JOIN4JOY

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D.10 RESULTS OF THE LTC PROGRAMME EVALUATION

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Table of acronyms

ADL	activities of daily living
BMI	Body mass index
IPAQ-SF	international physical activity questionnaire-short form
LTC	long-term care
NH	nursing home
PA	physical activity
PACES	physical activity enjoyment scale
PGI-I	patient global impression of improvement-I scale
QoL	quality of life
SB	sedentary behaviour
SPPB	short physical performance battery

Introducing Join4Joy

Join4Joy provides an intervention approach to promote physical activity among people 65 years of age or over and especially among those with fewer opportunities to participate. Traditionally, older people from social and cultural minorities, those with mobility restrictions or cognitive decline have faced barriers to join PA groups.

Scientific evidence points to social inclusion and enjoyment as key elements towards the facilitation of both physical activity uptake and sustainability (1,2). Through a comprehensive, participatory approach, the Join4Joy project has developed and piloted educational and interventional actions that seek to increase physical activity and reduce sedentary behaviour by focusing on personalization and being context sensitive.

A framework has been developed to place the focus on enjoyment and social inclusion, to overcome barriers, ensure equitable access to exercise and promote active ageing lifestyles from a biopsychosocial perspective. The Jon4Joy framework allows for flexibility in its implementation, leading to adaptable actions. Its feasibility has been studied.

The project was part of an Erasmus+ Sport programme, co-funded by the European Commission (years 2022-2025).

This report presents some of the main findings and provides additional resources for researchers, sports scientists, health care professionals and citizens with an interest in promoting physical activity in the older adult population.

> Join4Joy is a way to bring more movement, enjoyment and social connections into NHs. It lowers barriers and encourages older people to stay active in a way they find meaningful.

Key points

- Join4Joy focused on creating joyful and inclusive physical activity sessions for people aged 65 and over.
- A set of 9 Join4Joy principles was created to help guide the design of PA interventions.
- An educational course (freely available on our website www.Join4Joy.eu) was developed and all group facilitators involved in the pilot studies were previously trained.
- The intervention was conducted in NHs of 3 different countries -Spain, Germany and France- implementing the Join4Joy approach adapted to each site.
- 75 residents, around 20 facilitators and several assisting university students took part in the Join4Joy-NH project. All the people involved helped to shape the activities, which were adapted to both the context and participant preferences, making them enjoyable and inclusive.
- Most participants attended regularly, felt safe and supported, and enjoyed the activities. Some increased their social connectedness.
- Some users improved their PA levels; others maintained physical function and activity levels. Note: For people living in NHs, maintaining their physical function and activity levels —rather than losing them, is already a meaningful success. Even modest improvements in movement or energy can make a difference in daily life for older adults, especially for those who are frail. Health often declines fast in this population, so even staying stable reflects a positive outcome.
- The role of staff was key: they supported, motivated, and adapted activities to fit their residents' needs and were the centrepiece reported by users.
- The Join4Joy approach could be easily adapted to different NH environments where each site tailors their intervention around the suggested framework, by adapting it to their own space, tools, and possibilities.

Background and rationale

Insufficient physical activity (PA) and excessive sedentary behaviour (SB) among older people are linked to social, cultural, economic, educational barriers, as well as barriers related to disability, health problems and discrimination for different reasons. Adults who have low PA levels and tend to spend more time in a sitting position as part of their main daily activities self-report bad and very bad general health state (2).

In 2019, Parry et al. conducted a study in NHs and found that residents spent 85% of the time sedentary, 14% in light-intensity and 1% in moderate-to-vigorous-intensity PA (3).

Current PA and SB programmes for older people in the community and long-term care frequently fail to reach individuals with low functional and cognitive abilities, as well as minorities or people of deprived socioeconomic backgrounds. Instead of the traditional method of focusing on function and health, focusing on enjoyment is an approach that could increase behavior change and maintenance, by sharing with participants activities they might find more meaningful. This approach should also have a positive impact on health and function.

Join4Joy aimed to promote PA and decrease SB by co-creating and testing the mentioned framework that places the focus on enjoyment and social inclusion. Two separate arms were differentiated: Join4Joy-Community, for community-dewlling older people and Join4Joy-NH, targeting older adults living in assisted residential settings or nursing homes (NHs). This deliverable focuses on the experiences of the Join4Joy-NH arm, which conducted pilot interventions in Spain, France and Germany. A separate report can be found with results of the Join4Joy-Community interventions. More information is available on our website: www.Join4Joy.eu.

The aim of Join4Joy-NH was to evaluate the process and impact of implementing co-created interventions, based on the Join4Joy approach, which focuses on enjoyment and social inclusion for people 65 years of age or over that live in nursing homes.

The objectives of the Join4Joy-NH intervention were:

- To assess participant uptake, attendance and retention.
- To evaluate the feasibility of delivering the Join4Joy sessions in different care settings.
- To explore the acceptability and satisfaction levels among participants and staff.
- To collect data to inform the planning of a future larger-scale trial.

Methods

Ethics

The study is registered at ClinicalTrials.gov (NCT06100835).

The Research Ethics Committee of the University of Vic (UVic-UCC) granted a favourable report (internal code nr. 233/2022) for the conduction of co-creation processes, on October 3rd, 2022. The intervention protocol received a favourable report by the same Committee, with internal

code nr. 282/2023, on June 26th, 2023, providing coverage for both interventions in Spain and France.

Additional ethical clearance was obtained in Germany by the Ethics Committee of the University of Ulm on 31 October 2023 (internal code nr. 297/23) granting a favourable report for the conduction of the intervention protocol.

All participants were provided signed informed consent forms and were free to withdraw from the intervention at any time. In order to maintain transparency and gather valuable feedback, when dropping out, we kindly requested the participant to provide us with the reason for discontinuation, which they could do on a voluntary basis. This information was deemed relevant for our records and project analysis, as it helped us assess the acceptability of the programme and to make the necessary adjustments.

Design

This was a multicentric pragmatic feasibility study using a mixed-methods design (quantitative and qualitative), which evaluated the Join4Joy-NH approach, to pursue the reduction of SB and the increase in spontaneous and structured levels of PA among older people living in NHs. Pilots were conducted in the three countries in two rounds: first, one pilot (Pilot 1) was conducted in each site and later, after an iterative process of learning and improving from the first study, a second pilot (Pilot 2) was implemented.

A precise description of goals and methods can be found in the Join4Joy Protocol Publication, available on Open Access in the BMJ Open Journal (Ref. 4).

The Join4Joy study was designed with four different phases:

1. Co-creation of the framework with relevant stakeholders, including older adults and key agents;
2. Education of facilitators and assisting undergraduate students;
3. Intervention (pilot studies in NHs);
4. Analyses of qualitative and quantitative data towards a feasibility study.

The initial co-creation process resulted in the development of 9 principles, which were incorporated in later stages (eg., education, intervention) of the project. Join4Joy ground principles can be seen in Figure 1.

Figure 1. Join4Joy approach to PA for older adults Ground Principles.

Study setting

Interventions were conducted in NHs of three different countries (i.e., France, Spain, Germany). The names of the Join4Joy partners and the locations of the interventions are described below:

GERMANY: Partner name: AGAPLESION Bethesda. Pilots were conducted within their own premises in the city of Ulm. The NH facility has a total of 75 beds, located in 5 different residence units. The NH in Germany belongs to the AGAPLESION Geriatric Complex which includes a clinic for acute geriatrics, an in-patient rehabilitation unit, out-patient rehabilitation and day care.

SPAIN: Partner name: Universitat de Vic – Universitat Central de Catalunya conducted pilots at two different NHs: Aura Residence, in the city of Manlleu and Fundació Gallifa, in St. Hipòlit de Voltregà. Aura Residence holds 132 beds while Fundació Gallifa holds 41 beds and 15 spaces for day-care users. Both NHs in Spain are part of the Join4Joy collaborating Consorci Hospitalari de Vic.

FRANCE: Partner name: Siel Bleu Association. Pilots were conducted at EHPAD Mornant and EHPAD La Niveole, in Ugine.

All participating long-term care centres were informed about the Join4Joy-NH project, intervention characteristics and assessment procedures. Informed agreements were signed between the organizing partners and the residential participating institutions. The interventions took place within the residential facilities, so that residents did not need to commute.

Sample size

Interventions were designed as feasibility studies. Accordingly, there was no specific sample size calculation based on a primary outcome measure. The goal was to evaluate the feasibility of the intervention and key drivers for success. It is in view of the information derived from the feasibility study that sample size calculation and recommendations will be possible towards future controlled trials.

A pragmatic sample size was set for a minimum of 24 participants living in the NHs, for each of the three different countries. This added up to a target total sample of n = 72 NH residents for the whole of the Join4Joy-NH project. See separate report (Deliverable 3.3) for community setting results.

Eligibility criteria

Join4Joy focused intensively on social inclusion and diversity. It specifically targeted individuals with traditionally higher barriers to participation in PA interventions. Participation was voluntary in all cases. Every candidate received an explanation of the project and was requested to sign an informed consent form. Each NH determined if additional informed consent was required from a relative or tutor.

Inclusion criteria included being 65 years or older, living in a NH or being enrolled in their day care activities, having the ability to participate in group-based, structed PA sessions and not suffering from any reported or diagnosed health condition that would contraindicate participation in PA interventions.

People with severe dependence were excluded from the study. Severe dependence included either severe cognitive decline (i.e., 7 points in the Global Deterioration Scale of Reisberg, reported by professional caregivers) and/or severe mobility deficits (i.e., being bed-bound). No exclusions were made by age-related impairments, chronic health conditions, or other.

