



Determinants of representational and behavioral hyperactivity in patients with fibromyalgia syndrome

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Abstract

Fibromyalgia is associated with a premorbid hyperactivity. This study examines how contextual and personality factors contribute to premorbid hyperactivity. A total of 45 patients completed questionnaires. The results show that the number of children and the basic bodily needs neglect (and their interaction) explain nearly 50 percent of the variance of hyperactivity. The neglect toward bodily needs completely mediates the relation between self-oriented perfectionism and hyperactivity. This study suggests that hyperactivity itself would not have a pathological value, but that the neglect of basic bodily needs would represent a vulnerability factor in a hyperactive premorbid lifestyle in fibromyalgia patients.

Keywords

basic bodily needs, context, fibromyalgia, hyperactivity, personality

Introduction

Fibromyalgia syndrome affects between .2 and 6.6 percent of the general population in the United States and other regions of the world (Marques et al., 2017). A premorbid hyperactive lifestyle (expressed in short in this article by the term “hyperactivity”) is suggested to be associated with fibromyalgia (Van Houdenhove, 1986; Van Houdenhove et al., 1987, 1995, 2001, 2006; Van Houdenhove and Neerinx, 1999). However, a clear definition of hyperactivity in fibromyalgia patients remains lacking. Hyperactivity seems to implicitly refer to an excessive level of activity, with potential deleterious consequences on a healthy condition (precipitating illness onset) or on a painful condition (increasing pain intensity, fatigue, bodily damage, etc.). An attempt to clarify the nature of hyperactivity (Grisart et al.,

2010) showed that hyperactivity could be considered as a dual concept. The first component is the representation of hyperactivity, referring to the cognitive and/or attitudinal aspects (one’s own attitude

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toward activities). The second component is behavioral (effective engagement in many activities). Until now, assumptions about underlying factors remain hypothetical. Preexisting studies have never examined the nature of the assumed hyperactivity in fibromyalgia patients and the processes explaining the occurrence of symptoms. However, some authors suggest that hyperactivity may stem from overcompensated dependency needs, excessive bodily narcissism, and perfectionism, which all serve to protect against a psychological breakdown (Bourloux, 2004; Van Houdenhove, 1986). Some researchers also believe that hyperactivity may be linked to a constant pressure to perform and subsequent somatic attribution of failure or the self-sacrificing lifestyle which may eventually end up into over-dependent illness behavior (Van Houdenhove and Neerinx, 1999).

The purpose of this study is to empirically explore the nature of hyperactivity in fibromyalgia patients and to identify underlying variables. This article examines the contribution of contextual and personality factors to premorbid hyperactivity. Clinical observations and the existing literature (Delbrouck, 2003; Kempke et al., 2013; Malin and Littlejohn, 2012; Molnar et al., 2012) help us to identify variables potentially underlying hyperactivity. Some personality dimensions were assumed to be related to hyperactivity: perfectionism, self-sacrifice, and neglect of basic bodily needs. Income, years of education, number of children at home, and external help received for housework were expected to be contextual predictors. We hypothesized that the variables this study targets are positively associated with hyperactivity. No prediction was made about the strength of this association as a function of the representation or behavioral nature of hyperactivity.

Materials and methods

Participants

Participants ($N=45$) were patients recruited from a multidisciplinary chronic pain center or an association for fibromyalgia patients. A total of 50 persons were contacted. For various reasons

(move, loss of the questionnaire, severe psychological distress, beginning psychotherapy), five dropped off the study. Despite the fact that the recruitment was open to men and women, only 45 women participated in this study.

The aim of the study and the methods were approved by the ethics committee of the University Hospital Centre of Charleroi. All procedures performed in the study were in accordance with the ethical standards of the institutional ethics committee and with the 1964 Helsinki declaration and its later amendments. All participants were diagnosed with fibromyalgia according to the criteria set out by the American College of Rheumatology (Wolfe et al., 1990). At the time of this study, the 2010/2011 fibromyalgia diagnostic criteria were not validated (Wolfe et al., 2016). We also considered other criteria when selecting our sample population: first, in order to reduce memory biases, we limited our study to participants presenting fibromyalgia-related symptoms for, at most, 3 years (instead of 5 years as in Grisart (2010)). Indeed, in order to minimize cognitive demands and the difficulties associated with remembering events prior to the onset of fibromyalgia, it was necessary to ensure that the patients had not suffered from fibromyalgia for too long. Second, we selected participants who had never started any psychotherapy. We assumed that psychotherapeutic treatments may have modified the personality characteristics evaluated in this study. In this way, we could assume that our sample population's personality characteristics were stable and that their current scores were a reliable assessment of their past scores.

