

# Pain Tolerance: Norms and Reliability

John Mark Disorbio, EdD, Independent Practice • Daniel Bruns, PsyD, Health Psychology Associates • Dawn Jewell, PsyD, Health Psychology Associates • Alexander Bruns, Health Psychology Associates

The ability to tolerate pain is highly variable. Part of this variability relates to an ill-defined relationship between perceived pain severity and tolerability. Better understanding and assessment of the relationship between pain severity and tolerability may help provide new avenues for clinical intervention.

In an effort to determine whether a single metric can be developed that characterizes the relationship between pain severity and tolerability, the Pain Tolerance Index (PTI) was created. The PTI was initially defined using items included in the BBHI 2 and BHI 2 tests.<sup>1,2</sup> The BBHI 2 and BHI 2 both include a 0-10 numerical pain rating for most severe overall pain and separate 0-10 numerical pain ratings for each of 10 specific body areas. For calculation of the PTI, “Peak Pain” was defined as the highest rating among these 11 pain intensity items in the past month. The BBHI 2 and BHI 2 tests also ask the patient to identify the highest level of pain that could be tolerated and still permit functioning. This was described as “Maximum Tolerable Pain” level. The PTI was defined as Maximum Tolerable Pain minus Peak Pain.<sup>1,2</sup> Figure 1 graphically illustrates the conceptual basis for the PTI metric.

Thus, the PTI attempts to measure a construct linking perceived pain level and perceived pain tolerability. If valid, PTI may provide unique information about the relationship between pain and disability behaviors. The aim of the present study was to evaluate the validity of PTI by comparing the relationships between this new metric and matters of clinical interest. The purpose of this study was to develop norms and reliability for this measure.

## METHODS

Data from a total of 2264 subjects were gathered, consisting of 757 adult patients with pain or injury, and 1507 community members. These subjects were selected to match US Census demographics (Table 1). An additional 82 patients were retested after one week to assess test-retest reliability. These groups were subdivided by demographic and diagnostic categories for further analysis.

All subjects completed the Battery For Health Improvement 2 (BHI 2) test. Using this test, PTI was defined as the difference between patients’ perception of the maximum pain they could tolerate and still function, and the highest of all pain reports.

As both Maximum Tolerable Pain and Peak Pain can range from 0-10, this created a measure ranging from -10 to +10, with higher numbers suggesting greater pain tolerance. PTI scores were assessed in relation to demographics and clinical characteristics, using descriptive statistics. IRB approval was received for this protocol.

## RESULTS

The N, mean and standard deviation PTI scores are shown in Table 2. The distribution for the community norm group is shown in Figure 2, while the distribution for the patient norm group is shown in Figure 3. PTI one week test-retest reliability was .92.

## CONCLUSION

PTI is a novel measure of pain tolerability. The establishment of norms and reliability for PTI increases its value as a measure of pain tolerance.

### REFERENCES

1. Bruns D, Disorbio JM. *Battery for Health Improvement 2 Manual*. Minneapolis: Pearson; 2003.
2. Disorbio JM, Bruns D. *Brief Battery for Health Improvement 2 Manual*. Minneapolis: Pearson; 2002.

