be detected using electroencephalography (EEG) via the lateralized readiness potential (LRP), which appears smaller in amplitude as the number and distance between potential targets is increased. However, this line of research has thus far only investigated conflicts between potential actions involving a single effector, such as a hand, rather than conflicts between effectors. In two experiments, we sought to extend the investigation of action competition by offering participants a choice of effector when performing pointing towards a left- or right-lateralized, circular target. While Experiment 1 was free-viewing in design, Experiment 2 introduced a fixation cross as a control for target visual field. EEG was recorded during each experiment, which permitted detection and analysis of the LRP. Experiment 1 demonstrated a reduction in LRP amplitude when participants performed contralateral movements as well as when they performed movements to centrally-located targets regardless of effector, while Experiment 2 replicated the reduction in LRP amplitude during contralateral movements. Together, these findings constitute the first evidence of competition between effectors in humans. Competition appears to occur when no effector possesses an efficiency advantage in terms of the physical distance it must transverse to the target, or when people choose to perform movements which are inefficient. As relative movement efficiency is likely established through movement simulation and prediction, this finding suggests that the LRP could be used to measure imagined movements.

B112

USING EEG AND MACHINE LEARNING TO PREDICT ACTION GOALS FROM DATA IN THE HUMAN MIRROR SYSTEM

Lawrence P Behmer Jr.[1], Jason Fairey[1], Lawrence B Holder[1], Lisa R Fournier[1]; [1]Washington State Univeristy — The frontal-parietal mirror circuit (FPMC) is active when individuals observe or perform a goal-directed behavior. Evidence in macaques and humans suggest that the FPMC is extremely robust at the point when individuals code the goal of the motor act, enabling an observer to understand an agent's intentions. Recent theoretical hypotheses in the fields of computer science and machine learning suggest that data from the FPMC may have applications in robotics and artificial intelligence. Recently, EEG data has been used to control brain-machine interfaces, move a cursor on a computer screen, access a smart phone app, and to predict whether an individual won or lost in a blackjack game. Here, we used human FPMC data from the EEG (electroencephalography) to design a machine learning algorithm to predict the action outcome of an event that a participant was observing. Adapting a paradigm used by Iacoboni and colleagues, we measured mu-ERD (event-related desynchronization) while individuals observed videos of an actor engaging in goal-directed actions where the outcomes were either ambiguous or unambiguous. We observed that mu-ERD was significantly strongest during the action and goal conditions compared to the non-movement setting conditions. Additionally, mu-ERD was strongest when the action outcome was ambiguous. Mu-ERD data was used to evaluate machine learning algorithms that can predict an individual's intention. We discuss the use of this data towards the development of hands-free, non-invasive neural devices that can assist senior citizens with mobility impairments in a Smart Home environment.

B113

PLASTICITY IN ADULT SOMATOSENSORY CORTEX: COMPARISON BEFORE AND AFTER BRAIN SURGERY

Hana Burianova[1], Anina Rich[1], Mark Williams[1], Lars Marstaller[1], Michael Morgan[2], Greg Savage[3]; [1]Centre in Cognition and its Disorders, Macquarie University, Sydney, Australia, [2]Australian School of Advanced Medicine, Macquarie University, Sydney, Australia, [3]Department of Psychology, Macquarie University, Sydney, Australia — We investigated brain reorganization in a patient who underwent a surgery to remove a brain arteriovenous malformation located in left somatosensory cortex and who, consequently, lost proprioception in the fingers of her right hand. The objectives of our study were to investigate long-term changes in neural activation and functional connectivity associated with the loss of finger proprioception and its gradual recovery. The patient participated in a longitudinal functional magnetic resonance imaging study in which she was required to engage in a simple motoric (finger tapping) task several times in the span of fourteen months. The results show that after surgery the patient's right finger tapping was significantly slower than left finger tapping. These behavioural changes were associated with pronounced decreases in left-hemispheric somatosensory activity and increases in right-hemispheric motor activity. Additionally, we observed significant changes in functional connectivity of the somatosensory network over time. The results of this study provide further support for neural plasticity in adulthood, evidenced not only by changes in regional activations but also by changes in functional connectivity.

B114

LOOKING AT UNDERSTANDING THE INFLUENCE OF PERSPECTIVE ON HANDEDNESS IN ACTION RECOGNITION IN RIGHT HANDED SUBJECTS

Rachel Kelly[1], Chris Mizelle[1,2], Lewis Wheaton[1]; [1]Georgia Institute of Technology, [2]Atlanta VA Medical Center — Comprehension of skilled action is a typical aspect of daily behavior. The ability to understand action may require us to simulate that action in ourselves. The purpose of this neurobehavioral study is to evaluate the interaction of handedness and perspective plays in our ability to recognize the goals of motor acts. In a two- part study, right- handed subjects were first trained directly with different tools. Then they were presented with randomly organized static visual images of novel and familiar tools from egocentric or allocentric perspectives performed by either a left or right hand. For the first part, behavioral results showed there was a significant effect of accuracy with respect to perspective, with highest accuracy in the egocentric perspective. As this may relate to encoding of action from an internal perspective as opposed to a social perspective, the second neural study was performed. The neural study showed parietal and occipital activation for the allocentric perspective when compared to egocentric perspectives. Egocentric perspective showed a greater activation in the premotor regions that which is involved in motor planning. Further analysis revealed an effect of handedness of the actor, which showed activations consistent with limb-specific motor simulation. This suggests activation of motor representations of the observer's left hand when watching a left-handed person for comprehending actions, regardless of the perspective of the action seen. Consequently, the current research will help us better understand how we encode action and recall motor simulations and may ultimately contribute to understanding of some tool-use related deficits.

B115

TIME-FREQUENCY ANALYSIS OF CORTICAL RESPONSES TO VOICE PITCH FEEDBACK PERTURBATION REVEALS BILATERAL NETWORK OF DETECTION AND COMPENSATION.

Naomi S Kort[1], John F Houde[1], Srikantan S Nagarajan; [1]University of California, San Francisco — Speech requires the coordination of motor commands to produce sounds that convey an intended message. While auditory feedback, when available, is used to monitor speech and correct errors, the role of feedback in speech remains poorly understood. Thus, experimental manipulation of auditory feedback during speaking offers a unique window to understand the neural substrates of speech motor control. This study used real-time pitch-altered auditory feedback with magnetoencephalography to explore the neural correlates of feedback processing. In the Speaking Condition, subjects produced a sustained utterance of the vowel /a/. During the phonation the subjects heard one 100-cent pitch perturbation lasting 400ms. Equal numbers of trials raising and lowering the perceived pitch were pseudorandomly distributed. In the Listening Condition, subjects passively listened to the recording of their perturbed voice feedback. The neural analysis consisted of time-frequency beamforming using the NUTMEG software package. Only subjects who systematically changed their pitch to oppose the direction of the applied perturbation were used in this analysis. The compensation began on average 206ms after the perturbation onset with an average compensation of 19% and the range from 9% to 41%. The cortical response to the applied pitch perturbation revealed a distinct bilateral pattern of enhanced activity in the speaking condition as compared to the listening condition. Furthermore, a temporally dynamic network including temporal and motor areas shows significant regression with individual subjects' compensation. With this time-frequency analysis we observe the bilateral network involved in recognizing and responding to the pitch perturbation.