Materials

Socio-demographic variables. The participants filled in a questionnaire asking their age, civil status, education, disposable income before the onset of their disease, number of children, number of persons living with the patient before the onset of their disease, and date when they first experienced a pain episode.

Representational aspects of hyperactivity: the Habitual Action-Proneness Questionnaire. This

questionnaire is frequently used in research concerning hyperactivity and fibromyalgia (Van Houdenhove, 1986; Van Houdenhove et al., 1987, 1995, 2001, 2006; Van Houdenhove and Neerinx, 1999). Created in Dutch on the basis of 316 factory workers, its original version proved to be sufficiently reliable (Cronbach's $\alpha = .78$) (Dirken, 1970). Typical items from this scale include the following: "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." A French translation (Grisart et al., 2010) was used. The scale contains 50 self-descriptive items to which the participants in the previous versions answered on a dichotomous scale their agreement ("right") or disagreement ("wrong"). This dichotomous scale was modified in order to provide more nuanced answers into a Likert's scale with five levels. The total scores can vary from 50 to 250. When answering, the participants had to think of their life before fibromyalgia. In order to facilitate the recall process, a mental imagery exercise was conducted before completing the questionnaire. Participants were asked to visualize the place where they lived and with whom they lived at that time, their job, activities, sports and hobbies, and so on. The internal consistency for this adapted version in French was high (Cronbach's $\alpha > .80$) (Grisart et al., 2010).

Behavioral aspects of hyperactivity: the Activity Schedule Questionnaire. This questionnaire consists of a series of open-ended questions assessing the activity schedule of fibromyalgia syndrome (FMS) individuals before the onset of their symptoms (Grisart et al., 2010). The original categories were slightly modified in order to make them clearer. The questionnaire contains two parts: one with the global level of activities and the other with the global level of rest. The global level of activity is based upon the total number of hours a week devoted to the following categories of activities: occupational activities, domestic work, family tasks (time devoted to children or to any other family member, leisure (i.e. relaxing) activities with

the children were not included), social and spare-time activities. The global level of rest is based upon the total number of hours a week devoted to the following two categories: relaxing moments and sleeping.

The self-oriented and socially prescribed perfectionism subscales of the Multidimensional Perfectionism Scale. The Multidimensional Perfectionism Scale contains three parts: self-oriented perfectionism, socially prescribed perfectionism, and other-oriented perfectionism (Hewitt and Flett, 1991). This third part was considered irrelevant toward understanding the hyperactive way of life. As no association was found between other-oriented perfectionism and health functioning in fibromyalgia patients (Molnar et al., 2006, 2012) and as no research suggests that other-oriented perfectionism influences pain experience (Hadjistavropoulos et al., 2007), the other-oriented perfectionism subscale was not included in our study.

Both the self-oriented perfectionism and socially prescribed perfectionism subscales contained 15 items scored on a 7-point Likert scale, ranging from "completely disagree" to "completely agree." The total score of each subscale was calculated by adding up the 15 corresponding items, taking into account the reversed items. The Multidimensional Perfectionism Scale has been translated and validated in French (Labrecque et al., 1999). Typical items from this scale include the following: "One of my goals is to be perfect in everything I do" and "Anything that I do that is less than excellent will be seen as poor work by those around me."

The self-sacrifice subscale of the Young Schema Questionnaire—Short Form. Self-sacrifice was assessed by the self-sacrifice subscale of the Young Schema Questionnaire—Short Form (Young, 1998). This subscale contains five items. The participants evaluated each proposition on a 6-point Likert scale from "it is completely wrong for me" to "it is completely right for me." The Young Schema Questionnaire—Short Form has been translated and validated

into French (Lachenal-Chevallet and Mauchand, 2006). Typical items from this scale include the following: "I'm the one who usually ends up taking care of the people I'm close to" and "I am a good person because I think of others more than of myself." The total score of this subscale was calculated by summing the five items.

