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(184) Evaluating reliability and response bias in computer-administered pain rating scales: a generalizability theory analysis

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A critical element to understanding the nature and treatment of pain is the ability to accurately and reliably quantify the perceptual experience of pain. In the course of scientific research it may be necessary to alter the administration of previously validated rating scales in order to accommodate a particular design. Although modifications of this sort may seem innocuous, their impact on the validity of these scales should not be overlooked. The purpose of this study was to compare the reliability of two computer-administered protocols using the Gracely Box Scales and evaluate potential sources of response bias in each. Pain intensity and unpleasantness ratings were collected in response to a series of thermal stimuli (43-49° Celsius, presented in random order) from 73 participants using one of two computer-administered protocols. Protocol 1 (P1) required respondents to rate 14 thermal stimuli (7 temperatures, twice) using a cursor which reset to a predetermined value on the scale between stimuli. Protocol 2 (P2) employed 21 stimuli (7 temperatures, thrice) and a cursor which did not reset. The reliability of the ratings was estimated using generalizability theory, a technique which quantifies the dependability of responses and apportions the variability of those responses to the conditions of the testing procedure. The generalizability coefficients (ϵ_p^2) were very high for all scales ($\epsilon_p^2 > 0.92$), although comparatively lower for P2. Correlations between ratings of consecutive stimuli were significantly greater for P2 compared to P1 ($p < 0.001$; $r = 0.47$; $r = 0.30$). This analysis suggests that failure to reset the cursor between stimuli negatively impacts the reliability of these scales, possibly as overt information of previous ratings may influence subsequent responses. Resetting the cursor lessens this influence, while improving the reliability of the outcome and decreasing the number of necessary stimuli. Supported by the Department of Veterans Affairs.

(185) A comprehensive examination of the theoretical framework underlying acceptance and commitment therapy for chronic pain

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Acceptance and Commitment Therapy (ACT), as both a theoretical and applied model, is established as it applies to chronic pain. Several studies have examined measures of single ACT processes, such as acceptance of chronic pain, present-focused awareness, and values, or discrete subsets of these processes, and have almost uniformly provided supportive evidence. To date, however, no study has performed a comprehensive examination of the entire model, including all six of the specified component processes. The present study performed this examination and also evaluated relations of the model to key indices of patient functioning. In total, 205 individuals with chronic pain completed a battery of self-report questionnaires at an assessment appointment, including measures of physical and emotional functioning and multiple aspects of the ACT model. Initial factor analyses examined measures of the ACT model and measures of patient functioning separately in half of the sample. Each analysis identified three factors, which were supported in confirmatory factor analyses using the other half of the sample. Finally, Structural Equation Modeling was used to examine the fit of the entire model to the data. Overall fit was acceptable and indicated moderate correlations among the ACT processes themselves, as well as significant relations with pain intensity, emotional functioning, and disability. These analyses build on the existing literature by providing the first comprehensive evaluation of the ACT theoretical model in chronic pain.

(186) Depression as a mediator of the relationship between temporal summation of second pain and subclinical borderline personality characteristics

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Borderline personality (BP) is characterized by affect dysregulation and is positively associated with chronic pain. Previously, our laboratory observed that affect dysregulation was associated with enhanced temporal summation of second pain (TSSP). TSSP refers to the sensitization of pain evoked by repetitive heat pulses applied to the skin, which reflects a summation process of peripheral C-fiber nociceptive inputs and NMDA mediated sensitization of spinal dorsal horn neurons. However, further study is needed to investigate psychological mediators of enhanced pain sensitivity in individuals with BP characteristics. The purpose of this study is to examine whether depression mediates the relationship between affect dysregulation and central sensitization. TSSP was induced by 10 heat pulses in three trials. Before TSSP testing, sensitivity tests were conducted to identify a peak temperature to induce moderate pain (35 to 55 out of a 0-100 scale). While a thermode was applied to the thenar eminence of the non-dominant hand, participants rated their subjective pain after each peak. BP characteristics were assessed by the Personality Assessment Inventory-Borderline scale (PAI-BOR) and depression was assessed by the Center for Epidemiologic Studies Depression Scale in 80 pain-free college students. TSSP was compared between the two groups with the low (<50) and high (>50 and <70) PAI-BOR T scores using a repeated measures ANOVA (10 ratings of average pain at each pulse in the three trials by 2 groups). The results indicated a significant interaction between group and repeated pulses after controlling for peak temperatures ($F(9, 223) = 4.24, p = .01, \epsilon = .25$). The high PAI-BOR group reported significantly higher pain in the later pulse train. Analysis of covariance indicated that the interaction is no longer significant after controlling for depressive symptoms ($p > .05$). These findings suggest that the relationship between affect dysregulation and enhanced central sensitization is mediated by depressive symptoms.

(187) Multivariate cluster analysis of the MMPI-2-RF in pain patients with financial compensation: characterization of subgroups based on demographics, medico-legal and predictive outcome variables

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Psychosocial factors influence the experience of, and adaptation to, pain. Previous cluster analytic studies on pain patients with financial incentives using the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) have described three psychologically relevant pain subgroups that may influence symptoms and recovery. The Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF; Tellegen & Ben-Porath, 2008) is now offered as alternative to the MMPI-2. The MMPI-2-RF was developed to be a less time-consuming update of the MMPI-2. The purpose of the current study was to investigate whether the MMPI-2 subgroup solutions are replicated when using the newly developed MMPI-2-RF scales using an exploratory two-step cluster analysis. Similar to the MMPI-2, results demonstrated a three-cluster solution for the MMPI-2-RF, which described a Somatic, Depressed, and Pathological profiles. These subgroups were described based on their RC elevations. The Somatic profile was defined based on elevations on scales that resemble somatization (RC1); the Depressed profile was defined based on elevations on scales that resembles demoralization, negative mood and somatization (RCd, RC1 and RC2); and the Pathological profile was defined based on its multiple clinical elevations. Subgroup membership in pain patients with financial incentive was not conditioned to spine-related organic factors. Malingering, education, ethnic background, and legal status differentiated the pain subgroups. Moreover, similar to the MMPI-2, a dose-response relationship between perceived outcome and subgroup profile elevation was demonstrated. The results of the current study suggest that the MMPI-2-RF is equivalent to the MMPI-2 in determining pain subgroup membership and guiding decisions regarding interventions.