Table S1. Sample characteristics of studies examining cognitive-motor interference after stroke

First author, year	Groups	Sample size, mean (SD) age, gender	Mean stroke onset duration (SD)	Baseline Motor Function	Baseline Cognition
Dennis (2009)	Stroke, Healthy older adults	*Stroke:* n=21; mean age 61 years (SD 12 years); 13 men, 8 women; stroke hemisphere not reported; *Healthy Older Adults:* n=10; mean age 60 years (SD 6 years); 8 men, 2 women	25 months (range 7-50 months)	Rivermead Mobility Index: *Stroke:* 13 (range 9-15); *Healthy Older Adults:* N/A Gait speed**:** *Stroke:* 0.8 m/s (SD 0.4 m/s); *Healthy Older Adults:* 1.38 m/s (SD 0.21 m/s)	Repeated Battery for the Assessment of Neuropsychological Status: *Stroke:* 83.3 (SD 11.8); *Healthy Older Adults:* 97.9 (SD 13.7)
de Haart (2004)	Stroke, Healthy older adults	*Stroke*: n=37; mean age=61.6 years (SD 12.9 years); 20 men and 17 women; 13 left and 24 right hemisphere *Healthy older adults*: n=23; mean age=63.9 years (SD 9.3 years);	10.0 weeks (SD=5.4 weeks; range=3.3-24.1 weeks)	Brunnstrom Stage (lower limb motor selectivity): V (II-VI) Trunk control task: 41% able to sit edge of bed, feet off ground for 30 seconds Function Ambulation Categories: 2 (1-4)	Letter cancellation test, line bisection test, and first 6 items of WAIS block design subtest: 43% had neglect
Haggard (2000)	Stroke, Healthy older adults	*Stroke:* n=33; mean age 50.2 years (SD 16.5 years); 28 men, 22 women. *Healthy older adults*: n=10; mean age 45.3 years (SD 17.8 years); gender not reported;	Not reported; stroke group were receiving inpatient rehabilitation	Gait speed: *Stroke* 0.35 m/s (range: 0.04-2.0 m/s); *Healthy Older Adults:* No motor performance data reported;	No cognitive performance data reported.
Harley (2006)	Stroke, Healthy older adults	*Stroke*: n=36; mean age 61.6 years (SD 15.9 years); gender not reported; hemisphere not reported; *Healthy Older Adults*: n=21; mean age 71.0 years (SD 7.5 years); gender not reported;	69 days (SD 50 days)	No motor performance data reported	Short orientation-memory-concentration task (mean 22.1, SD 5.8); Star cancellation task (mean 47.3, SD 14.5);
Hyndman (2006)	Stroke (fallers and	*Stroke:* n=36; mean age	16.3 months (range	Rivermead Motor Assessment:	Required to pass a

