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Capturing coping with symptoms in people with a diagnosis of schizophrenia: introducing the MACS-24

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Abstract

In order to assess coping with psychotic symptoms, the Maastricht Assessment of Coping Strategies (MACS), 24 symptom version, was developed as a refinement of the previous MACS-13. Associations between type of coping and the experienced level of control over psychotic symptoms were examined using MACS-24.

MACS-24 was administered to 32 individuals with a diagnosis of schizophrenia. For each of 24 symptoms, experience of distress, type of coping and the resulting degree of perceived control were assessed. Coping types were reduced to two contrasting coping factors: symptomatic coping and non-symptomatic coping (combining active problem solving, passive illness behaviour, active problem avoiding, and passive problem avoiding).

Mean level of distress and perceived control (range: 1–7) were, respectively, 4.2 [standard deviation (SD) = 1.9] and 4.2 (SD = 1.9). The association between distress and perceived control was negative [$\beta = -0.28$; 95% confidence interval (95%CI) = −0.41 to −0.15]. Type of coping interacted with perceived control ($p = 0.005$), in that symptomatic coping was negatively associated with perceived control [odds ratio (OR) over seven levels = 0.82, 95%CI = 0.71–0.94], whereas for non-symptomatic coping a positive association was apparent (OR over seven levels = 1.10, 95% CI = 1.03–1.19).

Previous contrasts between symptomatic and non-symptomatic coping were replicated using MACS-24, suggesting clinical validity and utility.

Introduction

Breier and Strauss reported that individuals diagnosed with schizophrenia use coping mechanisms to control psychiatric symptoms (Breier and Strauss, 1983). Coping may even influence the probability of transition from a prodromal or at risk mental state, to full blown disorder with need for care (Bak *et al.*, 2003). Therefore, qualitative differences in coping strategies can be expected to impact on symptom management, relapse prevention, social adaptation and quality of life in subjects with a psychotic disorder (Bak 2004; Brenner *et al.*, 1987; Folkman *et al.*, 1986; Horan and Blanchard, 2003; Lobban *et al.*, 2003; Thurm and Haefner, 1987).

Previous studies assessing coping in patients with a diagnosis of schizophrenia or related disorders used coping scales developed for the assessment coping responses with general stress [for example Checklist of Coping Experiences (COPE) (Carver and Scheier, 1994), Utrecht Coping List (UCL) (Schreurs *et al.*, 1988), Antecedent Coping Interview (ACI) (Tarrier, 1992), Critical Incident Stress and Coping Rating (CISCR) (Madden *et al.*, 1995), Ways of Coping Checklist (WCC) (Folkman, 1984) and Coping Inventory for Stressful Situations (CISS) (Parker and Endler, 1990)] rather than specific coping assessment with the various psychotic symptoms and associated experience of distress (Brenner *et al.*, 1987; Carter *et al.*, 1996; Cohen and Berk, 1985; Farhall and Gehrke, 1997; Lysaker *et al.*, 2005; Lysaker *et al.*, 2003; McDonald *et al.*, 1998; Meyer, 2001; Rudnick, 2001; Thurm and Haefner, 1987; van den Bosch and Rombouts, 1997; van den Bosch *et al.*, 1992).

The Maastricht Assessment of Coping Strategies (MACS) is an instrument designed specifically to assess coping with the symptoms that form part of the diagnosis of schizophrenia and has been presented previously (Bak *et al.*, 2001a). It assesses the level of distress associated with 13 psychotic symptoms, and five coping domains of active problem solving (APS), passive illness behaviour (PIB), active problem avoiding (APA), passive problem avoiding (PPA), and symptomatic coping behaviour (SCB).