Recruitment procedure

1. Based on the previous eligibility criteria, health and exercise professional staff (e.g. physical educators, sport and exercise scientists, trainers, personal coaches, physiotherapists, nurses, general practitioners, psychologists, occupational therapists) were in charge of informing NH residents about the project.
2. Residents received clear information about the Join4Joy-NH project and about participation options.
3. Residents who expressed interest in participating in the intervention were given time to ask questions about the intervention and received answers, prior to providing them with the informed consent form. Signed informed consents were retrieved. Legal guardians were asked to sign the informed consent, when appropriate.
4. Priority was given to include older adults:
    a. from ethnic minorities and/or with low educational backgrounds.
    b. older people who do not usually participate in PA programmes.
    c. with frailty phenotypes (i.e., with 9 or less points from Short Physical Performance Battery-SPPB test).

In summary, participation was voluntary for all candidates who fulfilled the eligibility criteria. Participants could discontinue participation at any given moment for any reason. The protocol for the feasibility study required that participants be asked for drop-out reason so as to better comprehend the experience and perspectives of final users. Justification was not demanded by the research time, but appreciated and recorded as part of the qualitative assessment.

Intervention

The Join4Joy-NH approach to intervention design is the result of an extensive co-creation process which was conducted with professionals, students, experts and researchers, policy makers, formal and informal caregivers and NH residents at the end of 2022 and beginning of 2023, in all Join4Joy participating countries (Spain, Germany, Denmark, Italy, France).

Join4Joy-NH applied novel interventions based on PA reinforcement with self-management strategies to promote behaviour change. The intervention consisted of 1-hour weekly physical activity sessions, co-created with facilitators and participants, and tailored to the local context. Facilitators were also encouraged to promote active lifestyles outside the session. Prior to commencing the PA group, Join4Joy provided education towards and encouraged the

conduction of one-on-one interviews to allow for a better understanding of each participant background, needs and preferences. Interviews were most frequently conducted by the group facilitators. Information deriving from the interviews was not used for data analysis but guided the recommendations and proposals towards an increasingly tailored PA approach.

Staffing

Join4Joy provides a flexible framework within which professionals of any background on health and social care and sports are able to adjust and apply its recommendations to their particular contexts.

Prior to the conduction of the pilot studies, all facilitators and assisting students, as well as additional members of staff who wished to participate (including NH operational directors, nurse assistants and other) undertook the Join4Joy Educational Training, currently accessible online, with free access upon registration and available in six different languages.

Session calendar

Pilots were conducted between November 28th, 2023, and January 8th, 2025, depending on the site. While effort was made to hold one weekly session, several sites experienced interruptions for reasons such as Christmas or Easter break and festivities, disease outbreaks, or trainer sick leaves.

Assessments

This section provides a description of variables that helped evaluate impact trends of Join4Joy-NH in various domains of health:

a) **Sociodemographic information** —collected only at baseline: participants' age, gender, BMI, previous leisure-time PA experience, marital status and educational attainment.
b) **Perceived improvement in health after the interventions** was assessed through the Patient Global Impression of Improvement (PGI-I) scale. This single-item scale asks participants to rate how they feel their condition has changed since the start of the programme, using a 7-point Likert-type scale, with answers ranging from “very much improved” to “very much worse.” It evaluates the participants' subjective assessment of progress or deterioration (5).
c) **Enjoyment of PA** was assessed using the short form of the Physical Activity Enjoyment Scale (PACES), consisting of 4 items. Participants rated each statement on a 5-point Likert-type scale, with higher scores indicating greater enjoyment. This brief version captures key emotional responses to PA (6).

d) **Basic activities of daily living (ADL)** were assessed before and after the interventions using the Modified Barthel Index by Shah et al. This version uses a detailed scoring system (0, 5, or 10 points per item) across ten tasks, including mobility, personal care, and toileting. Total scores range from 0 (total dependence) to 100 (full independence), providing a picture of functional changes over time (7).

e) **Physical function** was evaluated using the Short Physical Performance Battery (SPPB). This is a standardized set of tests that assess lower extremity function through three components: 1) balance in different stances (side-by-side, semi-tandem, and tandem), 2) gait speed over a 4-metre distance, and 3) repeated chair stand test measuring lower body strength. The total score, ranging from 0 to 12, provides an indication of mobility limitations and risk of disability (8).

f) **Quality of life** (QoL) was measured using the EUROQOL-5D-5L (EQ-5D-5L) questionnaire, which assesses five dimensions: mobility, self-care, usual activities, discomfort, and depression. Each of them is rated on five levels of severity —from no difficulty to extreme difficulty. The combination of responses defines a health state, which can be converted into a score, ranging typically from less than 0 to 1, using country-specific value sets. The tool also includes a visual analogue scale, where participants rate their perceived overall health from 0 to 100 (9).

g) **SB** was assessed using the Sedentary Behaviour Questionnaire (SBQ). Participants reported the time spent in various sedentary activities —such as watching TV, reading, or using a computer— on both a typical weekday and weekend day. For each activity, responses are given in time intervals and converted into hours. Total sedentary time is calculated by summing the hours across all activities, providing an estimate of average daily SB (10).

h) **PA levels** were assessed using the International Physical Activity Questionnaire – Short Form (IPAQ-SF). This self-report tool captures the frequency and duration of walking, moderate, and vigorous PA over the past 7 days, as well as time spent sitting. Responses are converted into metabolic equivalent minutes per week (MET-min/week) to estimate overall PA and categorize participants as having low, moderate, or high activity levels (11).

i) Complementarily, to more objectively measure SB and PA patterns, partners in Germany and Spain used wrist-worn **accelerometres**, which participants wore on their dominant side. Participants were instructed to wear the devices for 7 consecutive days before the intervention and again for 7 days afterward. However, due to participant dropouts and varying compliance, not all individuals completed the full wear period. For analysis

purposes, we included data only from participants who wore the device for at least 5 days during each assessment period. These wearable devices recorded movement data, providing a device-based measure of activity intensity, duration, and sedentary time.

To evaluate the process in terms of acceptability and feasibility of implementing the JOIN4JOY-NH programme, the following methods were used:

a) Facilitators kept track of **attendance, non-attendance and dropouts** in a diary of sessions. Reasons for non-attendance were recorded, as well as any adverse events occurring.
b) **Participants**' perspective on **acceptability** was collected by means of open questions during in-person post-intervention assessments. Additionally, focus groups at end-of-intervention were carried out.
c) **Acceptability** of the programme was assessed via written, semi-structured interviews to the participating **facilitators**.
d) Initially, according to the proposal, **focus groups with participants** were planned to be conducted with at least one frail man and woman (SPPB <9 points) and one non-frail man and woman, for every group, giving priority to individuals from low socio-economic backgrounds. Nevertheless, finally, focus groups were conducted once the intervention had been finalized inviting all group participants to join. Focus groups were recorded and transcribed verbatim. When needed, the professionals who had been involved with the group were present to facilitate communication. Focus groups with participants further helped to assess acceptability.
e) **Satisfaction** with the intervention was assessed in Germany and Spain, by using a 5-point Likert-type questionnaire where the person specifies the level of agreement to statements typically in five points ranging from 1 to 5 (from "strongly disagree" to "strongly agree") (12). To facilitate understanding and avoid recall bias, participants were presented with Likert-fashion 'smileys' at the end of each session and were asked to select the one that best represented their degree of satisfaction that day.

Assessments were conducted by researchers, assisting students or the trainer themselves.

Regarding data management, all participants were given study identification numbers which were used in all records and electronic databases and ensured anonymity. Electronic databases were protected by passwords while paperwork were locked. Informed consent forms were stored separately from the research data. All the data was accessible to the research team members during the study. As per the official proposal for the European Union, all records will be kept for a minimum period of 5 years, for monitoring purposes.

Analysis

Quantitative data was analysed descriptively as means and standard deviations for continuous variables and used to compare changes of specific variables pre- and post-intervention for each pilot study and for the overall sample. Specifically, data analysis of variables included estimates of change in ADL, physical function, QoL and SB. The level of significance was set at 0.05.

Qualitative data were analysed using reflexive thematic analysis, following Braun and Clarke (2006) method (13). We additionally applied an open, flexible approach to identify common themes and meaningful insights about adherence, motivation, and satisfaction.

Results

Sociodemographic Characteristics of Participants

A total of 81 older adults initially participated in the JOIN4JOY-NH interventions (39 in pilots 1 and 42 in pilots 2). However, due to six dropouts during the study, complete data were available for 75 participants - 37 in pilots 1 and 38 in pilots 2. Data analysis was conducted on these 75 participants. As shown in Figure 2, participants were mostly women (78% in pilots 1 and 74% in pilots 2). The overall average age was 84 years. Mean ages in each group are reported in supplementary material in Table 1.

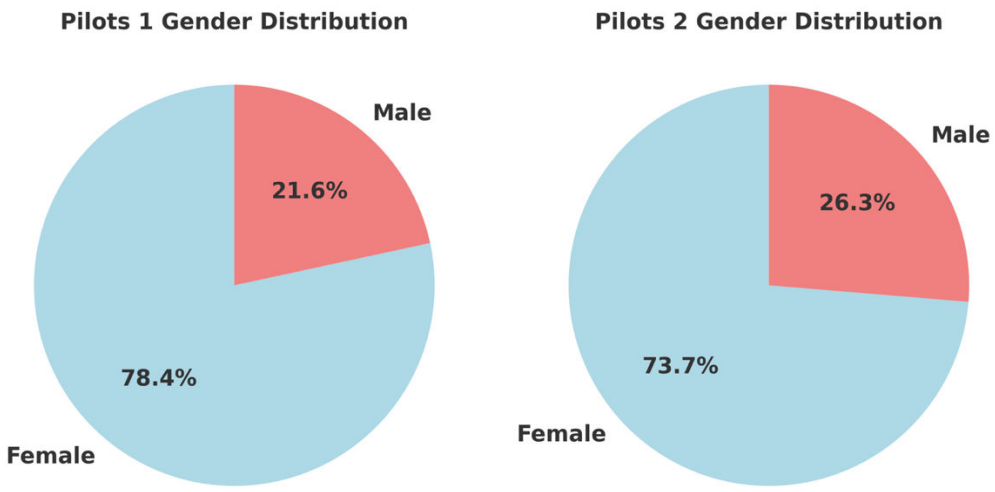

Figure 2. Gender distribution across all sites. Pilots 1 (*n* = 37) and Pilots 2 (*n* = 38).

