

## 1 **Online Supplement**

### 2 3 1. Details of the experimental setup

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5 Unexpected slip perturbations were induced as subjects walked along a 7-m walkway in  
6 which a sliding device was embedded. The device consisted of a pair of side-by-side, low-  
7 friction, passively movable platforms each mounted upon a metal frame supported by two  
8 individual force plates (AMTI, Newton, MA) for recording the ground reaction force (GRF)  
9 (Yang and Pai, 2007). Once released on slip trials, the platforms were free to slide with a  
10 friction coefficient less than 0.05, and which would latch into a stopper at their maximum  
11 allowable slip distances: 58cm backward, 75cm forward on the left; 11cm backward, 90cm  
12 forward on the right. These maxima were not reached throughout the present study. A  
13 harness, connected by shock-absorbing ropes at the shoulders and hips to an overhead beam,  
14 was employed to protect the subjects. A load cell measured the force exerted on the ropes.

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16 Subjects were informed that they would be performing normal walking initially and would  
17 experience a simulated slip later without knowing when, where, or how that would happen.  
18 They were only told to try to recover their balance on any slip incidence and then to continue  
19 walking. After about 10 normal walking trials, the right platform was automatically released  
20 by a powered solenoid when the vertical force exerted on it by right (slipping) foot contact  
21 exceeded a preset threshold. Subsequently, the left platform was automatically released only  
22 if it were contacted by the left (recovery) foot. To capture a targeted 90% of the subjects'  
23 spontaneous landings on the left platform, the 5% - 95% distribution of the left foot landing  
24 was calculated among 84 young subjects (Bhatt and Pai, 2005). This landing position was  
25 used to establish an 8.5-cm left offset posterior to the right platform.

### 26 27 2. Placement of all markers

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29 Specifically, 26 markers were affixed at vertex, ears, posterior neck (the spinous process of  
30 the 7<sup>th</sup> cervical vertebra), shoulders (the acromion of the scapulae), midpoint of the right  
31 scapula, elbows (the lateral humeral epicondyles), wrists (the radial styloid processes),  
32 sacrum, greater trochanters, mid-thighs, knees (the lateral femoral epicondyles), mid-legs

- 1 (the tibial tubercles), ankles (the lateral malleoli), heels (calcaneal tuberosities), and the 5<sup>th</sup>
- 2 metatarsal heads.