Effectiveness of this set of coping strategies are assessed by measuring the level of perceived control, separately for each symptom, experienced by the person. A person cannot quantify the amount of perceived control per single coping strategy, as they usually employ several coping strategies simultaneously for a give symptom. Perceived control is defined as feeling in control, as expressed in the construct 'locus of control' and the product of motivational behaviour and emotion regulation capacities (Declerck *et al.*, 2006). In their extensive overview on control perception, Declerck and colleagues conclude that perceived control follows the brain's capacity for self-regulation, leading to flexible and goal directed behaviours. It is made up essentially by personality traits (locus of control) (Rotter, 1966) and state aspects (Skinner, 1996). On a behavioural level, perceived control may be a corollary of emotion regulation, executive functions, and social cognition (Declerck *et al.*, 2006). Previous work has shown that symptomatic coping was negatively associated with perceived control over psychotic experiences and also with an increase in risk of transition from prodromal to clinical state (Bak *et al.*, 2003; Bak *et al.*, 2001b). The other four coping domains, however, were positively associated with perceived control, i.e. can be considered as effective strategies (Bak *et al.*, 2003; Bak *et al.*, 2001b).

The original MACS consisted of 13 symptom domains. Patients' subsequent feedback and research with this scale indicated the need for inclusion of a greater number of specific symptoms in MACS, as the ability of patients to describe coping with symptoms was greater if more specific symptoms were described rather than fewer and more broadly described symptom domains. Using the broad symptom descriptions in MACS-13, subjects not only had difficulty in scoring level of distress and perceived control associated with symptoms, but also found it difficult to make precise comments on the coping strategies used. Incorporating all comments suggested the use of 24 symptoms instead of 13. Therefore, in the current adaptation (MACS-24), the number of symptoms was extended, in that broadly defined symptom groups from MACS-13 were split into their smaller subcategories – no new symptoms were added.

In the current study, it was hypothesized that (i) MACS-24 would show associations between distress, coping and perceived control comparable to those described for MACS-13 and (ii) symptomatic coping behaviour would be negatively associated with perceived control as described earlier, whereas the other coping domains would display positive associations with perceived control (Bak *et al.*, 2003; Bak *et al.*, 2001b).

Method

Sample

Subjects were interviewed as part of the Experience Sampling Method – Maastricht Assessment of Coping Strategies (ESM-MACS) study. All subjects were born in the Netherlands and fluent in Dutch. Thirty-four patients (21 men and 13 women) with a clinical Diagnostic and

Statistical Manual of Mental Health-Fourth Edition (DSM-IV: American Psychiatric Association, 1994) diagnosis of schizophrenia were interviewed by trained interviewers with the MACS and the Brief Psychiatric Rating Scale (BPRS), 24 item version (Lukoff *et al.*, 1986; Ventura *et al.*, 1993). Mean age was 37.8 years [standard deviation (SD) = 12.3, range 20–68]. All subjects received standard psychiatric care in various settings. Half of the sample was living in sheltered housing outside the hospital, whereas the remaining 17 subjects lived alone ($n = 8$), with partner ($n = 1$) or with parents ($n = 8$). One subject had regular employment, two subjects were retired and 31 (91%) were receiving disability benefit. Nineteen subjects (62%) had received education above secondary school. All subjects were in a stable phase, with no changes in medication, living situation or service provision during the last six months.

The mean BPRS scores per symptom dimension (weighted for the number of BPRS items that made up the dimension) were positive dimension: 1.5 (range 1–4), negative dimension: 1.1 (range 1–2), depressive dimension: 1.6 (range 1–4.8) and excitement dimension: 1.2 (range 1–1.8).

Assessment scales

MACS-24

The MACS 24 is an extension and rearrangement of MACS-13 (Bak, 2004; Bak *et al.*, 2001a). MACS-24 (similar to MACS-13) assesses coping in subjects with a psychotic disorder, focussing specifically on coping with symptoms rather than with situations, and evaluating a range of possible different coping strategies for each symptom dimension. MACS-24 was designed to cover five symptom dimensions commonly described in psychosis (Peralta *et al.*, 1995; Peralta *et al.*, 1997), with symptom descriptions based on symptom definitions given by BPRS, Positive and Negative Syndrome Scale (PANNS), Psychiatric State Examination (PSE) and Subjective Experience of Negative Symptoms (SENS) (Kay *et al.*, 1987; Kay *et al.*, 1989; Lukoff *et al.*, 1986; Selten *et al.*, 1993; Wing *et al.*, 1977). A prerequisite for the assessment of coping with symptoms is that subjects have to be aware, although not necessarily insightful, of their symptoms. Therefore, some cognitive and negative symptoms, such as abstract thinking, were excluded as subjects are unable to produce conscious appraisals of these. A total of 24 symptoms were thus grouped *a priori* in five dimensions: (i) positive symptoms (suspiciousness, thought broadcasting, thought influence, grandiosity, magical thinking, passivity experiences, hearing voices and non-verbal hallucinations), (ii) negative symptoms (blunted affect, lack of initiative, emotional withdrawal, and self-neglect), (iii) depressive symptoms (anxiety, somatic fixation, depressive mood and feelings of guilt, lack of energy, diminished social contact), (iv) cognitive symptoms (poor memory, poor attention and concentration, slowed thinking and chaotic thinking), (v) excitement (hostility and euphoria).

