Temporal Network Analysis of Key Features of Rumination and Attention Control:

the Negative Valence of Thoughts Drives the Other Features of Rumination

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THEORETICAL BACKGROUND

→ Rumination =
- repetitive, passive, self-focused thoughts about the content, causes, and consequences of one's affective state without taking any problem-solving action [1].
- Usually conceptualized as a unitary construct and measured using a total sum-score [2].

→ Yet, prominent theories of rumination discuss several features of ruminative thoughts [1].

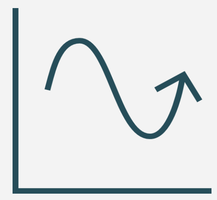
→ And, recent research suggests that **rumination may be best conceptualized and measured as a multifaceted construct [3,4,5]**.

→ One **potential mechanism** involved in rumination is **executive/attention control [6]**.

→ Cross-sectional, experimental, and longitudinal studies support a bidirectional association [7,8]:

- Rumination can lead to poorer attention control but poorer attention control might also lead to increased rumination because people are unable to disengage their attention from their thoughts.

! These associations remain to be studied in daily life.

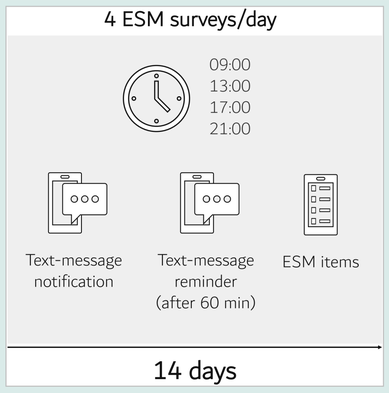


→ Researchers can use the **experience sampling method (ESM) [9]** to measure psychological processes and symptoms as they occur in daily life, . ESM consists of measuring variables once or several times a day in everyday life a day using smartphones or other means.

AIM OF THE STUDY

We used the experience sampling method (ESM) and temporal network analysis to investigate the dynamic interplay between five key features of rumination and attention control.

METHOD



Sample

N = 39 (unselected community sample).

Data analysis

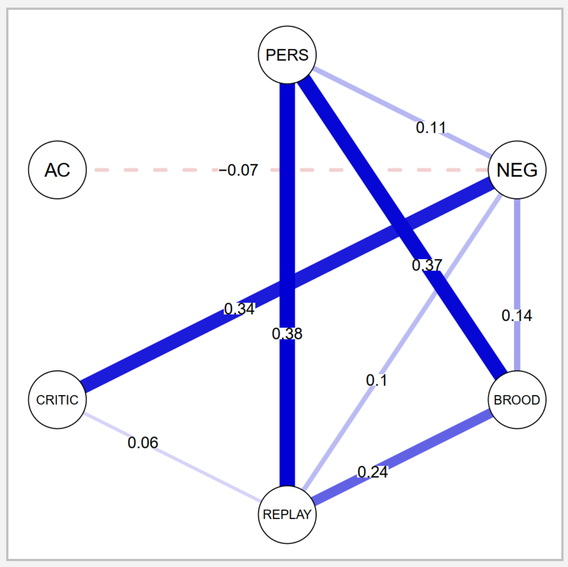
Multilevel vector autoregressive model (mlVAR R package) [10].

Method

Participants answered 4 surveys a day, delivered on their smartphones, for 14 days (2013 observations in total; 92.17% compliance rate).