	non-fallers), Healthy older adults	66.5 years (SD 11.8 years); 21 men, 15 women; 15 left hemisphere, 20 right hemisphere, 1 brainstem; *Healthy Older Adults:* n=24; mean age 62.3 years (SD 11.6 years); 14 men, 10 women	7-56 months)	arm 12.5 (SD 2.7); leg and trunk 8.6 (SD 2.2), gross function 10.1 (SD 1.8) Gait speed: *Stroke*: 0.7 m/s (SD 0.3); *Healthy Older Adults*: 0.9 m/s (SD 0.1);	cognitive screening test to be eligible; Star cancellation test for neglect (mean 52.9, SD 3.9)
Hyndman (2009)	Stroke only	*Stroke*: n=76; mean age 67.1 years (SD 11.3 years); 56 men and 20 women; 36 left hemisphere, 39 right hemisphere, and 1 unknown;	6 month follow up: 36.3 weeks (SD=6.4 weeks) 12 month follow up: 62.3 weeks (SD=6.2 weeks)	Able to stand independently for 15 seconds; Rivermead Motor Assessment Gross Function Mean at 24 weeks since onset=10.3 (1.8); Berg Balance Score Mean at 24 weeks since onset=47.2 (8.9)	No cognitive performance data reported;
Kemper (2006)	Stroke, Healthy older adults	*Stroke:* n=10; mean age 77.2 years (SD 5.8 years); gender not reported; 5 left, 3 right, 2 bilateral hemispheres; *Healthy Older Adults:* n=10; mean age 76.3 years (SD 5.4 years); gender not reported	Range: 24-36 months (mean not reported)	Fugl-Meyer (max. 123): 110.9 (SD 9.4); Berg: 47.2 (SD 4.1); Duke Mobility Scale (max. 26): 20.8 (SD 2.6) Gait speed not reported	Battery assessing verbal ability, working memory, inhibition, processing speed; no differences between stroke and healthy on cognitive measures;
Plummer-D'Amato (2008)	Stroke only	*Stroke:* n=13; mean age 60.5 years (SD 15.3 years); 11 men, 2 women; stroke hemisphere not reported;	8.7 months (SD 4.8 months)	Lower extremity Fugl-Meyer (max. 34) 24.2 (SD 5.3; range 14-30) Gait speed: 0.78 m/s (SD 0.38, range 0.15-1.11)	MMSE 24-30; able to follow 3-step commands;
Plummer-D'Amato (2010)	Stroke only	Subset of Plummer-D'Amato 2008: *Stroke:* n=8; mean age 60.3 years (SD 18.2 years); 7 men, 1 woman; 3 left and 5 right hemisphere;	7.6 months (SD 4.2 months)	Lower extremity Fugl-Meyer (max. 34) 25.9 (range 18-30) Gait speed: 0.82 m/s (SD 0.34)	Battery; MMSE 26.9 (SD 3.3)

Regnaux (2005)	Stroke, Healthy older adults	*Stroke:* n=18; mean age 46.6 years (SD 12.3 years); 12 men, 6 women; 7 left and 11 right hemisphere; *Healthy Older Adults:* n=10; 25-55 years (mean/SD not provided); 7 males, 3 females	13.7 months (SD 16.2 months)	Gait speed: Stroke: 0.52 m/s (SD 0.32); not reported for healthy controls	No cognitive performance data reported;
Roerdink (2006)	Stroke, Healthy older adults	*Stroke*: n= 33;mean age 61.2 years (SD 13.0 years); gender not reported; 10 left hemisphere and 23 right hemisphere *Healthy older adults*: n=22; mean age 63.9 years (SD 9.3 years); gender not reported;	9.8 weeks (SD = 5.2 weeks; range = 3.3 - 24.1 weeks)	Functional Ambulation categories: mean = 2 (Dependent, level 1; patient needs continuous or intermittent support of one person to help with balance and coordination) (range=1- 4) Lower limb motor selectivity (Brunnstrom stage): mean=IV (increased muscle tone with alternating gross movements in extension and flexion synergies) (range=II to VI)	No cognitive performance data reported;
Roerdink (2009)	Stroke	*Stroke*: n=33; mean age 61.2 years (SD 13.0 years); gender not reported; 10 left hemisphere and 23 right hemisphere	9.8 weeks (SD=5.2 weeks)	Functional Ambulation categories: mean=2 (Dependent, level 1; patient needs continuous or intermittent support of one person to help with balance and coordination) (range=1- 4) Lower limb motor selectivity (Brunnstrom stage): mean=IV (increased muscle tone with alternating gross movements in extension and flexion synergies) (range=II to VI)	No cognitive performance data reported;

Table S2. Summary of tasks in studies examining cognitive-motor interference after stroke