FIGURE 1

Conceptual Definition of PTI

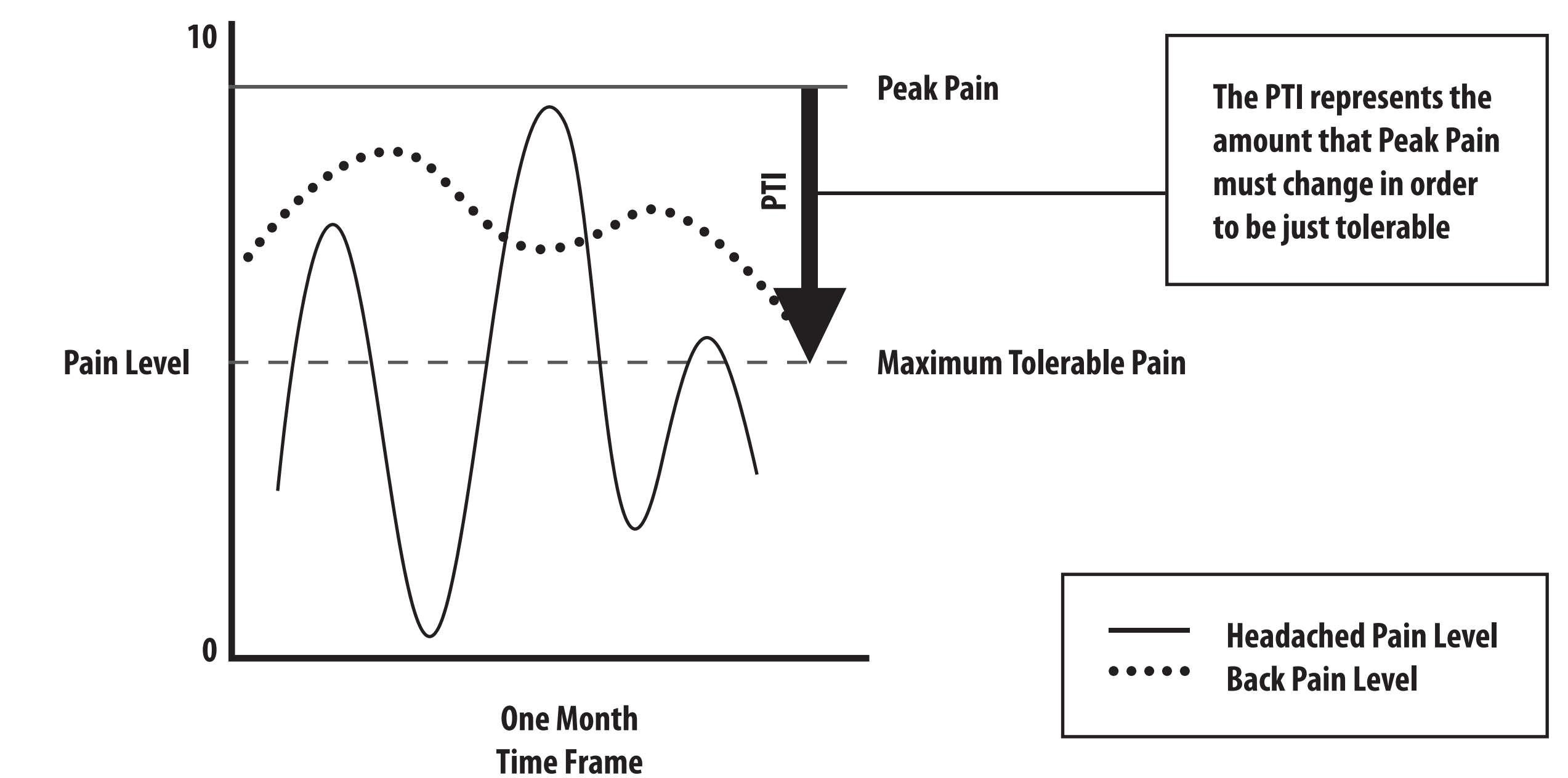


FIGURE 2

PTI Distribution, Community Norms

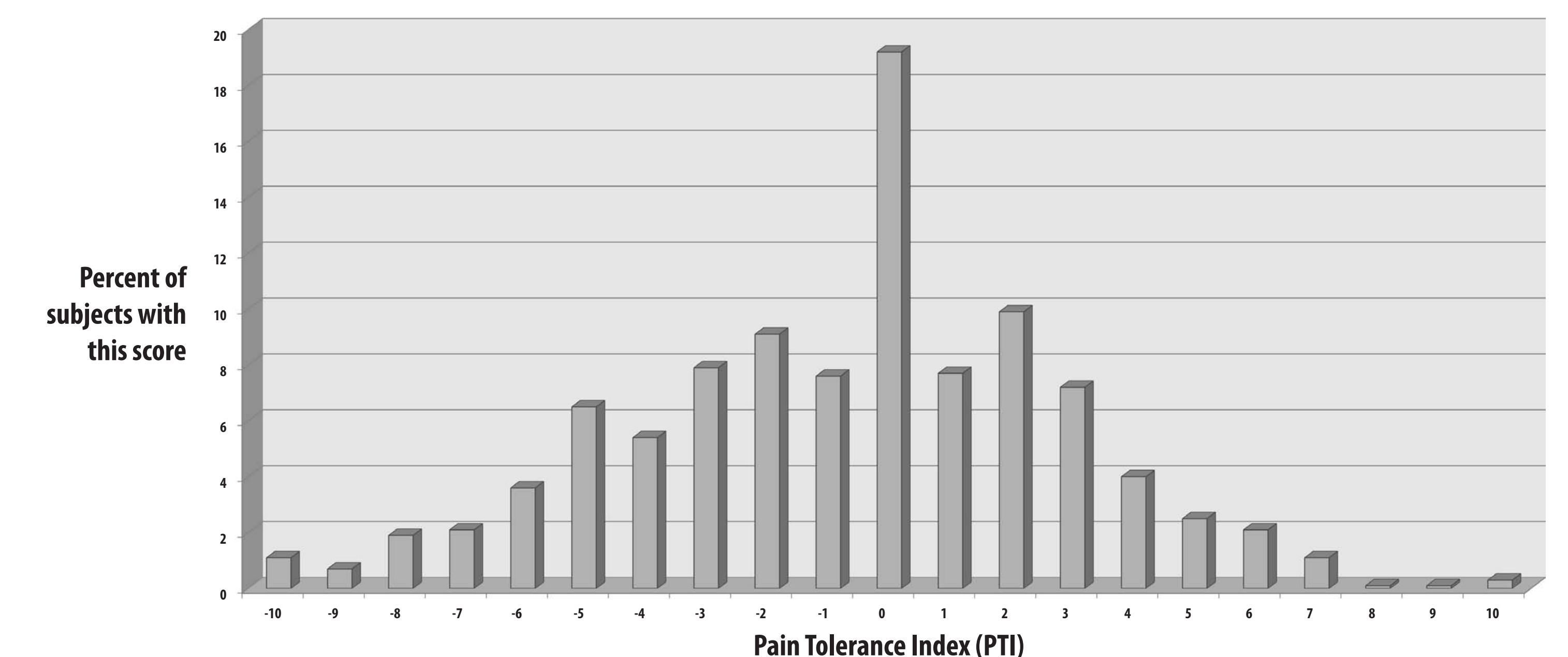


FIGURE 2

PTI Distribution, Patient Norms

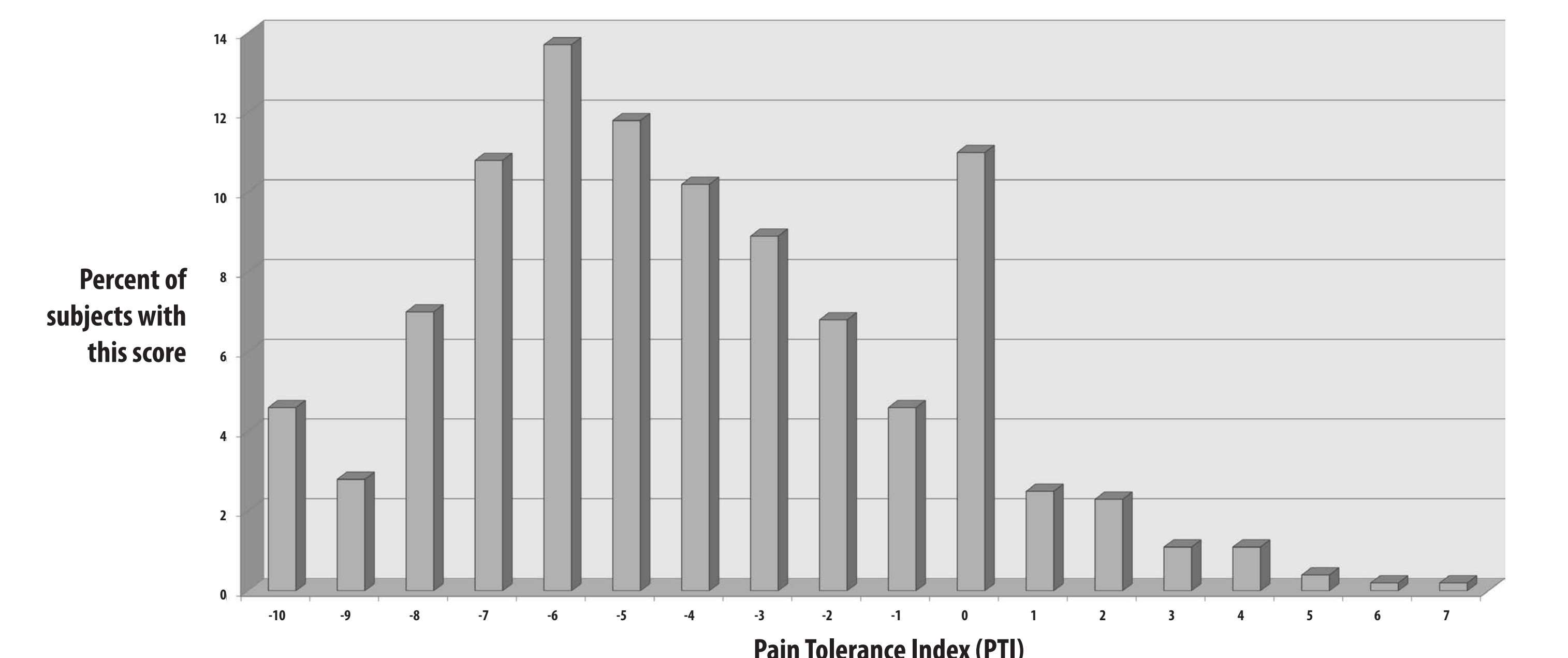


TABLE 1

### Demographics

	Community Non-Patients without Pain	Community Norms	Acute Pain	Rehabilitation Norms	Head Injury	Upper Extremity	Worker's Compensation	Litigants	Chronic Pain
Percent White (vs. Nonwhite)	69.0	74.6	85.3	81.8	76.0	82.4	82.2	79.5	80.6
Percent Male	57.4	53.9	44.8	43.6	34.9	34.1	48.9	39.9	43.7
Mean Age	37.6	39.6	36.4	38.0	39.7	40.9	39.6	39.2	39.8
Percent High School Graduate or higher	76.0	73.4	90.1	87.1	85.3	88.7	81.2	84.4	83.6

TABLE 2

### PTI Norms

Group	N	Mean	SD	Median	Mode
Community Non-Patients without Pain	129	1.29	3.573	0	0
Community Norms	725	-0.69	3.537	0	0
Acute Pain	326	-2.96	3.365	-3	0
Rehabilitation Norms	527	-4.10	3.332	-5	-6
Head Injury	115	-4.10	3.440	-5	-6
Upper Extremity	236	-4.56	3.238	-5	-5
Worker's Compensation	264	-5.07	2.877	-5	-6
Litigants	226	-5.24	3.034	-5.5	-4
Chronic Pain	341	-5.37	2.955	-6	-7