Basic bodily needs attitude scale. As we could not find any pre-existing scale that specifically addressed attitudes toward bodily needs, we developed the basic bodily needs attitude scale.¹ Two of the authors (N.S. and M.M.) generated a list of situations considered as relevant for "basic bodily needs" based on clinical observations. Items were generated according to four dimensions: sleeping/resting, eating, going to the toilet when necessary, and adjusting one's activities when ill. Each of these items was developed based upon what we heard from our clinical patients, for example, "when I had a job to finish, I preferred to sleep very little" and "people often told me to rest." Three more general items were introduced (e.g. "I always took into account what my body needed"). The 20 items of this scale evaluate attitudes toward fundamental bodily needs (sleeping, eating, adapting one's activities when ill, going to the toilet, etc.) before the onset of fibromyalgia. Participants answered the questions on a 5-point Likert scale from "completely disagree" to "completely agree." The higher the score on the scale, the more neglect toward bodily needs. The scale had a good internal consistency (Cronbach's $\alpha = .85$).

Procedure

Participants were first requested to fill out the questionnaires referring to the past (i.e. Habitual Action-Proneness Questionnaire, Activity Schedule Questionnaire, Basic Bodily Needs Attitude Scale) and then those referring to present (Multidimensional Perfectionism Scale and Self-sacrifice Subscale of the Young Schema Questionnaire—Short Form) (See Table A. Socio-demographic characteristics of the patients in supplementary files).

Statistics

We first computed Pearson correlations between the total score of the Habitual Action-Proneness Questionnaire and the number of activity hours prior to the onset of pain as evaluated by the Activity Schedule Questionnaire, on the one hand, and the list of predictors described in the method section (demographic variables, perfectionism, self-sacrifice, and neglect of basic bodily needs) on the other hand.

The respective contributions of the predictors on the total score of Habitual Action-Proneness Questionnaire and the number of activity hours in the past were computed in hierarchical regression analyses.

To identify the direct and indirect effects, ordinary least-square path analysis was employed to estimate coefficients in the model with bootstrapping (1000 replications) to provide a confidence interval (CI) for the mediation effects. Beta weights provide an index of the magnitude of the indirect effect size. We used the PROCESS macro (Hayes and Matthes, 2009) under SPSS (version 24, IBM Chicago, IL, USA). All variables were mean centered (Aiken and West, 1991). The mediation model was performed using the same PROCESS macro (Model 4), but we used a bootstrapping method (Resample=1000), which makes no assumptions about the shape of the sampling distribution (MacKinnon et al., 2004).

Results

Correlation analyses

For the Habitual Action-Proneness Questionnaire, four positive and significant correlations were found: number of children at home, self-sacrifice, self-oriented perfectionism, and basic bodily needs attitude. This last correlation was strong ($p < .001$). For the number of activity hours prior to the onset of pain, the only significant correlation observed was observed with the number of children at home (see Table B. Correlations between hyperactivity dimensions and situational/personality predictors in supplementary files).

Regressions analyses

For each of the two dependent variables, the five predictors that had the highest correlations with the dependent variable were entered in the model. We were mindful of not overloading the regressions with an inappropriately large number of predictors for our modest sample size. Therefore, we maintained a ratio of no more than one predictor in the regression for every 10 participants in the sample.

The hierarchical regression analysis with representational hyperactivity (Habitual Action-Proneness Questionnaire) as the dependent variable was computed with the predictor variables in the following order of entry: (1) number of children at home, (2) self-sacrifice, (3) self-oriented and socially prescribed perfectionism, and (4) neglect toward basic bodily needs.

The results in Table 1 show that one contextual and one dispositional variable remained significant in the final model of regression. Having more children at home ($B=4.14$, $R^2=.10$) and scoring higher on neglect of basic bodily needs ($B=.85$, $\Delta R^2=.19$) were related to higher scores of the Habitual Action-Proneness Questionnaire.

