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Behavioral and Representational Components of "Hyperactivity" in Fibromyalgia Syndrome Patients

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ABSTRACT. Hyperactive premorbid lifestyle is frequently reported by fibromyalgia patients. The present study investigates the original assumption that hyperactive lifestyle could be viewed as a two-sided concept, with a representational side (one's own attitude toward activities) and a behavioural one (effective engagement in many activities). Twenty-four patients diagnosed with fibromyalgia were recruited together with their significant others [SOs]. A group of 24 healthy control participants was matched with the fibromyalgia group for gender, age, educational level, and type of profession. The aims of the study were to (1) compare ratings of fibromyalgia patients and SOs, and (2) compare ratings of patients and controls on past and present behavioral and representational components of hyperactivity. No differences were observed between patients and SOs. For the comparison between patients and controls, patients scored significantly higher on representational components of past hyperactivity, but lower on representational components of current hyperactivity. For past behavioral hyperactivity, patients and controls did not differ, except that patients had less time devoted to resting activities and sleep. The discussion emphasises the need for a systematic assessment of both representational and behavioral components of hyperactivity and argues for a better identification of related pathogenic mechanisms.

KEYWORDS. Fibromyalgia, chronic pain, hyperactivity, belief, behavior

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INTRODUCTION

Most fibromyalgia syndrome [FMS] patients [up to 70 percent] (1) report a premorbid lifestyle that they explicitly described as hyperactive. This lifestyle is assumed to exert pathogenic influences on their illness (2). Etiopathological mechanisms would probably be mediated by several pathways [biological, cognitive, psychodynamic, and social] (1, 3, 4). Additional empirical support for pathogenic influence of premorbid active lifestyle comes from a recent publication (5) in the field of chronic fatigue syndrome [CFS], a syndrome that strongly overlaps with FMS. Using a large prospective birth cohort, the authors report that high levels of physical activities throughout childhood and early adult life were associated with an increased risk of later CFS.

However, some concerns about the topics of hyperactivity in FMS may be stressed. More precisely, the present study suggests that premorbid active lifestyle might have two sides, a *representational* one and a *behavioral* one. To our knowledge, premorbid lifestyle in FMS patients has never been assessed by both representational and behavioral measures. This distinction seems relevant to us for therapeutic purposes in order to better introduce and manage the cognitive and behavioral components of pacing strategies (6, 7). The present study compares healthy normal control [HNC] subjects and FMS patients on the assessment of representational and behavioral components of activity and the identification of a discrepancy between these two components. As "hyperactivity" would have etiopathological value in the literature and in patient's assertion, do measures of representational and behavioral components of [past or current] activity differ in healthy subjects and in FMS patients? Stories told by FMS patients about their past lives frequently report overcommitment in various activities and continuous activity-related ruminations leading to an irresistible urge to actions. This irresistible urge to actions maintaining a stressful condition should contribute to the etiological mechanisms in FMS. Consequently, here it is assumed that for a same amount of activities, patients would anyway remain more mentally engaged in activity-related topics than healthy subjects.

The present study is an attempt to clarify some concerns about the issue of hyperactivity. There is no clear definition of hyperactivity. For example, to our knowledge, no study provides a measure that refers to a normal range of activities and a cut-off value between a normal amount of activity and an important level of activities that would be labeled as "hyperactivity" or "overactivity." Usually, hyperactivity is associated with a declaration about being active, and thus, largely rests on a subjective judgment. The match with effective overcomittment in various activities may be questioned. Previous studies on hyperactivity (2, 8–10) do not use measures that target objective activities. These studies have assessed hyperactivity exclusively with the questionnaire of Habitual Action-Proneness [HAB] (11). The HAB questionnaire consists of self-statements describing attitudes [e.g., "Before I decide doing something, I never have to think long about it"; "Before I realize, I'm involved in all sorts of activities"] with respect to physical and mental activities. It does not assess the extent to which patients were actually engaged in activities. In addition, the literature on this issue refers to a premorbid overactive lifestyle with several terms such as "hyperactivity," "overactive lifestyle," and "action-proneness" (1, 2, 8–10). Do these terms reflect similar or different aspects of an [over]active lifestyle? "Hyperactivity" and "overactive lifestyle" might suggest effective engagement in many activities, i.e., active behaviors. "Action-proneness" might rather suggest a mental disposition to action, i.e., a representation of one's own attitude toward activities.[a]

