

Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see [Authors & Referees](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

- ☐ ☒ The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
- ☐ ☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
- ☐ ☒ The statistical test(s) used AND whether they are one- or two-sided
Only common tests should be described solely by name; describe more complex techniques in the Methods section.
- ☐ ☒ A description of all covariates tested
- ☐ ☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
- ☐ ☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
- ☐ ☒ For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
Give P values as exact values whenever suitable.
- ☐ ☒ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
- ☐ ☒ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
- ☐ ☒ Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection

Matlab 2017b was used to record EMG on a computer

Data analysis

Matlab 2017b was used to compute experimental means. SPSS v21 was used for ANOVAs, within-subject contrasts and paired sample t-tests.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors/reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

Raw kinematic and EMG data from these experiments are available from the corresponding author on request.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

- ☐ Life sciences ☒ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	This was a quantitative study of human movement and muscle activity.
Research sample	A representative sample of young, healthy adults from London, Ontario volunteered for this study. Ages ranged from 18-34, and were comprised of 44 males and 49 females. The sample was selected to determine how the healthy adult nervous system processes sensory feedback to control movement.
Sampling strategy	No statistical methods were used to pre-determine sample size but our sample sizes are similar to those reported in previous publications. Details appear in the Methods section of the manuscript.
Data collection	A robotic exoskeleton connected to a computer was used to collect movement kinematic data. Surface EMG electrodes connected to a computer were used to collect muscle activity data. Only the researcher and the participant were in the experimental suite during data collection. The researcher was not blinded to the experimental conditions or hypotheses being tested.
Timing	Start of data collection: February 2017. End of data collection: July 2018.
Data exclusions	No data were excluded from analysis.
Non-participation	No participants dropped out of the experiment or refused to participate.
Randomization	Participants were not allocated into groups as this was a repeated measures design.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems		Methods	
n/a	Involved in the study	n/a	Involved in the study
☒	☐ Antibodies	☒	☐ ChIP-seq
☒	☐ Eukaryotic cell lines	☒	☐ Flow cytometry
☒	☐ Palaeontology	☒	☐ MRI-based neuroimaging
☒	☐ Animals and other organisms		
☐	☒ Human research participants		
☒	☐ Clinical data		

Human research participants

Policy information about [studies involving human research participants](#)

Population characteristics	Healthy young adults. Ages ranged from 18 to 34. Comprised of 44 males and 48 females.
Recruitment	Participants were recruited via posted advertisements at Western University and via verbal communication. We do not believe that there was any selection bias. However, any selection bias would not influence our results.
Ethics oversight	Wester University Research Ethics Board

Note that full information on the approval of the study protocol must also be provided in the manuscript.