- Cognitive function data was given in by professional members of staff at baseline, and reported by means of the Reisberg Scale. For reporting purposes, data have been categorized in 2 groups:

  No or Mild Impairment (Stages 1-3 of Reisberg Scale):

  - **Pilots 1**: 26 out of 37 participants (**70.3%**).
  - **Pilots 2**: 22 out of 38 participants (**57.9%**).

Moderate to Moderately Severe Impairment (Stages 4-5 of Reisberg Scale):

- **Pilots 1**: 11 out of 37 participants (**29.7%**).
- **Pilots 2**: 16 out of 38 participants (**42.1%**).

Among the 75 participants included in the analysis, the most common education level was primary education, reported by 18 participants (48.65%) in Pilots 1 and 19 participants (50.00%) in Pilots 2. A smaller proportion had attained higher education at the university level: 3 participants (8.11%) in Pilots 1 and 3 participants (7.89%) in Pilots 2.

Regarding the use of wheelchairs, 7 participants (18.92%) in Pilots 1 reported using them: 1 in ABKU (9.09%) and 6 in UVic (35.29%). In Pilots 2, 3 participants (7.89%) used wheelchairs: 1 in ABKU (11.11%) and 2 in UVic (10.53%).

Most participants (84% in pilots 1 and 89% in pilots 2) declared having **previous experience with leisure-time PA** (i.e., dancing, attending exercise sessions, swimming or other). See Figure 3.

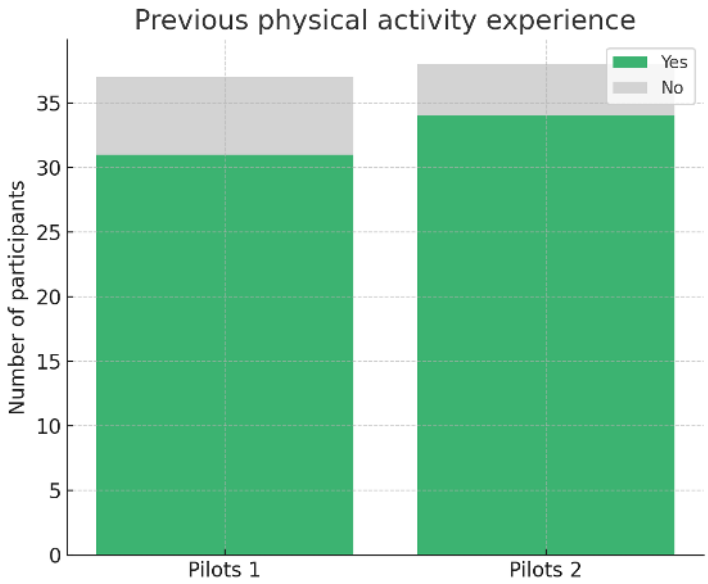

Figure 3. Previous experience with leisure-time PA all sites *n* = 75 (Pilots 1 *n* =37, Pilots 2 *n* =38).

Across all sites, the average BMI ranged from **26.9 in pilots 1** to **27.7 in pilots 2**, which falls within the **overweight classification,** according to WHO guidelines (see Figure 4).

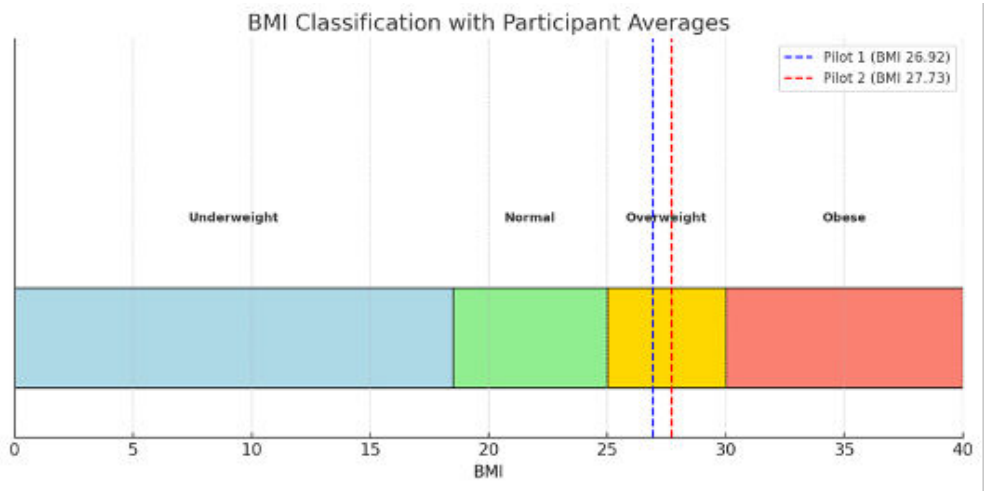

Figure 4. Average participant BMI across all sites, categorized according to WHO classifications.

More detailed sociodemographic results are available in Tables 1-3 of the Supplementary Material.

Description of implemented interventions in each site

Each country (i.e. Spain, Germany, France) was expected to conduct 2 pilot studies. In Spain, Pilot 2 was split into two separate groups (2.1 and 2.2), leading to a total of 7 distinct groups. Group sizes varied slightly across countries and pilots. In Spain, at Uvic: Pilot 1 began with 17 participants and had no dropouts; Pilot 2.1 started and ended with 9 participants, and Pilot 2.2 started and ended with 10 participants. In Germany, Pilot 1 at ABKU began with 12 participants and 1 person dropped out. Pilot 2 in Germany started with 13 participants but had 4 dropouts. In France, Pilot 1 (SielBleu) started with 10 participants and had one dropout. Pilot 2 had 10 participants from the start until the end. In total, the intervention started with 81 participants across all pilots, and 75 completed the study with full data available.

Lead facilitators of the Join4Joy-NH pilot interventions included sports scientists, occupational therapists, care assistants, and physiotherapists. Each facilitator received training via the Join4Joy Educational Course. Undergraduate university students provided support during sessions. All assisting students were also trained using the Join4Joy Educational materials.

Conducting participatory, co-created, socially inclusive and individually tailored sessions with NH residents was demanding. Support was encouraged, when possible, from additional members of staff. Undergraduate university students participating in service-learning opportunities provided valuable, further support. Collaboration agreements, as well as full insurance coverage, were ensured between the NH and academic centres.

Most frequently, lead facilitators were original citizens of their intervention country, as was the case for Join4Joy facilitators in France and Spain. Our colleagues in Germany, however, benefited from involving staff of diverse cultural backgrounds, including German, Turkish and Romanian.

The pilot interventions were conducted independently at each site; however, knowledge and experience from earlier phases were used to refine the new ones. In Spain, learnings from Pilot 1 were actively shared with the Pilot 2 facilitator, allowing for adaptations based on participant feedback and implementation experience. In Germany, the approach between pilots changed notably – based on Pilot 1 experiences, methodological adjustments were created for Pilot 2. In France, both pilots were led by the same trainer, which likely contributed to a smoother implementation in Pilot 2. Hence, comparisons of the results between Pilots 1 and Pilots 2 should take into account these differences among the sites.

Process Evaluation indicators

Attendance

The intervention achieved **high attendance rates** in all of the sites, indicating strong participant (i.e. facilitator and resident) commitment. Specifically, UVic Pilot 2.2 reported the highest (95%) mean attendance rate, while ABKU Pilot 2 had the lowest (**73.79%). In all, attendance was regular and high,** see Figure 5. Reasons for non-attendance were primarily due to participants feeling unwell, having family visits, being away from the NH or having different appointments.

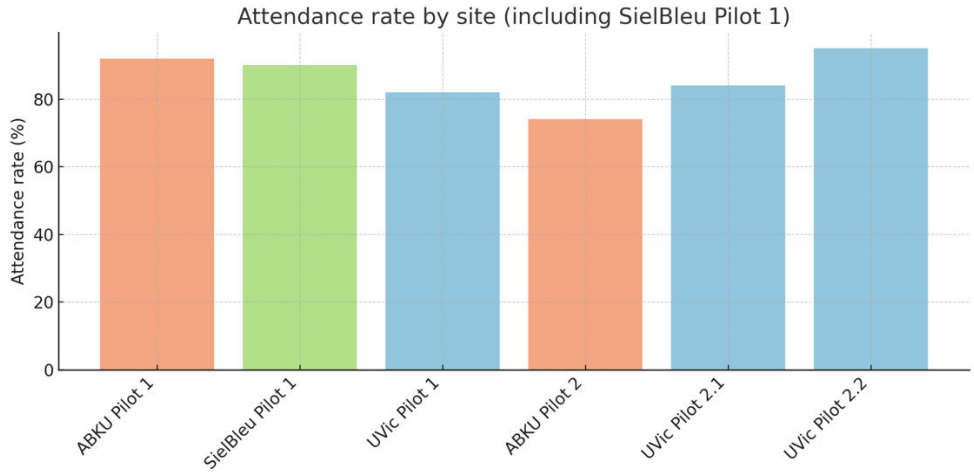

Figure 5. Mean attendance rates, by pilot. *n*=65. In Pilot 1 *n*=37. Of them, ABKU *n*=11, SielBleu *n*=9, UVic *n*=17. In Pilot 2 *n*=28. Of them, ABKU *n*=9, UVic 2.1 *n*=9, UVic 2.2 *n*=10.

