

# Paper I

# The impact of affectivity dispositions, self-efficacy and locus of control on psychosocial adjustment in patients with epilepsy

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Received 7 November 2000; received in revised form 31 January 2001; accepted 21 February 2001

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## Abstract

The main hypothesis of this study was that negative and positive affectivity, self-efficacy and health-related locus of control are important for psychosocial adjustment in patients with epilepsy. These dimensions are rarely examined directly in relation to the psychosocial adjustment in these patients. Correlations between measures of these constructs and measures of psychosocial adjustment in epilepsy were investigated. One hundred and one patients answered the Washington psychosocial seizure inventory (WPSI), the positive and negative affect schedule (PANAS-X), the multidimensional health locus of control scales (MHLC), the generalized self-efficacy scale and a scale measuring self-efficacy in epilepsy. Reliability analyses, correlational analyses and multiple stepwise regression analyses were performed. Negative affectivity (NA), positive affectivity (PA) and generalized self-efficacy showed high correlations with the WPSI scales emotional adjustment, overall psychosocial adjustment and quality of life. The epilepsy self-efficacy measures showed high, but lower correlations with the same WPSI scales. The MHLC scales showed low correlations with the WPSI scales. Multiple regression analyses showed that PA, NA and measures of self-efficacy explained more than 50% of the variances on emotional adjustment, overall psychosocial functioning and quality of life. In conclusion, positive and negative affectivity and self-efficacy are important predictors of perceived emotional adjustment, psychosocial adjustment and quality of life in patients with epilepsy. NA is the best predictor, but PA and self-efficacy measures give unique predictions independent of NA. © 2001 Elsevier Science B.V. All rights reserved.

*Keywords:* Epilepsy; Personality; Self-efficacy; WPSI; Positive/negative affectivity

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## 1. Introduction

Developing instruments to assess psychosocial problems in patients with epilepsy in a reliable and valid manner is an important issue (Bear and Fedio, 1977; Dodrill et al., 1980; Vickrey et al.,

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1992; Dilorio et al., 1992a; Baker et al., 1993; Devinsky et al., 1995; Tedeman et al., 1995; Cramer et al., 1996). As a supplement to the individual clinical evaluation, standardized questionnaires may contribute objective measures comparable to reference groups relevant to the parameters measured (Aldenkamp, 1993). Models of coping have been developed in social learning theory, and applied in studies of psychosocial adjustment and quality of life (Bandura, 1977; Schwarzer, 1992). However, in the field of epileptology, these models and constructs have been integrated to a minor degree, and little is known about how existing questionnaires reflect these constructs.

Data from a mixed population of patients with epilepsy in western Norway is presented, with focus on specified dimensions of functioning, based on contemporary trait theory of personality, and social learning theory. The dimensions are: positive affectivity (PA), negative affectivity (NA), generalized self-efficacy (GSE), self-efficacy in epilepsy (ESE), and multidimensional health-related locus of control (MHLC).

Concepts of PA and NA are empirically derived, and refer to pervasive tendencies in individuals towards experiencing predominantly positive or negative effects (Watson and Clark, 1984). NA is closely connected to the concept of neuroticism, and constitutes one of five basic factors in a five-factor model of personality (McCrae and Costa, 1990). PA and NA are not opposites, but they are moderately negatively correlated (Watson et al., 1988). Both significantly influence presentation of oneself in questionnaires measuring psychological problems, and are important for the experience of anxiety and depression (Watson et al., 1988; Clark et al., 1994). In patients with epilepsy, neuroticism influences psychosocial adaptation after surgery (Rose et al., 1996) and responses to psychosocial and quality of life inventories (Zhu et al., 1998).

Self-efficacy, or expectations of successful coping, influences achievement both in health-related coping and in other areas of functioning (Bandura, 1977; Schwarzer, 1992, 1993). Self-efficacy is operative as a general attitude and in specific coping with particular problems. Specific self-efficacy scales have been constructed for various health-re-

lated behavior (Schwarzer, 1992, 1993), and for coping with epilepsy (Dilorio et al., 1992b; Gramstad et al., 1995; Tedeman et al., 1995; Amir et al., 1999).

