) environmental changes
- Other individuals are cautious and fearful; they avoid forming a routine and remain attentive to (minor) environmental changes



Differential Susceptibility Model





Aims and approach



We aim to elucidate whether: (1a) overstimulation increases drug use in individuals high on SPS individuals and (1b) supportive social environmental factors can buffer against overstimulation and reduce drug use in individuals high on SPS.

➔ WORK PACKAGE 1.

Partners: **Melchior and Quednow: human cohort data analyses**
Homberg: experimental studies using animals

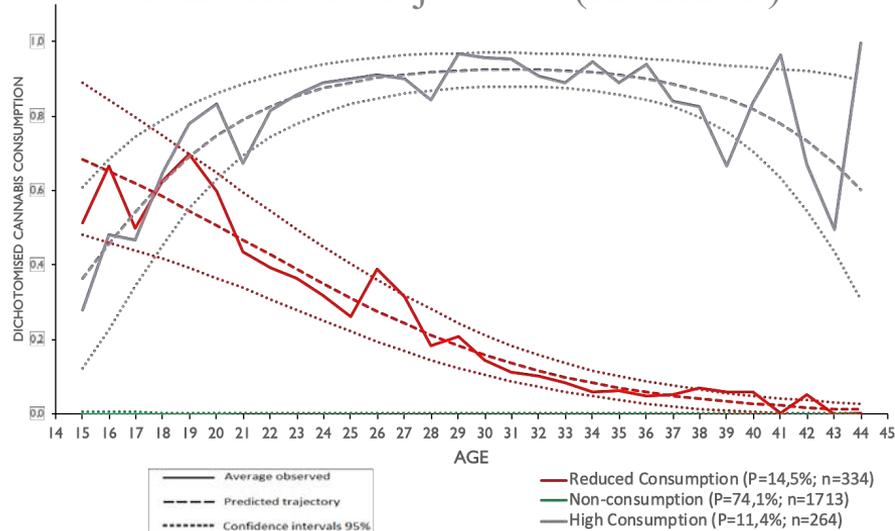
Additionally, we aim to identify (2) biomarkers of SPS-environment-drug use pathway links.

➔ WORK PACKAGE 2.

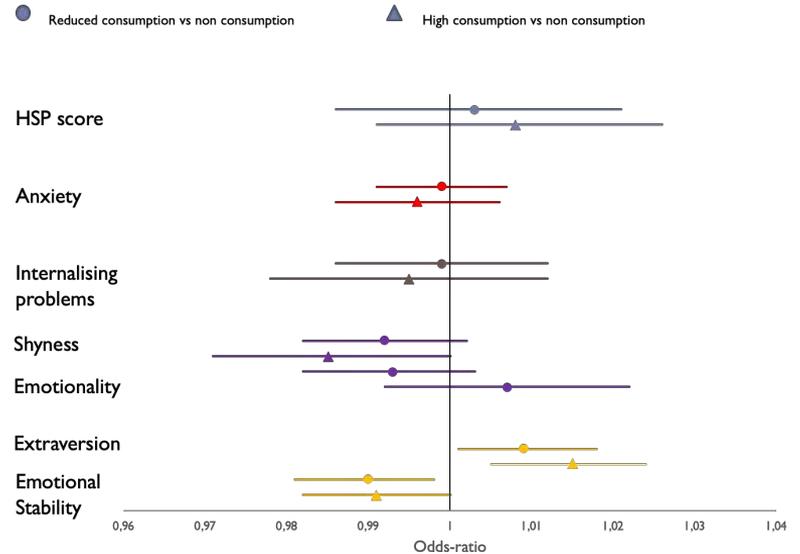
Partner: **Fumagalli: molecular analyses**



Cannabis use trajectories (12 months)



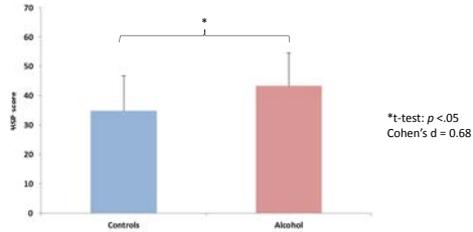
Cannabis: Multivariate multinomial logistic regression



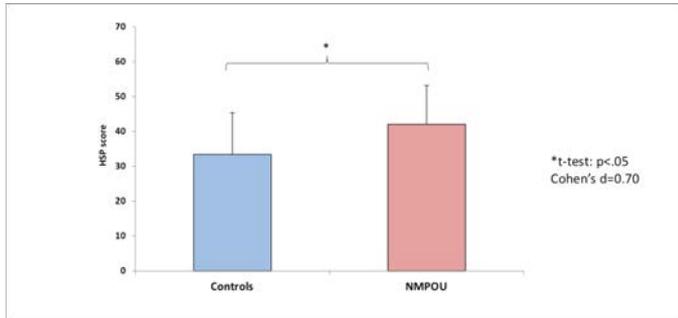
> Effects of environment and genotype



Alcohol



Opioid



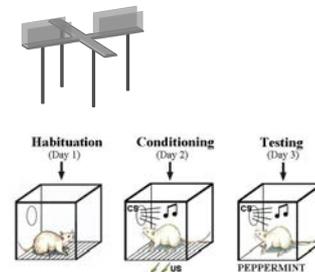
- Opioid users and alcohol dependent patients but not cocaine users show elevated SPS scores.
- In opioid users, drug use severity is inversely correlated with SPS scores indicating that recreational use rather than severe addiction is associated with increased sensory sensitivity.
- In cocaine users, duration of cocaine use but not weekly consumption is positively correlated with SPS.
- SPS is positively correlated with symptoms of depression, ADHD, and anxiety, as well as with impulsivity and childhood trauma scores.

