Reviewer's report

Title: The effect of mental stress on lumbar position sense acuity

Version: 2 Date: 7 March 2005

Reviewer: Stein Knardahl

Reviewer's report:

General
The manuscript has been revised, and most of the reviewer's comments have been followed. The methods permit some conclusions pertaining to effects of apprehension and threat of electrical shocks on lumbar position sense. However, conclusions pertaining to sympathetic effects on muscle spindles cannot be drawn. There is no data on sympathetic activity to spindles during "mental stress", hence the parenthesis "including increased sympathetic activity)" must be deleted from aim of the Introduction (p 5).

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

The Discussion should clarify the distinction between the two issues (i) whether sympathetic nerves innervate spindles, and (ii) whether "mental stress" does indeed increase muscle sympathetic nerve activity (to spinal muscles). The last issue pertains to the methods employed to test the hypothesis. During "mental stress" like mental arithmetics, Stroop tests, etc., a cardiovascular pattern of muscle vasodilation (and splanchnic, renal and skin vasoconstriction) is observed. Furthermore, muscle sympathetic nerve activity is differentially regulated in the arm and leg during mental arithmetics.

The study title and aim are "The effect of mental stress on ..." However, it is not entirely clear what is meant by "mental stress". Since the authors use the term "stressor", it seems reasonable that "mental stress" means "responses to stressors". However, in figure 1 "stress" denotes exposure (= stressor).

"Novelty stress" is a misleading concept that does not describe the apprehension of the subjects. One must assume (it is not stated in the Methods) that the subjects know from the general information provided on recruiting that electric shocks may be received. Hence, the period of apprehension should be given another description. The exposure that is tested is threat of electric shocks if not performing at a given criterion. Hence, the experimental task was a fear-motivated avoidance task. Fear was not monitored. It is not at all clear that any type of task can produce the same pattern of activation of sympathetic or other systems. One cannot generalize from fear or threat to any "mental stress". Therefore, the authors should revise the concepts used to describe the exposures/tasks.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)
What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No