Supplementary Material

The Role of Architecture and Design in the Management of Parkinson's Disease: A Systematic Review

Supplementary Table 1. Electronic search strategy

MEDLINE Search Strategy	Embase Search Strategy
1. exp cohort studies/	1. exp cohort analysis/
2. cohort$.tw.	2. exp longitudinal study/
3. controlled clinical trial.pt.	3. exp prospective study/
4. epidemiologic methods/	4. exp follow up/
5. limit 4 to yr=1966-1989	5. cohort$.tw.
6. exp case-control studies/	6. exp case control study/
7. (case$ and control$).tw.	7. (case$ and control$).tw.
8. (case$ and series).tw.	8. exp case study/
9. or/1-3,5-8	9. (case$ and series).tw.
10. exp Parkinsonism/	10. or/1-9
11. Parkinson*.ti,ab.	11. exp Parkinsonism/
12. OR/10-11	12. Parkinson*.ti,ab.
13. Architect*.ti,ab.	13. OR/11-12
14. Design*.ti,ab.	14. Architect*.ti,ab.
15. Edifice.ti,ab.	15. Design*.ti,ab.
16. Urban*.ti,ab.	16. Edifice.ti,ab.
17. OR/13-16	17. Urban*.ti,ab.
18. 9 and 12 and 17	18. OR/14-17
	19. 10 and 13 and 18

Supplementary Table 2. Characteristics of included studies

Reference	Study design	Participants	Outcome measures	Major findings/Conclusion
Almeida et al. 2005 [57]	Experimental study	1. 25 PD (20M, 5F; m-age 66.7 yrs) 2. 13 healthy aged-matched Controls (m-age 63.7 yrs)	Gait was assessed in two baseline conditions [1.) Light; 2) Dark] and in four experimental darkness conditions [1) Memory; 2) Chest light; 3) Chest and target light; 4) Wheelchair].	- PD and healthy participants employed a similar strategy when walking in darkness, with selection of a slower, shorter but wider stepped gait pattern with increased double support time. - PD patients (but not healthy participants) also increased their step times and walked with greater step-to-step variability of double support time when walking in darkness.
Almeida et al. 2010 [46]	Experimental study	1. 31 PD (23M, 8F; FOG group: 13M, 2F, m-age 72.4 yrs, m-disease duration 9.07 yrs, UPDRS part III 32.8; Non-FOG group: 10M, 6F, m-age 72.19 yrs, m-disease duration 5.97 yrs, m-UPDRS part III 28.81). 2. 16 matched Controls (6M, 10F; m-age 70.75 yrs).	Gait was assessed under three conditions: 1) Narrow doorway; 2) Normal doorway; 3) Wide doorway.	- While approaching a narrow doorway, freezers already exhibit alterations to gait (↓ step length, ↑ base of support and ↑ gait variability); - PD patients without FOG were also found to be affected by narrow doorways, suggesting that ↑ perceptual constraints may lead to gait alterations even in non-freezers.
Ashburn et al. 2008 [32]	Observational study (prospective cohort)	1. 124 PD (m-age 72 yrs, m-disease duration 16 yrs, 2-4 H&Y).	Fall diaries were used throughout 6 months to assess: 1) Location of falls; 2) Fall-related activity; 3) Perceived cause; 4) Landing; 5) Consequences.	- 80% of falls happened at home, with tripping during walking the biggest single cause of falls; - More falls happened outdoors (e.g., uneven surfaces, unanticipated trip hazards, difficult maneuvers) than in the bathroom, hallway or on the stairs.
Cole et al. 2011 [33]	Experimental study	1. 49 PD (33M, 16F; m-age 66.4 yrs, m-disease duration 5.4 yrs, m-H&Y 1.8, m-UPDRS total 31.8). 2. 32 aged-matched Controls (19M, 13F).	Gait was assessed while walking along two surfaces: 1) Firm surface; 2) Foam surface; 12-Month prospective follow-up.	- PD fallers adapted differently to walking on a foam surface; - The risk of falling for PD patients may be increased on less stable surfaces.
Cowie et al. 2010 [47]	Experimental study	1. 10 PD (10M; m-age 68.3 yrs; m-disease duration 14.5 yrs; m-UPDRS part III motor score: "off" 26.3, "on" 14.8; m-FOG-Q 13.6). 2. 10 matched Controls (10M; m-age 68.4 yrs).	Kinematics were measured under four doorway conditions: 1) No door; 2) Narrow door; 3) Medium door; 4) Wide door width.	- A variety of abnormal walking responses to doorways were identified in people with PD who regularly experience FOG, with the disturbances ↑ as door width ↓.