MACS-24 was designed to assess coping for each symptom. Individuals are asked to indicate the level of distress they experience in relation to each symptom on a seven-point Likert-scale (Bak *et al.*, 2001a), followed by questions aimed at eliciting how individuals cope with symptom-related distress. Originally, 14 coping strategies were isolated by Carr (1988). Using multivariate statistical techniques, these 14 coping strategies were further reduced to five coping domains in previous work (Active Problem Solving (APS): distraction, problem solving, and help seeking; Passive Illness Behaviour (PIB): physical change, prescribed medication and non-prescribed medication (including illegal drugs); Active Problem Avoiding (APA): shifted attention, socialization, task performance and indulgence; Passive Problem Avoiding (PPA): isolation, non-specific activities and suppression; Symptomatic coping behaviour (SCB): behaviour with the intention to reduce distress but resulting in an increased expression of illness-related behaviour making the external manifestations of the psychopathology increase rather than decrease – also described as 'going along' with the content of the symptom (Bak *et al.*, 2003; Bak *et al.*, 2001a). For the assessment of coping, verbatim responses are written down and coping is coded afterwards by the interviewer. People are encouraged to be complete and include all the behavioural, emotional and cognitive actions (Lazarus and Folkman, 1984) in response to the symptom and associated distress. This open strategy (coping strategies reported by the person) is used to avoid information bias as a result of providing descriptions of specific coping strategies (Coyne and Gottlieb, 1996). In addition, this strategy allows for the assessment of multiple coping strategies at the same time, as patients may use different coping strategies as defined earlier simultaneously. For example, during distraction or task performance, cognitive strategies may be used as well. The interviewer will translate the verbatim responses into the coping strategies defined earlier. After assessing the coping strategies, level of perceived control over the symptom as a result of coping in response to the symptom and associated distress is assessed (1–7 Likert scale from no control to maximum control), providing a measure of the subjective effectiveness of coping.

Previous studies with the MACS 13-item version showed good interrater reliability of coping, stability of coping over time and internal consistency of the items (Bak *et al.*, 2001a). Similarly, intraclass correlation coefficients for distress and control were high over time (Bak *et al.*, 2001a) (see also: http://www.macsinfo.homestead.com/index.html).

Changes from MACS-13 to MACS-24 included following items: the MACS-13 item Hallucinations was split into Hearing voices and Non-verbal hallucinations, the latter covering hallucinatory symptoms in the other four senses; the MACS-13 delusion items passivity experience and unusual thoughts became Suspiciousness, Thought interference, Passivity phenomena, Delusions of reference, Magical thinking and Grandiosity. The item Disorganization was dived into Sluggish thinking and Chaotic thinking. The MACS-13 item Lack of initiative was divided into Lack of initiative and Loss of energy. The item Emotional withdrawal was refined into Loss of social contacts and Loss of social interests. Depressive mood was divided into Depression and Feelings of guilt. The single Anxiety item was split into Anxiety and Somatic fixation. The cognitive item Poor attention became Memory and Attention. The items Irritability and Euphoria remained unchanged. During the interview, the chosen items were described in such a manner that subjects would recognize the meaning of the symptom, as MACS relies on adequate recognition and awareness of the symptom on the part of the patient. Therefore, items on negative and cognitive symptoms may be underrepresented. However, the symptoms chosen can be assessed through self report, suggesting adequate recognition and awareness of the experience by the subject (Selten *et al.*, 2000).

