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A Move Ahead

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Appendix A

Final list with barriers and facilitators

Table A1. Final list with barriers and facilitators

Factor as a barrier/facilitator	Barriers [reference number*]	Facilitators [reference number]
Personal factors		
Health issues	Specific health deficiencies [1]; health concerns/injures [9,11]; several health problems [1]; health issues (including not the energy, overweight, illness) [5]; ear problems [7]; health concerns/injures [9]; health [21]; medical and physiologic factors (e.g., overweight, unpleasant body feelings, gout, heart conditions) [12]; characteristics of DS [2]; characteristics associated with DS [3]; adult with ID is frail [23] physical health [10]; lack of energy [11]	Being fitter and healthier as a results of physical activity [22]; improving fitness level as results of physical activity [22]; walking for health [4]; be healthy, stay fit [6]; prevention of health concerns (like obesity) [14]; because it's good for body, health and weight [20]; promotion of a healthy lifestyle [8];
Physical abilities/disabilities	Residents having physical disabilities [6]; staffs' difficulty thinking of activities that a resident in a wheelchair could pursue [6]; reduced physical skills of child [3]; adult with ID is physically disabled [23]; gap between child's motor skills and the motor skills of peers [14]; physical disability [10]; knowledge and skills by adults with ID [13]	Physical and intellectual abilities of the residents [19]; children who were determined to succeed (i.e. physical skills, coordination and cognitive ability to understand rules) [3]; skills linked to physical activity [8]
Physical comfort/discomfort	Physical discomfort [20]; being tired quickly [20]; having pain [20]; medical and physiologic factors (e.g., overweight, unpleasant body feelings, gout, heart conditions) [12]; dislike of feeling tired [20]; avoiding discomfort and stress [4]	Feeling more flexible, relaxed and energetic [20]; looking and feeling good [9]
Intellectual abilities/disabilities	Challenging nature of severe ID's [1]; residents having lower intellectual functioning [6]; residents inability to express interest in physical activity [6]; dependency on staff [20]; lack of child's independence skills [7]; need for supervision [12]; don't know how [22]	Physical and intellectual abilities of the residents [19]; children who were determined to succeed (i.e. physical skills, coordination and cognitive ability to understand rules) [3]
Age	Residents being older [6]; retirement and relaxation [20]; aging [5]; adult with id is elderly [23]; staff members not always encourage older adults with ID [20]	Adults with ID who are younger [11]
Fear person with ID	Risk of falling [20]; afraid of getting hurt [22]; feeling unsafe [4]; not feeling safe [9]; fear of falling [20]	
Challenging behavior	Challenging behaviors [1]; residents having behavioral issues [6]; negative behaviors of child [8].	Physical activity to reduce negative behaviors [6]; the emotional benefits of walking [4]
Behavioral skills	Lack of social skills of individuals with ID [24]; reduced behavioral skills of child [3]; struggles with following instructions and rules [7]	Good social skills of individuals with ID [24];service user characteristic (like greater level of alertness) [1]

Factor as a barrier/facilitator	Barriers [reference number*]	Facilitators [reference number]
Motivation, or lack thereof	Resident's lack of motivation [6]; client's mood [10]; mood, motivation of participants [5]; feeling lazy [21]; adults with ID lacked motivation [23]; child's need to understand a reason to being physical active [14]; negative attitude adults with ID [23]; lack of time [9]; too lazy [11]; lack of interest [11]; clients lack of awareness of the available options for physical activity [10]; clients' lack of understanding of the benefits of physical activity [10]	Motivation and interest of the residents [19]; good understanding that physical activity was beneficial [5]; residents' knowledge about benefits [6]
Preferences	Adults with ID prefer the sedentary activities [23]; child not wanting to engage in physical activity (e.g., do not like it, poor attitude and concentration) [12]; child prefers the sedentary activities [14]; adults with ID were unwilling to persist with physical activity [23]; leisure time choices [9]; rights and choices client [17]; dislike activity [20]; physical activity too difficult or boring [11]; too difficult, useless activity [20] residents would rather be inactive [6]; preference of participants [5]; child's dislike of physical activity and trying new things [7]; job/life concerns [9]	Levels of enjoyment [1]; enjoy activity, useful activities, [20]; learning new exercises [22]
Being rewarded		Being praised or rewarded for contribution [3]; receiving a reward for participations [20]; receive medals, win [6]; awards [9, 23]; being rewarded [12]
Social interaction		Opportunity for social interaction with peers [3]; opportunities for social connections [4]; social engagement [6]; social interaction [7]; social interaction with peers [8]; peer encouragement [8]; social factors [9]; socialization [12]; friends, wanting to belong to a sport team [14]; making friends [22]; being part of a team [23]; social contact opportunities and conditions for individuals with ID [24]; peers [20]; affiliation [23]
Routine	Residents' resistant to change establishes routines [6]; motivation for change person with ID [13]	Activity is part of their day program [20]; routine and familiarity [12];
Financial resources	Personal resources (participant income and expenditure) [15,16]; lack of money [20];	

