

# Is the effect of coping styles disease specific?

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# Is the effect of coping styles disease specific? Relationships with emotional distress and quality of life in acquired brain injury and multiple sclerosis

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## Abstract

**Objective:** To investigate the use of coping styles and the relationships linking coping to emotional distress and quality of life in patients with acquired brain injury and multiple sclerosis.

**Method:** Cross-sectional cohort study of 143 patients with acquired brain injury and 310 patients with multiple sclerosis in the chronic stage. Quality of life was measured with the Life Satisfaction Questionnaire (LiSat-9), coping styles with the Coping Inventory for Stressful Situations (CISS-T, task-oriented; CISS-E, emotion-oriented; CISS-A, avoidance), emotional distress with the Hospital Anxiety and Depression Scale (HADS).

**Results:** Coping styles did not differ between types of multiple sclerosis and varied only little with regard to severity of disease. In both patient groups, task-oriented coping was most used followed by avoidance and emotion-oriented coping. Patients with multiple sclerosis used all styles to a greater extent. In acquired brain injury, lower CISS-E and lower HADS scores were associated with higher LiSat-9 scores. CISS-E had a direct effect on LiSat-9 and an indirect effect via HADS. In multiple sclerosis, next to lower CISS-E and lower HADS scores, higher CISS-A scores were also associated with higher LiSat-9 scores. CISS-E had an indirect effect and CISS-A had a direct and indirect effect on LiSat-9.

**Conclusion:** In both patient groups, coping patterns are similar, and emotion-oriented coping negatively influences quality of life. Additionally, in multiple sclerosis, seeking emotional support and distraction (CISS-A) was positively associated with quality of life. Interventions to improve adaptive coping could be organized within a neurorehabilitation setting for both patient groups together.

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Coping style, quality of life, emotional distress, multiple sclerosis, brain injury

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## Introduction

Coping, the cognitive and behavioural efforts to manage stressful situations,<sup>1</sup> plays an important role in adaptation to sudden or progressive onset of disability.<sup>2</sup> In neurorehabilitation, acquired brain injury and multiple sclerosis are highly prevalent conditions. Given their similarity in symptomatology, the question arises whether coping is different according to the mode of onset of disability. Moreover, coping is considered to be, at least in part, a trait-like phenomenon which means that people prefer certain coping styles over others regardless of contextual factors.<sup>3</sup> Some studies comparing the use of coping styles between diseases with both a progressive and non-progressive course and between diseases characterized by uncertainty have reported differences in preferred coping styles,<sup>4</sup> whereas others did not.<sup>5-7</sup>

In acquired brain injury, a large body of evidence is available showing that the use of passive, escape-avoidant and emotion-oriented coping styles is associated with worse quality of life and more symptoms of emotional distress.<sup>8-13</sup> Injury-related factors such as type of brain injury, severity of neurological symptoms and impairment have not been related to choice of coping styles.<sup>6,8</sup>

In patients with multiple sclerosis, emotion-focused coping styles such as wishful thinking, avoidance and denying have been consistently associated with poor psychological adjustment and lower quality of life.<sup>14-17</sup> While illness duration did not determine quality of life<sup>18</sup> or choice of coping styles,<sup>4,15,18</sup> higher levels of physical disability have been related to worse psychosocial adjustment and quality of life.<sup>19,20</sup> Whether level of physical disability and type of multiple sclerosis are of influence on choice of coping styles remains unclear with conflicting findings.<sup>15,21-23</sup>

So, the aims of this study were as follows: (1) to examine whether the preference of coping styles

differs (a) between type and severity of multiple sclerosis (this is already shown for acquired brain injury, see above) and (b) between patients with acquired brain injury and multiple sclerosis and (2) to explore interrelations between coping, emotional distress and quality of life in patients with acquired brain injury and in patients with multiple sclerosis.

## Methods

### Patients

We used two separate historical data sets: a longitudinal cohort study on factors influencing the adaptation process following acquired brain injury<sup>13,24</sup> including coping, emotional distress and quality of life and a cross-sectional study examining the influence of different coping styles on several complaints and quality of life in patients with multiple sclerosis.<sup>25</sup>

*Patients with acquired brain injury* were recruited by rehabilitation physicians and neurologists from two rehabilitation centres and two hospitals in the South of the Netherlands between January 2011 and January 2012. Inclusion criteria were as follows: (1) age  $\geq 18$  years; (2) newly acquired, non-progressive brain injury of any aetiology confirmed by neurological and/or neuroimaging data; and (3) for patients recruited at the start of outpatient rehabilitation, maximum time since injury was four months. Exclusion criteria were as follows: (1) any premorbid progressive brain disease, (2) insufficient command of the Dutch language, and (3) inability to complete questionnaires based on clinical judgement (aphasia, severe cognitive impairment).

