

Making Self-Report Ready for Dynamics: the Impact of Low Sampling Frequency and Bandwidth on Recurrence Quantification Analysis in Idiographic Ecological Momentary Assessment

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2 ABSTRACT

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1 INTRODUCTION

9 Self-report scales have a long historical precedent in psychology. Ecological momentary assessment (EMA)
10 has made it possible to construct time series based on self-report scales. This approach allows mapping
11 within-person fluctuations of psychological constructs in a systematic manner [ConnerExperienceSam-
12 plingMethods2009]. Data collected using these methods display all markers of complex dynamics, which
13 means that the future trajectory of the data generated using these methods is only predictable in the
14 short-term, and that observations are dependent on the state of the system and its externalities at earlier
15 time points [OlthofComplexityPsychologicalSelfratings2020]. While traditional statistical methods are
16 frequently and fruitfully employed to analyze data generated using EMA, these methods are not suitable
17 for capturing complex temporal within-person patterns [JenkinsAffectVariabilityPredictability2020;
18 OlthofPsychologicalDynamicsAre2020].

19 Time-dependent within-person dynamics have been neglected in recent history [MolenaarManifestoPs-
20 ychologyIdiographic2004]. The methods in this paradigm are still in relative infancy within a psychological
21 context. They are often imported from complex dynamical systems theory, which is an area of mathematics
22 that concerns itself with the study of time-dependent dynamics of systems. A popular analysis technique
23 is called Recurrence Quantification Analysis (RQA). It results in the identification of recurrent patterns,
24 or repetitions, in a time series [Webber2005recurrence]. One can then derive several indicators of the

25 stability, predictability, and dynamical behavior of data from these recurrences. This method was developed
26 in the physical sciences under the assumption that measurements can be retrieved at great frequency
27 and at high resolution, to an extent that is impossible when relying on self-report scales. Hence, it is
28 necessary to systematically assess the consequences of utilizing EMA data on the quality of RQA output
29 [haslbeckRecoveringWithinPersonDynamics2022].

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31 duction should be succinct, with no subheadings (3). For Case Reports the Introduction should include
32 symptoms at presentation (5), physical exams and lab results (1).

2 MATERIALS AND METHODS

33 2.1 Software

34 2.2 Toy model

35 For this study, I will use the

3 RESULTS

4 DISCUSSION

36 The results of this study suggest that applying recurrence methods in

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40 6.1 Heading Levels

41 6.2 Level 2

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43 6.2.1.1 Level 4

44 6.2.1.1.1 Level 5

45 6.3 Equations

46 Equations should be inserted in editable format from the equation editor.

$$\sum x + y = Z \quad (1)$$

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Details of all funding sources should be provided, including grant numbers if applicable. Please ensure to add all necessary funding information, as after publication this is no longer possible.

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SUPPLEMENTAL DATA

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DATA AVAILABILITY STATEMENT

The datasets [GENERATED/ANALYZED] for this study can be found in the [NAME OF REPOSITORY] [LINK].

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