Factor as a barrier/facilitator	Barriers [reference number*]	Facilitators [reference number]
Environmental factors		
Options for physical activity	Limited options for physical activity [15]; limited options and choices for physical activity [16]; a limited window for activity participation [1]; Lack of programs [12]	
Adapted and accessible activity, or lack thereof	Lack of adapted physical activity programs [2]; lack of accessible programs [3]; Physical activity too difficult or boring [11]; too difficult [20]; equipment is hard to use [11]; difficulty using the equipment by adults with ID [23]	Structured accessible programs adapted for DS [3]; adapted equipment for abilities [8]; short duration of activity [12]; availability of equipment [18]; having a physical activity program that is simple [6]; compatibility intervention and perceived needs [19]
Regularity, or lack thereof	Lack of regularity of the activities [5]; programs last only for one season [14]; lack of organized, structured physical activity intervention led by professionals [14]; lack of guidance (e.g., structured guidance to participate in physical activity, such as specialized programs or facilities [9]	The consistency of the program [1]; structured program [22]; regular and continuous nature of physical activity program [1]; structured accessible programs adapted for DS [3]; having a physical activity program that is well engrained into the group home system [6]
Inclusive activities, or lack thereof	Lack of programs of inclusion [2]; segregated leisure provision [17]; special needs activities [14]	Inclusive activities [14]
Competitive component	Competitive activity [14].	
Activity with fun component		Characteristics of physical activity (e.g., challenging and enjoying) [2]; familiarity with activity [5]; fun [6]; activity with fun component [7]; enjoyment of physical activity [8]; physical activity was fun and had an interesting purpose [12]; fun [22]
Staffing levels	Limited staff [6]; residential staffing (ratios) [16]; having too many persons with ID in the individual houses [1]; low staff numbers [1]; staffing options [15]; staffing level [10]; problems with staffing [5]; lack of staff [3]; lack of instructors expert at adapted physical activity [2]; lack of instructors and coaches [2]; no one to show how to exercise [11] no one to organize and go with them [12]; no one to exercise with [22]; time constraints (staff) [1,19]; lack of staff time [20]; staff did not have the time to promote physical activity [23]; time restraints [3]; level of care is time-consuming [1]	Adequate staffing [19];
Time constraints – parents	Time constrains [18]; finding time [14]	
Financial support, or lack thereof	Poor finances [1]; costs [6,14,21]; financial constraints [10]; costs too much [11]; financial limits [15]; limited financial resources [19]; residential resourcing (financial) [16]; money [9]; financial support [12]; lack of financial funding (for equipment) [23]	

