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Development and Initial Validation of the Activity Patterns Scale in Patients With Chronic Pain

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Abstract: **Several self-report measures were used to identify 6 activity patterns in chronic pain patients: pain avoidance, activity avoidance, task-contingent persistence, excessive persistence, pain-contingent persistence, and pacing. Instruments for assessing pacing should include 3 pacing behaviors (breaking tasks into smaller tasks, taking frequent short rests, slowing down), each of which relate to a single goal (increasing activity levels, conserving energy for valued activities, and reducing pain). This article presents the Activity Patterns Scale (APS), which assesses these 6 activity patterns. Study 1 included 291 participants with chronic pain, and tested 3 structures using confirmatory factor analyses. The structure with the best fit had 8 factors corresponding to the hypothesized scales. High correlations in the expected direction were found between the APS subscales and the "Patterns of Activity Measure-Pain." Study 2 included 111 patients with chronic pain, and aimed at examining the association between the APS subscales and adjustment to pain. It was found that that activity avoidance was associated with daily functioning and impairment. Negative affect was positively associated with activity avoidance and excessive persistence, and negatively associated with task-contingent persistence, which was also positively associated with positive affect. This study showed that the APS is a valid and reliable instrument for clinical practice and research.**

Perspective: ***This article presents a valid and reliable instrument to assess activity patterns in patients with chronic pain. The findings suggest that avoidance, persistence, and pacing are multidimensional constructs. Distinguishing between these dimensions sheds light on previous contradictory results and has direct clinical implications regarding recommending the most advisable activity patterns.***

Key words: *Activity patterns, avoidance, persistence, pacing, chronic pain.*

The well-being of individuals with chronic pain is partly associated with the different ways in which they engage in daily activities. Three activity patterns have been distinguished: avoidance, persistence, and pacing behavior. On theoretical grounds, avoidance and persistence are both expected to be associated with functional disability.[14,39] In contrast, pacing was traditionally thought to have positive effects and has been used as a treatment strategy[29]; nevertheless, empirical research has revealed a more complex picture. A meta-analysis[4] that investigated the relationship between different approaches to activity and functioning in chronic pain patients consistently found that activity avoidance was linked to worse physical and psychological functioning and increased pain. The relationship between persistence and functioning appeared to depend on the measure used: instruments that assessed overactivity were linked to poorer outcomes, whereas instruments that assessed persisting with activity despite pain were associated with positive outcomes. Finally, pacing was not only linked to better psychological functioning but, contrary to expectations, also to higher levels of pain and disability.

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In summary, the results of research on the relationship between activity patterns and well-being are far from clear. Andrews et al[4] suggested that because of the variance seen between effect sizes in their meta-analysis, there may be a need to develop new measures of activity patterns or to refine existing ones. Similarly, Kindermans et al[22] suggested that these ambiguous results could be due to dimensions underlying these 3 widely accepted general patterns; using exploratory factor analyses of various activity patterns in self-report measures, the authors identified the following activity patterns in patients with chronic pain: pain avoidance (avoidance behavior in the presence or anticipation of changes in pain); activity avoidance (avoidance refers to the patients' condition of being in pain rather than the fluctuating pain experience); task-contingent persistence (behavioral persistence in finishing tasks or activities despite pain); excessive persistence (doing too much, not respecting one's physical limits, and experiencing the rebound effects of heightened activity levels); pain-contingent persistence (the level of experienced pain as the determinant of the behavior performed with activity fluctuating over time as a result); and pacing (dividing daily activities into smaller tasks). Although Kindermans et al[22] found that pacing was a unidimensional construct, Nielson et al[27,28] considered pacing to be multidimensional and suggested that existing measures do not include some key pacing subdomains. The authors proposed that future measures should be developed that address a specific pacing behavior with a single goal. They identified the following pacing behaviors: breaking tasks into smaller, manageable tasks; taking frequent short rests; and slowing down. They proposed the following as the main aims of pacing: increasing activity levels; energy conservation for valued activities; and pain reduction. No existing pacing measure assesses these aims and thus a new pacing measure is needed that links each pacing behavior to each of these 3 objectives.

Study 1 constructed a self-report instrument to assess the activity patterns identified by Kindermans et al[22]: The Activity Patterns Scale (APS). The 3 items with the highest factor loading in the study by Kindermans et al[22] were included. Following the proposal by Nielson et al,[27,28] the 3 pacing subscales were constructed such that each specific behavior was related to 1 of the aforementioned goals. The internal structure of the APS was examined by confirmatory factor analysis. Study 1 also explored the association between each subscale and the subscales of a consolidated measure of activity patterns (ie, the Patterns of Activity Measure-Pain [POAM-P])[9] subscales. Study 2 analyzed the relationship between the APS subscales and pain intensity, daily functioning, impairment, and positive and negative affect.

Methods

Procedure

These studies form part of a larger research project and were approved by the University of Málaga Ethics Committee. In study 1, the Spanish associations of patients with fibromyalgia and rheumatic diseases were contacted via e-mail and their collaboration was requested in disseminating an online protocol among their members. The participants accessed the online protocol using the link provided by their respective associations. Participants were informed that their answers would remain confidential. The data were collected between October 2014 and January 2015.

In study 2, participants were recruited through 2 local associations of patients with fibromyalgia, an association of patients with rheumatic diseases, and through doctors working at the Pain Unit of the Hospital Costa del Sol. The data were collected between January 2015 and May 2015. Individuals were considered eligible for inclusion if they met the following criteria: At the moment of participation in the study they were experiencing pain and had been experiencing pain for at least the past 6 months; they were between 18 and 65 years old; they were not being treated for a malignancy, terminal illness, or psychiatric disorder; they were able to understand the Spanish language (spoken and written); and they were able to understand the instructions and the questionnaires. Patients were informed of the study aims, confidentiality was assured, and informed consent was obtained. Each participant had a semistructured interview with a trained psychologist to obtain demographic, social, and medical history data, and then they completed the questionnaires described in the Measures section.

Statistical Analyses

The internal structure of the APS was examined using confirmatory factor analysis via structural equation modeling using the Lisrel 8.30 software package.[20] Analyses were performed on the polychoric correlation matrix of the APS items using the maximum likelihood and robust estimation methods. The following goodness-of-fit indexes were used: Satorra–Bentler χ^2,[6] the Comparative Fit Index (CFI),[7] the Non-Normed Fit Index (NNFI),[8] the root mean-square error of approximation (RMSEA), and the Akaike Information Criterion[1] (AIC). The Satorra–Bentler χ^2 is a χ^2 fit index that corrects the statistic under distributional violations; to reduce the sensitivity of χ^2 to sample size, the index is divided by the degrees of freedom.[6] Ratios of 2 or less are indicative of an acceptable fit of the model.[23] The CFI and NNFI measure the proportional improvement in fit by comparing a hypothesized model with the null model as the baseline model. The CFI and NNFI range from 0 (absolute lack of fit) to 1 (perfect fit) and fit is considered to be good when the values are >.90.[16] The RMSEA is an absolute misfit index; the closer to 0, the better the fit. Values <.08 indicate an adequate fit and values <.06 indicate a good fit.[16,17] Finally, the AIC index[1] allows alternative models to be compared by taking into account parsimony (in the sense of the number of parameters) as well as fit. This index can be used regardless of whether or not the models can be ordered in a nested sequence. In this approach, the models are ranked according to their AIC values and the model with the smallest value is chosen.