First author, year	Types of tasks	Task features (difficulty, consistency of demands, duration)	Timing and order of tasks	Prioritization of tasks	Measurement of task performance
de Haart (2004)	**Postural tasks**: 4 quiet standing conditions were performed (1) eyes open with a visual midline reference (2) eyes open without a visual midline reference (3) eyes open while performing an arithmetic dual task (4) eyes closed	Each condition was recorded for 30 seconds, then participant was given one minute break before next condition	Every balance assessment consisted of 2 consecutive test series; each test series incorporated 4 quiet standing tasks and 1 weight shifting task in a fixed sequence. The sequence was repeated in reverse order to control for time effects related to learning or fatigue.	Not reported	**Posture control:** Center of pressure fluctuations were registered under each foot and in the sagittal and frontal planes separately using a dual plate force platform, RMS of COP velocities (VCOP), RMS amplitude of COP (ACOP) fluctuations, determination of asymmetry (via each foot separately), average position of COP **Cognition:** Number of arithmetic errors made during the standing balance task
Dennis (2009)	**Gait tasks:** Single task walking at preferred speed; single task fast walking; single task cognition; each cognitive task at preferred and fast speed. **Cognition tasks:** clock task, serial subtraction by 3	Task order randomized; gait tasks on 14 m oval walkway; data acquisition for 1 min	Single and dual of each cognitive task and gait task. In dual tasks, tasks initiated simultaneously	Instructed to walk at fastest speed for fast walk; for other dual tasks, asked to "maintain the desired walking speed and perform the cognitive task to the best of their ability"	**Gait:** gait speed **Cognition:** response accuracy (clock), number recalled (serial 3s)
Haggard (2000)	Walk continuously for 1 min (straight line walking, turn at end). Four cognitive tasks: word generation, mental arithmetic, word	Single cognitive, single gait, dual with each cognitive task	Order of tasks randomized; 2 trials each condition in following sequence: single walk, single cognitive, dual task, dual task, single	No instructions to prioritize either task in dual task trials	**Gait:** Stride duration measured using footswitches **Word generation**: number correct items, onset latency, non-items

	association, clock task. (Arithmetic task was dropped after first 32 participants)		cognitive, single walk		(e.g., "um") A**rithmetic**: accuracy and response latency **Word association**: number correct pairs, median latency of correct responses C**lock task**: accuracy and response latency
Harley (2006)	Sitting tasks: During unsupported sitting, (1)Sat still (2) Sat still with repetitive utterance ("ba") (3) Sat still with category word generation During supported sitting: (1) "Supported" word generation trials	4 trials were repeated twice in separate testing blocks Each trial lasted for 1 minute	Order of task presentation and target category were systematically varied across all participants	No instruction reported	**Postural control**: the average change in position from the initial starting point and the cumulative movement from the start sitting position **Cognition**: Number of words generated
Hyndman (2006)	Cognition task: Memorizing a "shopping list" of 7 items; Gait task: walk 5 m comfortable pace (time, stride length, velocity); Balance task: stand on a force plate (ML, AP sway);	Participants were instructed to rehearse the shopping list items in their minds during cognition single task condition, and all dual task conditions; Difficulty with all tasks in single and dual task conditions remained constant; 3 balance trials, 3 gait trials, and one cognitive trial in the single task condition; 1 balance trial and 1 walking trial simultaneously in the dual task condition	Single task condition (cognition task, gait task, balance task); Dual task condition (simultaneous)	Participants were asked to assign equal importance to both tasks during dual condition	**Cognition**: Listing items from the shopping list at the end of each trial; number of correctly recalled items **Gait**: speed, stride length, and velocity; **Balance**: ML and AP sway;