Since the number of children at home and the neglect of basic bodily both significantly predicted representational hyperactivity, it is possible that these two variables have an additive effect. Therefore, we tested for an interaction effect between number of children and scores on neglect toward basic bodily needs. We built a new regression model with these three predictors (the two factors and their interaction). The overall model explains 49 percent of the variance in representational hyperactivity, $F(4, 128)=12.13$, $p\leq.001$. The interaction accounted for an almost significant variance over and beyond the main effects (number of children at home and neglect toward bodily needs), with an additional 5 percent contribution to the total R^2 , $F(1, 40)=3.68$, $p=.05$. Simple slope analyses of the interaction revealed that the number of children at home significantly predicted hyperactivity at high levels of the neglect toward bodily need ($p=.01$) but not for low levels. In other words, the number of children

at home is associated with representational hyperactivity only when the neglect toward basic bodily needs increases.

We then examined the potential moderating effect of neglect for bodily needs on the association between, on the one hand, the premorbid lifestyle as measured by Habitual Action-Proneness Questionnaire and, respectively, on the other hand, self-oriented perfectionism, socially prescribed perfectionism, and self-sacrifice. However, we found no significant results.

We then examined whether neglect for basic bodily needs might act as a mediator. Four mediation analyses were conducted. The total score was always the dependent variable. We found no significant results when including number of children at home, socially prescribed perfectionism, and self-sacrifice as predictor in each model, respectively.

However, we did find that neglect of basic bodily needs fully mediated the association between self-oriented perfectionism and scores of the Habitual Action-Proneness Questionnaire. Self-oriented perfectionism and neglect toward basic bodily needs accounted for a significant amount of variance of the hyperactivity scores, $R^2=.42$, $F(2, 41)=14.52$, $p\leq.001$. The neglect toward basic bodily needs completely mediated the relation between self-oriented perfectionism and hyperactivity with an indirect effect of .42 (95% bootstrap CI (.17–.91)). Indeed, the total and direct effects of self-oriented perfectionism on hyperactivity were .61, $p\leq.001$, and .19, *ns*, respectively.

Examining the path direction suggests that a higher level of perfectionism toward the self leads to greater neglect toward basic bodily needs, which, in turn, leads to higher levels of hyperactivity (see Figure 1).

Another hierarchical regression analysis with number of activity hours in the past as the dependent variable was then computed with the following predictor variables (in order of entry): (1) number of years studying and number of children at home, (2) self-oriented and socially prescribed perfectionism, and (3) neglect toward basic bodily needs. Results displayed in Table 2 showed that only the situational variable of number of children at home before the onset of fibromyalgia remained a significant predictor ($B=8.06$, $p<.005$).

Table 1. Hierarchical regression analysis predicting total score to the Habitual Action-Proneness Questionnaire.

	Final β	R^2	R^2 adj.	R^2 chg.	df	F	F change
Step 1: Demographic		.10	.08		1.42	4.55*	
Number of children at home	.28*						
Step 2: Self-sacrificing		.20	.16	.10	1.41	5.03*	5.07*
Self-sacrificing scale	.19						
Step 3: Perfectionism		.33	.26	.13	2.39	4.88**	3.99*
Self-oriented	.12						
Socially prescribed	-.17						
Step 4: Basic bodily needs neglect		.52	.45	.19	1.38	8.11***	14.36***
Basic bodily needs attitude scale	.55***						

* $p < .05$; ** $p > .01$; *** $p < .001$.

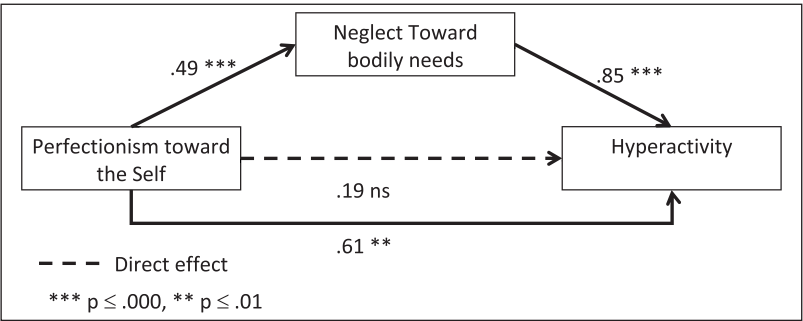


Figure 1. Mediation effect of the neglect toward bodily needs on hyperactivity through perfectionism toward the self.

