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Can people catastrophize barriers? An exploratory analysis of the association between pain catastrophizing and perceptions of environmental factors

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ABSTRACT

Background: Measurement of the environment is taking on increased importance for understanding variability in participation. Most measures of the environment use subjective ratings, yet little is known about how people appraise the environment.

Objective: /Hypothesis: We conducted this post-hoc study to examine whether or not catastrophizing, an important variable for understanding how pain contributes to disability, may be related to ratings of the environment. We hypothesized higher pain catastrophizing scores would be associated with greater environmental barriers and fewer facilitators.

Methods: Individuals with functional impairments (N = 525) were recruited from a population-based random sample of households in a small western city in the United States to complete a paper-based survey about their health and community living experiences. We conducted exploratory regression analyses to investigate associations with environmental factor ratings.

Results: We found substantial associations between pain catastrophizing and both environmental barriers and personal factor problems after controlling for demographics, participation assessed by community trips per week, health conditions, impairment and pain level. The models accounted for 28% of the variance in environmental factor ratings and 52% of the variability personal factor ratings. We also present odds ratios for the association between personal characteristics and the likelihood of endorsing EF and PF.

Conclusions: A variety of individual characteristics are associated with ratings of both environmental and personal factors that impact participation. Among these, pain catastrophizing is a robust predictor of EF and PF ratings which suggests future research designed specifically to test this relationship may generate useful results for developing interventions to increase participation.

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People with disabilities encounter a variety of contextual factors that can limit their community participation.¹ These have been categorized in International Classification of Functioning, Disability and Health (ICF) into environmental factors (EF) and personal factors (PF).¹ Environmental factors (EF) “make up the physical, social and attitudinal environment in which people live” including accessibility barriers and social policy. The ICF distinguishes between EF that act as barriers to participation from those that act as facilitators. PF “are the particular background of an individual’s life and living” and include individual characteristics such as education,

socioeconomic status, coping styles and health conditions,¹ p. 17). Complicating our understanding of EF and PF on participation is the fact that they are often measured subjectively. While this approach has its merits, subjective measurement of EF and PF may confound each other (e.g., the magnitude of environment barriers experienced is positively associated with depressed mood). We explored one aspect of this potential problem by conducting an exploratory study on how the PF pain bodily experience (e.g., B280–B289)¹ and pain catastrophizing are associated with ratings of EF.

Theoretical models that describe how EF impact rehabilitation and participation outcomes were well established by the 1980’s.^{2,3} Similarly, community researchers and disability activists began describing and emphasizing the environment in what has become known as the “social model” of disability.⁴ Today, nearly 40 years

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since the first descriptions of the social model, empirical research on EF remains in its infancy.⁵ However, there are examples in the literature that examine how facilitators and barriers affect participation. For example, fewer social interactions, less voting and lower healthcare utilization have all been associated with environmental characteristics.⁶ Likewise, EF are related to life satisfaction.⁷

How EF are best measured is debatable.^{8,9} On the one hand, objectively encoding the environment for the presence of facilitators and absence of barriers minimizes measurement error. That is, we can measure the slope of a ramp with precision so it is clear whether or not it meets a standard that facilitates entrancing a building (i.e., rises only 1 inch for each 10 feet of length). On the surface, this approach is compelling and useful for public policy. However, the objective approach is less useful for understanding how the environment affects participation.⁸ The degree to which the ramp facilitates participation for any given person is not simply a function of its slope, but also includes aspects of the person's functional ability and their perceived ability to navigate the ramp.¹ Thus, subjective EF measures predominate the literature and are necessary to understand how the environment affects participation.

A variety of studies have reported that perception of the environment is associated with health outcome. For example, subjective assessment of poor neighborhood quality and lack of social cohesion were associated with poor subjective health in a sample of over 10,000 adults in the UK.¹⁰ Most of these studies are cross-sectional with interpretation of results “suggestive” of environment perceptions affecting health outcomes. However, the opposite is also possible. One good candidate for examining the effect of health conditions on perception of the environment is pain.

