Due to chronic pain’s subjective nature, it cannot be observed directly, causing many challenges when attempting to assess it. This highlights the need to identify a method that more fully measures the concept of pain. One such method that has been used to examine constructs that present with similar difficulty has been to examine latent variables, or factors. To date, only two studies have attempted to identify latent variables of pain and their relation to specific symptoms.

Huber, Kunz, Artelt, and Lautenbacher (2010) investigated the factors involved in maintaining maladaptive psychological mechanisms of pain processing. They identified a significant path from affective and bodily distress to self-reported maladaptive attentional and emotional pain processing.

A more comprehensive study was done by Royall, Salazar, and Palmer (2014) utilizing data from a large cohort of healthy Mexican American adults aged 65 and older residing within the Southeastern United States. They identified two latent factors of pain—depressive-symptom related pain and somatic pain. Results of their study revealed that their factor of depressive-symptom related pain was uniquely related to self-reported sleep disturbances, anxiety, and medication use.

Although these two studies offer a great starting point to examine this relationship, both studies examined this relationship of pain to neuropsychological test performance using a sample with chronic pain.

### Methods

Four hundred seventy seven archived data files from individuals seen in a private psychologist practice in the southeastern United States comprised the sample collected. These individuals were referred by their physician for a presurgical psychological evaluation for pain-relieving procedures such as dorsal column spinal stimulators.

Data collected included demographic information as well as cognitive test data and answers to self-report pain questionnaires. Characteristics are presented in Tables 1 and 2.

Participants were randomly assigned to one of two subsamples. All chi square analyses were nonsignificant.

EFA was utilized to identify the latent factor structure of pain.

SEM was used to first confirm the factors and then examine their relation to an overall latent factor of cognition.

### Results

EFA. Principal axis factor analysis with varimax rotation was conducted. The KMO measure verified the sampling adequacy (KMO = .890 ‘superb’). Bartlett’s test of sphericity χ² (561) = 3869.73, p = .000 indicated the correlations between items were sufficiently large for EFA. Kaiser’s criterion indicated seven factors, accounting for 56.66% of variance, however, a scree plot justified using second factors were the only two of the seven that had good reliability and therefore, were the two that were retained (Cronbach’s α = .942 for Factor 1 entitled ‘Pain Distress’; Cronbach’s α = .867 for Factor 2 entitled ‘Pain Dysfunction’; see Table 3).

SEM: The measurement model indicated good fit - x² (157, N = 277) = 268.82, p = .000; CFI = .97; RMSEA = .05, 90% CI [.04, .06] and the factors were confirmed. The structural model also indicated good fit - x² (351, N = 277) = 542.336, p = .000; CFI = .956; RMSEA = .044, 90% CI [.037, .052]. Greater pain distress predicted worse cognition (p < .05). Greater pain dysfunction predicted worse cognition (p < .001). Twelve percent of the variance in cognition (g) was accounted for by these factors (see Figure 2 and Table 4).

### Discussion

Pain Distress and Pain Dysfunction are distinct factors of chronic pain. Together, they predict worse cognition and account for 12% of variance in cognitive test performance, which is a moderate effect size (Cohen’s d = .75).

The factors that emerged in the current study are different from those found in previous studies, which may be due to sample characteristics or the pain measures that were selected.

Additional research should attempt to replicate the current factor structure. Future studies should also assess for concepts that could further influence the latent factor structure of pain (such as duration of pain experience and coping skills).

### Contact Information

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