Table 2. Hierarchical regression analysis predicting number of activity hours in the past.

	Final β	R^2	R^2 adj.	R^2 chg.	df	F	F change
Step 1: Demographic		.27	.23		2.41	7.57**	
Number of study years	.20						
Number of children at home	.47**						
Step 2: Perfectionism		.30	.23	.03	2.39	4.27**	.98
Self-oriented	.16						
Socially prescribed	-.05						
Step 3: Basic bodily needs neglect		.31	.22	.01	3.37	3.77*	.17
Basic bodily needs attitude scale	.07						

* $p < .05$; ** $p > .01$; *** $p < .001$.

Discussion

The purpose of this study was to contribute to a refined description of hyperactivity in fibromyalgia patients by identifying factors associated

with hyperactivity. This study did not allow conclusions about causal mechanisms. In terms of representational hyperactivity, we found a positive correlation with the number of

children at home, self-sacrifice, self-oriented perfectionism, as well as neglect of basic bodily needs. Regression analyses indicated that the number of children and the neglect of basic bodily needs (and their interaction) explained nearly 50 percent of the variance of representational hyperactivity. Mediation analyses showed that the neglect toward bodily needs completely mediates the relation between self-oriented perfectionism and representational hyperactivity. The only variable significantly associated with behavioral hyperactivity was the number of children at home (22% of variance explained).

Our results provide more information on the variables associated with representational hyperactivity than on the variables related to behavioral hyperactivity. These results further emphasize a prior finding (Grisart et al., 2010) relative to the importance of distinguishing between the two forms of hyperactivity. The contrasting results for the predictors of representational and behavioral hyperactivity can be explained in different ways. First, there may be unidentified predictors that explain behavioral hyperactivity. For example, being hyperactive may be an emotional regulation strategy used to avoid negative emotions (Gross, 2009). This should be investigated in a further study. Second, a “ceiling effect” could also explain our results. Indeed, most female adults living in modern Western societies are led to be “hyperactive,” combining work and family responsibilities whether they have hyperactive personalities or not (Guéritault, 2004). However, a close examination of the variability in our “hyperactive behavior” measure suggests otherwise. Indeed, behavioral hyperactivity before the onset of pain shows a relatively large variance ($M=93.64$, standard deviation (SD)=22.22). Another possible explanation is that within our sample, it is mainly the representational component of hyperactivity that is deleterious through the neglect of basic bodily needs.

The creation of the Basic Bodily Needs Attitude Scale is one of the meaningful contributions of this study, suggesting that the

neglect of basic bodily needs could be (one of) the deleterious component(s) of representational hyperactivity. Mediation analyses suggest that self-oriented perfectionism leads to neglect of basic bodily needs, which, in turn leads to hyperactivity. Therefore, the neglect of basic bodily needs may play a role in explaining the deleterious effects of self-oriented perfectionism on representational hyperactivity. Thus, it may represent a vulnerability factor (Fry and Debats, 2009) suggesting a lack of awareness of bodily cues with a potential protective value. Fibromyalgia may be interpreted as a maladaptive over-adjustment forcing the hypothalamic–pituitary–adrenal axis to a persistent alternate steady state (Van Houdenhove et al., 2009; Van Houdenhove and Luyten, 2010). Due to severe overburdening with the neglect of basic bodily needs, the stress system may be understood in vulnerable individuals as a failure to cope with changes in the reactivity of both the hypothalamic–pituitary–adrenal axis and the sympathetic nervous system as well as disturbances in the peripheral and central nervous system.

Despite the novel contributions of this study, there are some limitations that are worth noting. First, the sample size is small as a result of the difficulty in finding recent onset cases of fibromyalgia with no psychotherapy history; this may introduce a selection bias. Future studies with larger sample sizes are needed. Moreover, our conclusions are only related to female fibromyalgia patients. It would be interesting to examine if similar results are found for men with fibromyalgia. A second limitation is the use of retrospective measures of hyperactivity. It is worth noting that previous research has not found any difference between the retrospective evaluation of premonitory active lifestyle among fibromyalgia patients and the hetero-evaluation involving significant others (Grisart et al., 2010). This result supports the validity of retrospective measures from the Habitual Action-Proneness Questionnaire. Except Grisart et al. (2010) with a fairly good Cronbach’s alpha ($>.80$) from the adapted French-speaking