*Patients with multiple sclerosis* were recruited from the department of Neurology/Academic MS

Centre Limburg of the Zuyderland Medical Centre in Sittard-Geleen by their neurologist from January to December 2011. Inclusion criteria were as follows: (1) age between 18 and 65 years and (2) diagnosed with clinical definite multiple sclerosis (regardless of time since diagnosis). Exclusion criteria were as follows: (1) insufficient command of the Dutch language and (2) inability to complete questionnaires based on clinical judgement (aphasia, severe cognitive impairment).

The medical ethics committees of Maastricht University Medical Centre and Zuyderland-Zuyd and all participating hospitals and rehabilitation centres approved this study. All patients gave written informed consent.

### Measures

*Coping styles* were measured using the Dutch version of the Coping Inventory for Stressful Situations.<sup>26,27</sup> This 48-item questionnaire has three scales: task-oriented, emotion-oriented and avoidance. The avoidance scale contains two subscales: social diversion and distraction. Item scores (1 = not at all to 5 = very much) are summed per scale; higher scores indicate a greater use of that particular coping style. We previously showed that the Coping Inventory for Stressful Situations has good psychometric properties for use in patients with acquired brain injury.<sup>28</sup> As our confirmatory factor analysis showed a three-factor structure (task-oriented, emotion-oriented and avoidance), we did not use the avoidance subscales.<sup>28</sup> We found good internal reliability (Cronbach's  $\alpha$  acquired brain injury/multiple sclerosis:  $T = .91/.86$ ,  $E = .90/.89$ ,  $A = .89/.85$ ).

The Dutch nine-item Life Satisfaction Questionnaire was used as a generic instrument for measuring *quality of life*.<sup>29,30</sup> The mean of all item scores (1 = very unsatisfactory to 6 = very satisfactory) is calculated. Higher scores indicate a better general quality of life. We found good internal reliability (Cronbach's  $\alpha$  acquired brain injury/multiple sclerosis:  $.84/.81$ ).

The Dutch Hospital Anxiety and Depression Scale was used as a general measure of *emotional distress* and contains two subscales: anxiety and depression.<sup>31,32</sup> Subscale scores  $\geq 8$  might indicate

the presence of a depressive disorder or a generalized anxiety disorder.<sup>31</sup> Reliability and validity are adequate for several clinical populations, including multiple sclerosis and acquired brain injury.<sup>33,34</sup> We found good internal reliability (Cronbach's  $\alpha$  acquired brain injury/multiple sclerosis: anxiety =  $.86/.84$ , depression =  $.86/.81$ ).

Data on age, sex, type of multiple sclerosis or acquired brain injury, illness duration (defined as time since diagnosis), educational level and recent (less than three months) Expanded Disability Status Scale<sup>35</sup> scores measuring disease severity in multiple sclerosis were extracted from the medical files. Level of educational attainment was classified according to a three-level system often used in the Netherlands: primary education (low), junior vocational training (medium) and senior vocational or academic training (high), corresponding to  $8.6 \pm 1.9$ ,  $11.4 \pm 2.5$ , and  $15.2 \pm 3.3$  years of full-time education, respectively.<sup>36</sup>

### Procedure

In the acquired brain injury, longitudinal cohort study patients were measured at two points in time: at discharge home from hospital or inpatient neurorehabilitation and one year later.<sup>13</sup> For this study, we used the one-year follow-up data. Patients had a telephone interview with the first author or research assistant to identify the three most stressful situations that they had encountered as a consequence of their brain injury during the previous two weeks. For each of the three stressful situations, a separate coping questionnaire (Coping Inventory for Stressful Situations) was prepared in which the instruction for completion was made specific: 'How much do you engage in these types of activities when you are confronted with ... (one of three situations)'. After the interview, each patient received three situation-specific coping questionnaires by post along with the Hospital Anxiety and Depression Scale and Life Satisfaction Questionnaire to complete via self-report. If a participant requested a live interview or asked for assistance to complete the questionnaires, a face-to-face appointment with the first author or research assistant was arranged ( $n = 26$  (18%)).