Pain is a subjective experience that is associated with actual and potential physiological damage.¹¹ The pain experience is influenced through the interaction of biological, psychological, and socio-behavioral factors, such as pain intensity and pain catastrophizing.^{12–14} While the exact mechanism of this effect is unknown, the effects are observed at both the ICF activity and participation level. These are probably linked wherein “activity avoidance” due to pain contributes to participation limitations.¹⁵ Further, the effect of pain on cognitive function has been linked to interference in activities and participation.^{16–18} Importantly, the enormous body of literature on pain has indicated that pain intensity is less predictive of participation level than pain catastrophizing, a cognitive reaction to the pain experience.^{16,19–21}

Pain catastrophizing magnifies 1) the threat of painful stimuli, 2) feelings of helplessness as pain is experienced, and 3) intrusive thoughts in anticipation of, during or following pain experiences.¹⁶ When people catastrophize pain, potentially painful stimuli are magnified, ruminated upon and are judged to be invariant regardless of efforts to affect them.²² Magnification is described as the amplification of pain and the expectancies for negative consequences related to pain. Rumination results from intense concentration on thoughts concerning pain. Helplessness occurs when “... individuals negatively evaluate their ability to deal effectively with painful stimuli” (p. 531).^{22,23} Self-reported pain intensity, pain-related activity interference and disability are associated with helplessness.¹⁶ A crucial aspect of pain catastrophizing is the overarching influence it has on the perception of pain. The complex connection between the perception of pain and pain catastrophizing has been supported and demonstrated in many studies with various populations.¹⁶ We suggest a similar cognitive processing strategy may affect people's perception of environmental barriers.

Environmental factors are commonly measured by subjective evaluation of environmental conditions. However, our understanding of the cognitive processing associated with perception of environmental conditions is very limited. We hypothesized that the cognition observed in perception of pain (i.e., catastrophizing) is related to perception of environmental barriers.

1. Method

1.1. Participants

We recruited 525 individuals with functional impairments (male = 217, female = 307) from a population based random sample of households in a small western city in the United States. Respondents were between the ages of 19 and 99 ($M_{age} = 62.02$, $SD = 16.3$), predominantly Caucasian (96.6%), in a committed relationship (53.5%) and not employed (70.8%). The sample was highly educated; 7.3% did not complete high school, 21.4% completed high school or received a GED, 38.1% had some college or had an Associate's degree, and 33.2% had a Bachelor's degree or higher, yet nearly half (49.8%) reported household income of \$30,000 per year or less. Importantly, 91.2% of respondents reported their average pain level in the past week was greater than 1 (Scaled 0–10). The percentage of respondents reporting each impairment and health condition queried in this study are included in Table 2. All study procedures were approved by the [institution omitted to facilitate blind review] institutional review board.

1.2. Measures

In addition to demographics (i.e., gender, age, employment status, income, education, relationship status, and racial/ethnic background) respondents completed measures of impairment status, community trips, personal and environmental factors associated with participation, pain level and pain catastrophizing. For these analyses, ratings of EF were used as the main dependent variable and ratings of PF were used a dependent variable for comparison purposes.

1.2.1. Impairment

Six American Community Survey impairment questions were used to indicate the presence of an impairment.²⁴ The questions included¹: are you deaf, or do you have serious difficulty hearing²; are you blind, or do you have serious difficulty seeing even when wearing glasses³; because of a physical, mental or emotional condition, do you have serious difficulty concentrating, remembering or making decisions⁴; do you have serious difficulty walking or climbing stairs⁵; do you have difficulty dressing or bathing⁶; because of a physical, mental or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?

1.2.2. Community engagement

To assess community engagement, we used the Brief Community Engagement Questionnaire (BCEQ).²⁵ Respondents indicated the number of trips they made to each of eight community locations (e.g., grocery stores, restaurants) during the 7 days prior to completing the survey. We used this as an indicator of how much people left home. This measure demonstrated good validity when compared with in situ data collected using Ecological Momentary Assessment.²⁵

1.2.3. Environmental barriers

To measure the frequency and magnitude of EF experienced by participants, we used the Disability and Health Perceived Barriers

¹ This point does not question the essential value of accessibility standards, but rather suggests that accessibility alone is insufficient for predicting participation.

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