The central purpose of the present study is to retrospectively compare FMS patients and HNCs, respectively, regarding their HAB scores [assumed to reflect the representational aspects of their lifestyle] and the results from a questionnaire investigating everyday activities [assumed to reflect the behavioral aspects of their lifestyle]. It is predicted that patients would have higher scores on the HAB questionnaire and report more past activities than the HNC subjects. A second objective is to replicate previous findings (2, 10) regarding the validity of self-reported action proneness by involving significant others [SOs]. This would provide potential inter-rater reliability and concurrent validation data for this measure. Given the results from

[a]For convenience, only the term "hyperactivity" will be further used in this paper, given it is closer to patient's and professional's words.

the studies carried out by Van Houdenhove and colleagues (2, 10), no differences were expected between observer reports about the patients' premorbid lifestyles and the patients' self-reports about their own lifestyles. The third purpose of the study was to ask FMS patients and HNCs to answer the HAB questionnaires according to their current lifestyle. This last purpose investigates whether activity-related beliefs change across time. According to our clinical observations supporting the strong influence of activity-related thoughts [e.g., "When I start a work, I never stop until it is finished"; "I feel very guilty since I have lost my job, that I feel obliged to do all the housework before anyone is back"], FMS patients repeatedly report discrepancy between current decreased daily activities and unchanged activity-related beliefs. It is predicted that activity-related beliefs would not evolve in a parallel fashion with behavior modification.

MATERIALS AND METHODS

Participants

The FMS participants were recruited in the multidisciplinary center for chronic pain management at the University Hospital of Mont-Godinne, Catholic University of Louvain, Belgium. Female and male patients who had been diagnosed with FMS according to the criteria of the American College of Rheumatology (12) were evaluated. Participants had to meet two other criteria to be included in the study. First, the start of the FMS symptoms had to be less than 5 years in order to limit reconstructive memory biases. Secondly, the participants could not have been involved in any psychotherapeutic interventions since the beginning of the syndrome, as this is likely to transform their usual coping style. A group of HNC participants characterized by the absence of any serious or disabling affection were recruited during private dental consultations and participated in the study only when free of any [dental] pain. The HNC group was matched with the FMS group for gender, age, education level, and type of profession. Patients and HNCs were perfectly matched regarding profession in order to enhance the likelihood that retrospective measures in both the groups rest on closely comparable lifestyles. For reliability purpose, SOs were also recruited for both the groups. For the patient group, SOs were spouses [83 percent] and close family members [17 percent]. For HNC, spouses constituted 87 percent and close family members were 13 percent. This study was conducted after obtaining approval from the ethics committee of the Catholic University of Louvain.

Measures

Questionnaire of Habitual Action-Proneness [HAB]

All the participants filled HAB questionnaire [Vragenlijst voor Habituele Actiebereidheid], a Dutch questionnaire developed by Dirken (11), which contains 50 self-descriptive items. Typical items are as follows: "I have always been an active and busy person"; "I do not like to postpone things"; "Life is too short for me to get everything done." According to Dirken (11), this instrument has proven to be sufficiently valid [Cronbach $\alpha = 0.78$]. As no French version was available, a translation from the original Dutch version was made by one of the present authors [AD]. Moreover, the original dichotomous way of answering the items by "correct" or "incorrect" choices were transformed into a Likert scale [1 = total agreement, 2 = agreement, 3 = neutral, 4 = total disagreement, and 5 = disagreement] in order to have continuous and more reliable assessments. Besides the initial version of the HAB questionnaire that refers to the present tense, we reformulated all the items in the past tense to evaluate retrospectively the premorbid "action-proneness" of the patients. In order to give all participants the same remembering task and to be able to compare both the groups, the HNC group received the instructions to fill the past version of the HAB questionnaire referring to their life 5 years earlier. Thus, "before the illness" was replaced by "five years ago" in the items. Finally, an adapted version of the HAB questionnaire was given to the partner of each participant or to a close relative in case the participant was single. The items of both past and present versions were reformulated to the third person singular version.