The concept of locus of control refers to an individual tendency to perceive events either as controlled by personal influence or by external forces (Rotter, 1966). Specific scales have been developed to measure health-related locus of control (Wallston et al., 1978). In epilepsy, the repeated loss of personal control is a central problem, and may be important to address directly. In children with epilepsy, increased external locus of control has been shown (Matthews et al., 1982). Moreover, elevated external locus of control is associated with depression in adults with epilepsy (Hermann and Wyler, 1989).

The Washington psychosocial seizure inventory (Dodrill et al., 1980), was chosen to measure psychosocial adjustment in patients with epilepsy in this study. This instrument is well validated and considered comprehensive enough to be applied as a 'stand-alone' measure assessing psychosocial adjustment in epilepsy (Aldenkamp, 1993). Its validity for use in Norway has been supported by earlier studies (Ellertsen et al., 1993; Gramstad et al., 1995). It has also been extensively cross-cultural validated in other states of the USA and other countries (Dodrill et al., 1984a,b; Tiberia and Froman, 1986; Trostle et al., 1989; Alvarado et al., 1992; Hosokawa et al., 1994). The construction of the scales of the WPSI were based on professional clinical judgement, and the selection of items was based on empirical correlations with such judgements (Dodrill et al., 1980).

In this study, we wanted to apply theory-based instruments measuring NA, PA, self-efficacy and health-related locus of control to validate or invalidate our hypothesis that these factors are important for the psychosocial adjustment of patients with epilepsy. The relative impact of these constructs on psychosocial adjustment was also investigated. We expected NA to show the largest general impact. Measures of this construct show high correlations with psychometric scales measuring general psychological adjustment, and the construct may reflect this common variance (Watson and Clark, 1984). We also expected other constructs to have unique contributions to

psychosocial adjustment, even when NA is controlled for.

Preliminary data from a subgroup of patients in this study have been presented earlier (Gramstad et al., 1995).

## 2. Methods

### 2.1. Instruments and procedures

The following questionnaires were used:

#### 2.1.1. Washington psychosocial seizure inventory (WPSI)

This questionnaire (Dodrill et al., 1980) consists of 132 simple questions, to be answered «yes» or «no». Three measures of answer validity, seven measures of distinct dimensions of psychosocial functioning and one summary measure of overall psychosocial functioning are given in the standard form. Later, one measure of *quality of life* has been constructed (Dodrill, 1995; Dodrill and Batzel, 1995), and this measure was also included in this study.

#### 2.1.2. Positive and negative affect schedule (PANAS-X)

This questionnaire (Watson and Clark, 1991) consists of 20 words describing different inner states or emotions. The words on the NA and PA dimensions are presented intermixed. Each word is ranged on a scale from one to five, as to whether the word fits the habitual or time-limited state of the individual. In this study, the general or habitual state was requested. One measure of *negative affectivity* (NA) and one measure of *positive affectivity* (PA) is given.

#### 2.1.3. Multidimensional health locus of control scale (MHLC)

This questionnaire (Wallston et al., 1978) consists of 18 statements concerning beliefs about what controls health. Each statement is ranged on a six-point scale as to the degree of agreement. Three measures are given: *internal health locus of control* (IHLC), *powerful others health locus of control* (POHLC) and *chance health locus of control* (CHLC).

#### 2.1.4. General self-efficacy scale (GSE)

This questionnaire (Schwarzer, 1993) consists of 10 statements concerning individual coping expectations, each to be ranged on a four-point scale as to what degree the statement is perceived to be correct for the responder. One measure of *general self-efficacy* is given.

#### 2.1.5. Epilepsy self-efficacy scale (ESE)

This questionnaire was constructed by the authors, based on the format of the general self-efficacy scale. It consists of six statements concerning individual coping expectations in epilepsy-related situations, each to be ranged on a four-point scale as to what degree the statement is perceived to be correct for the responder. It was deliberately designed to be brief and simple. One measure of *epilepsy self-efficacy* is given.

The six statements of this scale are:

1. I can easily talk to others about my epilepsy.
2. After a convulsive seizure, I can easily face my surroundings.
3. If I get into a difficult situation because of my seizures, I usually manage to get out of it.
4. If anyone uses my epilepsy against me, I manage to reply.
5. After a seizure, I often manage to do something that makes me feel good.
6. Even if I get a seizure, I usually complete what I had intended to do.

