How are activities in different Life-areas perceived? A behavioral study on depressed patients {…*work in progress*}

Darius A. Rohani*, Andrea Quemada Lopategui*, Nanna Tuxen, Maria Faurholt-Jepsen, Lars V. Kessing**, Jakob E. Bardram***

*Department of Applied Mathematics and Computer Science, Technical University of Denmark, Lyngby, Denmark
**Psychiatric Center Copenhagen, Copenhagen University Hospital, Rigshospitalet, Blegdamsvej 9, Copenhagen, Denmark

Background

- Behavioral activation (BA) has shown to be a simple yet effective therapy for depressive patients [1].
- The method relies on collection of patient reported activity data. Together with a psychologist they locate activities promoting healthy/unhealthy behavior and then plan the following week.
- We developed an app to support BA in therapy.

Objective

Collect highly-sampled activity data for a prolonged time:

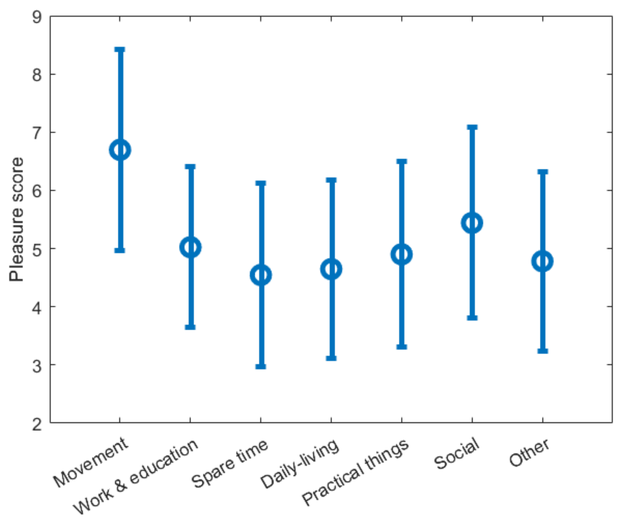
- Can we reproduce the paper-pen based activity scores?
- Should we design for personalization?

Apriori-knowledge

Last symposium: presented results from 2,480 hours of transcribed activity data from patients with depressive disorders [2]. Activities were divided into six life-areas.

- Compliance above 80% for all patients
- Movement-related activities were associated with the highest Pleasure (most enjoyable activities)

Figure 1: The grand average Pleasure of activities divided in 6 life-areas. +/- 1 standard deviation is shown as error bars.



Methods

We digitalized the current paper-pen based activity sampling, by developing an app to collect activities.
We added the score Mastery 'The effort it took to perform an activity' [3].

Recruited 6 patients with a diagnose of either unipolar- or bipolar disorder to use the app for 4 weeks.

2 x Two-way ANOVA, followed by Kruskal-Wallis test due to non-normality on the residuals.

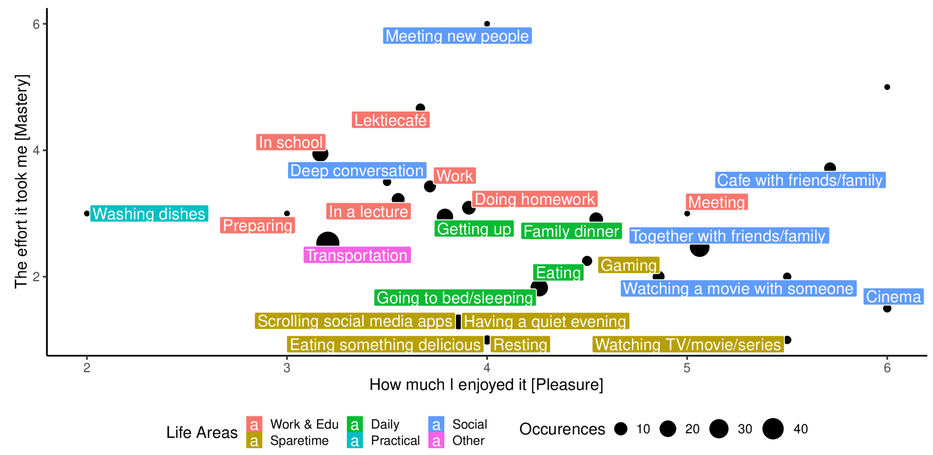
- Factor 1: Life area (6 levels)
- Factor 2: Patient ID (6 levels)
- Dependent variables: Pleasure, Mastery

Pairwise analysis on Life-area with Wilcoxon Rank Sum test (multiple-comparisons corrected by FDR, as implemented in R *stat* vs. 3.5.2)

Results

- N = 1684 activities were registered on the app (P8398 is shown in Fig. 2). Pleasure and Mastery score was reported in 96% (n = 1609) of the activities. The count is shown in Fig. 3.