In the multiple sclerosis cross-sectional cohort study, after consent, patients received all questionnaires by post to complete via self-report. The standard instruction for the Coping Inventory for Stressful Situations was used: 'How much do you engage in these types of activities when you are confronted with a difficult, stressful or upsetting situation'. No face-to-face appointments were arranged.

### Data analysis

For patients with acquired brain injury, the Coping Inventory for Stressful Situations completed for the first stressful situation was used in all analyses reported in this article. The results for the second and third situations (collected for a different research purpose) were not included to avoid problems of intra-person correlation.

One-way analysis of variance (ANOVA) was used to answer our question about differences in coping style between the three types of multiple sclerosis and between levels of severity. Therefore, severity of multiple sclerosis was classified into three categories:<sup>23</sup> Expanded Disability Status Scale  $\leq 2.5$ , 3.0–6.0 and  $\geq 6.5$ . Spearman's correlations were also used to investigate the relationship between coping styles and severity scores. Using independent sample *t* tests, we compared the Coping Inventory for Stressful Situations scale scores of patients with acquired brain injury and multiple sclerosis and the scores of each patient group with a Dutch norm group of 683 working adults.<sup>27</sup> Likewise, differences in scores on the Hospital Anxiety and Depression Scale, the Life Satisfaction Questionnaire and the Coping Inventory for Stressful Situations scales between patients with acquired brain injury and multiple sclerosis were calculated.

To answer our question about the relationships between coping style and emotional distress and their relationship to quality of life for each patient group, we first selected the variables (illness duration, Hospital Anxiety and Depression Scale scores, task-oriented coping, emotion-oriented coping, avoidance coping and Expanded Disability Status Scale scores (only for multiple sclerosis)) that had an independent effect on quality of life. Then, we conducted five hierarchical multiple regression analyses for each patient group separately. After entering

demographic variables, these variables were tested separately and those showing associations at a  $P < .10$  were retained. Next, we tested whether Hospital Anxiety and Depression Scale scores mediated the relationship between the three coping styles and quality of life using structural equation modelling. All demographic and retained variables were included in the structural equation model. A maximum likelihood estimator was used. The final model was determined by removing the variables from the full multivariable structural equation model that did not show a significant total effect on quality of life at a  $P < .05$  (backward selection). Standardized total effects, as well as direct and indirect paths, were examined. Evidence for mediation was indicated by a significant indirect pathway between coping style and quality of life. All analyses were carried out in Stata 12.1 (StataCorp, Texas, USA) and SPSS version 23 (IBMCorp, New York, USA), using two-sided hypothesis testing with an alpha level of .05.

### Results

Initially, 190 patients with acquired brain injury were approached, 37 refused to participate. Of the 153 patients willing to participate, 5 patients did not meet the inclusion criteria. Ultimately, 143 patients with acquired brain injury participated in the follow-up assessment. Too much burden was the reason for all drop-outs.

A total of 621 patients with multiple sclerosis were initially approached; of the 403 patients who consented, 310 completed the assessment. Reasons for drop-out were not recorded.

Table 1 shows the demographic and disease-related characteristics of both groups. In Table 2, descriptive statistics of quality of life and emotional distress are provided. Depression subscale scores of the Hospital Anxiety and Depression Scale were above cut-off indicative for a depressive disorder in 28.7% ( $n=41$ ) of patients with acquired brain injury and in 33.7% ( $n=104$ ) of patients with multiple sclerosis. For the anxiety subscale of the Hospital Anxiety and Depression Scale, 30.8% ( $n=44$ ) patients with acquired brain injury and 42.5% ( $n=130$ ) patients with multiple sclerosis scored above the cut-off indicative for a generalized anxiety disorder.

**Table 1.** Patient characteristics (ABI:  $n = 143$ ; MS:  $n = 310$ ).

		ABI			MS		
		Mean	SD	Range	Mean	SD	Range
Age (years)		56	12.4	19–84	49	10.3	20–66
Illness duration (ABI: weeks, MS: years)		63.8	9.2	44.1–94.1	9.5	7.4	0.1–36.0
EDSS					3.7	1.9	0.5–8
		<i>n</i>	%		<i>n</i>	%	
Sex (male)	Male	91	63.6		82	26.4	
	Female	52	36.4		228	73.6	
Educational level	Low	40	28.0		77	24.9	
	Medium	59	41.2		109	35.3	
	High	44	30.8		123	39.8	
Type	Infarction	97	67.8				
	SAH	10	7.0				
	ICH	9	6.3				
	Diffuse vascular lesions	2	1.4				
	TBI	12	8.4				
	Anoxic encephalopathy	3	2.1				
	Tumour benign	4	2.8				
	Meningitis/encephalitis	1	0.7				
	Other	5	3.5				
	Relapsing remitting				209	67.9	
	Primary progressive				31	10.0	
Secondary progressive				68	22.1		