Activities Schedule Questionnaire

We developed a questionnaire with the aim of investigating the patients' daily activities before

the onset of symptoms and comparing it with the HNC participants' 5-year earlier activities. To do so, we established categories for every type of activity that might occur in someone's daily life in order to cover the maximum number of activities in the participants' schedule. The list included professional activities, household activities, family activities, social activities, leisure activities, and resting activities [including sleeping time]. The questionnaire enables us to know the time given for each category of activities [number of hours per week].

Procedure

Controls were asked to complete the HAB questionnaire and the activities schedule questionnaire upon the basis of their lives previous 5 years. Moreover, HNCs also completed the HAB questionnaire according to their current lifestyle. Patients were asked to complete both questionnaires referring to their premorbid lifestyle [i.e., before the onset of symptoms] and their current lifestyle. The mean time interval between the period of the study and the reference period for retrospective measure was 4.55 ± 3.37 years for the FMS group. Patient's SOs had to complete the HAB questionnaire referring to the period preceding the onset of symptoms and to the present time.

RESULTS

Twenty-two female patients and two male patients were evaluated. The mean age was 46.54 ± 10.34 years for the FMS group and 45.58 ± 10.27 years for the HNC group. As displayed in Table 1, patients and controls were matched regarding their respective socio-demographic characteristics.

Internal Consistency of the French Version of the Questionnaire of Habitual Action-Proneness

Internal consistency [Cronbach alpha] of this translated version of the HAB questionnaire was computed. The internal consistency is moderate to excellent [HAB past scores: patients = 0.91, SO = 0.92, HNC = 0.63; HAB present scores: FMS = 0.91, SO = 0.81, HNC = 0.81]. With one exception, the indices are even higher than the original psychometric properties of the questionnaire [Cronbach alpha = 0.78] (11).

TABLE 1. Socio-demographic Characteristics of the Patients and Controls

	Patients N = 24	HNC N = 24
Age	46.54 [10.34]	45.58 [10.27]
Age at onset of first symptoms	41.30 [9.85]	—
Gender		
Female	22	22
Male	2	2
Marital status		
Single	4	3
With partner	20	21
Education		
Secondary school	20	19
High school/university	4	5
Profession	Before FMS	Five years ago
Blue collar worker	7 [2*]	7 [7*]
Healthcare provider	7 [3*]	7 [7*]
Policeman	1	1 [1*]
Office worker	3 [1*]	3 [3*]
Housewife	5	5 [5*]
Student	1	1 [1*]
	* = still working at the time of the study	* = still working at the time of the study

HNC = healthy normal controls, FMS = fibromyalgia syndrome

Retrospective Questionnaire of Habitual Action-Proneness Scores and Activities Schedule: Comparison between Fibromyalgia Syndrome Patients and HNCs

The retrospective HAB scores among FMS patients [173.63 ± 24.03] are significantly higher [$t = 2.866$, $P < 0.001$] than those of the HNCs [158.08 ± 11.34].