Factor as a barrier/facilitator	Barriers [reference number*]	Facilitators [reference number]
Policy guidelines	Unclear policy guidelines for day service provision [15]; unclear policy guidelines for residential service provision [16]; lack of policy direction [6,23]; risk assessment issues [10]	Opinion and agenda of local policies [19]; policy guidelines of physical activity [23]
Staff interest	Carers seem to attribute greater importance to the health benefits of diet than physical activity (attitude) [13]; lack among staff of interest in physical activity [23]; caregivers reinforcing health concerns [9]; negative support (e.g., caregivers rationalized sedentary behavior) [9]; negative physical activity support [6]; living principles by staff [17]; staff members not always encourage older adults with ID [20]; lack of support from staff or relatives [23]; adults with ID not being supported to successfully engage in physical activity [23]; staff members' perceptions about the ability of persons with ID [1]	Staff members' attitudes towards physical activity [1]; adults with ID whose carers perceived more benefits of exercise for them [11]; support from others (e.g., support person's decision to be active, enthusiasm and interest in physical activity) [12]; having role models or positive encouragement from support [6]; general interest in health-related issues [19]; enthusiasm staff [6]; support from carers [5]; support from teachers [8]; including support from staff or relatives [20]; positive providers' attitude towards inclusion of individual with ID [24]; one person in the team with deeper interest and motivation for these issues [19]
Anxiety on the part of staff	The propensity for things to go wrong [1]	
Anxiety on the part of parents	Parental beliefs and worries [2]; parents being overprotective [3]; parents' fear of harassment and low sense of entitlement [24]	
Family support	Negative parental influence [17]; negative parental support [8]; lack of emphasis on the importance of physical activity by parents [18]; lack of support from staff or relatives [23]; parents sport values are (very) low [24]; negative influences of family members [6]; competing family responsibilities [3,14]; family members' schedules [14]. siblings' other needs and activities [14]; keep doing their routine [18]; parental resistance to change established routines [6]	Family; parents and siblings [2]; positive role of parents (including parents recognizing the importance of fitness, are actively involved, proactive parents [3]; supportive parents [8]; positive attitude of trustees and relatives [19]; parents' sport values are high [24]; parents' high sense of entitlement and awareness of civil rights [24]; including support from staff or relatives [20]; positive role of siblings (including assisting with engaging their sibling, sibling as positive role model) [3]; siblings involvement [14]
Community support	Lack of community support [12] classes being stopped [5]; lack of support for both child and parents [7]; lack of support and resources [1]; lack of acceptance and awareness by community [12]; community discrimination [10]; staff turnover [6]; high turnover among staff [19]; staff change their shifts a lot [5]	Warm work climate and leadership (colleagues share responsibilities) [19]; having good support and resources [1]; the encouragement of activity within the organization [1]
External research team		External course leader [19]; support from a research team [19]

Factor as a barrier/facilitator	Barriers [reference number*]	Facilitators [reference number]
Staff expertise	Overwhelming staff training [6]; lack of education staff [3]; lack of instructors expert at adapted physical activity [2]; staffs' difficulty thinking of activities that a resident in a wheelchair could pursue [6]; lack of job experience staff [6]; carers knowledge [13]; lack of staff members knowledgeable enough to work with the programs [14]; lack of skills and knowledge related to physical activity [23]	Availability of instructors expert at adapted physical activity [2]; competence and skills among staff [19]
Work routines	Work routines (e.g., finding time, other priorities) [19]; staff resistance to change established routines [6]	Work routines (collaboration between staff in neighboring residences) [19]
Societal influences	fitness centers are not assessable [11]; negative social attitude [24]; lack of understanding and knowledge about disability [24]; discrimination by peers and parents [24]; negative attitudes and exclusive behaviors of others [3]; feeling insecure in social context [20]; people might make fun of them [11]; negative providers' attitude towards inclusion of individual with ID [24]; parents fear of harassment [24]; negative social influences/behaviors of peers [8]; Lack of participation information and opportunities [24]; lack of advertised events [3]; lack of information about the physical activity opportunities for people with DS [7]	Societal influences [19]; support someone with a disability [22]; perform community services [22]; gain experience with people with ID [22]; fulfil a physical education credit [22]; trends and media messages [19]; volunteers [6]
Weather/season	Weather [6]; bad weather [20]; winter months [7,8]; weather (e.g., cold or raining) [9]; weather constraints [21]; weather condition [4]	Summer [8];
Geographical location and environment	geographical location [15]; geographical complications [7,8]; geographical location [10]; environmental factors affecting walking (hills, uneven paths) [4]; traffic and automobiles [9]; traffic [4]	Novel environment[1]; being outside [4]; accessibility to a healthy environment [19]; pleasant atmosphere [20]
Transport	Transport [5,8,11,15]; taxi constraints [20]; transportation [9,12]; lack of transportation [23]; transport difficulties [10]	Transport [7]; like to travel [6]
Having a pet		Having a house pet [6]

* Reference numbers correspond with the study number in Table 3.1.

