BRIEF CLINICAL REPORT

# The Short Version of the Metacognitive Anger Processing Scale (MAP-SV) – initial psychometric testing

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## Abstract

**Background:** The 26-item version of the Metacognitive Anger Processing Scale (MAP) has shown good psychometric properties in previous studies. However, there is a need for a shorter version of the scale. **Aims:** The aim of the present study is to psychometrically evaluate the 9-item Metacognitive Anger Processing Scale – Short Version (MAP-SV) in comparison with the original, 26-item version. **Method:** The 26-item MAP includes three subscales: rumination, positive beliefs and negative beliefs. Three items from each subscale were selected based on clinical validity to constitute the 9-item MAP-SV. A previous sample used for validation of the 26-item MAP was used for clinimetric testing. The sample included psychiatric patients ($n = 88$) and male forensic inpatients ($n = 54$). The MAP-SV was assessed according to scalability, convergent validity with general metacognition, and concurrent validity with anger measures. **Results:** The scalability of the 9-item MAP-SV was comparable to that of the original 26-item MAP in most psychometric tests. The Loevinger's coefficient of homogeneity for the total score of the MAP-SV items was 0.29 for the combined sample compared with 0.36 in the original MAP, indicating close to acceptable scalability. The alpha coefficient for the MAP-SV total score was 0.79. For the combined sample, Pearson inter-correlations between the subscales of the MAP-SV were highly correlated with the MAP-SV total score (ranging from .66 to .84). **Conclusions:** The 9-item MAP-SV showed good psychometric properties and can be used as a reliable tool for assessing self-reported metacognitive anger processing.

**Keywords:** anger; assessment tool; metacognitive anger processing; metacognitive beliefs; rumination; short version

## Introduction

The metacognitive approach, developed by Wells and colleagues, has gained substantial support in recent years (Wells, 2013). It proposes individually held, positive and negative beliefs about sustained thought processes, such as worry and rumination, as an important factor in a broad range of mental health issues (Wells, 2002). Dysregulated anger is one such clinically widespread problem, leading to the development of the 26-item Metacognitive Anger Processing Scale (MAP) for clinical use in populations with anger and/or aggression problems (Moeller, 2016; Moeller and Bech, 2019).

In order to be prioritized routinely in a busy clinical schedule, or in research assessment batteries, measures should pose the smallest possible burden regarding response time and scoring, as well as cognitive demands on the patient (Cella *et al.*, 2013). Speculatively, ensuring maximal engagement from the patient might heighten validity in responses. For this

purpose, the MAP-Short Version (MAP-SV) was developed using a clinimetric approach, selecting items based on clinical judgment of experienced clinicians, while attempting to retain the high psychometric standards of the original measure.

## Aims

The current study aimed to develop a short version of the 26-item MAP which measures metacognitive beliefs and rumination in relation to anger. It was tested whether the psychometric properties of the MAP-SV had reduced compared with the MAP focusing on scalability, convergent validity with general metacognition, discriminant validity with anxiety and depression, and concurrent validity with anger measures.

## Method

### Participants

In view of the relevance of anger among psychiatric and forensic patients, the sample consisted of psychiatric patients ($n = 88$) and male forensic in-patients ($n = 54$) (for details on the sample and recruitment, see Moeller and Bech, 2019). Participants were selected as a group of relevance for the target group for the tool, but not based on relevance at an individual level.

### Measures

The Metacognitive Anger Processing Scale (MAP; Moeller, 2016; Moeller and Bech, 2019) is a 26-item measure assessing metacognition in relation to anger on a 4-point scale (1 = never true, 2 = sometimes true, 3 = often true, 4 = always true). It has three subscales: (1) positive beliefs about anger (e.g. 'anger helps me solve problems'); (2) uncontrollable rumination (e.g. 'I cannot let go of angry thoughts'); and (3) negative beliefs about anger (e.g. 'anger could make me go mad'). The MAP has shown satisfactory psychometric properties regarding factor structure, internal reliability, test–re-test reliability and concurrent and convergent validity (Moeller and Bech, 2019).