In order to test for the differences between the two groups, a multivariate analysis of variance with the type of activity (7) as the within-subjects repeated measure and group as the between-subjects independent variable was performed. The effect of the type of activity was highly significant, $F(6,41) = 294.6$, $P < 0.001$. The effect of group was not significant [NS], $F(1,46) = 0.21$. There was, however, a highly significant interaction effect, $F(6,41) = 6.94$, $P < 0.001$, indicating that the difference between the two groups was strongly related to the type of dependent variable considered. The significant

interaction allowed us to test for univariate effects. As displayed in Table 1, there is no evidence for a difference between patients and HNCs regarding family, social, and leisure activities. Mean duration of weekly professional activities in patient groups is higher due to three outliers presenting a mean of 110 hr per week. However, this higher mean does not result in a significant difference in professional activities. Finally, there is a trend [P = 0.054] in patients for more domestic activities and significantly less time devoted to resting and sleeping activities [P < 0.001]. In order to ensure that the three outliers with a mean of 110-hr professional activities per week did not bias analyses, these cases were removed. These additional analyses did not affect any of the results presented above.

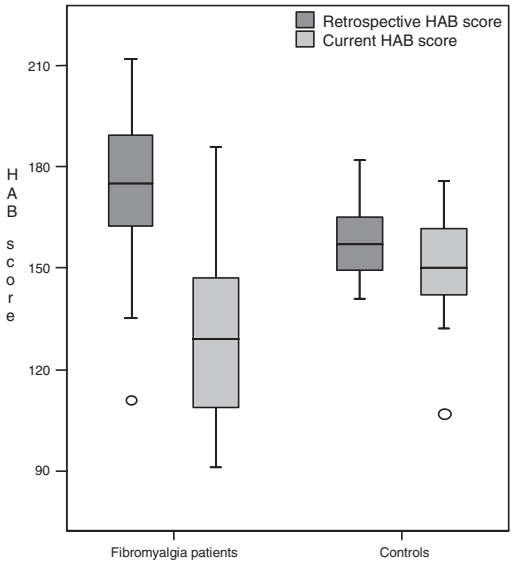
Current Questionnaire of Habitual Action-Proneness Scores: Comparison between Patients and HNCs

As displayed in Figure 1, current HAB scores are significantly [$t = -.3.082$, P < 0.001] lower in patients [131.21 ± 26.18] compared to those of the HNCs [150.33 ± 15.44]. This indicates a reverse pattern relative to the results from the past HAB scores.

Retrospective Questionnaire of Habitual Action-Proneness Scores: Comparisons between Patients and Patients' SOs

There is no difference [$t = 0.071$, P = 0.94] between the retrospective HAB scores obtained by the hetero-evaluation involving the SOs [174.1 ± 25.20] and by the self-reported measures of the patients [173.63 ± 24.03]. These retrospective HAB scores are significantly correlated [r = 0.566; P < 0.01]. Similar analyses of the current HAB scores do not reveal any difference [SO: 139.45 ± 16.84; Patients: 131.21 ± 26.18] [$t = -1{,}281$, P = 0.21]. These current HAB scores are significantly correlated [r = 0.609; P < 0.01). These results replicate previous findings (2).

FIGURE 1. Retrospective and current questionnaire of habitual action-proneness scores for fibromyalgia syndrome patients and healthy normal controls.



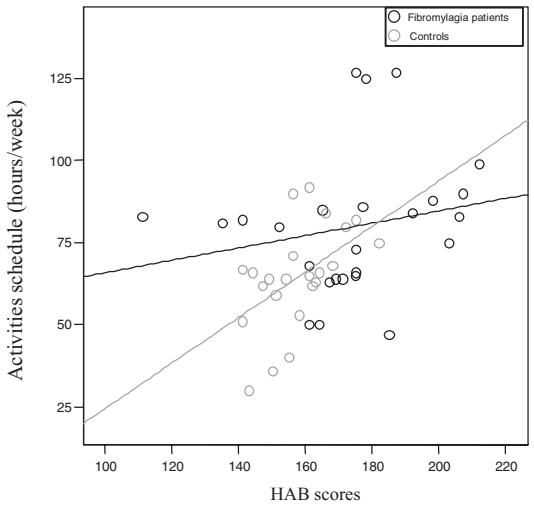
Relationship between Retrospective Representational and Behavioral Measures in Patients and HNCs