These scales were answered by patients at the Department of Neurology, Haukeland University Hospital in the period 1993–1997. All patients gave informed consent. The scales were collected in one leaflet. Thirty-one patients answered the scales as part of a separate clinical evaluation, and the response rate in this study was 77.5%. The remaining seventy patients answered the scales consecutively during their stay in the hospital for planned comprehensive evaluation of their epilepsy, or due to recent seizures demanding immediate hospitalisation. This corresponds to a response rate of over 95%.

When nothing else is mentioned in the text or tables, the level of statistical significance was set to 0.05. All statistical calculations were performed on SPSS for Windows, version 6.0.

## 2.2. Patients

One hundred and one patients with a definite diagnosis of epilepsy were included in the study. It was a heterogenous sample of patients (Table 1). The epilepsy unit consists of an interdisciplinary team, which is part of the larger neurological department. The unit represent a regional third line service, and the patient pool includes patients with all kinds of epilepsy, including intractable epilepsy, surgery candidates, and patients with uncomplicated epilepsies consulting the outpatient clinic.

Of the 23 patients in Table 1 with generalized epilepsy, 11 had definite juvenile myoclonic epilepsy (JME), three had likely JME (Kleveland and Engelsen, 1998). One patient had a classical absence epilepsy which persisted into adulthood, and eight patients had absence or GTC seizures classified as part of a generalized epilepsy. Two patients had likely secondary generalized epilepsy with developmental disease. Eleven patients used one antiepileptic drug (AED), nine patients used two AEDs and three used three AEDs.

Of the 78 patients with focal epilepsy, 14 had frontal lobe epilepsy, four occipital and five parietal epilepsy, whereas three patients had non-specifiable location of focus. The remaining 52 patients were classified as having certain or likely temporal lobe epilepsy. Of these, 20 had hippocampal atrophy and/or sclerosis, documented by magnetic resonance imaging (MRI).

Table 1  
Demographic and seizure characteristics of study sample

<i>N</i>	101
Gender	53 females 48 males
Mean age	33.4 years (17–60, S.D. = 10.9)
Mean age at onset of epilepsy	16.7 years (0–51, S.D. = 10.9)
Mean duration of epilepsy	16.7 years (0.5–44, S.D. = 10.6)
Patients with generalized seizures	23/101
Patients with focal seizures	78/101
Left focus	52/101
Right focus	21/101
Uncertain	5/101

Table 2

Means, standard deviations and ranges on scales of the WPSI

WPSI scales	Mean	S.D.	Range
Blank	0.94	1.78	0–7
Lie	2.43	1.82	0–7
Rare items	2.22	1.47	0–6
Family background	1.67	1.99	0–8
Emotional adjustment	12.82	6.02	1–31
Interpersonal adjustment	5.12	4.00	0–18
Vocational adjustment	4.72	2.99	0–11
Financial status	2.31	2.19	0–7
Adjustment to seizures	5.42	3.12	1–13
Medicine and medical management	2.28	1.80	0–8
Overall psychosocial functioning	17.19	10.07	0–46
Quality of life	13.56	4.62	0–21

On the whole, 43 of the 101 patients had monotherapy with AED. Nine patients were treated with three AEDs, one patient had no AED, and the remaining 48 patients had two AEDs. At least 79 patients had one or more cases of generalized tonic-clonic convulsions, and eight patients had one or more instances of status epilepticus.

## 3. Results

The mean scores on the clinical scales of the WPSI are expressed in Table 2. On the Lie scale, 74 subjects (73.3%) had a score of 3 or less, and 87 subjects (86.1%) had a score of 4 or less. On the Rare items scale, 99 subjects (98.0%) had a score of 5 or less. The two remaining subjects had a score of 6. In their original publication of the WPSI, Dodrill et al. (1980) defined that scores of 0–3 on the Lie scale and 0–5 on the Rare scale indicated acceptable validity, but that scores above these limits affected the validity of the rest of the WPSI scales. Later research (Dodrill et al., 1984b; Alvarado et al., 1992; Hosokawa et al., 1994) have shown considerable cross-cultural variation in the scores of the Lie scale. The mean score of the Lie scale in this study is slightly elevated compared with reported data from the USA (Dodrill et al., 1980, 1984a), but considerably less elevated than reported data from former