Appendix B

Item Information Functions

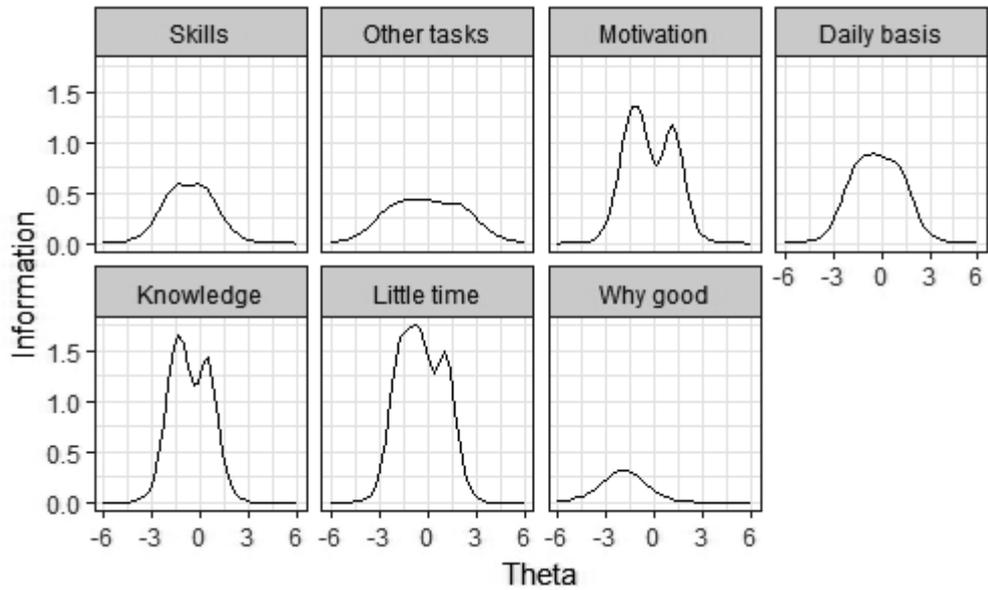


Figure B1. Item Information Function per item in the Capability scale

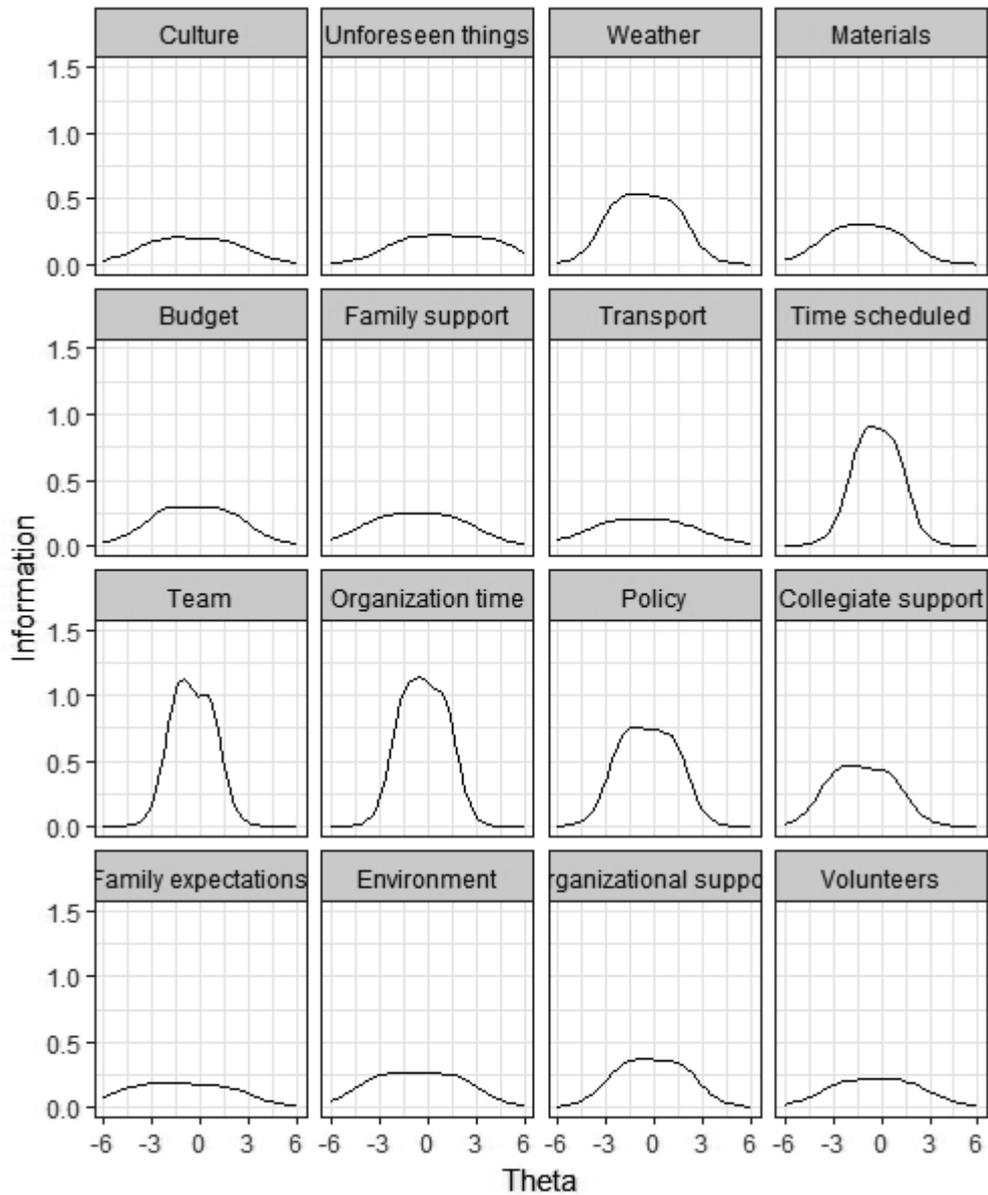


Figure B2. Item Information Function per item in the Opportunity scale

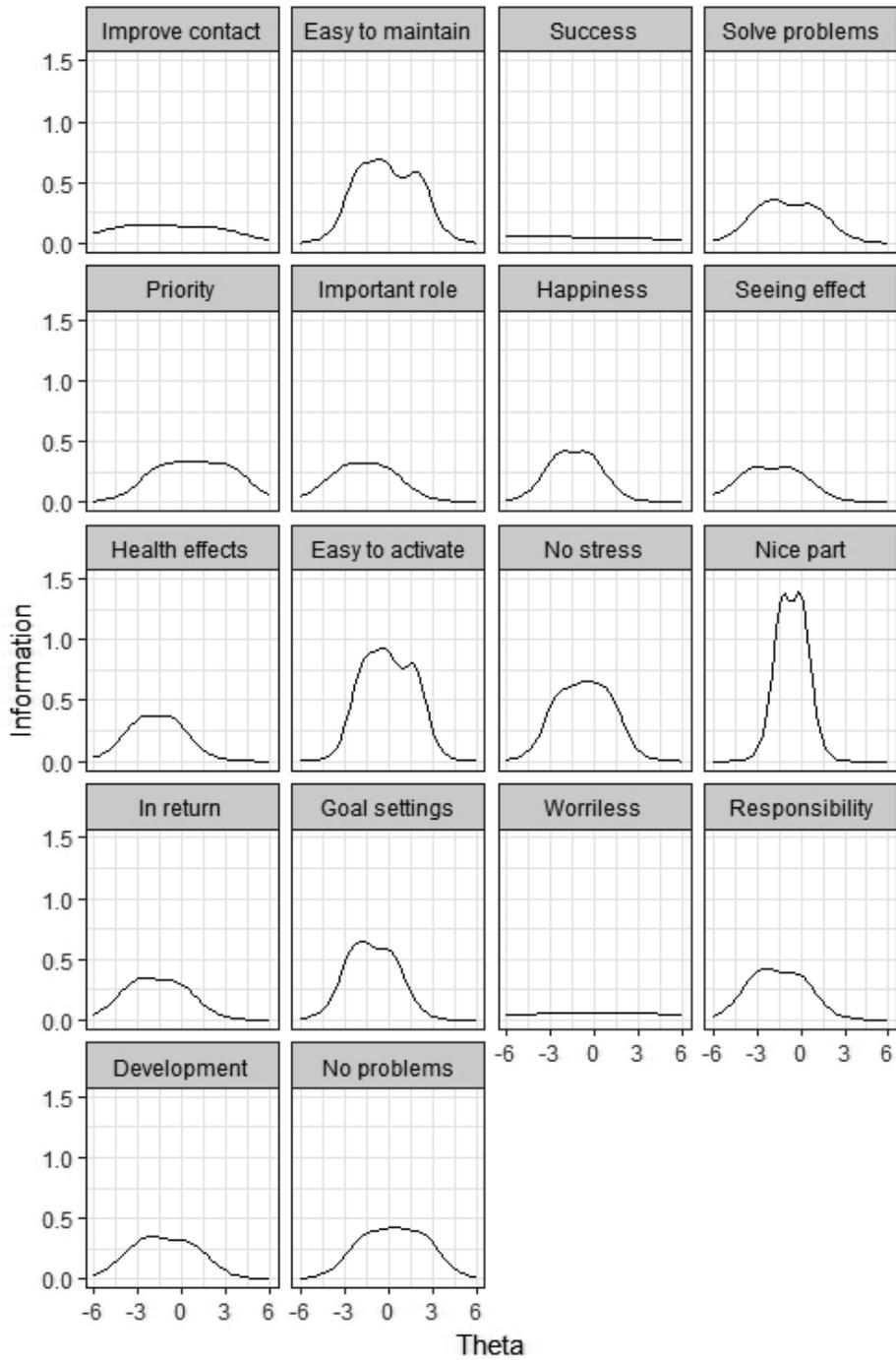


Figure B3. Item Information Function per item in the Motivation scale

Appendix C

Description of the power-assisted exercise intervention

The intervention consists of power-assisted exercises and was provided in a specially equipped exercise room within the residential facility where the participants were living. All the exercises were carried out using six different powered-exercise machines which supported the participants in performing specific movements, such as sit-ups, hip flexion, abduction and adduction of arms and legs, flexion and extension of arms, and moving legs up and down (see Table C1). The intervention was an adaptation