Anger was measured with the Novaco Anger Scale (NAS) and the Stait Trait Anger eXpression Inventory (STAXI-2), metacognition was measured with the MetaCognitive Questionnaire (MCQ), anger rumination with the Anger Rumination Scale (ARS), and anxiety and depression with the Hospital Anxiety and Depression Scale (HADS).

### Procedure

Three items from each subscale (totalling nine items) were selected based on clinical validity by the first author and validated by Professor Raymond Novaco (personal communication, May 2018). The selected items were then subjected to similar psychometric tests as the original 26-item version to evaluate scalability and other psychometric properties, using the same dataset. Results on the combined sample are presented here; for results on the psychiatric patients and the male forensic inpatients investigated separately, see the Supplementary material.

## Results

Psychiatric patients had an average age of 38.1 years (range 16–74, $SD = 14.2$); 36 (47%) were male. Forensic male patients had an average age of 36.4 years (range 19–67, $SD$ 11.9).

### Scalability

The scalability of the MAP-SV was comparable to the longer version. The Loevinger's coefficient of homogeneity (Bech, 2012) for the total score of the nine MAP items was 0.29, compared with 0.36 in the MAP 26-item version, indicating almost acceptable scalability (coefficients of homogeneity from 0.20 to 0.29 belong in a questionable zone as to constitute a cumulative scale, coefficients of 0.30 to 0.39 are acceptable, while a coefficient of 0.40 or higher clearly indicates scalability). The subscales all had good scalability in the combined sample: rumination, 0.50; positive beliefs, 0.51; and negative beliefs, 0.44. Results were in the same range as the longer version (see Supplementary material, and Moeller and Bech, 2019).

### Internal reliability

The alpha coefficient for the MAP-SV Total was 0.79. Alpha coefficients for the subscales were: for rumination, 0.72; positive beliefs, 0.73; and negative beliefs, 0.77. Pearson inter-correlations between the subscales of the MAP-SV were highly correlated with the MAP-SV Total (ranging from .66 to .84). For the inter-correlations between the subscales of the MAP-SV, the lowest was between positive beliefs and negative beliefs ($r = .16$), and the highest between rumination and negative beliefs ($r = .53$). The correlation between positive beliefs and rumination was $r = .38$.

### Discriminant validity

Correlations between positive beliefs and anxiety/depression were low (for anxiety $r = .14$, for depression $r = -.08$), intermediate for negative beliefs (for anxiety $r = .33$, for depression $r = .17$), and highest for rumination (for anxiety $r = .47$, for depression $r = .17$). All were in the same range as for the 26-item MAP (see Supplementary material, and Moeller and Bech, 2019).

### Convergent validity

The correlation between MAP-SV Total and MCQ-30 Total were $r = .42$ (for MAP-26 items $r = .38$), for MCQ-30 Cognitive Self-Consciousness ($r = .07$), for MCQ-30 Need to Control thoughts ($r = .38$), for MCQ-30 Cognitive Confidence ($r = .39$), for Negative Beliefs about worry ($r = .47$), for Positive Beliefs about worry ($r = .09$), which again were comparable to the results on the MAP 26-item. Correlations between MCQ-30 Total and MAP-SV subscales were: rumination, $r = .35$; negative beliefs, $r = .40$; and positive beliefs, $r = .18$.

### Concurrent validity

Concurrent validity was examined using anger criteria by computing correlations for the MAP-SV with the NAS, STAXI-2 and ARS. Results are given in Table 1. Each of the MAP-SV subscales substantially correlated with the NAS Total, STAXI Trait Anger, and ARS score criteria. Results were generally in the same range as for the MAP-26; however, correlations between MAP-SV and the anger criteria were slightly lower for the MAP-SV positive beliefs subscale. Importantly, the correlation with MAP-SV rumination subscale and ARS rumination had increased from $r = .75$ to $r = .78$. In addition, indicating that the rumination subscale had not lost capacity to measure a maladaptive anger processing strategy, MAP-SV rumination showed a similar negative correlation with the NAS Regulation ($r = -.38$) and STAXI anger control (AC-O, $r = -.47$; AC-I, $r = -.42$) as the MAP rumination subscale from the 26-item MAP.