Table 3  
Means, standard deviations and Cronbach's alpha on scales of the PANAS-X, GSE, ESE and MHLC

Scales	Mean	S.D.	Alpha
NA	19.27	6.93	0.86
PA	32.61	6.24	0.84
GSE	28.09	4.78	0.83
ESE	17.42	3.32	0.59
IHLC	22.71	5.48	0.64
POHLC	21.06	6.25	0.71
CHLC	19.37	6.20	0.35

DDR (Dodrill et al., 1984b) and Japan (Hosokawa et al., 1994).

Table 3 gives the scores and the alpha values of the scales of the PANAS-X, MHLC and the self-efficacy measures GSE and ESE. The table shows that the internal consistencies of the scales of the PANAS-X and the GSE, measured by Cronbach's alpha, are above 0.80. The alpha score of the other scales are somewhat below this number. This is in part due to statistical properties. The number of items in a scale influences the alpha value, in such a way that more items increases the value. The scales with alpha values of above 0.80 contain ten items, whereas the scales with alpha values below 0.80 all contain six items. The alpha values of all the scales except CHLC are good or acceptable.

Table 4 shows the intercorrelations among the scales of Table 3. In general, the intercorrelations are moderate, with only three values above 0.30. As might be expected, the two self-efficacy scales show a relatively high correlation. The scores on

PA and GSE show a moderately high correlation, as does the POHLC and IHLC.

In Table 5, the correlations between the scales of the WPSI and the scales of Table 3 are given. The table shows a number of high and significant correlations for NA, PA and the self-efficacy scales with the clinical scales of the WPSI. In particular, the highest correlations were between NA and the WPSI scales emotional adjustment, overall psychosocial adjustment and quality of life. The high degree of similarity between the pattern of correlations can in part be explained by significant item overlap between these WPSI scales.

The correlation between NA and the WPSI scale interpersonal adjustment also was statistically significant. Furthermore, highly significant correlations were found for PA and GSE with these same WPSI scales. The ESE scale showed high correlations with the adjustment to seizures scale, and with the overall psychosocial adjustment scale.

In general, NA and PA showed moderate to high correlations with all the clinical scales of the WPSI. The lowest correlations were on scales likely to measure more specific areas of psychosocial functioning, whereas the highest correlations were on scales designed to measure emotional and general psychosocial distress and quality of life. The locus of control scales from the MHLC in general showed low and insignificant correlations with the clinical scales of the WPSI. Most of the correlations between the WPSI validity scales and the scales of Table 3 were low and insignificant.

Table 4  
Intercorrelations between the scales of PANAS-X, MHLC and self-efficacy scales<sup>a</sup>

	NA	PA	IHLC	PHLC	HLC	GSE	ESE
NA	–	–0.25	–0.13	0.10	0.11	–0.28	–0.23
PA		–	0.01	0.06	–0.07	0.38**	0.28
IHLC			–	0.37**	0.04	0.08	0.18
POHLC				–	0.26	0.01	–0.07
CHLC					–	0.19	0.01
GSE						–	0.49**
ESE							–

<sup>a</sup> \* $P < 0.005$ ; \*\* $P < 0.001$ .

Table 5

Intercorrelations between scales of the WPSI and scales from the PANAS-X, MHLC and self-efficacy scales

	NA	PA	IHLC	POHLC	CHLC	GSE	ESE
Family background	0.37**	−0.23	−0.20	−0.08	0.04	−0.12	−0.12
Emotional adjustment	0.64**	−0.46**	−0.15	−0.03	0.04	−0.51**	−0.34*
Interpersonal adjustment	0.46**	−0.43**	−0.11	0.02	0.19	−0.39**	−0.34*
Vocational adjustment	0.29*	−0.39**	−0.08	−0.01	0.11	−0.28	−0.33*
Financial status	0.24	−0.36**	0.02	−0.15	0.07	−0.14	−0.22
Adjustment to seizures	0.42**	−0.26	−0.05	0.05	0.09	−0.32*	−0.52**
Medicine and medical management	0.32*	−0.24	−0.09	−0.22	−0.14	−0.18	−0.17
Overall psychosocial functioning	0.61**	−0.50**	−0.16	0.02	0.11	−0.48**	−0.45**
Quality of life	−0.57**	0.52**	0.13	0.03	−0.08	0.48**	0.41**
Validity scales							
No. blank	0.27*	−0.23	−0.14	0.00	−0.05	−0.06	−0.04
Lie	−0.19	0.12	0.03	0.27	0.11	0.13	0.11
Rare items	0.34*	−0.30*	−0.24	−0.23	−0.02	−0.16	−0.18

