1st July 2025

STIMULATION AND SAFETY LEVELS IN LIVING ENVIRONMENTS OF OLDER PEOPLE: WEIGHTING OF ITEMS WITH INTERDISCIPLINARY EXPERTS IN AGEING

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Workshop – Housing and Living Conditions of Ageing Populations

INTRODUCTION

CONTEXT

WHO (2020). UN Decade of Healthy Ageing: Plan of Action 2021–2030. ; Gobbens et al (2018). *The Gerontologist*. 58(1):101–10.

LIVING ENVIRONMENT AND SAFETY

Lee HS (2022). *Landscape and Urban Planning*. 227:104545. ; Brookfield et al (2015). *Building Research & Information*. 43(5):616–30.

Meghani et al (2023). *PLoS One*. 18(11):e0294715., Chen X et al (2022). *Social Science & Medicine*. 1;292:114560

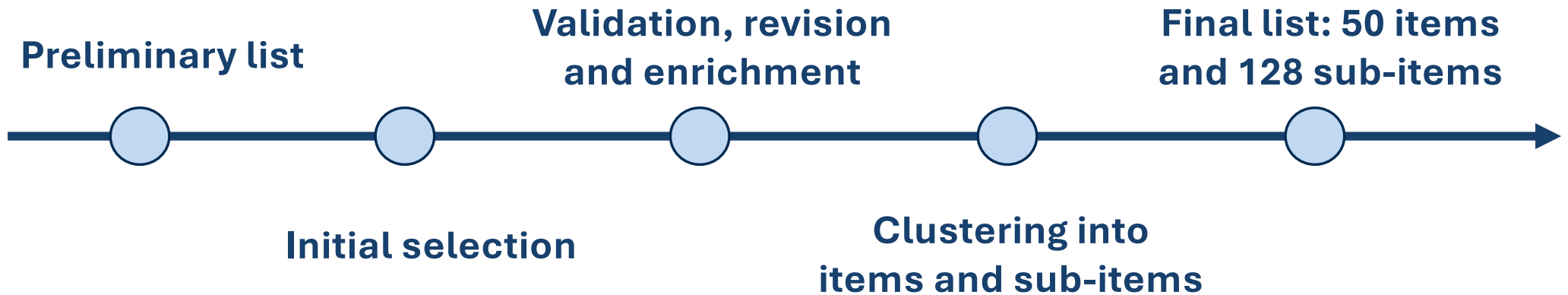**HabitAge project**

Develop a criteria scoring system

i.   **Physical stimulation**

i.   **Cognitive stimulation**

i.   **Safety**

EXPERTS

METHODOLOGY

METHODOLOGY – ITEMS SELECTION

Preliminary list

Validation, revision and enrichment

Final list: 50 items and 128 sub-items

Initial selection

Clustering into items and sub-items

METHODOLOGY – ITEMS SELECTION

Items		Sub-items	
Index	**Name**	**Index**	**Name**
BI	Shops and public places within 500m of the dwelling	1	A grocery or supermarket
		2	A sport or leisure facility (e.g.: swimming pool, tennis court, golf court, fitness room, bingo, bridge, etc.)
		3	A meeting place (e.g.: cafe, restaurant, village hall, square with benches, library, place of worship, dwelling of a member of your family, etc.)
		4	A park or other place offering a link with nature

Table 1: Examples of Items and Sub-items

EXPERTS

METHODOLOGY – DATA COLLECTION

First phase:
- ✓ Assessment of the 50 items according to their importance for the 3 domains
- ✓ Likert scale / 0 to 10
- ✓ Semi-structured interviews

Second phase:
- ✓ Assessment of the extent to which the 128 sub-items increased or decreased the 3 domains
- ✓ Likert scale / -5 to +5
- ✓ Self-administered questionnaire

Complement to second phase:
- ✓ Choice of the type of influence : "beneficial" - "harmful" - "dependent on older adult's profile" - "not relevant"