Cowie et al. 2011 [49]	Experimental study	1. 10 PD (8M, 2F; m-age 59.8 yrs; m-disease duration 14.6 yrs; m-time of implanted electrodes 4.02 yrs). 2. 10 matched Controls (8M, 2F; m-age 62.8 yrs).	Gait was assessed while walking under four doorway conditions: 1) No door; 2) Narrow door; 3) Medium door; 4) Wide door width.	- PD walking velocity ↓ at doorways by an amount inversely proportional to door width; - The risk of freezing is highly sensitive to door width.
Ehgoetz et al. 2013 [56]	Experimental study	1. 19 PD (15M, 4F; m-age 74 yrs; m-UPDRS part III 34; confirmed to experience FOG).	Gait was assessed while walking in the dark through a door under three doorway conditions: 1) Complete darkness; 2) Door frame illuminated; 3) Both the door and limbs illuminated. Two conditions of walking away from the doorway were also included: 4) Into open space in complete darkness; 5) Into open space with the limbs illuminated.	- FOG episodes were experienced by 53% of all participants for a total of 151 episodes; - The greatest number of FOG episodes occurred while approaching the door frame in complete darkness; FOG occurrences were reduced by 38% when walking toward the doorway with only the door frame illuminated; FOG occurrences where further reduced by an additional 25% when limb position was illuminated; - The amount of FOG was significantly different between conditions 1) and 4) ($p = 0.016$), with FOG occurrences being four times more often when walking toward the door frame in complete darkness, than walking into open space in complete darkness.
Gál et al. 2019 [58]	Experimental study	1. 32 PD (22M, 10F; m-age 65.4 yrs; m-disease duration 13.5 yrs; m-H&Y 2.5; m-UPDRS: Total 64.3, Part III 27.9; presence of FOG)	Gait was assessed while walking on six different floor patterns: 1) No pattern; 2) Real 50x50cm transverse regular chessboard; 3) Virtual 50x50cm transverse	- There were significant differences in time ($p = 0.016$) and gait speed ($p = 0.0024$) in favor of the reference virtual pattern, compared with the real pattern; There were significant differences in time ($p = 0.0092$), gait speed ($p = 0.007$), number of steps ($p = 0.0008$), and step length ($p = 0.0033$) in

			regular chessboard [reference pattern]; 4) Virtual 5x5cm transverse regular chessboard; 5) Virtual 50x50cm diagonal regular black-and-white floor stones; 6) Irregular virtual pattern. A subjective evaluation of floor patterns was performed by PD patients.	favor of the reference pattern, compared with diagonal floor stones; There were no differences between walking on small and large floor patterns; There was a significantly increased step length ($p = 0.0395$) when walking on the reference virtual pattern, compared with the irregular virtual pattern; - There were only significant differences of the patients' evaluation of floor patterns in favor of the reference virtual pattern compared with the irregular ($p = 0.0066$) or no pattern ($p = 0.0136$) - There were no differences between the six floor patterns regarding the number of FOG episodes and total FOG episodes duration.
Galna et al. 2013 [13]	Experimental study	1. 20 PD (16M, 4F; m-age 65.6 yrs, I-III H&Y, m-UPDRS III 12.6, m-MMSE 28.1). 2. 20 healthy controls (16M, 4F; m-age 65.3 yrs).	CoM analysis was made while walking along each of two conditions: 1) Level-ground; 2) Obstacle crossing.	- Some people with PD walk with greater and faster mediolateral CoM sway than control participants, especially when walking over obstacles; - Environmental hazards (e.g., ground-based obstacles), may ↑ postural instability in people with PD.
Gazibara et al. 2014 [35]	Observational study (cross-sectional)	1. 180 PD (105M, 75F; range age 22-83 yrs; M-age (yrs): indoor fallers 64.6, outdoor fallers 60.5; M-disease duration (yrs): indoor fallers 8.5, outdoor fallers 7.7; M-UPDRS parts I-IV total: indoor fallers 80.9, outdoor fallers 73.8).	Characteristics of the most recent fall were collected through interviews with people with PD and/or caregivers: 1) Location; 2) Time of day/type of light/footwear; 3) Circumstance; 4) Needing of assistance/injury.	- Slightly > frequency of outdoor falls was found compared with indoor falls (57.2% vs. 47.8%) among persons with PD; - Outdoor falls were almost 8x > likely caused by extrinsic factor (e.g., tripping while walking over a curb or an object on the ground), while indoor falls were approximately 5x > likely caused by intrinsic factors.