> Effects of environment



SPS facets in humans and rats

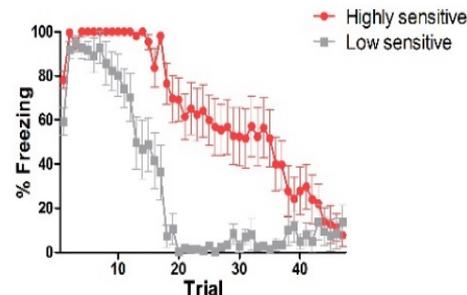
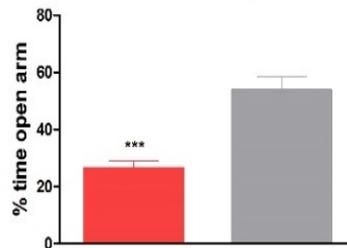
Facets	..in humans	..in rats
Increased emotionality 1	High reactivity to emotional pictures	Increased emotionality <u>Test:</u> elevated plus maze
Increased information processing 2	'pause-to-check' memory before action in new situations	Freezing in new situations <u>Test:</u> cued fear memory retrieval in new context

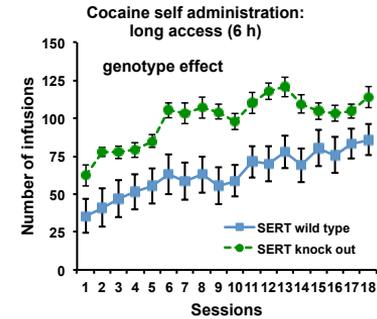
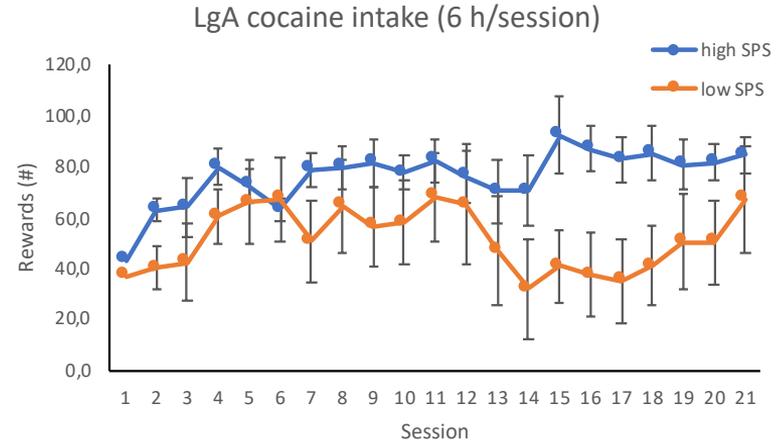
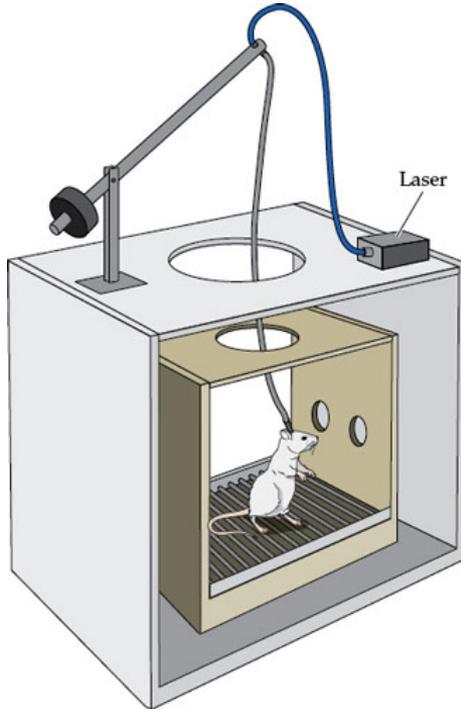


60 wild-type rats



Top 25% of scores = high sensitive
Bottom 25% of scores = low sensitive





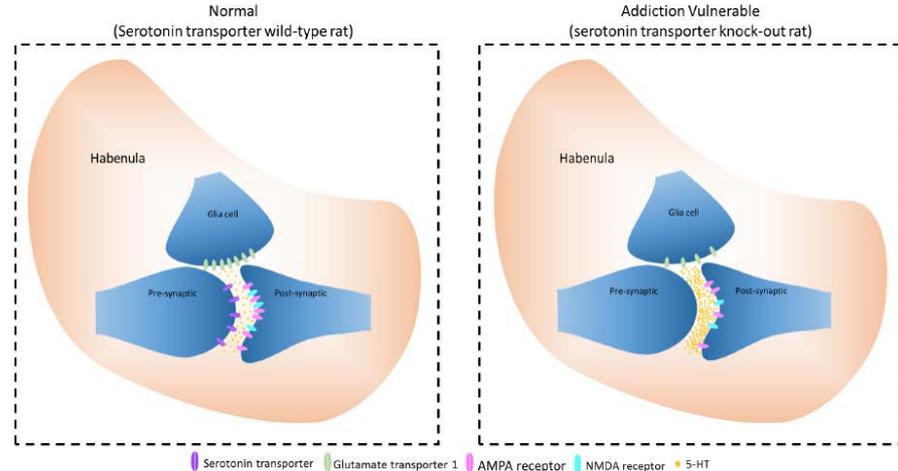
> Negative and positive environmental manipulations ongoing



Increased cocaine self-administration in rats lacking the serotonin transporter: a role for glutamatergic signaling in the habenula

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> Molecular analyses on SPS rat model and blood cells from humans

High societal interest



IMPACT

Society is craving for information about SPS. Impact will depend on whether associations between SPS, drug use and environmental influences are found in humans.