MIXED METHOD APPROACH

METHODOLOGY – DATA ANALYSIS

QUANTITATIVE APPROACH

✓ Final score: Median score Phase 1 * Median score Phase 2

✓ Agreement in Phase 1: MAD <2.5

✓ Agreement in Phase 2:

Increasing (score >0)	Decreasing (score <0)	Neutral (score =0)
% of experts	% of experts	% of experts

Table 2: Categorisation of agreement in Phase 2

   o Agreement if one category ≥ 75%

✓ Reliability: Intraclass Correlation Coefficient (ICC), ≥0.70 indicating a good reliability

Leys C et al (2013). *Journal of Experimental Social Psychology*.49(4):764–6 ; De Vet HCW et al (2011). *New York: Cambridge University Pr*ess.

METHODOLOGY – DATA ANALYSIS

QUALITATIVE APPROACH

✓ Semi-structured interviews

✓ Transcription (Transkriptor) and categorisation (Nvivo)

✓ Analysis of the disagreement in Phase 1 (MAD ≥2.5)

✓ Analysis of the individual cases of disagreement in Phase 1 (+/- 4 points)

Median score of the item	Score expert 1	Score expert 2	Score expert 3	Score expert 4	Score expert 5	Score expert 6	Score expert 7	Score expert 8	Score expert 9	Score expert 10	Score expert 11	Score expert 12	Score expert 13
8	4	8	3	8	8	8	5	5	9	10	8	10	3

RESULTS & DISCUSSION

HIGHEST SCORES OF IMPORTANCE – PHASE 1

SAFETY

50%

25 out of 50 items

(e.g.: obstacles in the neighbourhood)

PHYSICAL STIMULATION

38%

19 out of 50 items

(e.g.: typology of the dwelling)

COGNITIVE STIMULATION

12%

6 out of 50 items

(e.g.: shops and public places within 500m of the dwelling)

AGREEMENT – PHASE 1

COGNITIVE STIMULATION

24% in disagreement

(MAD ≥ 2.5)

PHYSICAL STIMULATION

24% in disagreement

(MAD ≥ 2.5)

SAFETY

14% in disagreement

(MAD ≥ 2.5)

AGREEMENT – PHASE 1

COGNITIVE STIMULATION

24% in disagreement

(MAD ≥ 2.5)

PHYSICAL STIMULATION

24% in disagreement

(MAD ≥ 2.5)

SAFETY

14% in disagreement

(MAD ≥ 2.5)

Case study: *"The expert provided a justification that differed from those of the other experts"*

Item: "Home Automation elements related to safety" (median:6, MAD:3)

Use of devices

Attentional functions

Visuospatials functions

Not related

Related only to safety

6 experts : no justification provided

AGREEMENT – PHASE 1

COGNITIVE STIMULATION

89% items with outliers (for MAD <2.5)

SAFETY

86% items with outliers (for MAD <2.5)

PHYSICAL STIMULATION

84% items with outliers (for MAD <2.5)

AGREEMENT – PHASE 1

COGNITIVE STIMULATION

89% items with outliers (for MAD <2.5)

SAFETY

86% items with outliers (for MAD <2.5)

PHYSICAL STIMULATION

84% items with outliers (for MAD <2.5)

Case study: *"Same justification but different way of rating than the other experts "*

Item: "Luminosity of the dwelling " (median: 9, MAD: 1)

"The better it is lit, adapted,... I would almost say that we should carry out lighting studies […] and reimbursed [them] to people so that they don't fall over themselves in their flat because there is a shadowy area that they haven't spotted, so it seems obvious" (**score of 10**)

« That, I think, is really a safety factor » (**score of 5**)

PHYSICAL STIMULATION AND SAFETY

"Physical and cognitive limitations often accompany aging, increasing the importance of a safe and supportive environment to help older adults maintain mobility. Neighborhood design and maintenance must be evaluated to promote physical activity, mobility, and safety » *(Perez et al, 2016, p.13)*

