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Article (Accepted Version)

Welsh, Patrick, Cartwright-Hatton, Sam, Wells, Adrian, Snow, Libby and Tiffin, Paul A (2013) Metacognitive beliefs in adolescents with an at-risk mental state for psychosis. Early Intervention in Psychiatry, 8 (1). pp. 82-86. ISSN 1751-7885

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Brief Report: Metacognitive beliefs in adolescents with an At-Risk Mental State for psychosis

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Abstract

Aim: The Self-Regulatory Executive Function (S-REF) model suggests that metacognitive beliefs play a role in all forms of psychological disorder, including psychosis. However, our understanding of these beliefs and their relationship with symptoms in adolescents with an At-Risk Mental State for psychosis (ARMS) is limited.

Methods: The Metacognitive Questionnaire-short form (MCQ-30) was administered to 31 adolescents with an identified ARMS. Scores were subsequently compared to a control group of 76 adolescents drawn from a community population.

Results: As predicted ARMS patients scored significantly higher on metacognition subscales, with Negative beliefs ($F=42.97$, $p=0.001$), Cognitive Confidence ($F=17.11$, $p=0.001$) and Need for control ($F=22.48$, $p=0.001$) subscales of the MCQ-30 distinguishing them from the comparison group.

Conclusions: The finding that metacognitive beliefs are significantly elevated in comparison to a community sample of adolescents is in keeping with previous adult orientated research. Possible implications for clinical practice are discussed.

Key words: high risk, psychosis, metacognition, youth
**Introduction**

Metacognition refers to the cognitive structures, knowledge and processes involved in the interpretation and regulation of mental experiences. This component of cognition is given a central role in the development and persistence of psychological disorders in the Self-Regulatory Executive Function (S-REF) model of disorder (1, 2). In this model metacognition leads to patterns of responses to intrusive thoughts that fixate attention on threat, maintain worry-based processing and give rise to mental-regulation strategies that backfire. For instance, negative beliefs about the uncontrollability and danger of thoughts can lead to failure to use flexible executive control that terminate negative thinking processes and instead lead subjects to rely on counterproductive forms of control such as thought suppression or alcohol.

Several studies have shown that metacognitive beliefs (beliefs about one’s thought processes) have a role to play in the development and maintenance of psychotic experiences (3-6). Negative metacognitive beliefs, in particular, have been suggested as potential causal factors. These may increase the anxiety and distress caused by anomalous experiences, as they are responsible for guiding attention, the execution of worry/ruminative processing, and the interpretation and control of cognitive events such as unwanted thoughts (7).

With the generation of operational criteria to identify individuals at-heightened risk of developing psychosis (an At-Risk Mental State or ARMS; 8) it is now possible to investigate the role of the metacognitive beliefs in help-seeking individuals with sub-clinical psychotic experiences. Previous studies of adults with psychosis or ARMS have shown that psychotic individuals exhibit significantly higher levels of positive metacognitive beliefs about worry, however, ARMS individuals exhibit similar elevated levels in relation to negative beliefs (3,
Moreover, these negative beliefs (in both psychotic and ARMS groups) are significantly higher than those reported by non-patient controls. The authors of these studies therefore suggest that positive beliefs about worry contribute to escalation and persistence of symptoms (rather than their creation) leading to a full psychotic episode.

Outside of the psychosis domain, there is growing evidence that metacognitive beliefs have a significant role in the development and maintenance of various symptoms of adolescent psychopathology (e.g. OCD: 10, 11; Generalised Anxiety: 12). However, there have been no published studies that have specifically focused on investigating metacognitive factors in adolescents with an ARMS. Thus, the aim of this study was to investigate metacognitive beliefs in adolescents identified with an ARMS. These perceptions would subsequently be compared to a group of ‘healthy’ adolescent controls with the hypothesis that adolescents with ARMS would have more maladaptive metacognitive beliefs.