Gazibara et al. 2016 [36]	Observational study (prospective cohort)	1. 120 PD (80M, 40F; m-age 60 yrs, m-disease duration 4.9 yrs, m-levodopa dosage 650.0, m-H&Y 2).	Fall events and characteristics were studied after 1 year follow-up: 1) Location; 2) Time of day/footwear; 3) Circumstance; 4) Needing of assistance/injury.	- Indoor falls were > common compared with outdoor falls (61.34% vs. 38.66%). Outdoor falls were > preceded by the extrinsic factors – tripping (19.6%) and slipping (37%), and slipping was a predictor of outdoor falls (OR 17.25; $p = 0.001$).
Giladi et al. 1992 [41]	Observational study (case-control)	1. 990 PD (318 with MB; m-age of disease onset: group without MB – 57.9 yrs, MB group – 58.4 yrs; m-disease duration: group without MB – 5.0 yrs, MB group – 8.3 yrs; m-H&Y score: group without MB – 2.1, MB group – 3.1).	Is was assessed: 1) Motor Blocks (MB); 2) Type of MB.	- Blocking in narrow spaces (e.g., at doorway) was the third most common type of MB (25%), only preceded by start hesitation (86%) and blocking on turning (45%).
Gray et al. 2000 [31]	Observational study (prospective cohort)	1. 118 PD (73M, 45F; m-disease duration 5-10 yrs, m-H&Y 2.5).	Fall diaries were used throughout 12 weeks to assess fall related characteristics; Interviews were conducted 12 weeks later.	- The use of stairs and type of residence did not appear to be linked to an ↑ risk of falling. At the time of the falls, the > common activity reported was walking (54%) and the > common fall location was on carpet; - Being in confined spaces was associated with 36% of falls reported.
Haak et al. 2013 [63]	Observational study (cross-sectional)	1. 20 PD (5M, 15F; m-age 82 yrs, range 76-90 years). 2. 60 Controls (15M, 45F; m-age 82 yrs, range 76-91 yrs).	It was assessed during a structured interview in the home environment: 1) Technical aids; 2) Housing adaptations.	- Very old people with self-reported PD use significantly more aids for personal mobility than very old people in general (55% vs. 30%), including having a significant perceived unmet need for aids intended for personal care and protection (20% vs. 3%). Significantly > participants in the PD sample reported having had a housing adaptation in the hygiene area (20% vs. 3%).
Jonasson et al. 2015 [40]	Observational study (cross-sectional)	1. 241 PD (148M, 93F; m-age 70 yrs, m-disease duration 8 yrs, m-H&Y stage 3, m-UPDRS III 30).	It was assessed through questionnaires, interviews and clinical assessments: 1) Concerns about falling; 2) Explanatory factors of concerns about falling.	- Walking difficulties in daily life was by far the strongest individual explanatory factor for concerns about falling in people with PD; - None of the studied environmental factors (e.g., housing type, residential area) significantly explained concerns about falling in people with PD.
Jones et al. 2008 [37]	Observational study (cross-sectional)	1. 20 PD (12M, 8F; m-age 65 yrs, m-disease duration 10 yrs, 1-4 H&Y).	It was assessed during a semi-structured interview: 1) Walking challenges; 2) and Walking strategies.	- Challenges were ↑ in busy environments outdoors (e.g., crowded places), but also indoors (e.g., by doorways, furniture, stairs or exiting the bath). Cues were used to start and maintain stepping and overcoming FOG; - Fear of falling was reported outside (e.g., loss of confidence, having to stop suddenly/to hurry) and around the home (e.g., confined spaces/steps/stairs).

Kataoka et al. 2011 [50]	Experimental study	1. 30 PD (14M, 16F; m-age 68.3 yrs; m-disease duration 85.4 months; 3 H&Y; Fallers: 15, non-Fallers: 15).	Information on falling was collected and gait was assessed using a suddenly narrowed path.	- Gait variability occurred before arrival at a narrowed path, as well as in confined spaces, in patients with Hoehn-Yahr stage III PD.