34% of sub-items
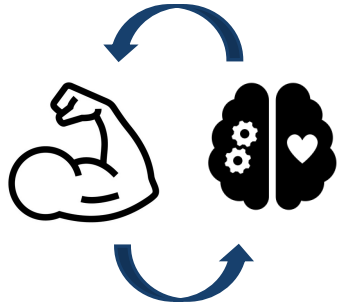
increasing both physical stimulation and safety

Grab bars in bathroom
Grab bars in circulation

Acess to different services and facilities
Sufficient number of pavements

Perez et al (2015). *J Gerontol Nurs*. 41(3):13-21.; Van Cauwenberg et al (2014). *J Aging Phys Act*. 22(4):508-17;Brookfield et al (2015). *Building Research & Information*. 43(5):616-30; Golovchanova (2022). *Nordic Journal of Criminology*. 23(1):44-60

PHYSICAL STIMULATION AND COGNITIVE STIMULATION

52% of sub-items increasing both physical stimulation and cognitive stimulation

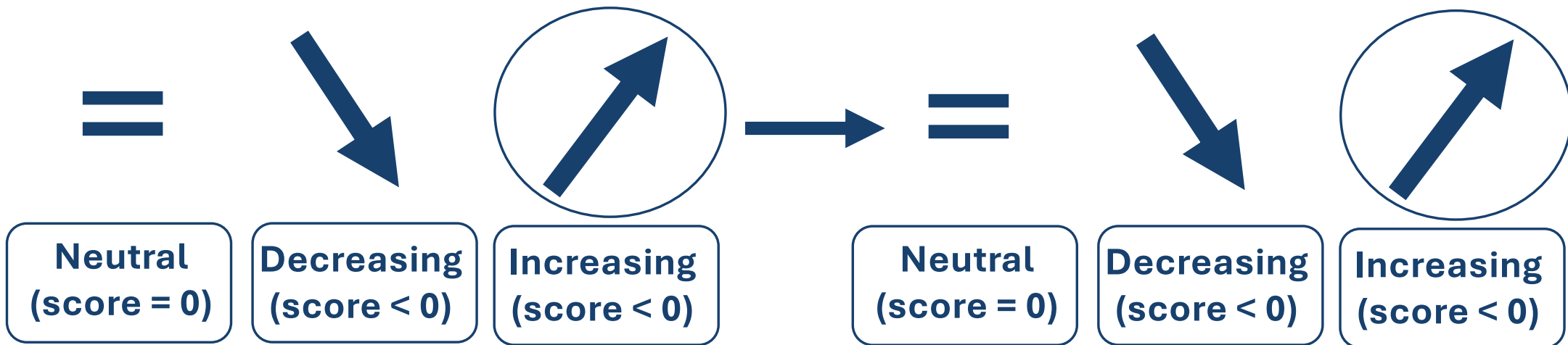Shops
Sports and recreational facilities
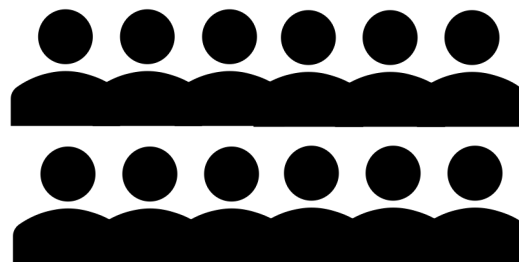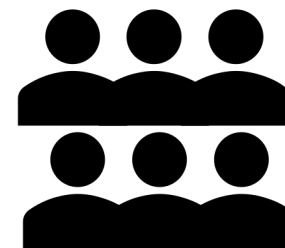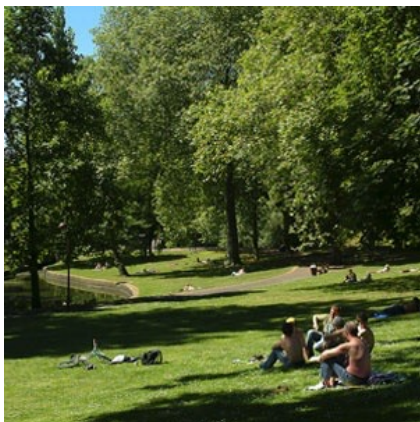Meeting places
Bus, tram or metro stops
Train stations