**Methods**

**Participants**

Adolescents aged between 12-17 years of age with an ARMS (as defined by the Melbourne Ultra High Risk Criteria; 13) were initially recruited as part of a study aimed at characterising how they present to Child and Adolescent mental health services in terms of symptomatology and functioning (14). A community control group (aged between 12-16 years of age) was subsequently recruited (opportunistically) from a local comprehensive school (of approximately 1000 students) to allow for data comparison.

**Assessment measures**
Both groups were asked to complete the Metacognitions Questionnaire short form (MCQ-30; 15) which is a short; self-report questionnaire designed to assess maladaptive metacognitions (e.g. worrying is dangerous for me). The MCQ-30 is a 30 item questionnaire which allows participants to report upon their metacognitive beliefs across five dimensions: cognitive confidence, positive beliefs about worry, cognitive self consciousness, negative beliefs about worry and need to control thoughts. The response format is a four point Likert scale (Do not agree, Agree slightly, Agree moderately, Agree very much) that is scored to produce total scores for each area. Higher scores indicate more maladaptive belief systems. Although the MCQ-30 has been validated within an adult population (15) it has been utilized previously in at least one other adolescent study (16).

In order to aid psychiatric diagnosis and obtain data on symptom severity and psychosocial functioning within the ARMS group, all ARMS participants were assessed by PAT (Consultant Psychiatrist) and PW (Assistant Psychologist) using the following additional measures:

- The Comprehensive Assessment of At Risk Mental States (CAARMS) is a semi-structured interview designed specifically for the assessment of help seeking individuals suspected of having ARMS (17). It measures a range of ‘positive’ psychotic like symptoms (under the sections of Unusual Thought Content, Non-Bizarre Ideas, Perceptual Abnormalities and Disorganised Speech). During assessment, the intensity, frequency/duration and distress related to the reported symptoms are rated on a likert scale to classify individuals via the Melbourne UHR criteria. Inter-rater reliability for the CAARMS was good (κ= 0.75).
• The Hamilton Depression Rating Scale (HAM-D) is a measure of reported and observed depressive symptomatology with higher scores indicating more severe/significant symptoms (18).

• The Young Mania Rating Scale (YMRS) is a diagnostic questionnaire, which measure the severity of manic symptomatology in adolescents. Higher scores indicating more severe symptoms (19).

• The Children’s Global Assessment Scale (C-GAS) is a reliable and valid global measure of functioning and disability for children under 18 years of age (20, 21). Levels of functioning are assessed against a 100 point scale with lower scores denoting poorer functioning.

**Ethical approval**

The original study was approved by Durham University, School of Medicine and Health Ethics Committee, University of Sussex School of Psychology Research Ethics Committee and the NHS National Research Ethics Service for County Durham & Tees Valley 2 Committee.

**Data analysis**

Data were examined for normality. Proportions of binary demographic variables were compared using chi-squared tests. A series of t-tests were used to compare age, socio-economic status and metacognitive beliefs between the two study groups (unless significant differences existed between the two groups on one or more of the demographic variables. In these instances an analysis of covariance was adopted).
Pearson product moment correlations were also calculated within the ARMS groups as part of a further analysis in order to assess for any relationship between metacognitive scores, symptom severity, functioning and age.

3. Results

Demographic details

Demographic details are outlined in Table 1. The groups did not differ significantly in terms of sex ($\chi^2 = 0.952, p = 0.329$) but did so in relation to age ($t = 3.89, p = 0.001$) and socio-economic status ($t = -3.94, p = 0.001$), with the ARMS individuals more likely to be older and to live in more socio-economically disadvantaged neighbourhoods than controls.

Group differences in Metacognitive Style

Data analysis using an analysis of covariance with age and socio-economic status as covariates revealed that ARMS patients scored significantly higher on the Negative beliefs ($F = 42.97, p = 0.001$), Cognitive Confidence ($F = 17.11, p = 0.001$) and Need for control ($F = 22.48, p = 0.001$) subscales in comparison to the community control group (Table 1). Not surprisingly, Total MCQ score was also significantly elevated within the ARMS group ($F = 24.42, p = 0.001$).

