Project Details	
Project Code	NMH27Ba Khatibi
Title	Title: Beyond Pain Intensity: Ecological Measurement and Neurostimulation of Pain-Related Motor Interference
Research Theme	Neuroscience & Mental Health
Project Type	Other
Summary	This project will develop and validate an ecologically meaningful measure of pain-related interference with motor function. Rather than relying on simple laboratory tasks or pain-intensity ratings, it will quantify how pain disrupts real-world-relevant performance, including action selection, hazard response, motor control, attention and decision-making during driving. The first phase will use graded noxious stimulation to test how different pain levels affect automated motor tasks and whether interference reflects sensory, attentional, threat-related or predictive processes. The second phase will examine whether neurostimulation can restore functional performance despite ongoing pain, shifting the primary endpoint from analgesia to improved movement, activity and participation.
Description	This project will develop and validate an ecologically meaningful measure of pain-related interference with motor function. Motor function involves the capacity of the nervous, muscular and skeletal systems to plan, produce, control, coordinate and adapt movement in order to achieve a goal. Pain can interfere with several elements of this process, yet research often relies on relatively simple laboratory motor tasks or pain-intensity ratings. This project will move beyond those approaches by quantifying how pain disrupts real-world-relevant functional performance, including action selection, hazard response, motor control, attention and decision-making during driving. The central research question is: how does pain interfere with motor function, and can neurostimulation reduce this interference even when pain is still present? This question is important because complete pain relief is often difficult or unrealistic for many patients. A more achievable and clinically meaningful target may be to reduce the extent to which pain disrupts movement, activity, confidence and participation. In the first phase, the student will use graded experimental noxious stimulation to examine how different levels of pain affect motor function during highly automated tasks such as driving. This will allow the project to test whether pain-related interference increases linearly with pain intensity, or whether specific sensory, attentional, threat-related or predictive processes have differential effects on functional performance. A key objective will be to separate the sensory-discriminative aspects of stimulation from the broader functional consequences of pain. For example, two individuals may report similar pain intensity but show different levels of disruption in attention, decision-making or motor control. The project will therefore examine pain interference as a functional outcome in its own right. In the second phase, the student will test whether neurostimulation can reduce pain-related interference with motor function. Unlike many neurostimulation studies, the primary endpoint will not be analgesia or reduction in pain intensity alone. Instead, the project will ask whether

	neurostimulation can help restore functional performance despite ongoing pain. This will provide a proof-of-mechanism test of whether modulating activity in the human nervous system can reduce the disruptive impact of pain on movement and performance. The specific objectives of the studentship will be to: 1. Develop and refine an experimental platform for measuring pain-related interference with motor function during real-world-relevant tasks, including simulated driving. 2. Use graded experimental pain to test how pain intensity, attention, threat processing and prediction influence functional performance. 3. Identify behavioural and physiological markers of pain-related interference, with a focus on outcomes such as hazard response, action selection, motor control and decision-making. 4. Develop expertise in experimental pain methods and the investigation of pain modulation in the human nervous system. 5. Develop expertise in neurostimulation and its integration with experimental pain paradigms to test whether modulation of nervous system activity can reduce pain-related interference with motor function. 6. Evaluate whether neurostimulation improves functional performance despite ongoing pain, thereby shifting the emphasis from pain relief alone to restoration of movement, activity and participation. The student will have substantial opportunities to take ownership and steer the project. In the early phase, they will contribute to the design and optimisation of the experimental task platform, including decisions about which driving-related outcomes best capture pain-related functional interference. They will also help determine the most appropriate behavioural, physiological and self-report measures to include. As the project develops, the student will be able to shape the neurostimulation protocol, refine the hypotheses, contribute to analysis decisions, and identify additional mechanistic questions emerging from the data. Depending on their interests, they may choose to place greater emphasis on experimental pain mechanisms, neurostimulation, motor control, attention and decision-making, or the translation of laboratory findings into clinically meaningful functional outcomes. Overall, this studentship will provide advanced training in experimental pain research, human nervous-system modulation, neurostimulation, motor-function assessment and ecologically valid behavioural measurement. The project will generate a new framework for studying pain-related interference with function and will inform future interventions that aim not only to reduce pain intensity, but also to help people move, act and participate more effectively despite pain.
Can be completed part time?	No
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