of a power-assisted exercise program for the elderly (Jacobsen et al., 2012), with each participant in the intervention group participating three times a week for thirty minutes over a twenty-week period. The heterogeneity of the participants ensured that the program design was individualized, taking into account the abilities, disabilities and preferences of each person. The individual programs were composed by a physical therapist and direct support professional with expertise in the target group. Both were familiar with the participants and their physical condition.

The twenty-week program was divided into periods of five weeks. Power-assisted exercises were planned to be offered for the first five weeks with the machines set at low speed and low intensity. The second period involved exercise of moderate speed and intensity and the third period involved exercise of high speed and intensity. The participants used two different powered exercise machines during each session of the first three periods. Each session was organized as follows: a participant started on the first powered-exercise machine for approximately ten minutes, followed by a ten-minute break during which the participant was transferred to the second powered exercise machine. Each session ended with ten minutes on the second powered exercise machine. Only the most intensive exercise machines were offered to the participants for the sessions in the final period of the individual programs, if possible.

Table C1. Movement results for the various powered machines

Powered-exercise machine	Move results
1	Sit-up; movement of the straight abdominal muscles
2	Abduction and adduction of arms and legs
3	Rotation of the hips, lumbar vertebral column and pelvis
4	Breast is pushed upwards, arms are raised as far as possible
5	Movement of the entire spine (lateral flexion)
6	Hip flexion; legs are moved up and down

