Final Report Minerva Scholarship – Sharina Hamm

Dates of stay abroad	from: 05/09/20022 up to: 19/12/2022
Academic year	2022 / 2023
Name of University abroad	Yale University
City/town	New Haven, CT
Country	USA
Leiden study program	MSc Psychology (research) - Clinical and Health track
Bachelor / Master	Master
Faculty	Social and Behavioral Sciences

Department and Laboratory

For my Clinical and Health Research MSc Internship, I was invited to join the Rutledge Lab at Yale University throughout the Fall 2022 semester and was supported by the Minerva Scholarship Fund. The Rutledge Lab is a clinical psychology and neuroscience lab of the Yale Department of Psychology. Its overall aim is to build computational models that explain human learning and decision-making. Researchers in the lab aim to describe factors that determine affective states like happiness and the relationship between those states and behavior (Rutledge et al., 2014). Mathematical models in psychology are built to concretize and represent a specific property of an established theory. Its advantage over verbal theories is that those are subject to assumptions, inconsistencies, and vague definitions while computational models can incorporate complex analysis levels and allow for precise control (Guest & Martin, 2021). The "Happiness Quest" smartphone app is an essential part of the lab and is used in a majority of experiments. It compromises various gambling games that allow researchers to investigate decision-making. Gaining insight into this machine learning data analysis method is therefore of high relevance for psychological research.

Projects and Tasks

As a graduate research intern, I primarily worked on two projects. First, I was involved in a large-scale multimodal depression study supervised by Principal Investigators Robb Rutledge that investigates the heterogeneity of depressive symptoms using fMRI, behavioral tasks, and machine learning methods. The aim of this study is to test the validity of RDoC Positive Valence Systems dimensional constructs by looking at the ways in which prediction errors map onto depression dimensions and their neural circuitries. My responsibilities were pre-screening and remote consenting (vulnerable) participants, engaging in recruitment, assisting with fMRI scans, and working on ethics amendments. It was great to get insight into the organization of a large-scale research study and to acquire hands-on experience working with neuroscientific research methods.

Second, I independently worked on a project that investigates the influence of social feedback (acceptance/rejection) and social comparison on self-esteem in a decision-making task. This data has been collected a few years ago at Leiden University. To work on this data, I learned programming in MATLAB by following a computational modeling class from the Yale Graduate School of Arts and Sciences. The preliminary analysis of this data confirms previous research by Will et al., (2017) and shows that self-esteem does not only depend on whether people are accepted or rejected by their

peers but whether they are more accepted or rejected than they expected (social prediction error). Additionally, I found that by being rejected and comparing yourself to someone else, the effect is attenuated when another person is also rejected and amplified when another person is accepted. Moreover, the analysis shows that overall people are more negatively affected by rejection than positively affected by acceptance. In the coming months, I am hoping to extend the self-esteem model by Will et al., (2017) with additional parameter(s) of feelings evoked by social comparison.

Next to working on these research projects, I audited the graduate class "Advanced Psychopathology" by Jutta Joormann and attended weekly colloquia where professors from other reputable US universities presented their ongoing research. Diving into these research topics and being able to follow lectures or courses from Yale inspired me to further investigate psychopathological risk factors and their dynamics in social situations.

Contribution to science

The preliminary analysis I carried out as part of my internships can give us great insight into how being evaluated by peers can influence our self-esteem and in what ways our social environment may influence how we make inferences about ourselves. Low self-esteem is a major risk factor for a wide range of psychopathologies such as generalized anxiety, major depression, or PTSD (Adams et al., 2006; Sowislo & Orth, 2013). Nevertheless, studying subjective momentary feelings such as self-esteem is challenging as it is dependent on self-report and thus subject to bias. It is therefore crucial to investigate these complex cognitive mechanisms further and make advances in capturing these in mathematical constructs which will be the next step of my analysis.

Future plans

In the coming months, I am hoping to finish the remaining courses of my research master's and will return to Yale University to write my thesis in a different clinical psychology lab. After finishing my degree, I would like to pursue a Ph.D. at a reputable research institute where I aim to work on early risk factors of internalizing psychopathologies to one day develop early intervention strategies. Throughout this research internship, I have not only acquired great programming and machine-learning skills but also further explored my research interests by having various thought-provoking conversations with researchers. I am grateful to have received this incredible opportunity.

Literature

Adams, R. E., & Boscarino, J. A. (2006). Predictors of PTSD and delayed PTSD after disaster: The impact of exposure and psychosocial resources. *The Journal of mental disease*, *194*(7), 485.

Guest, O., & Martin, A. E. (2021). How computational modeling can force theory building in psychological science. *Perspectives on Psychological Science*, *16*(4), 789-802.

Will, G. J., Rutledge, R. B., Moutoussis, M., & Dolan, R. J. (2017). Neural and computational processes underlying dynamic changes in self-esteem. *Elife*, *6*, e28098.

Rutledge, R. B., Skandali, N., Dayan, P., & Dolan, R. J. (2014). A computational and neural model of momentary subjective well-being. *Proceedings of the National Academy of Sciences*, *111*(33), 12252-12257.

Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological bulletin*, *139*(1), 213.

Appendix A – Photos from my internship at Yale University

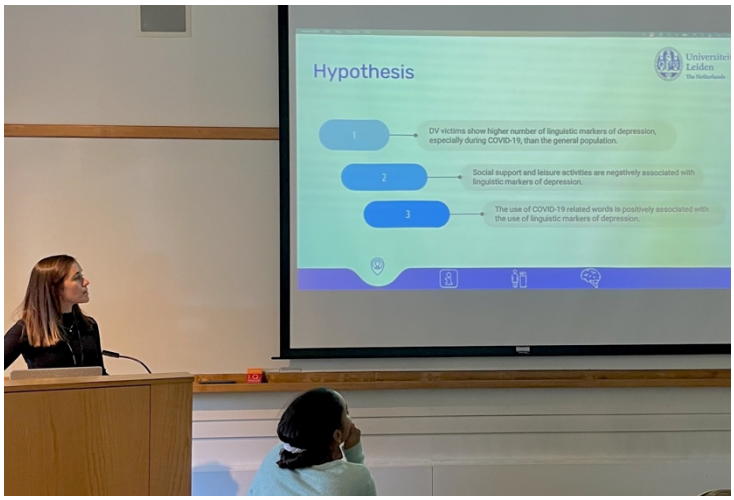

Figure 1. *Presenting my first publication*

Figure 2. *Replicating a computational model*

Figure 3. *Rutledge Lab Group Picture with PI Robb Rutledge*

Figure 4. *Rutledge Lab Social Activity*

Figure 5. *Yale Sterling Memorial Library*

Figure 6. *Yale Psychology Department*