Two coping factors

As previous work has consistently shown a divergence between symptomatic coping behaviour and the other four coping domains (hereafter: non-symptomatic coping), both in terms of negative associations, within persons, between symptomatic and non-symptomatic coping, and in terms of negative (symptomatic) and positive (non-symptomatic) associations with perceived control and risk of transition from prodromal to clinical state (Bak, 2004; Bak et al., 2001b), coping domains, for the purpose of the current analyses, were further reduced to these two main categories.

Analyses

Of the 34 people who participated, two subjects had incomplete data on MACS. Thus 32 subjects were used in this report (see Table 1).

Symptom level

The data were analysed with STATA, version 9.1 (Statacorp, 2006). A data file was constructed in which the 32 patients included in the study contributed 768 observations: one for each of the 24 symptoms described earlier ($32 \times 24 = 768$ symptom observations). Each symptom pertained to one of the five symptom

Table 1 Sample description

	Total	Men ($n = 20$)	Women ($n = 12$)
Age (mean years)	35.9 (range 20–68)	31.6 (range 20–60)	44.9 (range 20–68)
Employment status:			
Regular job	15%	16.3%	12.7%
No/sheltered work	85%	83.7%	87.3%
Social:			
Alone	24%	26.5%	18.8%
Partner	2%	0.0%	5.8%
Family/parents	33%	38.9%	20.9%
Sheltered living	41%	34.9%	55.0%
Level of education:			
Primary school	22%	22.5%	20.3%
Secondary school	20%	21.1%	15.9%
Lower & intermediate vocational education	43%	38.1%	52.2%
Higher vocational education & university	35%	18.4%	11.6%

dimensions as described earlier. In the symptom-level analyses, dependent variables were level of distress and level of control, and independent variables were symptom dimensions and cognitive variables.

Coping observation level

A data file was constructed where for each symptom the scores of each of 14 coping strategies were scored, resulting in a data file with 32 (subjects) × 24 (symptoms) × 14 (coping strategies) = 10,572 observations. Each coping strategy pertained to one of five broader coping domains as described earlier, which was further simplified to the two domains of symptomatic and non-symptomatic coping as described earlier. In the coping level analyses, the binary coping variable (presence or absence of coping for the specific symptom and coping category) was the dependent variable, and coping type the independent variable.

As observations were clustered within individuals for both data sets (symptom level and coping level), multilevel random regression analyses were conducted using the STATA XTGEE (binary coping variable) and XTREG (continuous distress and control variables) routines. For the coping level analyses, effect sizes were expressed as odds ratios (ORs) with their 95% confidence interval (95%CI), whilst for the symptom level analyses effect sizes were expressed regression coefficients. In the coping analyses, APS was the reference strategy, as problem solving was regarded the most functional coping strategy. Model contributions of independent variables and interactions were assessed by the Wald test.

Results

Symptom level

The mean BPRS score was 31.7 (SD = 6.0, range 24–51). Twenty one (66%) subjects were in cross-sectional remission (i.e. meeting the psychopathology criterion but not the time criterion) as defined recently (Andreasen *et al.*, 2005; van Os *et al.*, 2006). Remission thus defined does not mean that individuals were asymptomatic across the symptom domains of psychosis; all subjects had at least one symptom present per MACS interview. Thus, the mean number of MACS symptoms per subject was 7.0 (SD = 4.0, range 1–17) with a mean distress score of 4.2 (SD = 1.9, range 1–7) and a mean level of perceived control of 4.2 (SD = 1.9 range 1–7). The association between subjective distress and perceived control was negative ($\beta = -0.28$; 95%CI = −0.41 to −0.15). There were no significant differences between symptoms in terms of distress ($\chi^2 = 5.92$, df = 4, $p = 0.21$) or perceived control ($\chi^2 = 7.1$, df = 4, $p = 0.13$). Crohnbach's alpha for symptom distress and symptom perceived control were 0.50 and 0.68, respectively.

Coping level

There were 373 instances of coping with the following distribution: APS, 22%; PIB, 17%; APA, 15%; PPA, 19%; SCB, 27%. Instances of coping were distributed across patients, only a single patient had no instances of coping at all. Table 2 displays the frequency per coping domain. The frequency of coping strategy did not vary as a function of symptom dimension ($\chi^2 = 2.32$, df = 4, $p = 0.68$). Multilevel logistic regression showed that symptomatic coping, compared to the reference category of APS, was five times more likely to be used (OR = 5.6; 95%CI = 3.9–7.9), whereas APA was about half as likely to be used (OR = 0.5; 95%CI = 0.3–0.7). For PIB and PPA, no significant differences existed with regard to the reference category. There was no interaction between coping domain and symptom type, indicating that there were no differences in the frequency of type of coping between different symptoms.