Satisfaction

The results of **session satisfaction** evaluated through session diaries show consistently high satisfaction scores, with UVic Pilot 1 achieving the highest mean (**4.61 over 5)**, and most other sites also averaging **above 4 points over 5** (See Figure 6). This indicates that the sessions were well-received and enjoyable.

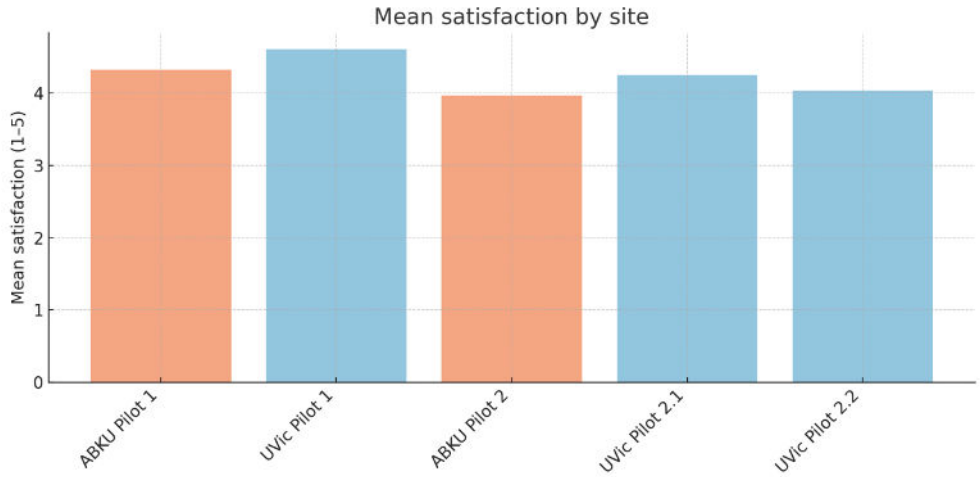

Figure 6. Mean session satisfaction scores by site *n*=56. Of them, Pilots1 n=28 (ABKU n=11, UVic *n*=17), Pilots 2 *n*=28 (ABKU *n*=9, UVic 2.1 *n*=9, UVic 2.2 *n*=10).

Dropouts

Pilots maintained **low drop-out rates**, underscoring its acceptability and feasibility. Although ABKU Pilot 2 experienced a higher drop-out rate (4 out of 13 participants; 30.77%) than other sites, most of the sites reported **no dropouts** (see Figure 7). Among the small number of participants who discontinued the Join4Joy intervention, the most common reason was **relocation from the NH**, *n* = 3. This was followed by **participant death** (*n* = 2) and **physical health issues** (*n* = 1) - see Figure 7.

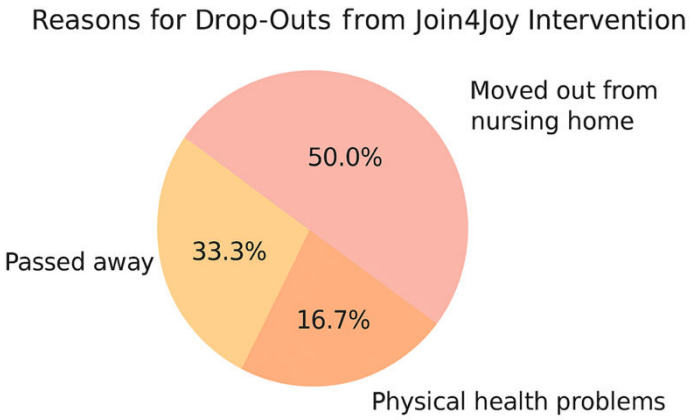

Figure 7. Reasons for participant dropouts (*n* = 6) from the Join4Joy pilot interventions.

The mean session satisfaction, attendance and drop-out rates are presented in Table 4 of the Supplementary Material.

Participant outcomes

In Pilots 1, participants showed modest improvements in physical performance **(SPPB: 3.92 to 4.65)**, self-perceived health **(EuroQol VAS scale: 59.25 to 60.69)**, and PA levels **(IPAQ-SF METs: 1601.21 to 2613.36)**. Although the change in SPPB scores falls slightly below the commonly accepted minimal clinically important difference threshold of 1.0 point, it may still reflect a meaningful non-worsening in physical function given the frailty of the population in this intervention. For frail older adults, even a 0.5-point increase in SPPB can be considered clinically relevant (Ref. 14). **In Pilots 2**, daily functioning improved slightly **(Modified Barthel Index by Shah: 69.50 to 74.18**), and PA also increased (**IPAQ-SF METs: 1762.90 to 2284.61**), while other measures remained stable. It is important to note that the questionnaires that were used are subjective self-report tools that depend on how well participants can answer them and how consistently they are interpreted by evaluators. In our study, many participants had cognitive impairment, which may have likely contributed to the wide variation in IPAQ-SF scores across sites, highlighting the need to interpret these results with caution.

The pre- and post-intervention changes in physical performance, assessed using the SPPB, are shown in Figure 8.

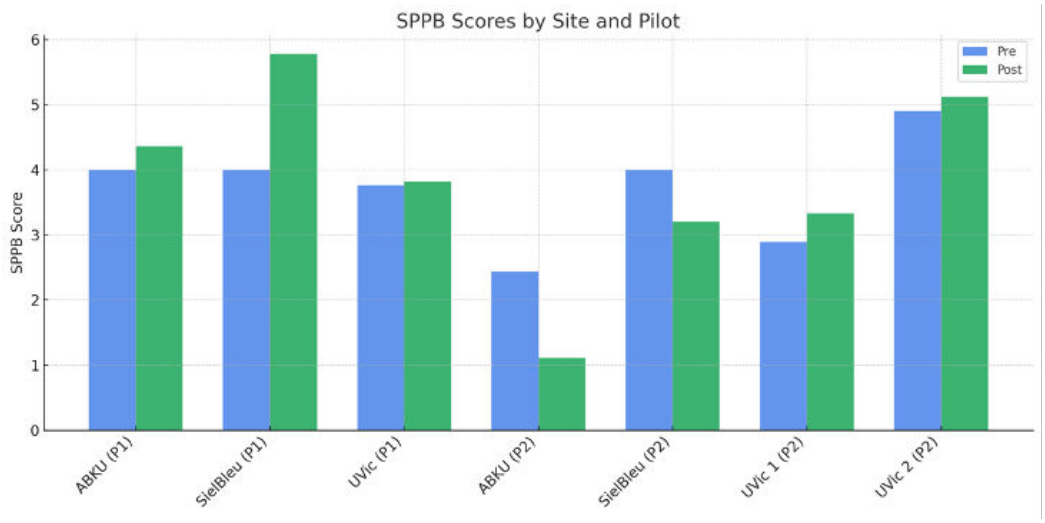

Figure 8. Changes in Physical Performance according to the SPPB results among all participants by site and pilots *n*=75 (Pilots 1 n=37: ABKU *n*=11, SielBleu n=9, UVic *n*=17. Pilots 2 *n*=38: ABKU *n*=9, SielBleu *n*=10, UVic 2.1 n=9, UVic 2.2 n=10).

Figure 9 represents the results for functional ability based on the Modified Barthel Index by Shah scores, for all sites.

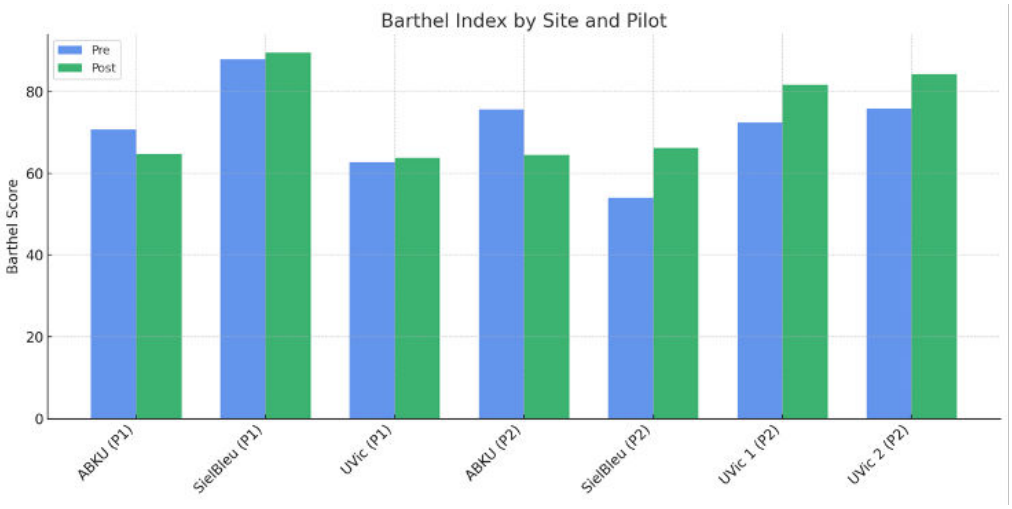

Figure 9. Changes in functional ability among all participants by site and pilot *n*=75 (Pilots 1 *n*=37: ABKU *n*=11, SielBleu *n*=9, UVic *n*=17. Pilots 2 *n*=38: ABKU *n*=9, SielBleu *n*=10, UVic 2.1 *n*=9, UVic 2.2 *n*=10).

Finally, changes in PA levels, measured as MET-minutes per week using IPAQ-SF, are shown below in Figure 10.