The WPSI scales emotional adjustment, overall psychosocial functioning and quality of life showed high correlations with a number of the other scales utilized in this study. To further investigate the meaning of these findings, multiple stepwise regression analyses with these WPSI scales as dependent variables were performed. The independent variables were the seven scales of Table 3, and the demographic variables *gender* and *mean duration of epilepsy*. Because of the high degree of item overlap within the WPSI scales, approximately similar results on the three analyses would be expected. The results of the analyses are given in Table 6. As can be seen, over 50% of the variance in each of the three scales from the WPSI is explained. The results of the analyses was overall similar in all three scales, although some minor differences between the WPSI scales appeared. For each WPSI scale, NA explained most variance. PA explained a significant amount of variance in all three WPSI scales, when the variance explained by NA had been controlled for. One measure of self-efficacy also explained a significant amount of variance on each WPSI scale after control for the variance explained by NA. The ESE scale significantly explained the variance of the overall psychosocial functioning scale, and the GSE scale significantly explained the variance of the emotional adjustment and quality of life scales. Gender and duration of epilepsy did not contribute significantly to the explained variance.

The results can be expressed as coefficients of contribution (Beta  $\times$  Pearson correlation, Keeves, 1970), to sort out the unique weighted contribution of each of the independent variables in each analysis. The relative contribution of NA was largest on the emotional adjustment scale, and the contribution of PA relative to NA was largest in the quality of life scale.

#### 4. Discussion

The initial hypotheses regarding the intercorrelations between scales, were in general supported by the findings of this study. There were high correlations between NA, PA and GSE on one hand, and the WPSI scales emotional adjustment, overall psychosocial functioning and quality of life on the other hand (Table 5). These correlations were all of a magnitude over 0.45. In addition, there were high correlations between epilepsy self-efficacy and the WPSI scales adjustment to seizures and overall psychosocial functioning. Moreover, multiple regression analysis showed that for the WPSI scales emotional adjustment and quality of life, NA, PA and GSE were significant predictors. NA, PA and epilepsy self-efficacy were significant predictors for the WPSI scale overall psychosocial functioning. This means that for the overall psychosocial functioning scale, the epilepsy self-efficacy scale con-

tributed stronger than the GSE scale, despite the fact that the GSE scale had a higher bivariate correlation with this WPSI scale. The magnitude of explained variance on the WPSI scales analyzed was impressive, with over 60% explained variance on the emotional adjustment and overall psychosocial functioning scales, and over 50% explained variance on the quality of life scale.

Therefore, the findings of this study suggests that the constructs of NA, PA and self-efficacy are important predictors of emotional adjustment, overall psychosocial functioning and quality of life in patients with epilepsy. Moreover, each of these constructs were found to give unique contributions to these predictions, with NA as the strongest single predictor for each of the dependent variables. The relative contribution of PA was stronger in quality of life and overall psychosocial functioning than in emotional adjustment.

The intercorrelation between PA and NA measures was only moderately negative. This finding agrees with earlier findings (Watson et al., 1988; Watson and Clark, 1991; Clark et al., 1994) that they are separate constructs. NA showed positive correlations with all the WPSI scales, but measures of general or emotional distress had higher correlations with NA than measures of more specified psychosocial problems, such as vocational or financial problems. This pattern of correlations closely resembles the correlations found by Rose et al. (1996) between the neuroticism scale of the MMPI-2 and the WPSI in patients with epilepsy. In the literature, neuroticism is closely connected

to NA, and the terms are often regarded as representing the same underlying construct (Watson and Clark, 1984; Watson et al., 1988; Clark et al., 1994). Thus, the findings of our study agrees with at least one comparable study in the literature. Earlier studies (Rose et al., 1996; Zhu et al., 1998) have found increased neuroticism in patients with epilepsy compared with controls. It seems that the further investigation of the influence of neuroticism and/or NA on the psychosocial and emotional adaptation of patients with epilepsy is warranted, as this factor seems to be important for understanding the general adjustment in this population.