The occurrence of coping *per se* was not associated with perceived control (OR = 1.04, 95%CI = 0.98–1.10). However, there was a strong interaction with type of coping ($\chi^2 = 15.0$, df = 4, $p = 0.005$), in that the four non-symptomatic coping domains APS, PIB, APA and PPA, combined into the Non Symptomatic Coping (NCS) category, were positively associated with perceived control (OR over seven levels = 1.10, 95%CI = 1.03–1.19), whereas SCB was negatively associated with perceived control (OR over seven levels = 0.82, 95%CI = 0.71–0.94).

Discussion

The current analyses with MACS-24 yielded results that were comparable to those obtained with MACS-13 and therefore provide an important replication. The distribution of symptoms was comparable with previous reports, depressive and positive symptoms being most prevalent (Bak *et al.*, 2001a; Carr, 1988; Middelboe and Mortensen, 1997). The internal validity of MACS was comparable with the previous version of MACS-13. The frequency of the various coping domains and associations with perceived control were broadly similar for MACS-13 and MACS-24. As in previous reports, symptomatic coping behaviour was the most frequently used coping strategy (Bak *et al.*, 2003; Bak *et al.*, 2001b; Carr, 1988; Middelboe and Mortensen, 1997). Previous results about the effect of coping on perceived control were replicated, as was the

Table 2 Frequencies per coping domain

Coping domain	Coping strategy	Frequency	Percentage	OR	95%CI
APS	Distraction	24	10.5	1[a]	
	Problem solving	51	22.3		
	Help seeking	8	3.5		
PIB	Physical change	48	21.1	0.76	0.54–1.07
	Prescribed medication	9	3.9		
	Non-prescribed medication, drugs	8	3.5		
APA	Socialization	10	4.4	0.48	0.33–0.67
	Shifted attention	31	13.6		
	Task performing	6	2.6		
	Indulgence	9	3.9		
PPA	Non-specific activities	29	12.7	0.83	0.59–1.16
	Isolation	22	9.7		
	Suppression	19	8.3		
SCB	Symptomatic behaviour	99	43.4	5.6	3.9–7.9
Total		373	11.7		

Note: Frequency of coping strategies; maximum observations are 3196, maximum observation per coping strategy are 228.

[a] Reference category.

APS, Active Problem Solving; APA, Active Problem Avoiding; PIB, Passive Illness Behaviour; PPA, Passive Problem Avoiding; SCB, Symptomatic coping behaviour.

finding that symptomatic coping behaviour was negatively associated with perceived control (Bak, 2004; Bak *et al.*, 2003; Bak *et al.*, 2001b).

Clinical relevance

Several arguments suggest that the findings are clinically relevant. First, the results concur with our previous report (Bak *et al.*, 2001b) that coping is relatively infrequent, occurring in 5–10% of all possible instances. In the current report, the relative proportion of coping was even smaller at 3.5%, which likely reflects in part the fact that the majority of the sample were not in a state of acute exacerbation of psychosis. This suggests that using the MACS may help individuals become conscious of the possibility of 'empowerment' (Birchwood *et al.*, 2000; Hacker *et al.*, 2007) through coping and develop efforts to apply more coping strategies. Second, using MACS-24 brings into focus the fact that symptoms do not arise in a psychological vacuum, but give rise to interactions between person and psychopathology, that impact on well-being and outcome. Trying to capture these interactions in a valid way may help both patient and clinician gain insight into underlying mechanisms and result in targeted interventions including cognitive therapy. In particular the distinction between symptomatic and non-symptomatic coping may be important. Symptomatic coping is associated with poorer outcome and increased likelihood of transition from prodromal state to clinical disorder (Bak *et al.*, 2003; Bak *et al.*, 2001b). The results suggest that MACS taps into the interaction between symptom-related distress, coping strategies used and the amount of perceived control coping generates, which in turn may lead to alterations in symptom-related distress depending on the type of coping used. The process of transition from prodromal state to full-blown psychotic state remains poorly understood. The perspective of coping and assessment of the degree of symptomatic coping in individuals at risk may help efforts to modify the risk of transition with psychological interventions (Morrison *et al.*, 2004), given the fact that coping mediates need for care (Bak, 2004; Breier and Strauss, 1983).