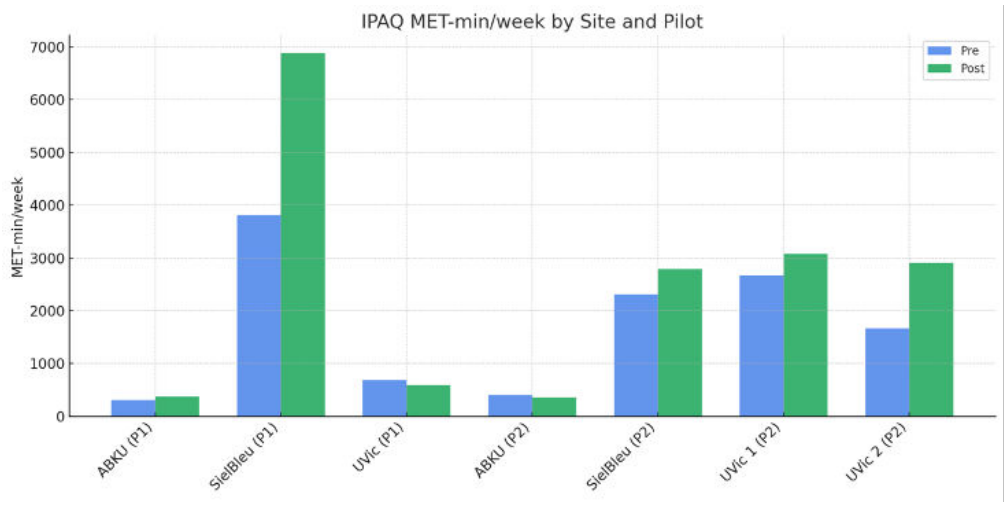

Figure 10. Changes in PA levels (measured by IPAQ MET-min/week) among participants by site and pilot *n*=75 (Pilots 1 *n*=37: ABKU *n*=11, SielBleu *n*=9, UVic *n*=17. Pilots 2 *n*=38: ABKU *n*=9, SielBleu *n*=10, UVic 2.1 *n*=9, UVic 2.2 *n*=10).

Paired t-tests were used to compare pre- and post-intervention outcomes. While none of the changes were statistically significant, some measures, like SPPB, EuroQol-5D VAS scale and IPAQ-SF showed positive trends. These results suggest that the intervention may have beneficial effects on PA levels and the quality of life that could reach significance in a larger

sample. Moreover, such results show the importance of considering both statistical and clinical significance, especially in small-sample pilot studies.

Furthermore, despite modest clinical changes, the interventions were well-received and positively experienced by participants. More detailed results of the tests and questionnaires are available in Table 4 of the Supplementary Material.

Importantly, participants in both groups reported high levels of perceived improvement and enjoyment:

- PGI-I scores averaged 3.61 over 7 in Pilots 1 and 3.90 in Pilots 2, reflecting positive impressions of personal progress and outcomes.
- PACES scores were 4.24 over 5 in Pilots 1 and 3.88 in Pilots 2, indicating strong enjoyment during the PA sessions.

These results suggest that the intervention not only impacted participants physically, but they also found the sessions enjoyable and motivating. The level of enjoyment reported through PACES scores is shown in Figure 11.

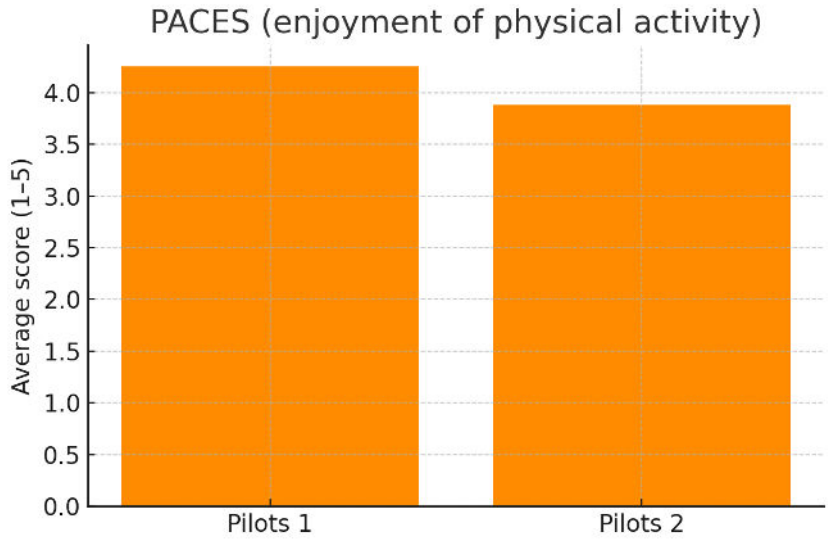

Figure 11. Average Enjoyment of Physical Activity (PACES) scores among all the participants by pilot *n*=75 (Pilots 1 *n*=37: ABKU n=11, SielBleu *n*=9, UVic *n*=17. Pilots 2 *n*=38: ABKU *n*=9, SielBleu *n*=10, UVic 2.1 *n*=9, UVic Pilot 2.2 *n*=10).

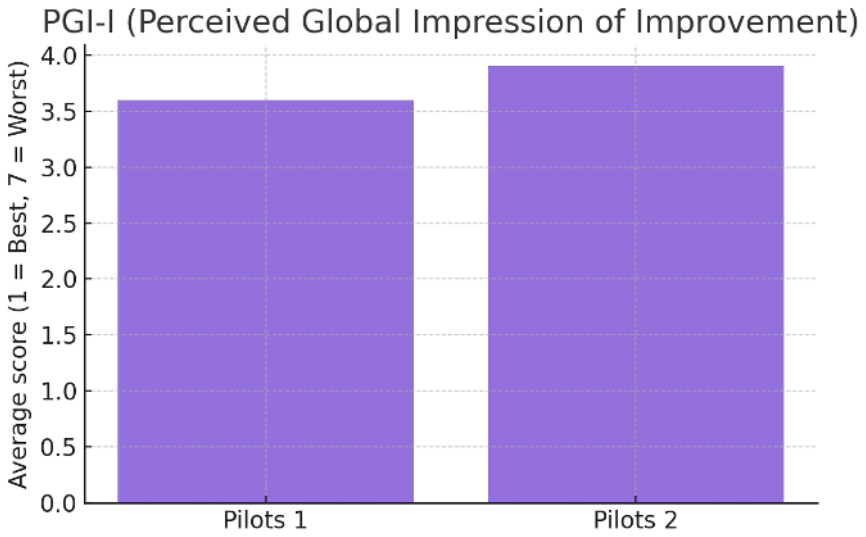

Figure 12. Average Perceived Global Impression of Improvement (PGI-I) scores among all participants, by pilot *n*=75 (Pilots 1 *n*=37: ABKU *n*=11, SielBleu *n*=9, UVic *n*=17. Pilots 2 *n*=38: ABKU *n*=9, SielBleu *n*=10, UVic 2.1 *n*=9, UVic 2.2 *n*=10).

Accelerometry Data

The accelerometry data collected shows that sedentary time remained high, with minimal variation from pre- to post-intervention. UVic Pilot 2.1 and 2.2 reported the highest drop in post-intervention sedentary levels, from **92.97% to 89.37%,** respectively. Accelerometry findings are illustrated in Figure 13, which compares sedentary time percentages across all pilot sites, before and after the intervention.

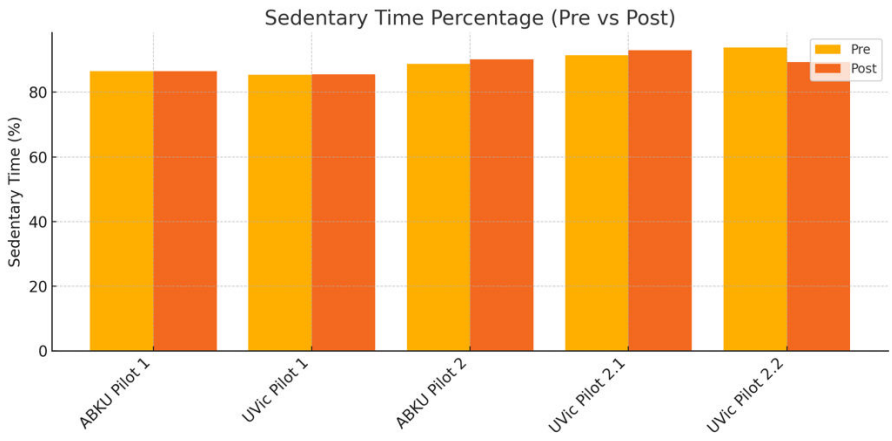

Figure 13. Sedentary time measured by wrist-worn accelerometres by site (pre vs post intervention), per pilot *n*=37 (Pilots 1 *n*=20: ABKU *n*=11, UVic *n*=9. Pilots 2 *n*=17: ABKU *n*=8, UVic 2.1 *n*=4, UVic 2.2 *n*=5).

In contrast, changes in **light PA minutes per day** were more variable. While UVic Pilot 2.2 showed an increase from **121.64 to 144.00** minutes per day, UVic Pilot 2.1 recorded a decrease from **121.64 to 96.46** minutes per day. These trends are shown in Figure 14.