Kataoka et al. 2012 [54]	Experimental study	1. 1 PD (1F; 65 yrs; 3 H&Y; Faller from the previous study [50]).	Gait was assessed under two circumstances: 1) Suddenly narrowed path; 2) Straightly narrowed path	- Slow gait freezing was evident while walking on a suddenly narrowed path; Gait time and step number significantly decreased while walking on a straightly narrowed path; - Gait variability decreased markedly before entering the straightly narrowed path (where a narrow entrance is absent), compared to the suddenly narrowed path.
Kataoka et al. 2018 [55]	Observational study (prospective cohort)	1. 26 PD (m-age 67.2 yrs, m-disease duration 87.1 months, 3 H&Y)	Patients were prospectively studied for six years, aiming to evaluate the disease progression. Gait was assessed under two circumstances: 1) Suddenly narrowed path; 2) Straightly narrowed path.	- The number of steps on the suddenly narrowed path was significantly higher than that on the straightly narrowed path at the time of final follow-up in the 26 patients ($p < 0.001$). - The magnitude of significance on the straightly narrowed path was smaller ($p = 0.003$) than that on the suddenly narrowed path ($p = 0.009$). - The number of steps on the suddenly narrowed path were related to the increase in the H&Y stage.
Lamont et al. 2012 [60]	Observational study (cross-sectional)	1. 18 PD (m-age 67 yrs, m-disease duration 10.3 yrs). 2. 22 Partners (m-age 65.4 yrs).	To understand the facilitators and the barriers to walking in the community perceived by people with PD, focus groups were used: 1) Internal factors; 2) External factors.	- External environmental factors were > frequently perceived to limit community walking than internal personal factors (e.g., characteristics of the walking surface, ↓ or fluctuating lighting). Only signalled pedestrian crossings were described as a facilitator to community walking.
Lebold et al. 2010 [48]	Experimental study	1. 31 PD (23M, 8F; FOG group: 13M and 2F, m-age 72.4 yrs, m-disease duration 9.07 yrs, UPDRS part III 32.8; Non-FOG group: 10M and 6F, m-age 72.19 yrs, m-disease duration 5.97 yrs, m-UPDRS part III 28.81). 2. 16 matched Controls (6M, 10F; m-age 70.75 yrs).	Gait was assessed under three narrowed doorway randomized conditions for five trials each: 1) Baseline narrowed doorway; 2) Ground lines; 3) Laser condition.	- When walking through a narrowed doorway, PD individuals gait parameters differed from those seen in healthy control participants (PD: ↓ velocity, ↓ step length, ↑ step time coefficient of variation, ↑ step length variability, ↑ double support time, especially in the PD FOG-group).
Lee et al. 1999 [42]	Observational study (cross-sectional)	1. 197 PD (104M, 93F; m-age 65.6 yrs, m-disease duration 10 yrs). 2. 43 RA (m-age 54.5 yrs). 3. 69 Controls (28M, 41F; m-age 64.1 yrs).	Is was assessed trough questionnaires: 1) Perceptual changes in vision; 2) Space and movement-related changes; 3) Changes in body image.	- 50% of PD individuals reported problems with judging the space between objects ($p = 0.001$) and 46% of PD individuals reported to have problems reaching for objects ($p < 0.0001$). 70% of PD individuals reported to have problems walking through narrow spaces within the home ($p < 0.0001$).
Mak et al. 2013 [53]	Experimental study	1. 15 PD (8M, 7F; m-age 63.0 yrs, m-disease duration 7.7 yrs, 2.1 H&Y). 2. 13 healthy controls (4M, 9F; m-age 60.0 yrs).	Gait was analyzed while walking: 1) At their natural pace; 2) While doing a cognitive task; 3) Doing the same cognitive task with the addition of traffic lights signals.	- When traffic lights were given as audio-visual cues, individuals with PD walked with significant ↑ stride length (by 8.8 cm; ↑ 8.8%), cadence (by 9.5 step/min; ↑ 9.6%), and gait velocity (by 17.1 cm/s; ↑ 21.0%) (all $p < 0.001$).