Abbreviations: ABI: acquired brain injury; MS: multiple sclerosis; EDSS: Expanded Disability Status Scale; SAH: subarachnoid haemorrhage; ICH: intracerebral haemorrhage; TBI: traumatic brain injury.

**Table 2.** Descriptive data of quality of life (LiSat-9) and emotional distress (HADS).

	ABI		MS		MS vs. ABI
	Mean	SD	Mean	SD	<i>P</i> -value
LiSat-9	4.54	0.85	4.31	0.86	.008
HADS-A	5.5	3.9	6.7	4.4	.004
HADS-D	5.3	4.4	6.0	4.0	.087
HADS	10.8	7.7	12.7	7.4	.009

Abbreviations: ABI: acquired brain injury; MS: multiple sclerosis; LiSat-9: Life Satisfaction Questionnaire; HADS: Hospital Anxiety and Depression Scale; HADS-A: anxiety subscale; HADS-D: depression subscale.

### Use of coping styles in acquired brain injury and multiple sclerosis

Table 3 gives an overview of the differences in coping styles between the different types of multiple sclerosis and categories of severity. In Table 4,

differences between multiple sclerosis and acquired brain injury and the comparison with a norm group of working adults<sup>27</sup> are displayed.

No difference in coping style was found according to the type of multiple sclerosis. Higher severity scores were only very weakly associated with

**Table 3.** Relations between coping styles and type of multiple sclerosis and EDSS score.

	RRMS		PPMS		SPMS		P ANOVA
	Mean	SD	Mean	SD	Mean	SD	
CISS-T	56.0	9.9	54.0	9.3	55.7	13.0	ns
CISS-E	38.7	12.0	37.0	10.7	39.6	13.4	ns
CISS-A	46.0	10.8	42.1	11.9	45.0	13.3	ns

	EDSS ≤ 2.5		EDSS = 3.0–6.0		EDSS ≥ 6.5		P ANOVA
	Mean	SD	Mean	SD	Mean	SD	
CISS-T	56.7	8.7	55.5	11.3	52.5	13.5	ns
CISS-E	36.5 <sup>a</sup>	11.8	39.6	12.0	42.0 <sup>a</sup>	14.0	.04
CISS-A	47.4 <sup>a</sup>	9.9	43.4 <sup>a</sup>	11.3	45.0	11.4	.03

Abbreviations: EDSS: Expanded Disability Status Scale; RRMS: relapsing–remitting multiple sclerosis; PPMS: primary-progressive multiple sclerosis; SPMS: secondary-progressive multiple sclerosis; CISS-T: Coping Inventory for Stressful Situations task-oriented scale; CISS-E: Coping Inventory for Stressful Situations emotion-oriented scale; CISS-A: Coping Inventory for Stressful Situations avoidance scale; ANOVA: analysis of variance.

<sup>a</sup>Comparison of these values significantly differs.

**Table 4.** Descriptive data of coping (CISS).

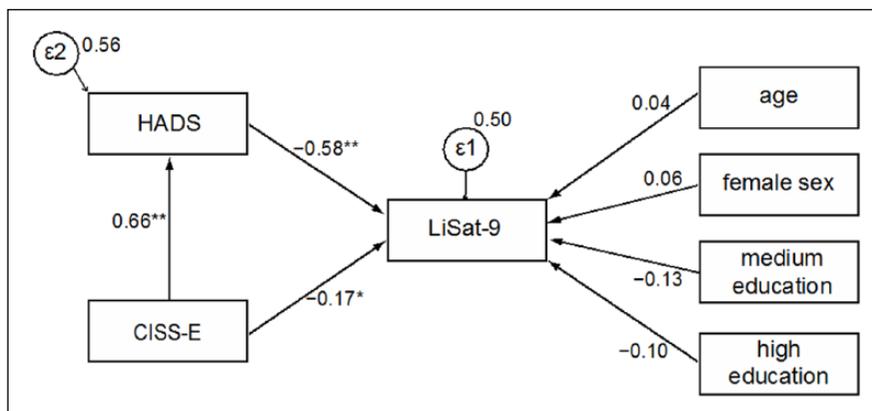
	ABI		MS		ABI vs. MS		Norm		Norm vs. ABI		Norm vs. MS	
	Mean	SD	Mean	SD	P-value	d	Mean	SD	P-value	d	P-value	d
CISS-T	49.3	12.4	55.6	10.7	<.001	0.54	60.31	8.65	<.001	1.03	<.001	0.48
CISS-E	33.6	11.7	38.7	12.2	<.001	0.43	38.29	10.52	<.001	0.42	.61	
CISS-A	41.1	12.1	45.3	11.6	<.001	0.35	45.16	10.11	<.001	0.35	.85	