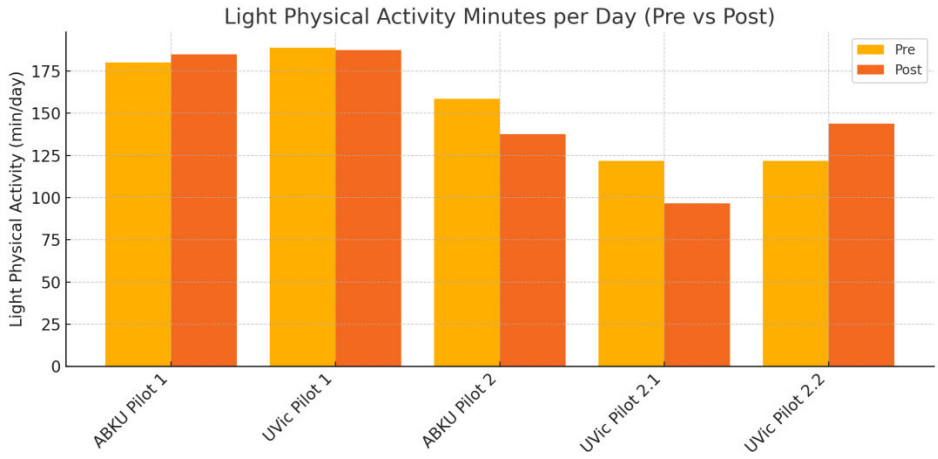

Figure 14. Daily light PA time measured by accelerometers by site (pre *vs* post intervention), per pilot *n*=37 (Pilots 1 *n*=20: ABKU *n*=11, UVic *n*=9. Pilots 2 *n*=17: ABKU *n*=8, UVic 2.1 *n*=4, UVic 2.2 *n*=5).

However, none of the changes in the accelerometry data were statistically significant.

More detailed accelerometry information can be found in Table 7 of the Supplementary Material.

Participants' perspective on acceptability

Data was retrieved from all participants taking part in the post intervention assessment (n = 75). To ensure the clarity and reliability of responses, 29 participants (38.67%) with moderate or greater cognitive impairment (Reisberg Scale stage 3 or higher) were excluded from the analysis. Data for *n* = 46 were categorized and are presented below.

Reason for participation

- 28 participants (61%) said enjoyment, routine, and social interaction kept them engaged.

Barriers to participation

- 34 participants (74%) reported no major barriers to participation.
- 12 participants (26%) mentioned physical or external challenges (e.g. pain, vision impairment, hospital stays).
- 27 out of 46 (59%) participants faced no major barriers.
- 19 participants (41%) cited physical function-related issues, like joint pain or difficulty with balance.

Enjoyment

- 35 participants (76%) found sessions enjoyable and motivating.
- 11 participants (24%) described sessions as repetitive or had difficulty remembering specific activities which were done.
- 34 participants out of 42 (81%) enjoyed the sessions.
- 8 participants (19%) gave neutral or negative feedback.

Suggestions for improvement

- 21 participants (46%) suggested improvements like music, more variety, or different intensity.
- 25 participants (54%) didn't feel any changes were needed.

Perceived improvement

- 24 out of 46 participants (52%) noticed benefits (e.g. better mood, flexibility).
- 22 participants (48%) saw no changes, and 2 (4%) expressed feeling worse (more tired after sessions).

Tailoring to needs

- 36 out of 46 participants (78%) felt the intervention matched their needs.
- 10 participants (22%) found the sessions too easy or too hard.

Support by trainers

- 40 out of 44 participants (91%) felt supported by trainers and peers, 4 (9%) were unsure at the time of data collection.

Valued activities

- Popular activities included music-based movements, balance games, and coordination tasks.

Readiness to sustain PA behaviour

- 33 out of 46 participants (72%) planned to stay active after the intervention. Among the remaining 13 participants (28%), 8 (17%) expressed uncertainty, often due to lack of motivation or support, while 5 (11%) felt unlikely to continue, mainly because of health-related limitations.

Satisfaction

Participants were asked to what extent they agreed with the statement: “I am satisfied with my participation in the Join4Joy programme.” 32 respondents (89%) out of 36 said they were satisfied (Figure 15).

- 21 (58%) strongly agreed.
- 11 (31%) agreed.
- Only 4 (11%) were neutral or disagreed.

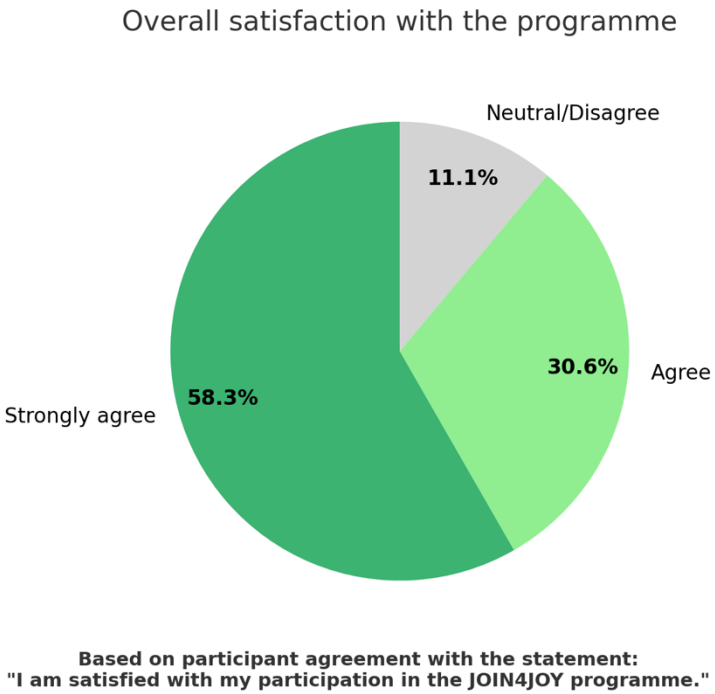

Figure 15. Overall participant satisfaction with the Join4Joy intervention (*n* = 36).

Qualitative results: perceptions on the process and impact

Reflections by intervention facilitators

As part of qualitative methods, insight from the facilitators was collected by means of a formal written form, as well as via conversations with lead researchers.

When analysing at trainers' perspectives on all Pilots 1 and Pilots 2, some clear patterns can be noticed: activities that included **music, simple games, and group interaction** were the most successful. These types of activities helped participants enjoy themselves, connect with others, and feel more comfortable joining in. This was especially relevant for those individuals who were previously less active or who had mobility challenges. On the other hand, activities that were too

complicated or competitive did not work out well: some participants found them confusing, too fast-paced, or simply not fun. A common point from many trainers was that the group had very different needs, so it was important to **adapt the sessions** to make sure everyone could take part. Overall, trainers agreed that focusing on **fun, social connections, and session flexibility** worked much better than focusing primarily on physical function.

In Germany:

In the focus group with trainers after pilot study one, it was described that the availability of activities such as memory training and exercise classes is good, but often lacks the motivation and support needed to take advantage of these offerings. The importance of group cohesion at Join4Joy was emphasized, with activities like dancing and singing bringing more joy. Participants expressed during sessions a desire for more opportunities to exercise outdoors while being accompanied by music. A trainer commented on this "*Every opportunity for movement should be used. Integrate exercises into everyday life. Always incorporate music*". They felt better and more satisfied after the Join4Joy training sessions, especially when they were still able to independently perform everyday tasks like bending down and tying their shoes. Another trainer summarized this by saying "*less impairment, more profit*".

In Spain:

In **Pilot 1**, four university students supporting the sessions described the experience as highly enriching. They emphasized how the intervention improved their motivation and knowledge about ageing and physical activity, highlighting gains in communication skills, empathy, and teamwork. They mentioned that interactive and creative activities, such as games, music-based movement, and storytelling exercises, promoted enjoyment, engagement, and emotional connection among older participants. These types of sessions fostered social bonding and group cohesion. On the other hand, students observed that more complex exercises were sometimes difficult for residents with lower mobility or cognitive challenges, and that simpler, more emotionally resonant activities often had a stronger impact.

In **Pilots 2**, feedback was gathered from two professional trainers leading the sessions. Both reported that the most effective activities were those involving music, rhythm, and personal expression, which visibly boosted participant mood and group dynamics. For example, sessions that incorporated shared memories, dance-like movement, or symbolic gestures were noted to have emotional responses and deepen group connection. One trainer noted that such activities helped participants "feel alive" and strengthened a sense of belonging. However, similar to Pilot 1, challenges were reported in managing differences in participants' mobility and cognitive

levels, requiring constant adaptation of exercises. Trainers also identified limited preparation time and staff coordination as barriers, suggesting improvements in the organization of the intervention.

Reflections by participants

As part of the participatory approach of the Join4Joy project, focus groups were conducted with end-users, after pilots 2, at all sites. While some minimum requirements for participation were established (eg., the presence of at least one frail man and woman), finally most intervention participants attended the focus groups. This, again, is interpreted as a sign of good acceptability with participants often expressing their appreciation for new activities or opportunities to interact.

In Spain

In the focus group conducted by UVic, a total of 15 residents (3 men and 12 women) were present. The session was conducted by 2 UVic researchers with valuable support from one of the facilitators (the NH physiotherapist). Residents explained their experience in the Join4Joy PA intervention as a joyful dynamic where they used very different kinds of music and could dance again in their lives music they loved. An important aspect to highlight is that participants choose the songs for the session, choosing very different styles, from modern to old songs. Interestingly, this challenged common preconceptions –which even the experienced professionals held- about the type of music that older people prefer. Women in particular seemed to recall the times when they were younger and went dancing with their partners, and appreciated having again the chance to dance, even though now in a different context and with different abilities. Participants unanimously highlighted an important principle: that everybody in the group should do what they could. This way, each one would work at their own pace and capability, considering their own abilities and limitations, without comparison with one another. Another important aspect was the group atmosphere created by the facilitator, with a huge sense of proximity and kindness. During the conversation, they recalled many exercises done in pairs or with the whole group. Social connection during the activities proved to be a key element of enjoyment and sense of belonging. Moreover, some of the residents had the routine to do daily activities in terms of PA, like going for a walk, or contributing to the NH by folding clothes or watering the plants, which also involves a degree of physical activity while at the same time constituting a generative and meaningful task. Finally, we learned that some relationships among participants were further developed and reinforced thanks to this group intervention.