Nieuwboer et al. 2001 [43]	Experimental study	1. 14 PD (9M, 5F; m-age 64.5 yrs, m-disease duration 12.78 yrs; m-UPDRS part III: "on" – 18.35, "off" – 30.29; m-H&Y stage: "on" – 2.61, "off" – 3.71).	Gait was assessed under three conditions: 1) Normal; 2) Stop; 3) Block condition.	- In half of individuals, the confrontation with visual stimuli suggesting a limited space (e.g., narrow walkway) or a change of direction (e.g., randomly placed obstacle course) produced FOG.
Nieuwboer et al. 2004 [45]	Experimental study	1. 11 PD (6M, 5F; m-age 64.8 yrs, m-disease duration 13.5 yrs; m-UPDRS part III: "on" – 16, "off" – 29; m-H&Y stage 4).	Gait was assessed under three conditions: 1) Normal; 2) Stop; 3) Freezing condition.	- More than half of patients (n=6; 54.5%) froze when exposed to freezing-provoking circumstances (approaching obstacles, e.g., narrow walkway or obstacle course).
Nilsson et al. 2012 [39]	Observational study (cross-sectional)	1. 154 PD (92M, 62F; m-age 70 yrs; m-disease duration 6 yrs).	The impact of motor/non-motor/demographic factors on fear of falling was assessed.	- The strongest contributing factor to fear of falling was walking difficulties, among which climbing stairs seem to be of particular importance.

Nilsson et al. 2013 [61]	Observational study (cross-sectional)	1. 20 PD (5M, 15F; m-age 82 yrs, range 76-90 yrs). 2. 60 Controls (15M, 45F; m-age 82 yrs, range 76-91 yrs).	Through structured interviews, self-ratings, and housing observation using Activities of Daily Living (ADL) Staircase, the following data was collected: 1) Aspects of housing; 2) Aspects of health.	- Very old people with self-reported PD live in housing with > accessibility problems and experience < usability of their home than matched controls; - Very old people with self-reported PD are < independent in ADL, have > functional limitations, and are > dependent on walking aids.
Oates et al. 2013 [52]	Experimental study	1. 8 PD (m-age 66.0 yrs, H&Y range 1-3, UPDRS III range 7-44). 2. 10 Controls (m-age 65.4 yrs).	Gait kinetics were collected while walking on a slippery surface under 3 conditions: 1) Unexpected slip perturbation during Gait Termination (GT); 2) Planned slip perturbation during GT; 3) Slip perturbation cued one step prior to GT.	- When walking on a slippery surface, PD individuals had their walking speed and step parameters affected in all conditions, and also stability when cued to stop within one step.
Pretzer-Aboff et al. 2009 [59]	Observational study (cross-sectional)	1. 3 PD. 2. 7 Caregivers (3 formal, 4 informal).	Barriers and Facilitators to Optimizing Function were assessed through interviews.	- Environmental interventions (e.g., the use of safety bars/shower benches/lift chairs/raised beds and seats) were described as fostering independence, sense of security and safety, and improving mobility among people with PD; - Small spaces, clutter, and stairs were reported to ↓ their mobility.
Rahman et al. 2008 [16]	Observational study (cross-sectional)	1. 130 PD (84M, 46F, m-age 66.7 yrs, m-disease duration 12.1 yrs, m-H&Y stage 2.63).	FOG was assessed: 1) Gait and falls questionnaire (GFQ); 2) Factors that induce FOG; 3) Factors that ameliorate FOG.	- Being in a confined space (53.1%), being in a stressful situation (53.1%), walking in a narrow space (49.2%), going through doorways (43.8%), crossing roads (30.8%) and bright lights (11.5%) were some of the factors that induced FOG; Climbing stairs was reported by > 40% of the sample to improve walking and overcome FOG. - Visual cues were reported to be useful for gait improvement by more than 30% of the sample (e.g., following lines on the floor [24.6%] or walking over the edges of tiles/paving stones [20.8%]).
Rahman et al. 2011 [38]	Observational study (cross-sectional)	1. 130 PD (84M, 46F, m-age 66.7 yrs, m-disease duration 12.1 yrs; m-self rated H&Y stage 2.63; m-CoF score 26.9 (± 7.90); m-FES score 38.0 (± 24.8); m-SAFFE score 10.2 (± 6.95)).	Is was assessed: 1) FES, CoF, and SAFFE scales (used to identify characteristics of fear of falling and assess its impact on quality of life).	- Some activities are avoided by PD patients as a consequence of fear of falling (e.g., going out when it is slippery [72.3%], going to a place with crowds [64.6%], reaching for something above head level [48.5%], bend down [40.8%], going up and down stairs [33.8%], and taking a shower [33.1%]).