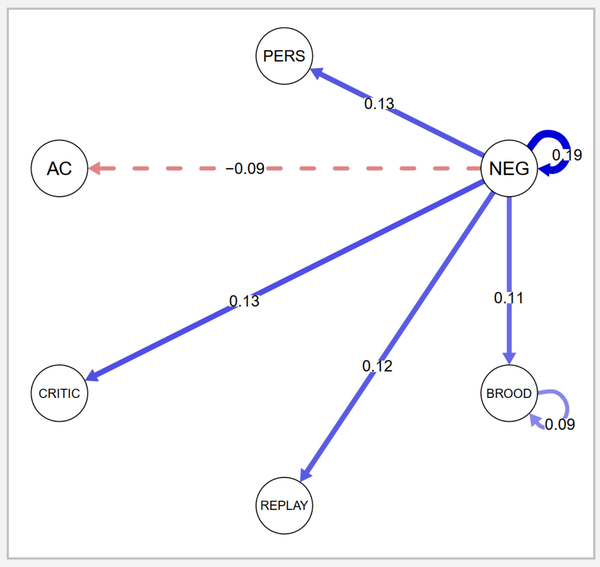
ESM Items (answers ranging from 0 to 100) [see 11]		
Perseveration	PERS	How much time did you spend thinking of one or more emotional experiences?
Negativity	NEG	To what extent were your thoughts negative?
Brooding	BROOD	How much did you think about the causes and consequences of emotional experiences?
Replaying	REPLAY	To what extend have you mentally replayed emotional experiences that you've had?
Criticism	CRITIC	To what extent were your thoughts self-critical?
Attention Control	AC	When I wanted to deliberately concentrate on something, I was capable of ignoring environmental distractions (noise, notifications, visual distractors, ...)"

RESULTS



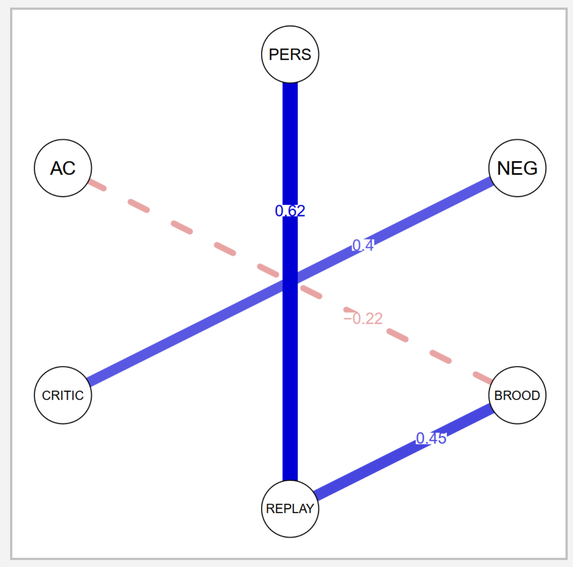
Contemporaneous network

→ Depicts the associations between variables within the same time frame after controlling for the effect of variables at the previous time point and within the same time point.



Temporal network

→ Represents the extent to which variables predict themselves (i.e., autoregression) and each other from one time-point (t) to the next time-point (t + 1). The arrow depicts the direction of the prediction.



Between-subjects network

→ Depicts the associations between the person-level means of each participant for each variable.

DISCUSSION

→ The features of rumination act as a coherent system (i.e., each variable was related to at least one other variable) but are not interchangeable (i.e. they vary in strength of association and number of associations).

→ **Negativity** predicts itself strongly over time and is the only predictor of all the other features of rumination from one time point to the next.

→ These results are consistent with the habit-goal framework [12]: negative affect and goal-discrepancies can trigger rumination and both negativity and brooding predicted themselves.

→ Negativity of thoughts could serve as a proxy of affect and goal-discrepancies.

→ **Attention control** (AC) is negatively predicted by negativity on a temporal level. In contrast, at a between-subjects level, poorer AC is associated with a higher tendency to brood.

→ This is consistent with findings showing that inducing rumination leads to worse AC [13] and that rumination and AC are associated on a cross-sectional basis [7,8].

→ Interestingly, the features of rumination associated with AC are not the same on a temporal and between-subjects level.

→ Future research could further investigate these associations, for example by using computerized tasks.

TAKEAWAY

→ **The five features of rumination appear to be distinct and not interchangeable.**

→ **Examining each feature separetely may lead to better understanding the temporal course and maintenance factors of rumination.**

→ **Future studies could also examine the role of goal discrepancies and affect.**

→ **Our results provide evidence that the degree to which one's thoughts are negative appears to drive and maintain the other features of rumination and negatively predict attention control in everyday life.**

References

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