Figure 2 shows that retrospective representational [HAB] and behavioral [activities schedule questionnaire] measures are closely and

TABLE 2. Mean [Standard Deviation] Retrospective Duration [in Hours] of Weekly Activities among Fibromyalgia Syndrome Patients and Healthy Normal Controls [HNCs]

	Patients	Controls	*t*	P value
Family activities	8.92 [7.97]	8.88 [9.18]	0.02	0.987
Social activities	4.79 [5.43]	4.79 [4.10]	0.00	1.00
Leisure activities	5.58 [6.93]	4.54 [3.74]	0.65	0.52
Professional activities	35.21 [28.36]	27.79 [18.13]	1.08	0.29
Household activities	26.29 [14.92]	18.83 [10.87]	1.98	0.054
Resting activities	8.67 [5.67]	16.04 [7.63]	−3.01	< 0.001
Sleep	49.03 [7.69]	57.04 [4.61]	−4.23	< 0.001

FIGURE 2. Correlation between retrospective representational [questionnaire of habitual action-proneness scores] and behavioral [number of hours per week according to activities schedule] measures of activities in patients and healthy normal controls.



significantly associated in HNCs [r = 0.510, P < 0.05], but not in patients [r = 0.205, NS; without the three outliers: r = 0.206, NS].

Current and Retrospective HAB Scores in Patients and HNCs

In patients, the mean past HAB scores [173.63 ± 24.03] are significantly [$t = 4.674$, P < 0.01] higher than the current HAB scores [131.21 ± 26.18; see Figure 1]. A highly significant negative correlation [r = −0.57, P < 0.01; without the three outliers: r = −0.65, P < 0.01] was found between the past scores and the current scores. Descriptive analyses revealed that 22 out of the 24 patients had a decrease in HAB score between past and present, while only two had an increased score. This indicates that the more the patients report high action-proneness before pain onset, the less they report current activity. This suggests a decreased action-proneness in the patients group. In the HNC group, the mean past HAB scores [158.08 ± 11.34] are slightly and significantly [$t = 3.461$, P < 0.01] higher than the current HAB scores [150.33 ± 15.44]. A high significant positive correlation between the past HAB scores and the current HAB scores was found [r = 0.704, P < 0.01], suggesting the same type of lifestyle across time.

DISCUSSION

The initial purpose of the study was to assess the active lifestyle of patients before the onset of FMS by means of the HAB questionnaire assessing the activity-related beliefs and a new questionnaire assessing the number of hours per week that patients spent on a range of activities. We hypothesized that these instruments evaluate distinct aspects of active lifestyle. The HAB questionnaire contains self-descriptive items about attitudes toward active lifestyles and focuses more on the representational aspects of active lifestyle, whereas the activities schedule questionnaire focuses on the behavioral aspects of active lifestyles. The present study found higher scores on HAB retrospective measures for FMS patients as compared to healthy controls and convergent responses of SOs on the active lifestyle of patients and healthy controls. This evidence replicates the previously published findings (2). The present study also provides original findings in showing no differences between the patients and the HNCs regarding their past weekly activities. Moreover, the retrospective HAB scores and the past activities schedule questionnaires reveal contrasting patterns between the groups: higher HAB scores in FMS patients as compared to HNCs, but the same amount of activities in the past. Correlational analyses further document this contrast suggesting a moderate overlap between the representational measures and the behavioral measures in HNCs. This indicates that the way HNCs were behaviorally active matches their current beliefs about how they are currently active. However in patients, the overlap is smaller, suggesting a positive but less robust link between attitudes related to activities and the effective achievement of activities before the onset of illness. Interestingly, whereas no significant difference between groups is observed regarding their overall past weekly activities, FMS patients report more activity-related cognitions and clearly devoted significantly less time to resting activities and sleeping than HNCs. This points to a frequent clinical observation that before pain onset, patients do not feel free to interrupt their activities for moral or social motivations.