In France

Overall, it was perceived as a positive experience, despite partial memory loss. Participants generally expressed high satisfaction with the sessions. They appreciated the instructor, the physical activities, and the feeling of pushing themselves. One participant said they "loved everything." However, because the last session took place two weeks earlier, many had forgotten specific details, with comments like “I forgot everything” or “it’s already evaporated.”

Second, tangible benefits in mobility and autonomy were perceived. One highly engaged participant shared that she could now stand up from her chair without help, which she couldn’t do before. She even managed to take a few steps thanks to the sessions. Others mentioned feeling less stiff and overall physical improvement, though not all perceived significant changes.

Third, evaluations were seen as necessary but slightly burdensome. While some participants couldn’t remember the assessments, those who did acknowledged they were a bit unpleasant but understood their necessity. This shows that evaluations are acceptable but could benefit from being better explained or made more engaging.

Fourth, participants manifested a strong motivation not to “be like statues”. Participants were motivated by a desire to stay active and maintain dignity in aging. One person said, “We don’t want to be like statues doing nothing,” which highlights a clear will to maintain independence and a meaningful daily life.

Finally, participants identified the need for continued support to maintain activity. For example, several participants expressed the need for guidance to keep exercising outside of the structured sessions. One person said: “As long as someone comes to help, we try. But alone, it’s not possible anymore.” This underscores the importance of ongoing external support (from instructors or caregivers) to sustain long-term benefits.

In Germany

Despite low participation for diverse reasons at the focus group —with only three nursing home residents attending, one participant expressed her satisfaction with the study as follows: "*I have to be honest, I can't say anything spontaneously because I don't always have the head for it. All I know is that I was very satisfied. I really enjoyed it. I always looked forward to that day and it was good for me, yes? I benefited from it. I know that*”". Another participant found it very motivating to see all the other people in the group participating actively. He expressed: "*That I saw that people actually always played along well. I liked that*”".

When asked about which session strategies had worked well for them, participants declared having very much liked the pieces of homework they received at the end of the session, to continue practicing physical activity by their own: "*Yes, I have them upstairs and I always do them after lunch, at lunchtime when I don't want to drink coffee I do the exercises. And I also do them in the evening. And sometimes it even happens to me that when I can't sleep, I get up and do the exercises at night. Honestly, because the exercises are good for me. Especially for my bones, because you're already sore afterwards when you do the exercises*". A second participant found kindness an important aspect of the session. With respect to intrinsic motivation, curiosity was mentioned as an important motivator to keep coming to the sessions. Using different-faced smileys at the end of each session to assess daily satisfaction with the training was perceived as good.

Some challenges were mentioned, especially the ones related to the own disabilities: "*So everything I had to do with my left arm, I couldn't do because I couldn't do anything with it anymore*". Another participant stated it as follows: "*Yes, but it's not as extreme as before because of the bones. I can't do it to the same extreme as before*". Having cognitive impairment was also found to be a big challenge to recall the activities. Nevertheless, the positive feelings associated with the training sessions remain: "*I'm a faint memory, but I'm there too. I liked everything they said*". No newly arising health problems were associated with participation in the intervention.

When looking into the impact of the intervention into their potential future practice of and attitude towards physical activity, one participant summarized as follows: "*I've already done it, but not as extensively as you say. Now I'm doing it for real, extensively, really, and I want to make progress, yes. And I do it all the time. I don't give up, yes, I always do it*". Another participant mentioned the following with respect to the overall benefit of the intervention: "*Yes, I was always happy with myself and felt at home, yes, I felt comfortable*". At the end, all three participants were of the opinion that they would recommend this intervention to others.

Learnings by facilitators and supporting students

As co-creators, facilitators and assisting students were asked about their perception of progress, and learning derived from participating in one or several stages of the project.

Most pilot intervention facilitators clearly expressed that Join4Joy had constituted an improvement in their working procedures. They expressed moderate increases in their ability to plan and deliver group PA sessions for older adults. A wide range of answers, from little to great

increase, was observed for acquired knowledge on behaviour change techniques. Facilitating Join4Joy pilots had a positive effect on staff motivation to continue to work with older adults.

The results above are interpreted as positive, especially when added to the fact that most settings have decided to continue to conduct Join4Joy-based activities, even after project end. A special note should be made that the research time found difficulty collecting learning reflections from their least qualified facilitators, who were often people with low educational background and often from non-European origin, and therefore different cultures and native languages.

Students participating to different degrees. While some assisted in data taking or questionnaire development, others were active part of interventions, assessments or interviewing. Clearly, those who participated in intervention or more than one task benefited most and were the most satisfied. A majority of participating students showed:

- Great improvement in PA behaviour change knowledge.
- Moderate increase in knowledge about ageing.
- Great increase in level of motivation to work with older adults in the future.
- Moderate-to-high increase in practical skills working with older adults.
- That the Join4Joy process had allowed them to learn.
- Moderate-to-high satisfaction with their participation.
- Noticeably higher interest in pursueing a career with older adults in the future (all except for one student, who attended only one assessment session).

Substudy on the implementation and adaptation to local contexts

As already detailed, the Join4Joy approach was implemented in the 5 participating countries and required an adaptation to the settings (nursing home or community), to the cultural and socio-economic contexts, and the specificities of the target population involved in each site. It is to be highlighted that the trainer, after undergoing the educational training, was the key actor to adapt and implement the Join4Joy approach in the PA sessions.

Therefore, a specific evaluation was conducted aimed at understanding how each intervention site in the 5 participating countries has implemented and adapted the core components of Join4Joy approach, i.e., enjoyment and social inclusion, to the setting (nursing home or community), specific target population and the cultural and socio-economic context.

Specifically, a qualitative design applying a phenomenological perspective was conducted. All trainers involved in the 5 sites were asked to participate. The techniques applied were online

semi-structured interviews conducted via teams. A total of 8 individual interviews and one group interviews reaching a total of 9 professionals from the 5 sites who agreed to participate. Interviews were audio-recorded and transcribed.

The topic guide structuring the interview included questions about: the characteristics of the group, enjoyment, social inclusion, implementation and adaptation and ideas for improvement and sustainability.

An inductive thematic analysis was conducted looking for similarities and differences across settings, as well as what has worked better and what worse.

The results found in terms of similarities across sites were the following: enjoyment was key for adherence and participation to the intervention: it created a sense of belonging and bounding; the trainer addressed individual needs.

Regarding the differences encountered, in the community, a specific challenging step was the recruitment of participants. Overall, community-dwelling participants were autonomous in their daily lives. Moreover, a very diverse population was targeted in this setting needed specific adaptation such as the groups for different ethnic minorities, which required overcoming language barriers when they were not fluent in the local language. During the intervention, some groups had to deal with participants having low attendance and some others dropping out.

The specificities found in the nursing home settings were related to the high diversity of functional capacities and pathologies. Given the heterogeneity among participants, the recruitment and the implementation of the intervention required coordination with other professionals working in the nursing home, as well as the support of the facility director.

Similarities were identified across sites: music was played in all sessions, enjoyment was used both as a tool and as a goal in itself, elements supporting having fun were included, the session was structured while accounting for adaptations to individual needs. The differences reported across groups were related to the trainers' profile and how they facilitated the groups. Trainers came from a diversity of disciplines, and their heterogeneity in previous experience with PA groups lead to different levels of confidence in applying specific tools. They could dedicate different amounts of time to plan the sessions and planned them differently, for example they all did the initial interview, but it changed slightly from trainer to trainer according to the setting. Finally, the degree of cocreation during the sessions, i.e., the extent to which participants were asked and involved in the decision making of how sessions would be conducted, differed across sites.

Enjoyment was reported as a drive for sustained participation, a key element to motivate participants and was related with autonomy and a positive social interaction.

Social inclusion was reached with limited success. The more isolated and socially vulnerable profiles of older people were more difficult to reach. In the case of ethnic minorities, groups were conducted among themselves, thus not reaching social integration. In this case, cultural and idiomatic barriers were encountered.

The adaptation differed in the sites, counting on different degrees of co-creation during the implementation (participation of the participants in deciding what to do and how, along the process) and was influenced by the previous training and experience of the trainer.

This analysis was useful to identify barriers and enablers. The main limitations reported were the room and the space they had to conduct the groups and the material at their disposal. In the community setting, recruitment was challenging, as already mentioned, while in nursing homes, the lack of staff was a limitation. Key enablers were assisting students and members of staff involved in the project who supported recruitment and the facilitation of groups. Last but not least, the facilitator charisma was a major facilitator to motivate participants and establish a bond with him/her.

This process had some **limitations**. Interviews were carried out using English as a common language between trainers and the professional interviewing. However, for none of those English was the mother tongue and some trainer had difficulties with English. Therefore, researchers from the local site were present during the interview to support understanding. Moreover, interviews could not be conducted in person and were done through video calls.

Conclusions from the analysis on the implementation and adaptation to local contexts are the following:

- Enjoyment has been the main motivational pillar of the interventions.
- Inclusion has been challenging and demands specific adaptations.
- Implementation is a balanced action between structure and flexibility.
- The management of tasks related with the PA group was challenging and labour-intensive and required supporting staff (recruitment, bringing NH residents to the group...).
- The role of the trainer is key to successful implementation.