Abbreviations: ABI: acquired brain injury; MS: multiple sclerosis; Norm: Dutch norm group of working adults;<sup>27</sup> d: effect size (Cohen's d); CISS: Coping Inventory for Stressful Situations; CISS-T: Coping Inventory for Stressful Situations task-oriented scale; CISS-E: Coping Inventory for Stressful Situations emotion-oriented scale; CISS-A: Coping Inventory for Stressful Situations avoidance scale.

higher emotion-oriented coping scores ( $r=.14$ ,  $P=.03$ ) and lower avoidance coping scores ( $r=-.18$ ,  $P=.003$ ). No significant correlation was found with task-oriented coping scores. The high severity category used significantly more emotion-oriented coping compared with the low severity category. The mid severity category used significantly less avoidance coping than the low severity category. Patients with acquired brain injury made significantly less use of all coping styles compared with both multiple sclerosis patients and the Dutch norm group of working adults.<sup>27</sup> Patients with multiple sclerosis only made less use of task-oriented coping strategies compared with the Dutch norm group of working adults.<sup>27</sup>

### *The relationship between coping, emotional distress and quality of life in acquired brain injury*

In the selection of variables, illness duration, task-oriented coping and avoidance coping scores showed non-significant associations with quality of life scores when tested separately. So, only emotion-oriented coping scores and Hospital Anxiety and Depression Scale scores were entered into the structural equation model. In Figure 1, the final structural equation model obtained for patients with acquired brain injury is shown. By combining the estimates of direct and indirect pathways in the final model, the total effect of each variable on



**Figure 1.** Structural equation model of direct and indirect effects of coping and emotional distress on quality of life in acquired brain injury: final reduced model showing standardized regression coefficients for direct paths.  $\epsilon$ : error variance; HADS: Hospital Anxiety and Depression Scale; LiSat-9: Life Satisfaction Questionnaire; CISS-E: Coping Inventory for Stressful Situations emotion-oriented scale. \* $P < .05$ ; \*\* $P \leq .001$ .

quality of life was calculated, revealing significant total effects for Hospital Anxiety and Depression Scale scores ( $\beta = -.58$ ,  $P < .001$ ) and emotion-oriented coping scores ( $\beta = -.55$ ,  $P < .001$ ). Testing for effect mediation showed that emotion-oriented coping scores had a direct effect on quality-of-life scores ( $\beta = -.17$ ,  $P = .04$ ) as well as an indirect (mediated) effect via its association with Hospital Anxiety and Depression Scale scores ( $\beta = -.38$ ,  $P < .001$ ). Emotion-oriented coping and Hospital Anxiety and Depression Scale scores, together with the demographic variables accounted for 50% of explained variance in quality-of-life scores (Figure 1).