Hyndman (2009)	Cognition task: Memorizing a "shopping list" of 7 items Balance task:3 conditions of increasing difficulty: (1) preferred stance (2) feet together (3) eyes closed	3 repeats of each task The balance and cognitive tasks were performed in isolation in the single-task condition The balance and cognitive tasks were performed simultaneously in the dual task condition	Trial order counterbalanced Single task condition (cognition task, 3 balance tasks); Dual task conditions (simultaneous)	Instructed to place equal importance on the balance and cognitive task	**Balance:** ML and AP sway **Postural Control:** Examined using a Kistler force plate – sway data were collected at 100 Hz for 15 seconds, and the mean displacement from the center of pressure over time in the ML (medial-lateral) and AP (anterior-posterior) directions was calculated for each task performed. **Cognition:** number of correctly recalled items
Kemper (2006)	9 tasks*: (1) talking alone, (2) talking while ignoring concurrent speech, (3) talking while ignoring concurrent noise, (4) walking alone, (5) walking while talking, (6) finger tapping alone, (7) finger tapping while talking, (8) complex finger tapping alone, (9) complex finger tapping while talking	Walking task: walk at a "brisk but comfortable pace" around an irregular elliptical pathway, approx. 18 ft in diameter, 2 ft wide, for 3-5 mins. Talking task: language sample elicited using variety of questions, lasted 3-5 mins and contained at least 50 utterances.	Task in fixed order and interspersed with cognitive tests	No specific instruction; asked to walk at a "brisk but comfortable pace"	**Gait:** cadence and "errors" (fumbles, missteps, footsteps outside boundaries), "time on task": percentage of time actually walking or walking and talking simultaneously (for dual task condition). **Cognition:** fluency, complexity, and propositional density;
Plummer-D'Amato (2008)	3 mins continuous walking around oval track; 3cognitive tasks -- memory (1-back), visuospatial (clock task), spontaneous speech	Single cognitive (sitting), single gait, dual (one of each cog task); all trials ~3 mins	Order of cog tasks randomized; always single before dual; single walk task performed first and last	No instruction regarding prioritization	**Gait:** gait speed, stride duration, stride duration variability, stride length, cadence **Cognition:** reaction time and accuracy, speech variables

Plummer-D'Amato (2010)	3 mins continuous walking around oval track; 3cognitive tasks -- memory (1-back), visuospatial (clock task), spontaneous speech	Single cognitive (sitting), single gait, dual (one of each cog task); all trials ~3 mins	Order of cog tasks randomized; always single before dual; single walk task performed first and last	No instruction regarding prioritization	**Gait:** gait speed, stride time, stride time variability, average stride length, cadence; **Cognition:** reaction time
Regnaux (2005)	Treadmill walking, constant speed based on self-selected overground walking speed. Cognitive task: biting a sensor in response to electrical stimulation on back of neck	Stimuli triggered manually by examiner at various times in gait cycle (single or double support); minimum of 30 reaction times in each condition (sitting, standing, walking)	Order is the same for all: familiarization period, sitting reaction time task, standing reaction time task, walking reaction time task	Not reported (but maintained constant treadmill speed)	**Gait:** stride duration, velocity **Cognition:** reaction time
Roerdink (2006)	3 quiet standing conditions were performed: (1) eyes open (2) eyes open while performing an arithmetic dual task (3) eyes closed	Two posturographic trials	Not reported	The participants were asked to stand as still and symmetrically as possible (barefoot, arms alongside the trunk, feet placed with the heels at 8.4 cm apart, with the toes pointing outward at a 9 degree angle from the sagittal midline)	**Postural Control:** Center of pressure was recorded for 30 s at a sample frequency of 60 Hz **Cognition:** Verbal indication of the correctness of each summing response by good or fault response.
Roerdink (2009)	3 quiet standing conditions were performed: (1) eyes open (2) eyes open while performing an arithmetic dual task (3) eyes closed	Two posturographic trials	Not reported	The participants were asked to stand as still and symmetrically as possible (barefoot, arms alongside the trunk, feet placed with the heels at 8.4 cm apart, with the toes pointing outward at a 9 degree angle from the sagittal midline)	**Postural Control:** Center of pressure was recorded for 30 s at a sample frequency of 60 Hz **Cognition:** Verbally indication of the correctness of each summation by good or fault response.