Schaafsma et al. 2003 [44]	Experimental study	1. 19 PD (12M, 7F; m-age 63 yrs, m-disease duration 12 yrs; m-UPDRS total: "on" – 27; m-UPDRS part III: "on" – 10, "off" – 23; m-H&Y stage: "on" – 3; "off" – 3).	Is was assessed in a gait laboratory: 1) Type of FOG; 2) Duration; 3) Clinical manifestations.	- During "off" states, FOG was elicited by walking through narrow spaces (12%) (*versus* 2% during "on" states [$p < 0.011$]).
Slaug et al. 2013 [62]	Observational study (cross-sectional)	1. 20 PD (5M, 15F; m-age 82 yrs, range 76-90 yrs). 2. 60 Controls (15M, 45F; m-age 82 yrs, range 76-91 yrs).	Using a version of the Housing Enabler instrument, data regarding person-environment (P-E) fit was collected: 1) personal component of P-E fit (functional limitations and use of mobility devices); 2) environmental component of P-E fit (physical environmental barriers); 3) P-E fit (accessibility) problems.	- Very old people with self-reported PD have > functional limitations and are > dependent on mobility devices than old people in general; - Very old people with self-reported PD live in housing with > accessibility problems than old people in general. The top 10 environmental barriers that generated the most accessibility problems were: wall-mounted cupboards and shelves placed extremely high (kitchen), no/few seating places (exterior surroundings), no grab bars at shower/bath and/or toilet (hygiene area), high kerbs and uneven surfaces outdoors (exterior surroundings), bathtub (hygiene area), high thresholds and/or steps (entrance), no handrails (entrance), inadequate shelter from weather in passenger unloading zone (exterior surroundings), and insufficient maneuvering areas (kitchen/laundry room).
Stack et al. 1999 [30]	Observational study (cross-sectional)	1. 55 PD (27M, 28F; m-age 71.5 yrs, m-disease duration 3.6 yrs, m-H&Y III).	Is was assessed: 1) Process of falling/nearly falling; 2) Location; 3) Landing; 4) Activity; 5) Frequency; 6) Avoidance.	- Tripping was mentioned more often than any other process leading to a fall or near-miss, including tripping over steps, kerbs, skirting boards and on paths and carpets. - The majority of falls described occurred in fallers' homes with steps and doorways identified as particular difficulties.

Stack et al. 2013 [34]	Observational study (cross-sectional)	1. 136 PD (86M, 50F; age range 54-91 yrs, m-disease duration 8 yrs; fallers: 19 single fallers, 86 repeat fallers and 31 very frequent fallers).	To survey falls beyond home the following data was assessed through questionnaires: 1) Location; 2) Activity; 3) Perceptive cause; 4) Landing; 5) Consequence.	- Most falls beyond home occurred in streets or car parks (38%), or in or at the entrance of unfamiliar buildings (35%) – over half the falls occurred during walking (52%). - Tripping after unwanted contact with the ground or other hazard dominated the sudden causes of falling (24%).
Stegemöller et al. 2012 [51]	Experimental study	1. 10 PD (m-age 62.0 yrs, m-disease duration 11 yrs, 2.4 H&Y). 2. 10 age- and sex- matched HOA.	Gait kinematics and kinetics were collected under two circumstances: 1) Normal walking; 2) Obstacle crossing.	- The ↓ walking ability in people with PD is amplified in instances where an obstacle must be negotiated (a more conservative strategy may be adopted by PD individuals when stepping over an obstacle, further ↑ the risk of falling).

↑, Increase; ↓, Decrease; >, More; <, Less; ~, Approximately; ADL, Activities of daily living; CoM, Center of mass; CoF, Perceived consequences of falling scale; F, Female; FOG, Freezing of gait; FES, Perceived self-efficacy in performing a range of activities scale; GT, Gait termination; HOA, Healthy older adults; H&Y score, Hoehn and Yahr score; M, Male; m-, mean; MB, Motor blocks; PD, Parkinson's disease; P-E fit, Person-environment fit; PCI, Phase coordination index; RA, Rheumatoid arthritis; SAFFE, Activity avoidance scale; UPDRS, Unified Parkinson's Disease Rating Scale; Yrs, Years.