### *The relationship between coping, emotional distress and quality of life in multiple sclerosis*

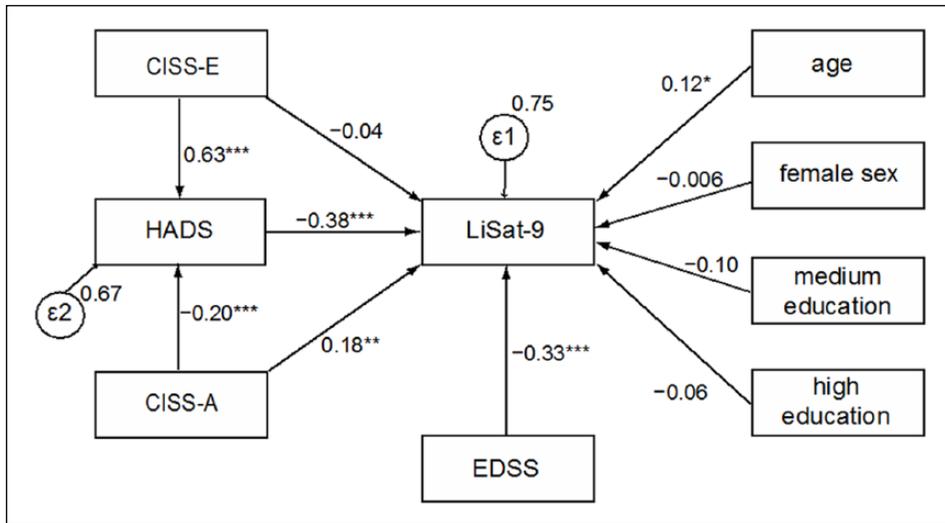
In the selection of variables, only illness duration showed a non-significant association with quality-of-life scores when tested separately and therefore was the only variable not included in the structural equation model. Next, to obtain the most parsimonious model, task-oriented coping was removed because of its non-significant total effect on quality-of-life scores. Figure 2 displays the final, most parsimonious structural equation model for patients

with multiple sclerosis. By combining the estimates of direct and indirect pathways, the final model showed significant total effects for Expanded Disability Status Scale scores ( $\beta = -.33$ ,  $P < .001$ ), Hospital Anxiety and Depression Scale scores ( $\beta = -.38$ ,  $P < .001$ ), emotion-oriented coping scores ( $\beta = -.28$ ,  $P < .001$ ) and avoidance coping scores ( $\beta = .26$ ,  $P < .001$ ) on quality-of-life scores. Testing for effect mediation revealed that avoidance coping scores had both a direct effect on quality-of-life scores ( $\beta = .18$ ,  $P = .001$ ) and an indirect (mediated) effect via its association with Hospital Anxiety and Depression Scale scores ( $\beta = .08$ ,  $P = .001$ ). In contrast, emotion-oriented coping scores only had an indirect (mediated) effect on quality-of-life scores via its association with Hospital Anxiety and Depression Scale scores ( $\beta = -.24$ ,  $P < .001$ ) (Figure 2).

Emotion-oriented coping, avoidance coping, Hospital Anxiety and Depression Scale scores, together with the demographic variables accounted for 25% of explained variance in quality-of-life scores.

## **Discussion**

We studied the associations between coping styles, emotional distress and demographics with quality



**Figure 2.** Structural equation model of direct and indirect effects of coping and emotional distress on quality of life in multiple sclerosis: final reduced model showing standardized regression coefficients for direct paths.  $\epsilon$ : error variance; HADS: Hospital Anxiety and Depression Scale; LiSat-9: Life Satisfaction Questionnaire; CISS-E: Coping Inventory for Stressful Situations emotion-oriented scale; CISS-A: Coping Inventory for Stressful Situations avoidance scale. \* $P < .05$ ; \*\* $P = .001$ ; \*\*\* $P < .001$ .

of life in two clinical cohorts of patients with multiple sclerosis or acquired brain injury. Results showed that less reliance on emotion-oriented coping was associated with higher quality of life in acquired brain injury and multiple sclerosis. Further testing showed that this was predominantly due to the fact that these patients also experienced lower levels of emotional distress, which in turn was strongly related to quality of life. In addition, in patients with multiple sclerosis, greater reliance on avoidance coping also contributed to lower levels of emotional distress and higher quality of life. Coping styles did not differ between the patients with relapsing–remitting, primary–progressive, and secondary–progressive forms of multiple sclerosis. Coping styles varied very little with regard to severity of disease in patients with multiple sclerosis. Patients with acquired brain injury made less use of all types of coping strategies and reported higher quality of life and less emotional distress than patients with multiple sclerosis.

The present findings are generally in accordance with previous research in both multiple sclerosis and acquired brain injury showing that a greater

reliance on emotion-focused coping strategies is related to poor psychosocial adjustment, depression and anxiety.<sup>8,37–40</sup> Interestingly, however, we found that patients with multiple sclerosis who make more use of avoidance coping experienced lower levels of emotional distress and higher quality of life. At first glance, these findings appear contradictory. Yet, avoidance measured with the Coping Inventory for Stressful Situations refers to actively seeking social support and distraction, whereas in most other coping questionnaires, avoidance is associated with a passive, non-productive attitude. In that sense, our findings are in line with a study by Mikula et al.<sup>41</sup> showing that problem-focused coping as well as coping focusing on getting emotional support and stopping unpleasant thoughts contribute to successful adaptation in multiple sclerosis. Since there was no such association in acquired brain injury, one could hypothesize that this particular strategy is of importance to face illness uncertainty. Many studies have shown that illness uncertainty is associated with worse adjustment and depressive symptoms in multiple sclerosis.<sup>42</sup> Also, in our study, patients with multiple sclerosis

displayed lower quality of life than those with acquired brain injury.