Finally, to test that the concurrent validity of the MAP-SV had not reduced substantially by shortening the scale, a hierarchical regression was repeated on the psychiatric sample data, with

**Table 1.** Correlations (Pearson) between the MAP-SV subscales and anger measures: the NAS for mixed clinical patients and forensic inpatients ($n = 142$), and the MAP and STAXI-2 and ARS subscales for mixed clinical patients ($n = 88$)

| | MAP-SV ($n = 142$) | | |
|---|---|---|---|
| | Rumination | Negative beliefs | Positive beliefs |
| NAS ($n = 142$) | | | |
|    Total | .74 | .63 | .45 |
|     Cognitive | .61 | .51 | .58 |
|     Arousal | .75 | .61 | .31 |
|     Behavioural | .65 | .59 | .38 |
|     Regulation | −.38 | −.09 | .19 |
| STAXI ($n = 88$) | | | |
|     Trait Anger | .65 | .53 | .35 |
|     State Anger | .48 | .49 | .34 |
|     AX-O | .53 | .50 | .30 |
|     AX-I | .53 | .53 | .19 |
|     AC-O | −.47 | −.30 | −.01 |
|     AC-I | −.42 | −.27 | .07 |
| ARS ($n = 88$) | .78 | .59 | .37 |

MAP, Metacognitive Anger Processing scale; MAP PB, positive beliefs subscale; MAP NB, negative beliefs subscale; MAP RUM, rumination subscale; NAS, Novaco Anger Scale; COG, cognitive subscale; ARO, arousal subscale; BEH, behavioral subscale; STAXI-2, Stait Trait Anger eXpression Inventory; Trait, trait anger subscale; State, state anger subscale; AX-O, anger expression out; AX-I, anger expression in; AC-O, anger control out; AC-I, anger control in; ARS, Anger Rumination Scale.

NAS Total as the criterion variable and the HADS subscales, Trait Anger (T-Ang), and MAP-SV Total as the predictors. On the first step, HADS subscales were entered as co-variates. T-Ang was entered on the second step, and then MAP-SV Total entered on the third step to test for its incremental contribution. The HADS subscales entered alone were significantly associated with anger level (NAS Total), adjusted $R^2 = .263$ ($p < .001$). When T-Ang was added to this equation on the second step, an additional 44% of the variance in the criterion variable was explained ($\Delta R^2 = .436$; $p < .001$). Entering the MAP-SV Total on the third step explained an additional 10% of the variance in the criterion variable ($\Delta R^2$ of .096, $p < .001$; for the MAP Total with 26 items, additional 11% of the variance was explained on that third step). The final model was significant, adjusted $R^2 = .812$, $F_{4,83} = 89.72$, $p < .001$. In the final model, T-Ang ($p < .001$), MAP Total ($p < .001$), and HADS-anxiety ($p = .038$) were significantly associated with anger level measured by the NAS Total, whereas HADS-depression was no longer significant.

## Discussion and conclusion

As the above results show, the MAP-SV showed psychometric properties similar to the original 26-item MAP. This includes scalability, internal reliability, and convergent as well as concurrent validity according to the expected hypotheses (see Moeller and Bech, 2019), compared with measured levels of anxiety, depression, metacognition and anger. The innovative clinimetric approach to scale development introduced by Per Bech (Fava *et al.*, 2018) proved valuable with results supporting the use of separate scores for the MAP-SV subscales (rumination, positive beliefs, and negative beliefs), instead of using a total score.

   HADS-anxiety seemed to have a stronger relation to the MAP-SV than HADS-depression, potentially reflecting the relevance of threat activation with related agitation for anger problems as well as anxiety. That said, HADS cannot be used as a screen for depression and anxiety disorders or to differentiate between depression and anxiety (Norton *et al.*, 2013).

Although the current clinimetric testing of the MAP-SV provided evidence from relevant target groups, test–re-test reliability and sensitivity of the MAP-SV to treatment were not investigated. As such, the usefulness of the MAP-SV as a tool to measure treatment change in relation to metacognitive anger processing needs to be addressed in future studies. Also, including observer measures of anger and aggression is relevant to further investigate the clinical utility of the scale as a measure of metacognition in relation to problematic anger.

In conclusion, the MAP-SV provides a promising, quick and easy assessment of metacognitive domains relevant in the assessment and treatment of problematic anger.

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