

Unpredictable pain timings lead to greater pain when people are highly intolerant of uncertainty

Clémence Bélanger¹, Bernard Blais-Morin¹, Andréanne Brousseau¹, Nicolas Gagné¹, Anne Tremblay¹, Kathya Daigle, M.Sc.¹, Philippe Goffaux, Ph.D.^{1*}

1. Faculté de Médecine et des Sciences de la Santé, École de Réadaptation, Université de Sherbrooke, Sherbrooke, Qc, Canada

*Corresponding author: philippe.goffaux@usherbrooke.ca



INTRODUCTION

Humans differ greatly in how they respond to pain. Part of this variability may be explained by intolerance of uncertainty (IU), one of many psychological variables that may affect human responses to pain [1]. Our objective in the current study was to determine the impact of inter-individual differences in IU on the report of pain when the onset of painful stimuli could not be predicted. Using a cue-shock testing paradigm where the cue-shock interval (CSI) varied from trial-to-trial, we expected that high levels of IU would predict elevated reports of pain, especially at long CSIs.

METHODS

Participants

Twenty healthy adults between the ages of 18 and 35, including 10 men (mean age: 21.4 ±0.3) and 10 women (mean age: 23.5 ±0.9) participated in this study.

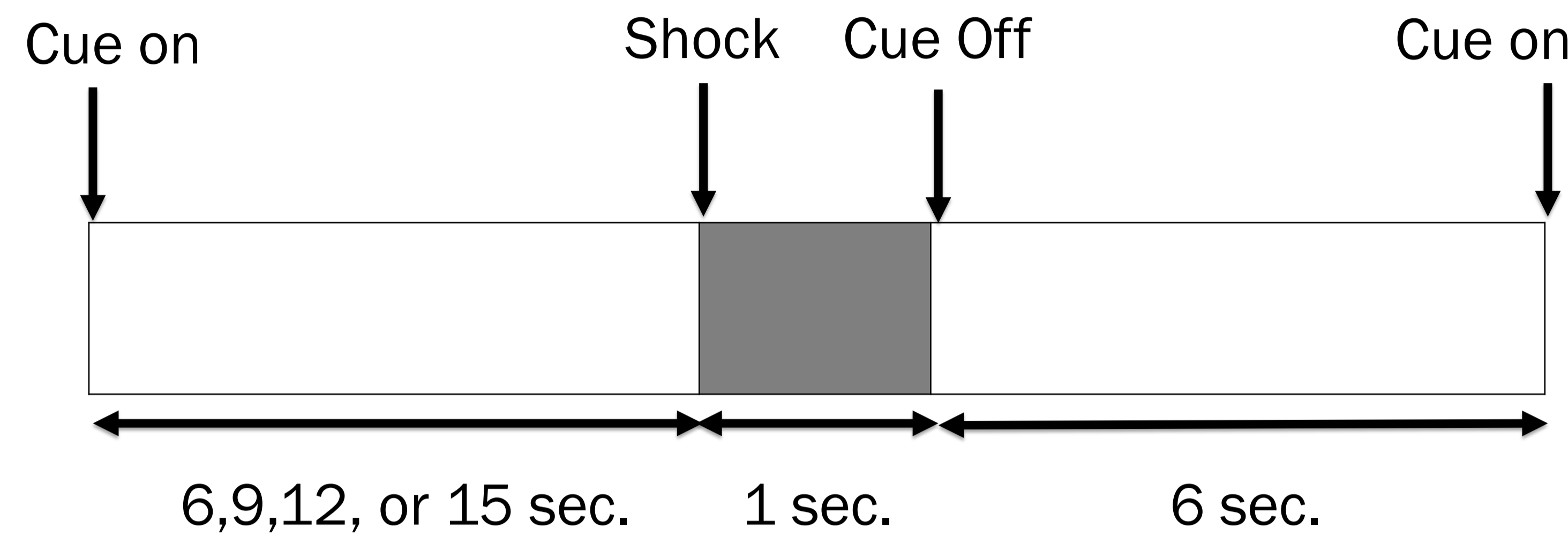
Instruments and Procedure

Pain intensity was assessed using a 0-100 verbal numerical rating scale (NRS).

IU (Intolerance of Uncertainty Scale (IUS) [2]), pain catastrophizing (Pain Catastrophizing Scale (PCS) [3]), anxiety (STAI [4]), and, vigilance to pain (Pain Vigilance and Awareness Questionnaire [5]) were all assessed.

Painful sensations were provoked using transcutaneous electrical stimulations of the right sural nerve. Shocks were administered in three separate CSI testing blocks; two fixed CSI blocks (where the CSI was fixed at 6 and 15 sec., respectively) and one variable CSI testing block (where the CSI varied randomly between 6, 9, 12, 15 sec. from trial-to-trial). Electrical stimulations of the sural nerve were always cued ahead of time using a visual cue (red light) to signal the presence of an upcoming shock. (See Fig. 1 for details regarding the cueing design).

