

1 **Supplemental Figure 1:** Bland-Altman plots with 95% limits of agreement demonstrating the
2 *concurrent validity* of neurovascular coupling metrics within the middle cerebral artery (MCA)
3 derived from one to seven trials compared to the “*reference-standard*” eight trials. A total of 160
4 time points were drawn from 60 participants (30 females / 30 males). It is important to note the
5 increasing trials represent the average from the given numbers of trials completed, which would
6 contain the previous trial(s). It should be highlighted the time-to-peak measures displayed wide
7 variance across all trials and therefore this metric should be interpreted with caution. The outcome
8 metrics of interest within the middle cerebral artery (MCA) included: baseline MCA velocity
9 (cm/s), peak MCA velocity (cm/s), relative percent (%) increase in MCA velocity from baseline
10 to peak, MCA total activation/area-under-the-curve during the first 30-seconds of task engagement
11 (AUC30) (cm/s/30s), and time-to-peak MCA velocity during task engagement (s).

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13 **Supplemental Figure 2:** Intraclass correlation coefficients (ICC), adjusted coefficient of
14 determination (r^2) values, and coefficient of variation (COV) metrics demonstrating the *concurrent*
15 *validity* of neurovascular coupling metrics within the middle cerebral artery (MCA) derived from
16 one to seven trials compared to the “*reference-standard*” eight trials. It is important to note the
17 increasing trials represent the average from the given numbers of trials completed, which would
18 contain the previous trial(s). Thresholds for the ICC were set at: <0.50 (poor; red), 0.50 – 0.75
19 (moderate; orange), 0.75 – 0.90 (good; yellow), and >0.90 (excellent; green). Thresholds for the
20 adjusted r^2 metrics were set at: <0.10 (negligible; red), 0.10 – 0.30 (small; orange), 0.30 – 0.50
21 (moderate; yellow), 0.50 – 0.80 (large; blue), and 0.80 – 1.00 (very large; green). Thresholds for
22 the CoV were: >20% (unacceptable; red), 10 – 20% (acceptable: orange), 5 – 10% (good; yellow),
23 and <5% (excellent; green). The outcome metrics of interest within the middle cerebral artery

24 (MCA) included: baseline MCA velocity (cm/s), peak MCA velocity (cm/s), relative percent (%)
25 increase in MCA velocity from baseline to peak, MCA total activation/area-under-the-curve
26 during the first 30-seconds of task engagement (AUC30) (cm/s/30s), and time-to-peak MCA
27 velocity during task engagement (s).

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29 **Supplemental Figure 3:** Intraclass correlation coefficients (ICC) and coefficient of variation
30 (COV) metrics demonstrating the *within-day reliability* of neurovascular coupling metrics within
31 the middle cerebral artery (MCA) derived from one to eight trials. It is important to note the
32 increasing trials represent the average from the given numbers of trials completed, which would
33 contain the previous trial(s). Thresholds for the ICC were set at: <0.50 (poor; red), 0.50 – 0.75
34 (moderate; orange), 0.75 – 0.90 (good; yellow), and >0.90 (excellent; green). Thresholds for the
35 CoV were: >20% (unacceptable; red), 10 – 20% (acceptable: orange), 5 – 10% (good; yellow),
36 and <5% (excellent; green). The outcome metrics of interest within the middle cerebral artery
37 (MCA) included: baseline MCA velocity (cm/s), peak MCA velocity (cm/s), relative percent (%)
38 increase in MCA velocity from baseline to peak, MCA total activation/area-under-the-curve
39 during the first 30-seconds of task engagement (AUC30) (cm/s/30s), and time-to-peak MCA
40 velocity during task engagement (s).

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42 **Supplemental Figure 4:** Intraclass correlation coefficients (ICC) and coefficient of variation
43 (COV) metrics demonstrating the *between-day reliability* of neurovascular coupling metrics within
44 the middle cerebral artery (MCA) derived from one to eight trials. It is important to note the
45 increasing trials represent the average from the given numbers of trials completed, which would
46 contain the previous trial(s). Thresholds for the ICC were set at: <0.50 (poor; red), 0.50 – 0.75

47 (moderate; orange), 0.75 – 0.90 (good; yellow), and >0.90 (excellent; green). Thresholds for the
48 CoV were: >20% (unacceptable; red), 10 – 20% (acceptable: orange), 5 – 10% (good; yellow),
49 and <5% (excellent; green). The outcome metrics of interest within the middle cerebral artery
50 (MCA) included: baseline MCA velocity (cm/s), peak MCA velocity (cm/s), relative percent (%)
51 increase in MCA velocity from baseline to peak, MCA total activation/area-under-the-curve
52 during the first 30-seconds of task engagement (AUC30) (cm/s/30s), and time-to-peak MCA
53 velocity during task engagement (s).

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