(with Likert scale), only Dirken (1970) shortly refers to the psychometric qualities of the Habitual Action-Proneness Questionnaire. A more completed validation procedure is needed. The appropriateness of measuring lifestyle in our modern societies with a tool dating from 1970 should be examined. Anyway, additional studies on the psychometric properties of the scale would be useful. In order to limit recall bias, premorbid measures of hyperactivity were limited to 3 years (instead of 5 years) before the onset of their disease. Such careful approach was perhaps not essential given the high convergence found in measures provided by the patients and by their significant others (Grisart et al., 2010). Another limitation is the use of self-report measures. Objective measures of activity do exist, for example, the actigraph which measures ambulatory activity (Korsun et al., 2002; Tryon, 1991). One can wonder if such measures could be used as a means to evaluate hyperactivity (at least behavioral hyperactivity). Such measures may be more objective but require a prospective study, which is very difficult to set up. However, the comparison of measures about activity-related thoughts and objective active behaviors offers discrepant observations; this might suggest a problem of reliance on these measures (Ball et al., 2008; Prince et al., 2008). An alternative assumption is that subjective and objective measures target two different aspects of being active; this would suggest that both kinds of measures are needed. In any case, future research should focus on the complete validation of tools used to measured hyperactivity.

Another limitation is the absence of a control group. This is due to the exploratory nature of our study trying to identify factors presumably associated with premorbid hyperactivity. Anyway, it would be interesting in future research to examine whether the same determinants of hyperactivity are found in an age-matched control group, as well in other (chronic) pathologies such as chronic fatigue syndrome, irritable bowel syndrome, or burnout as in healthy subjects.

Finally, no measure of life stress, anxiety, and depression were used. Therefore, one can wonder about the relationship between representational hyperactivity and measures of distress. Although a previous study did not show any correlation between Habitual Action-Proneness Questionnaire and depression either in chronic fatigue patients or in chronic pain patients (Van Houdenhove et al., 1995); further studies are needed to clarify a possible link between representational hyperactivity and emotional distress.

Furthermore, prospective studies are needed to better understand whether hyperactivity is a risk factor in fibromyalgia. Additionally, as hyperactivity has been understudied in the health field, apart from fibromyalgia and chronic fatigue, it is necessary to investigate whether hyperactivity is a risk factor for other health disorders and to better understand the link of basic bodily needs neglect with hyperactivity and with an individual's health more generally. As measures of basic bodily needs bring additional insights, further studies should validate the Basic Bodily Needs Attitude Scale.

If future studies confirm that hyperactivity and neglect for basic bodily needs are negatively associated to an individual's health, a number of preventive actions can be implemented. For example, psychoeducation training for the general population (whether they are in good health or not) that emphasizes the importance of adopting an appropriate lifestyle "tempo" (e.g. pacing, goals prioritization, and life values) both in their private and public lives may greatly benefit people in general and may reduce the number of individuals with fibromyalgia. Emphasis should be placed on considering the pressures and burdens imposed by some cultures and socio-professional contexts. Finally, it could be relevant to help general practitioners to identify hyperactive patients that do not respect their basic bodily needs.

An issue that remains unanswered is whether patients with a premorbid hyperactivity remain hyperactive despite their painful condition. Psychological flexibility should be promoted

through acceptance-based treatments in order to limit a rigid use of coping strategies (Saariaho et al., 2012). Therefore, we think that a better understanding of premorbid hyperactivity in fibromyalgia patients is an important step in order to tailor interventions with chronic pain patients who remain hyperactive despite increasing pain (Andrews et al., 2015, 2016). As far as treatment is concerned, previous studies pointed out to the relevance of targeting self-oriented perfectionism, as patients with exceptionally high levels of self-oriented perfectionism suffered from poorer health functioning (Molnar et al., 2012). Our results suggest that helping perfectionist fibromyalgia patients better respect their basic bodily needs could be particularly advantageous.

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Supplementary Material

Supplementary material for this article is available online.

Note

1. This questionnaire is available upon request to the corresponding author.

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