PA and generalized self-efficacy showed a similar pattern of correlations as NA. One earlier study (Tedeman et al., 1995) have found reduced levels of self-efficacy in patients with epilepsy compared with controls, supporting the idea that self-efficacy is important for understanding the general adjustment of these patients.

To our knowledge, there are no earlier studies utilizing any measure of PA in patients with epilepsy. The results of this study suggests that PA is an important independent predictor of general adjustment in these patients, and it may be of particular importance in the measurement of quality of life.

In general, the results of this study suggests that both PA, NA and generalized self-efficacy explains significant amounts of variance in measures of quality of life, and that the influence of these factors should be considered in further studies of the quality of life in patients with epilepsy.

Table 6  
Results of multiple stepwise regression analysis<sup>a</sup>

Dependent variable	Independent variables	Beta	Part. cor.	Co.c.	R <sup>2</sup>
Emotional adjustment	Step 1: NA	0.54	0.51	0.35	0.60
	Step 2: GSE	-0.27	-0.24	0.15	
	Step 3: PA	-0.20	-0.18	0.09	
Overall psycho-social adjustment	Step 1: NA	0.52	0.49	0.34	0.60
	Step 2: PA	-0.30	-0.28	0.15	
	Step 3: ESE	-0.25	-0.24	0.12	
Quality of life	Step 1: NA	-0.46	-0.43	0.28	0.55
	Step 2: PA	0.30	0.26	0.15	
	Step 3: GSE	0.24	0.21	0.12	

<sup>a</sup> Part cor., partial correlation; Co. c., coefficient of contribution (Beta × correlation).



The epilepsy self-efficacy scale utilized in this study showed a high positive correlation with the adjustment to seizures scale of the WPSI. This scale was also shown to contribute significantly and uniquely to the explained variance in perceived overall psychosocial functioning in epilepsy patients. These findings seem to support the construct validity of this scale, and to support the relevance of this kind of measure in the overall evaluation of psychosocial functioning in patients with epilepsy. The scale has the advantage of being a brief and simple measure, suitable to integration in more comprehensive questionnaires. However, the scale needs further independent validation before it can be recommended for general use.

The quality of life scale is not as well documented as the other clinical scales of the WPSI, and there remains some uncertainty regarding the relation of this scale to the concept of quality of life as used in other studies. It has significant item overlap both with the emotional adjustment scale and the overall psychosocial functioning scale, and it also resembles these scales in its structure of correlations with other variables. Our study shows somewhat higher influence from the PA dimension on the quality of life scale than on the emotional adjustment scale. This finding is not very striking in terms of differences in explained variance. Nevertheless, the relative contribution of PA and NA in explaining quality of life relative to emotional distress level may be of theoretical and practical interest and should be investigated further, also in patients with epilepsy.

The hypothesis that health-related locus of control is of importance for the psychosocial functioning in patients with epilepsy was not supported by this study. This may be explained by shortcomings of the particular scales used in this study. The scale measuring chance health locus of control showed an unacceptably low level of internal consistency, and it is unclear whether this measure can be considered a unitary measure of the underlying concept. The scales measuring internal and powerful others health locus of control showed acceptable internal consistencies. The relations to other measures of documented validity in assessing psychosocial problems in epilepsy,

however, was weak. The MHLC scales have met criticism on a more general basis, and the utility of the concept of locus of control is also under question (Wallston, 1992). The clinical application of these scales in patients with epilepsy have not been supported by this study.

In sum, measures of positive and negative affectivity and self-efficacy each appear to add significant contributions to the understanding of emotional adjustment, overall psychosocial functioning and quality of life in patients with epilepsy. The strength of these contributions is impressive, and in the further study of emotional and psychosocial adaptation and quality of life in patients with epilepsy these factors should be taken into consideration.

### Acknowledgements

We thank Professor Bjørn Ellertsen, who is responsible for the Norwegian translation of the WPSI, and Trude Belset, MD, for her contribution in the data collection.

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