Krivanek et al (2021). *J Alzheimers Dis*. 81(3): 871-920; Cheval et al (2020). Health Psychol. 39(6):519-29; Wood et al (2022). J Urban Health. 99(3):427-56; Twardzik et al (2023). BMC Geriatrics. 23(1):596; Chiatti et al (2017). Journal of Transport & Health. 7:218-26; Rambaldini-Gooding et al (2021). Transport Reviews. 41(5):600-16

PHASE 2

SCORES

75% OF AGREEMENT
(42-77 sub-items)

=	↘	↗	→	**=**	↘	↗

Neutral (score = 0)	Decreasing (score < 0)	Increasing (score < 0)	Neutral (score = 0)	Decreasing (score < 0)	Increasing (score < 0)

Bonaccorsi et al (2020). *Int J Environ Res Public Health*. 17(17):6127; Meghani et al (2018). *PLoS One*. 18(11):e0294715; Brookfield et al (2015). *Building Research & Information*. 43(5):616-30; Afacan (2019). *J Hous and the Built Environ*. 34(2):619-42; Abe et al (2020). *BMJ Open*. 10 (3): e033338

Chen et al (2022). *Social Science & Medicine*. 292:114560; Lentoor (2024). Explor Neuroprot Ther. 251-72.

Montero-Odasso et al (2022). *Age and Ageing*. 51(9):afac205; Takahashi et al (2024). *Mayo Clinic Proceedings: Digital Health*. 2(2):259-69; O'Malley et al (2020). *Injury*. 51(6):1306-11