[Insert Table 1 here]

[Insert Figure 1 here]
In terms of the relationship between metacognitive beliefs and symptom severity, Negative beliefs were significantly related to intensity ($r=0.503$, $p=0.004$) and distress ($r=0.426$, $p=0.017$) scores on the Perceptual Abnormalities section of the CAARMS. Negative beliefs were also inversely correlated with C-GAS scores ($r=-0.36$, $p=0.045$) indicating that those with more maladaptive beliefs had worse psycho-social functioning. Need for control was significantly associated with YMRS scores ($r=0.473$, $p=0.008$) whilst Positive beliefs was related to frequency of Unusual Thought Content ($r=0.356$, $p=0.05$).

**Discussion**

The results confirm our hypothesis that adolescents with ARMS experience more maladaptive metacognitive beliefs in comparison to a community sample of controls. These findings are also in line with previous adult-based studies, in showing that negative as opposed to positive metacognitions were significantly elevated (3, 7, 9). The possibility that positive beliefs about worry contribute to the escalation and persistence of symptoms, leading to a full psychotic episode is therefore supported. Our secondary finding, that Negative beliefs were significantly related to the intensity and distress of perceptual experiences is in keeping with the cognitive model of psychosis which suggests that these beliefs may have an important role to play in affecting the responses that individuals make to intrusive mental experiences (1).

**Strengths and potential limitations**

To our knowledge, this is the first study of its kind to assess metacognitive beliefs in an adolescent ARMS cohort. However, we were unable to control for levels of anxiety, depression, neurocognitive and psychosocial functioning within both of these samples. As such, it is possible that the elevation in unhelpful metacognitive beliefs in the ARMS group
arose as the result of concurrent emotional distress independent of the anomalous experiences and their appraisal. Such distress is common within ARMS patient groups (22). On the other hand, these findings may simply relate to superior neurocognitive and psychosocial functioning within the community adolescent sample. This assumption may be partly supported by the significant relationship observed between Negative beliefs and psychosocial functioning within the ARMS sample. This study would also have benefitted from recruitment of a matched control group of psychiatric help-seekers to ensure differences in metacognitive beliefs are genuinely associated with psychotic symptom development. Finally, the MCQ-30 has not been validated for use in this age group although our data analysis indicates that MCQ scores do not appear to be related to age.

**Implications for Practice and Future Research**

Our findings indicate that adolescents suspected of an ARMS may benefit from an assessment of metacognitive beliefs upon entering mental health services. Such a measure could be used to direct future therapeutic input and assess outcomes. Possible interventions could include brief metacognitive therapy (MCT; 23) that would aim to modify metacognitive beliefs as part of the goal of changing the nature of the relationship that individuals have with negative intrusive thoughts. A feasibility trial of group MCT is worthy of consideration given the absence of any treatment evidence base for those ‘at-risk’ (24, 25). Repetition of our study addressing the limitations previously mentioned would further our understanding of metacognitions within adolescents with sub-threshold psychotic symptoms.

**Conclusions**

Metacognitive beliefs appear to be elevated in adolescents with ARMS and could feasibly be assessed and addressed during psychosocial intervention. These findings however require
replication, controlling for factors such as mood, anxiety and psychiatric help seeking, to understand the exact role of metacognitive beliefs in the development of sub-threshold psychotic symptoms.
Acknowledgements

The authors wish to acknowledge the support of the Durham Doctoral Fellowship scheme that funded a PhD for PW, making this work possible. PT is supported in his research by a Higher Education Council for England (HEFCE) Clinical Senior Lectureship.

SCH was supported by an NIHR Career Development Award from the National Institute for Health Research during preparation of this manuscript. The views expressed in this publication are those of the authors and not necessarily those of the NHS, the National Institute for Health Research of the Department of Health.

The authors declare no other financial grants or industrial links or affiliations.
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