Fig. 1

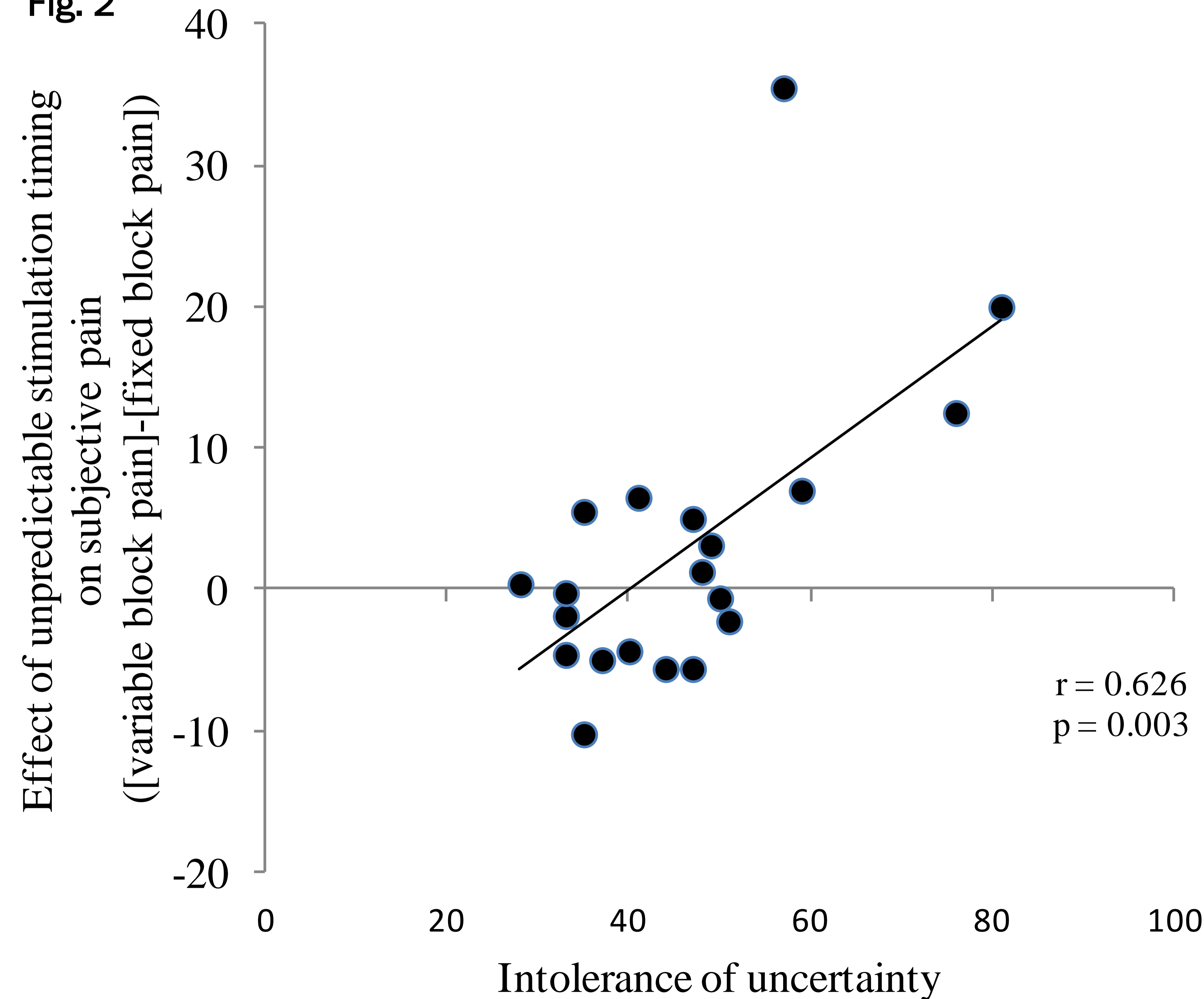


timings was calculated by subtracting the NRS pain score experienced in the predictable timing block from the NRS pain score experienced in the unpredictable timing block. Higher change scores reflected the experience of greater pain during unpredictable as opposed to predictable timing blocks.

RESULTS

The only significant association found between our predictor variables and our psychophysical pain indices was between IU and the change in pain intensity provoked by unpredictable stimulation timings ($r=0.63$, $p=0.003$; see Fig. 2). This association was significant only for stimulations provided at long CSIs (i.e., 15 sec.), suggesting that higher IU scores predicted higher pain intensity scores when stimulation timings became unpredictable and when the cued delay was long.

Fig. 2



Statistical approach

To explore the relationship between our key predictor variables (i.e., IU, anxiety, hypervigilance to pain, and pain catastrophizing) and our psychophysical pain indices (i.e., pain threshold, suprathreshold pain sensitivity, and change in pain intensity provoked by unpredictable stimulation timings), we ran a series of Pearson product-moment correlations. Pain intensity provoked by unpredictable stimulation

CONCLUSION

Participants who were most intolerant of uncertainty were also those who experienced the greatest increase in pain when stimulation timings changed from being fully predictable to fully unpredictable. This was most obvious when shocks were provided at long cue-shock delays than when they were provided at short cue-shock delays. This finding is consistent with the idea that pain is most intolerable when it is both uncertain and protracted in its onset [6]. We now show that IU shapes this effect.

REFERENCES

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