Another original aspect of this study is the comparison between the past HAB scores and the present HAB scores. This comparison shows a slight decrease in HNCs, suggesting stability in activity-related beliefs in these individuals. In contrast, in FMS patients, the current HAB scores were significantly reduced, suggesting that since the onset of pain, patients might have adjusted their expectations toward performing more activities. This is not in line with our initial assumption that most FMS patients remain demanding for high performance in their daily activities despite limits due to pain, and that acceptance of a balanced adjustment to functioning with pain is sometimes very hard to obtain. On the contrary, the present results converge toward previous findings that changes occur in action-proneness (10). The present data suggest that the recruited patients were able to modify their activity-related beliefs. It might be inferred that this modification refers to a relative acceptance of their condition. However, in the absence of specific measures, this study does not allow one to ascertain the extent to which patients accept their pain conditions. For this reason, further studies aimed at refining the definition of active lifestyle in FMS patients should include measures of psychological characteristics of the patients [e.g., acceptance, psychological inflexibility, etc.]. Nonetheless, the present study confirms the relevance of distinguishing two sides for the concept of hyperactivity: a pattern of behaviors and a set of influential activity-related beliefs.

This study is not without limitations. First, the sample size is small due to the recruitment limited by strict inclusion criteria, i.e., to have no symptoms of FMS for more than 5 years in order to limit memory bias and to have not followed any psychotherapy since the beginning of the syndrome, as this would likely influence their coping style. Larger samples should be considered in further research to enhance the reliability of the current evidence. Another limit concerns the translation process of the questionnaire. The HAB (11) is a Dutch questionnaire. To our knowledge, this is the first study to use a French version. However, the procedure we used did not follow the recommendations for a valid translation of psychological questionnaires (13). For example, the way we translated the HAB questionnaire was not based on a common translation issued from the several translations performed by separate individuals and a subsequent back translation [from French to English] by an English native. Nevertheless, participants did not make any comments about the comprehensibility of the French version of the HAB questionnaire. Moreover, the psychometric parameters we computed provide good evidence for the internal consistency of the scale, even higher than the results obtained with the original version of the HAB questionnaire. A third limitation is that the assessment of daily activities in the present time has not been completed in the HNCs and the FMS patients. This restricts consideration about the usefulness of distinguishing between representational correlates and behavioral correlates of hyperactivity across time when comparing healthy subjects with FMS patients. Furthermore, given that no reliability or validity data were available for the activities schedule questionnaire, it would also be useful to consider validated behavioral measures such as the FMS impact questionnaire that assesses functional interference in daily life due to FMS (14). A fourth limitation relates to the exclusive use of self-reported measures for the [representational and behavioral] assessment of active lifestyle. This may be responsible for recall bias of past events and biased perception of current lifestyle. An actometer (15) would be an alternative and/or a complementary way to assess activity commitment [this alternative would be limited to the current period]. Besides an objective measure of hyperactivity, subjective measures are needed, given the subjective and objective components of hyperactivity as discussed in the paper. Further studies should bring additional empirical support for distinguishing two sides of hyperactivity by using a factor analysis from both measures to see if these two separated factors emerge. It was not possible in this study, given the small sample size. A last critical comment relates to the unavoidable bias on retrospective measures. The reference period for retrospective measures was limited to the past 5 years with the hope that setting borders to the reference period would restrict bias. We intuitively chose this method. However, we are not able to appreciate if setting borders to the reference period is better than not putting borders as in earlier studies (2–4, 8–10) on premorbid lifestyle in FMS.