Methodological issues

An important limitation is that MACS data are essentially cross-sectional and therefore not suitable for the full analysis of the dynamic relationship between symptom-related distress, coping and control. For example, the negative association between symptom distress and symptom control reported earlier can be indicative of both successful coping (if coping reduced a previously even larger negative association between distress and control) and unsuccessful coping (if coping did not alter

a negative association between distress and control or made it even larger). Any association between distress and coping would be similarly difficult to interpret. Therefore, interpretation of MACS data is limited to assessing frequency of coping and quality of coping in terms of comparing the association between control and different types of coping. It has been argued that a truly dynamic assessment of coping is only possible with multiple measurements incorporating moment to moment variation (Stone *et al.*, 1998). For example, Lardinois *et al.* (2007), using the experience sampling method to collect data on coping with psychotic symptoms in the flow of daily life, found that effective coping was associated with the tendency to develop conscious appraisals of distress associated with psychotic symptoms.

Conform previous work (Bak *et al.*, 2001a, 2001b), coping strategies were *a priori* classified into five domains representing two broad subcategories of symptomatic and non-symptomatic coping. The validity of this classification may be questioned, but is supported by the fact both the current as well as previous studies with MACS showed that symptomatic coping can be considered as a dysfunctional coping strategy, whereas the four other coping domains appear to be more functional (Bak, 2004; Bak *et al.*, 2003; Bak *et al.*, 2001b). Other work also suggests that non-symptomatic coping 'functionally' increases perceived control and decreases distress associated with symptoms (Cohen and Berk, 1985; Folkman *et al.*, 1986; Holahan *et al.*, 1996; Lazarus, 1993). Therefore, it appears that the broader grouping of symptomatic coping versus non-symptomatic coping has face validity and facilitates the clinical interpretation of the results.

The results should be interpreted with caution as the number of patients is small, the age range large and the design cross-sectional. For these reasons, it was not possible to study age effects, possibly reflecting learning and development of experience, on the use of coping strategies. Longitudinal work in larger samples is needed to address these questions.

It may be argued that use of MACS is selective as it requires insight into symptoms. However, MACS does not require insight, but awareness of the experience, similar to interviews with any instrument assessing psychopathology such as PANSS and BPRS. MACS additionally requires that the patient is able to reflect to a certain degree on what effects the symptom has on him/her but for this no insight is required. For example, a patient was examined who reported voices that were distressing and gave rise to coping, yet his ideas about the origin of these voices was delusional. Therefore, insight is not strictly required for assessment with MACS, although it is true that patients should be able to reflect on the symptom as something generating responses and actions on their part. It is likely that not all patients will be able to have such reflections, affecting the generalizability of the results.

The majority of the sample was in a state of cross-sectional remission, although not asymptomatic, and it may be argued that patients with relatively low levels of symptoms will not display coping. The analyses, however, suggested that instances of coping were distributed across patients, only a single patient had no instances of coping at all. The likely explanation for this is when coping is successful, symptoms have less impact on functioning resulting in lower levels of scoring on the BPRS.

The way in which symptoms were explained to patients during MACS assessment was not formally standardized but rather was conducted in the form of a clinical interview. This was necessary as different patients require different clinical approaches in order to generate a meaningful dialogue about their symptoms. This means that MACS requires a clinical training and that particular attention needs to be paid to how symptoms are elicited.

Conclusion

An important advantages of MACS-24 over MACS-13 is that a more specific and detailed list of symptoms is offered for assessment, so that the assessment of coping takes on a more standardized format reducing variability between interviewers. The results suggest that MACS may help clinicians identify, and make patients aware of, self-initiated psychological strategies to reduce distress associated with psychotic symptoms. In addition, it may help patients discriminate between functional and dysfunctional coping with their experiences.

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Declaration of interests statement

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