TYPE OF INFLUENCE

SCORES
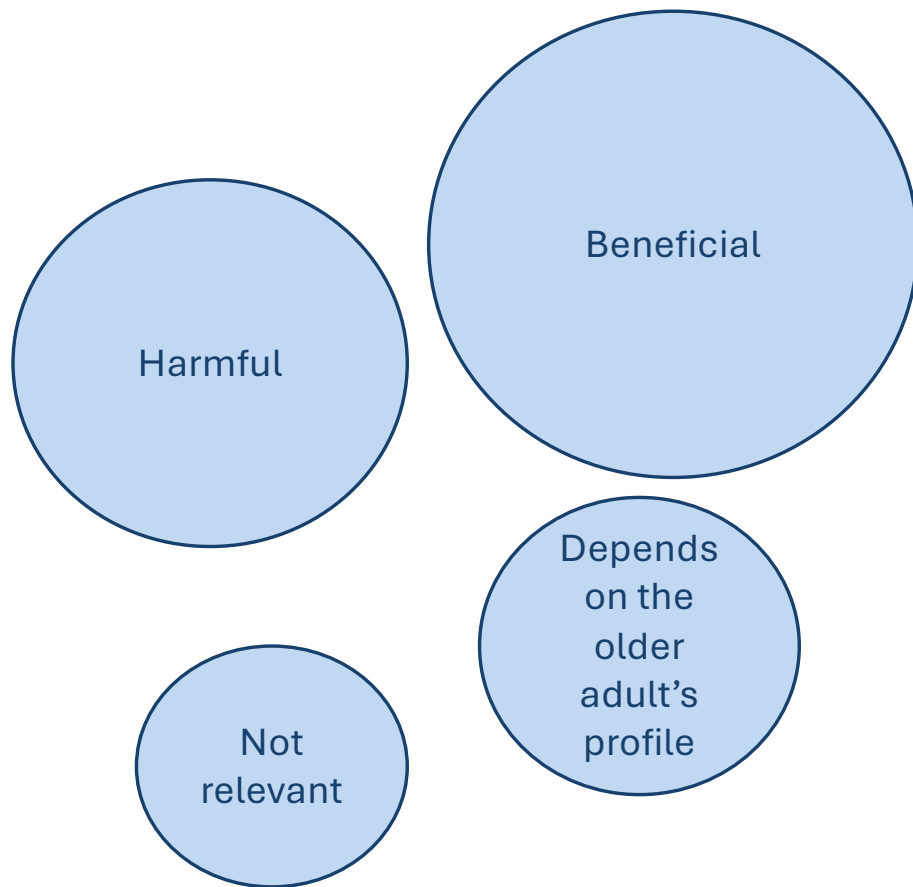
75% OF AGREEMENT
(31-61 sub-items)
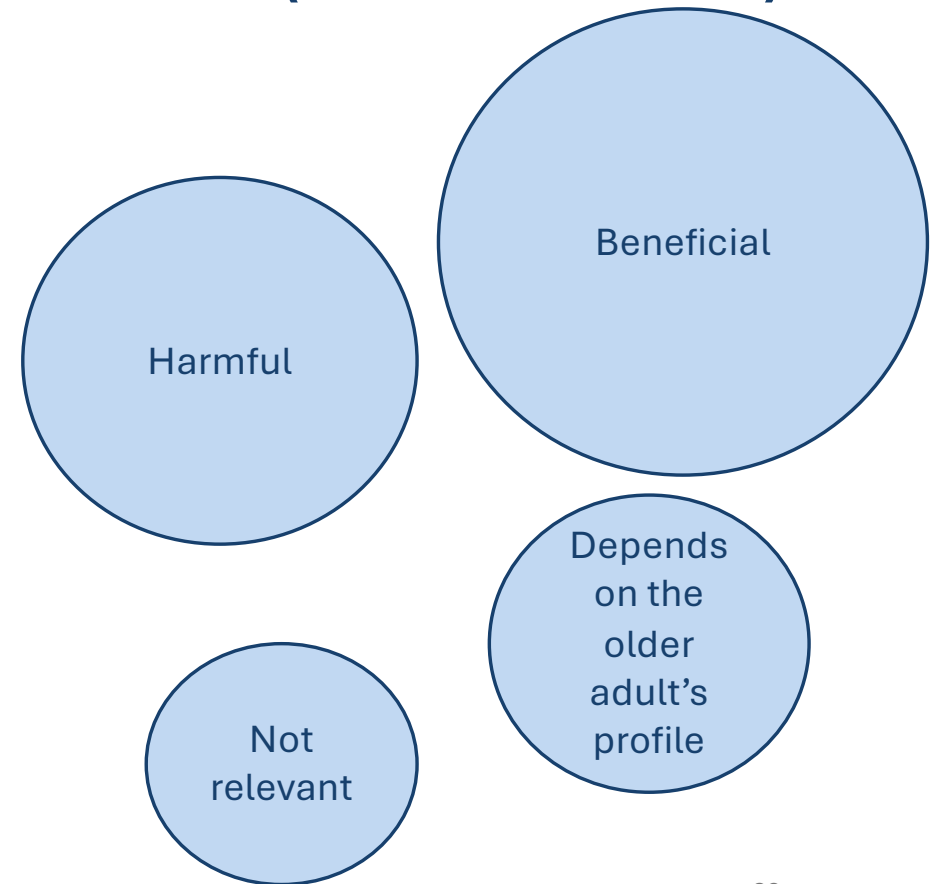
Harmful