Hopefully, the distinction between representational aspects and behavioral aspects of

hyperactivity will contribute to a refined definition of hyperactivity. This distinction might have clinical implications for helping the patient to develop more adapted pacing strategies or to prevent chronic musculoskeletal pain. For these purposes, mediating variables between active lifestyle and development of FMS [i.e., motivations for hyperactive lifestyle] should better outline what is pathogenic in hyperactivity [note that both groups cannot be distinguished upon the amount of activities for the past period, indicating that the amount of activities is not sufficient to define hyperactivity]. The present study describes a decline in HAB scores in persons enduring long-lasting pain relative to the premorbid period. This may be viewed as an indication that patients have adapted their active lifestyle, which might be attributed to be a certain degree of acceptance. Therefore, additional measures describing an ongoing adaptive process, e.g., acceptance or psychological inflexibility, would be useful, as these measures are associated with adjustment to chronic pain (16, 17). Patients frequently invoke perfectionism as a reason for hyperactivity (1). Despite advances in our understanding of how perfectionism is related to mental health, relatively little is known about how perfectionism is related to physical health. A recent study has shown that one dimension of perfectionism [socially prescribed perfectionism] is associated with poorer physical health (18). Future studies on hyperactive lifestyle among FMS patients should include measures of perfectionism. Other plausible reasons for action-proneness [narcissistic tendency, self-scarifying personality, etc.] are not easy to detect with traditional self-report measures because of potential denial or social desirability [implicit measures would offer a valuable alternative] (19). Nonetheless, all these characteristics would probably reveal an underlying factor referring to a longstanding and uninterrupted effortful commitment in daily activities. In the search for the determinants of hyperactivity and its pathogenic value, findings from a recent study (20) should be integrated, as they question the idea that hyperactivity is necessarily a maladaptive behavior. The authors report that activity persistence in a state of chronic pain was closely associated with better quality of life than control of pain through pacing strategies. Other recent studies in CFS report that exaggerated persistence despite frustration and fatigue may lead to physical overburdening by a negligent attitude toward the needs of the body, musculoskeletal overuse or strain, and/or sleep deprivation (5, 21). These findings emphasize the need to more accurately determine, when hyperactivity may be considered as an adaptive or a counterproductive response to a chronic pain condition.

An issue that has not been discussed until now is the possible link between premorbid hyperactivity as defined in psychological terms and premorbid biological hyperactivity in FMS patients. A great deal of research has shown general sympathetic hyperactivity (22) with an evidence of muscular tension (23) in FMS patients. This discussion should integrate more recent evidence on the possible role of neuroendocrine dysregulation in etiopathogenic processes leading to FMS. In particular, the presumed switch from hypothalamic–pituitary–adrenal [HPA] axis premorbid hyperfunction toward HPA axis hypofunction in CFS (24) should inspire new avenues for a better understanding of hyperactivity as a causal factor in FMS patients. This is a complex issue with contrasting data. In a prospective study investing predictors of FMS, mixed neurohormonal data were found in at-risk individuals, i.e., low cortisol levels in morning saliva, high levels in evening saliva, and high post-dexamethasone cortisol (25). Moreover, anxiety and/or depression in reaction to disability, and concomitant widespread pain may influence the HPA axis in the direction of hyperfunction (26). This core of knowledge is not often recognized in the literature on psychosocial approaches of hyperactivity. It would be interesting to observe the extent to which representational, behavioral, and societal expressions of hyperactivity may co-vary with biological activity.

In conclusion, this study confirms the previous findings of higher HAB scores in FMS patients. Further, representational and behavioral aspects are distinguishable in patients, illustrating the distinction between intention and commitment. This study demonstrates that in the patients group, representational aspects, although conceived as highly resistant to change, evolve across time. This suggests that patients were able to better fit their expectations to their functioning capacities. Further studies should document the determinants of HAB scores and their changes across time. A better understanding of the determinants of representational hyperactivity should help clinicians in assessing cognitive

mechanisms contributing to hyperactive lifestyle and in helping patients to develop more suitable coping strategies.

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