Figure 2: Activities reported by patient: p8398



- Reproducible findings in high Pleasure life-areas (Movement, Social), when comparing Pleasure scores from paper-pen (Fig. 1) and app (Fig. 4).

Figure 3: Number of activities registered

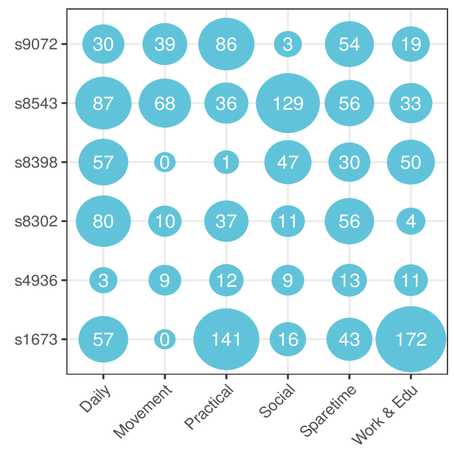
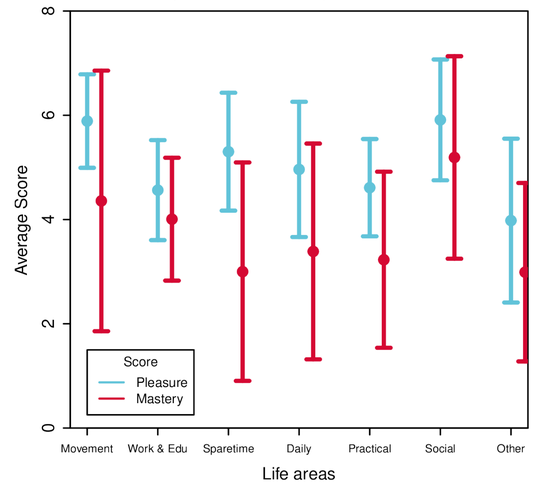


Figure 4: Average Pleasure (light-blue), and Mastery (dark-red) for all patients



- The non-parametric Kruskal-Wallis test on the full model is shown in Table 1 and reveals a significant effect of all test conditions on the dependent variables.

PLEASURE			MASTERY		
Factor	$\chi^2(df)$	p-value	Factor	$\chi^2(df)$	p-value
F1	284.9 (5)	<.001	F1	183.9 (5)	<.001
F2	497.7 (5)	<.001	F2	1119.2 (5)	<.001
F1*F2	700.3 (33)	<.001	F1*F2	1212.0 (33)	<.001

Table 1: Kruskal-Wallis test statistics for Factor 1 (Life-area), Factor 2 (Patients) and their interaction.

- A Wilcoxon pairwise comparisons of Life-area on Pleasure reveal that the Life –areas are statistical significant in all cases except: (i) Movement and Social, (ii) Work & Edu. and Practical as shown in Table 2

		<.001	.542	<.001	.018	<.001
	<.001		<.001	.002	<.001	.009
	<.001	<.001		<.001	.023	<.001
	<.001	.389	<.001		<.001	<.001
	.008	<.001	<.001	<.001		<.001
	<.001	<.001	.700	<.001	<.001	

Table 2: Pairwise analysis of life-area for Pleasure (light-blue) and Mastery (dark-red)

Conclusion

- Activities and the perceived Pleasure and Mastery is highly individual (Pleasure F2: $\chi^2(5) = 497.70, p < .001$).
- Although activities within some life-areas achieve same Pleasure, they require totally different effort to initiate
- The results in this poster, suggest that similar apps in the area of BA should design for personalization

Acknowledgements

This research is funded by the Innovation Fund Denmark through the RADMIS project and the Copenhagen Center for Health Technology (CACHET)

References

[1] Dimidjian S, et al. Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the acute treatment of adults with major depression. J Consult Clin Psychol 2006;74(4):658–70.
[2] Rohani DA, et al. Data-Driven Learning in High-Resolution Activity Sampling From Patients With Bipolar Depression: Mixed-Methods Study. JMIR Ment Heal 2018;5(2):e10122.
[3] Dimidjian S, et al. The Origins and Current Status of Behavioral Activation Treatments for Depression. Annu Rev Clin Psychol 2011;7(1):1–38.