Beneficial

Not relevant

Depends on the older adult's profile

Harmful

Beneficial

Not relevant

Depends on the older adult's profile

28
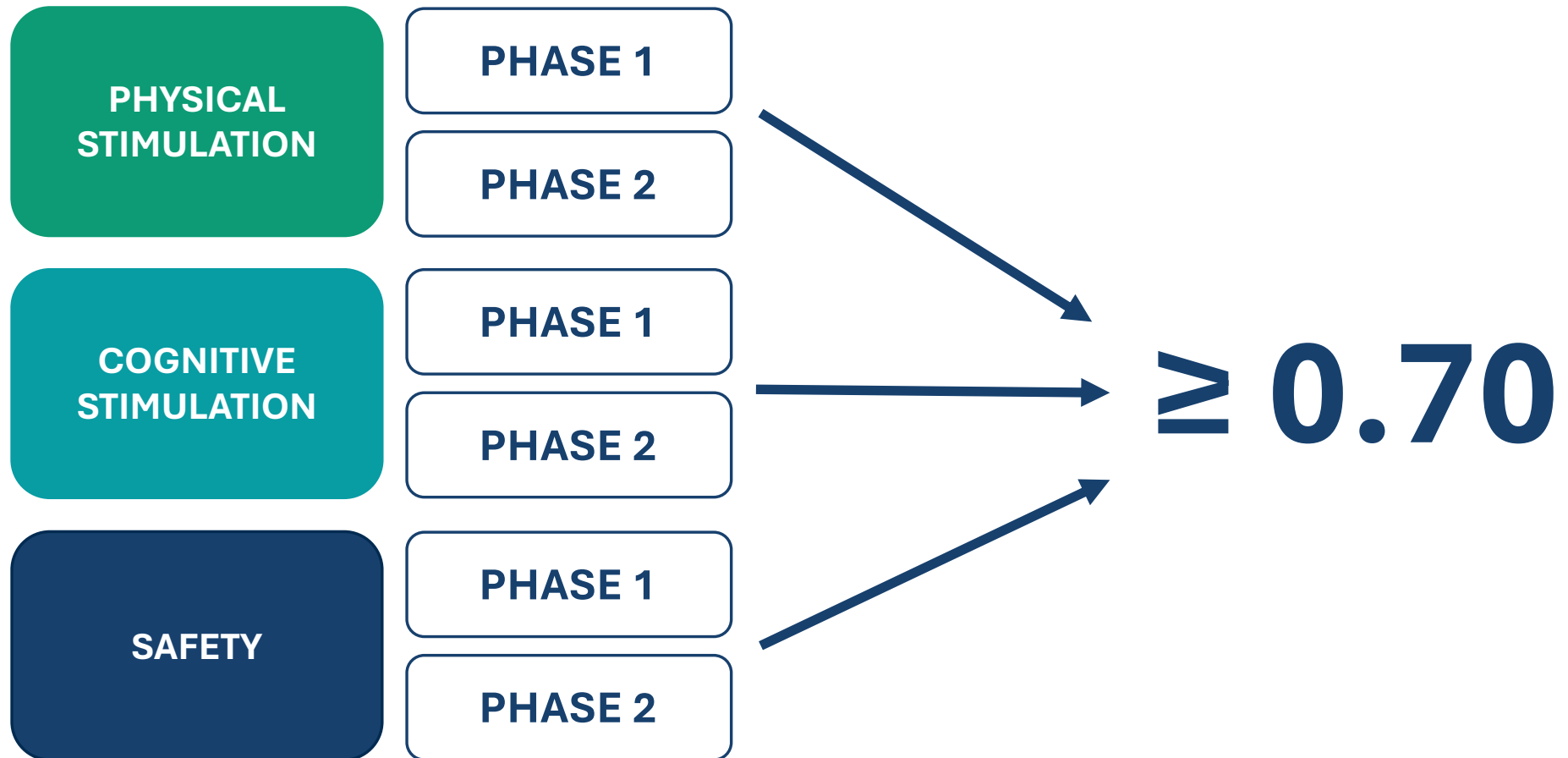
LIMITS

PHASE 2

PHYSICAL STIMULATION

COGNITIVE STIMULATION

SAFETY

128 sub-items

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