Furthermore, patients with multiple sclerosis and acquired brain injury showed a similar coping pattern. Task-oriented coping was most used followed by avoidance coping and least used was emotion-oriented coping. The only difference is that patients with acquired brain injury use all coping styles to a lesser extent.

In line with previous studies, the influence of type and severity of multiple sclerosis on coping was limited.<sup>15,22</sup> However, Montel and Bungener<sup>21</sup> found that patients with secondary-progressive multiple sclerosis used more emotion-focused strategies, whereas patients with primary-progressive multiple sclerosis used more problem-focused strategies. Furthermore, Rommer et al.<sup>23</sup> showed that patients with a medium level of disability were using both emotion-focused and problem-focused coping strategies more extensively than the lesser or stronger impaired patients.

With regard to clinical practice, we think that systematic screening of coping styles might be helpful to identify patients at risk for worse outcome. Because we found more similarities than differences, we suggest that interventions to promote coping can be organized for both patient groups together within a neurorehabilitation setting. Both groups will benefit from therapeutic attempts to minimize the use of emotion-oriented coping. Moreover, especially in multiple sclerosis patients, it seems of importance to stimulate a broad spectrum of coping strategies directed towards actively seeking support and distraction. Cognitive behavioural therapy has shown to be effective in increasing the ability to implement adaptive coping strategies and reduce emotional distress.<sup>43-46</sup>

Some limitations of our study have to be acknowledged. Our acquired brain injury and multiple sclerosis study sample showed a large difference in illness duration, which could be of influence in choice of coping responses. Yet, we corrected for illness duration in our analyses. Coping was measured with the Coping Inventory for Stressful Situations in both samples, but we used a situation-specific instruction in acquired brain injury versus

the general instruction in multiple sclerosis. Because coping styles did not vary significantly across situations in patients with acquired brain injury<sup>24</sup> and both versions of the questionnaire have the same factor structure,<sup>28</sup> we assume that the difference in instructions is of limited influence. Our cross-sectional design does not allow for testing of reciprocal relationships between coping and emotional distress, although a bidirectional influence seems a more appropriate reflection of reality. Response rate of patients with multiple sclerosis (50%) was much lower which might have resulted in a selection bias. Furthermore, our acquired brain injury sample was mostly composed of men, whereas for the multiple sclerosis sample, the majority was female. We corrected for sex in our analyses, but it is known that in the general population, women more frequently use emotion-focused coping styles than men.<sup>27</sup> The same is true for female patients with acquired brain injury,<sup>9,47</sup> but it has not been shown for women with multiple sclerosis.<sup>27</sup> The fact that we did not find a difference in coping between types of multiple sclerosis must be interpreted with some caution because sample sizes were different between groups.

In contrast to the population with multiple sclerosis, we did not have a measure of severity of disease for acquired brain injury. In a post hoc analysis, we have compared the structural equation model for multiple sclerosis with and without the Expanded Disability Status Scale. We found a minor difference, most notably a conversion to non-significance for the age variable in the model without the severity measure, and therefore decided to retain the Expanded Disability Status Scale in the model.

In conclusion, we showed that coping patterns are quite similar, and higher quality of life is associated with less reliance on emotion-oriented coping in both patient groups. The latter is partly mediated by symptoms of emotional distress. In addition, in patients with multiple sclerosis, making more use of avoidance coping contributed to lower emotional distress and higher quality of life. Disease-related factors are of limited influence on coping in multiple sclerosis, which is also the case in acquired brain injury.

### Clinical Messages

- Patients with acquired brain injury and multiple sclerosis show a similar pattern of coping. Patients with multiple sclerosis use all styles to a greater extent.
- Coping styles do not differ according to type of multiple sclerosis.
- Severity of multiple sclerosis is of little influence on choice of coping styles.
- Higher quality of life is associated with less reliance on emotion-oriented coping, which is partly mediated by depressive symptoms in both patient groups.

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