Report discussion and conclusions

Overall, Join4Joy pilot interventions were well-received by participants, with high levels of engagement. Contrary to our experience with traditional PA programmes, attendance rates were strong, with most participants attending most of the sessions, and drop-out rates that remained low across all sites. The involvement of local staff and organisations was key in

achieving such high figures as they contributed significantly by timely reminding residents of the session days and times. Participants expressed satisfaction with the sessions, with over 89% of them indicating they enjoyed and valued this intervention. Many also shared that they would like to continue staying active once the intervention ended, which could be indicative of the potential of the Join4Joy approach in fostering sustained PA behaviour, in the mid and long-term. Several of the assessed outcomes showed positive (beneficial) trends, despite the fact that most results for physical-related aspects did not reach statistical significance. This could, nonetheless, possibly be explained by the fact that these pilot studies involved small sample sizes. For older adults living in NHs, maintaining existing levels of physical function and activity is already a valuable outcome, as age-related decline is common. Even small gains can enhance daily life and well-being, but preventing deterioration is just as important. Another key aspect of the success of the pilots was the participant-reported degree of enjoyment. Many described the sessions as fun, motivating, and socially inclusive. Activities that included music, balance challenges, and coordination exercises were particularly well-received. Many participants noted the support they received from staff and peers as a crucial factor in their continued motivation and success. To this regard, the idea of flexibility is a very relevant trait of the Join4Joy approach, which should be spotlighted. While all sites followed the core Join4Joy recommendations, each one of them adapted the content and format to fit their local context, available resources, and the needs of the involved individuals. The results of these pilots suggest that Join4Joy-NH has strong potential for broader implementation, especially when supported by trained staff and tailored to the specific context/scenario and participants. One key strength of the implementation lies in the multidisciplinary nature of the facilitator's role. Sports educators are not only required to master PA techniques but also to integrate elements of dementia care, cultural sensitivity, storytelling, and humour into their sessions. This blend of clinical awareness and creative engagement is essential for adapting to diverse resident profiles and maximizing impact in long-term care settings.

Join4Joy gave participants the opportunity to identify challenges and areas of improvement by the performance of training sessions with NH residents. Having trainers with different professional backgrounds was one of the main challenges to address when building the structured sessions. Moving beyond one's own comfort zone was described as a main challenge by our facilitators in Germany. The staff requirements increased when working with NH residents. As an example, the use of diuretics affects participation, requiring at the same time staff support for the use of the toilet. Having residents using wheelchairs and rollers implies the need for staff to facilitate transport within the facility as well as for bigger rooms for the training sessions. As strengths we identified the diversity with respect to training and

background from the facilitators, which enriched the training sessions and increased motivation among participants. For instance, while in Germany pilot 1 had a strong focus on cognitive tasks, combined with PA, pilot two –which was carried out in a larger room- shifted towards mor PA, with some cognitive tasks. Music, either played or sung, was integrated in each session. Simple exercise tasks to be done by the participants on their own during the time till the next session, also identified as 'homework', were provided at the end of each Join4Joy session. Join4Joy also allowed for a better connection between facilitators and participants by incorporating biography elements in the training sessions. In addition to evaluating outcomes among participants, the acceptability and experience of the Join4Joy approach from the perspective of staff were also explored. A separate publication is planned to present these findings in detail. Furthermore, a qualitative analysis is planning to be done to better understand how the Join4Joy approach can be adapted to different care settings and populations. These additional results will support the future development of innovative PA interventions for older adults. Preliminary results on how Join4Joy was and can be adapted to local settings can be found under section Analysis on the implementation and adaptation to local contexts.

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SUPPLEMENTARY MATERIAL

Table 1. Sociodemographic data of participants in Pilots 1 and Pilots 2, for all intervention sites.

	PILOT 1				PILOT 2				
	Germany (n=11)	**France (n=9)**	**Spain (n=17)**	**Total (n=37)**	**Germany (n=9)**	**France (n=10)**	**Spain 2.1 (n=9)**	**Spain 2.2 (n=10)**	**Total (n=38)**
Number of females (%)	7 (63.64%)	9 (100.00%)	13 (76.50%)	29 (78.38%)	5 (55.56%)	8 (80.00%)	6 (66.67%)	9 (90.00%)	28 (73.68%)
Number of males (%)	4 (36.36%)	0 (0.00%)	4 (23.50%)	8 (21.62%)	4 (44.44%)	2 (20.00%)	3 (33.34%)	1 (10.00%)	10 (26.32%)
Mean age, years (SD)	87.64 (7.88)	91.89 (6.64)	84.82 (8.00)	85.46 (8.87)	85.44 (8.92)	87.60 (2.46)	81.78 (12.75)	79.1 (5.69)	(82.03 (11.35)
Mean weight, kg (SD)	72.14 (8.30)	67.06 (13.59)	70.05 (16.43)	68.83 (14.56)	72.90 (14.60)	69.09 (19.94)	66.16 (14.62)	65.90 (7.92)	69.99 (15.99)
Mean height, cm (SD)	164.91 (7.44)	154.89 (7.98)	159.12 (7.25)	158.93 (9.24)	168.10 (9.48)	155.90 (4.23)	157.67 (11.77)	153.60 (8.49)	157.92 (11.37)
Mean BMI (SD)	26.54 (2.79)	26.51 (5.30)	27.58 (5.68)	26.92 (5.35)	27.76 (8.03)	28.43 (7.94)	26.19 (4.37)	28.62 (4.72)	25.28 (7.45)
Number of participants with previous PA experience (%)	9 (81.82%)	9 (100.0%)	13 (76.5%)	31 (83.78%)	8 (88.89%)	8 (80.00%)	8 (88.89%)	10 (100%)	34 (89.47%)
Number of participants with no previous PA experience (%)	2 (18.18%)	0 (0.00%)	4 (23.50%)	6 (16.22%)	1 (11.11%)	2 (20.0%)	1 (11.11%)	0 (0.00%)	4 (10.53%)

Colours: blue – Pilot 1 results; yellow – Pilot 2 results

Table 2. The results of Reisberg scale of participants in Pilots 1 and Pilots 2 in all the sites.

	PILOT 1				PILOT 2				
	Germany (n=11)	**France (n=9)**	**Spain(n=17)**	**Total (n=37)**	**Germany (n=9)**	**France (n=10)**	**Spain 2.1 (n=9)**	**Spain 2.2 (n=10)**	**Total (n=38)**
No cognitive impairment	2 (18.18%)	0 (0.0%)	0 (0.0%)	2 (5.41%)	3 (33.33%)	1 (10.0%)	1 (11.11%)	2 (20.00%)	7 (18.42%)
Very mild cognitive impairment	6 (54.55%)	2 (22.22%)	8 (47.1%)	16 (43.24%)	1 (11.11%)	4 (40.0%)	3 (33.33%)	1 (10.0%)	9 (23.68%)
Mild cognitive impairment	0 (0.0%)	2 (22.22%)	6 (35.3%)	8 (21.62%)	1 (11.11%)	2 (20.0%)	2 (22.23%)	1 (10.0%)	6 (15.79%)
Moderate cognitive impairment	2 (18.18%)	3 (33.34%)	3 (17.6%)	8 (21.62%)	1 (11.11%)	3 (30.0%)	3 (33.33%)	6 (60.00%)	13 (34.21%)
Moderately severe cognitive impairment	2 (18.18%)	2 (22.22%)	0 (0.0%)	4 (10.81%))	3 (33.34%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (7.89%)

Colours: blue – Pilot 1 results; yellow – Pilot 2 results

Table 3. Level of education of participants in Pilots 1 and Pilots 2 in all the sites.

	PILOT 1			
	ABKU (n=11)	SielBleu (n=9)	UVic (n=17)	TOTAL (N=37)
illiterate	0 (0.00%)	0 (0.00%)	1 (5.88%)	1 (2.70%)
alphabetized	0 (0.00%)	0 (0.00%)	6 (35.29%)	6 (16.22%)
primary education	6 (54.55%)	5 (55.56%)	7 (41.18%)	18 (48.65%)
secondary education	3 (27.27%)	2 (22.22%)	3 (17.65%)	8 (21.62%)
higher non-university education	0 (0.00%)	1 (11.11%)	0 (0.00%)	1 (2.70%)
higher education at the university	2 (18.18%)	1 (11.11%)	0 (0.00%)	3 (8.11%)

	PILOT 2				
	ABKU (N=9)	SielBleu (N=10)	Uvic 2.1 (n=9)	UVic 2.2 (n=10)	TOTAL
illiterate	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (2.6%)
alphabetized	0 (0.00%)	0 (0.00%)	4 (44.44%)	1 (10.00%)	6 (15.4%)
primary education	2 (22.22%)	0 (0.00%)	3 (33.33%)	8 (80.00%)	19 (48.7%)
secondary education	2 (22.22%)	2 (20.00%)	2 (22.22%)	1 (10.00%	8 (20.5%)

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higher non-university education	1 (11.11%)	1 (10.00%)	0 (0.00%)	0 (0.00%)	2 (5.1%)
higher education at the university	4 (44.44%)	7 (70.00%)	0 (0.00%)	0 (0.00%)	3 (7.7%)

Table 4. Mean satisfaction of the sessions, attendance rate and the number of dropouts of participants in Pilots 1 and Pilots 2, in all of the sites.

		Mean Satisfaction of the Sessions (Points)	Mean Attendance Rate (Numbers and %)	Drop Out Rate (Numbers and %)
Pilots 1	**Germany**	4.32 (0.45)	11.0/12 (91.67%)	1/12 (8.33%)
	France	NA	10.8/12 (89.81%)	1/10 (10.00%)
	Spain	4.61 (0.41)	9.7/12 (80.88%)	0/17 (0.00%)
Pilots 2	**Germany**	3.97 (0.47)	8.9 (73.79%)	4/13 (30.77%)
	France	NA	NA	0/10 (0.00%)
	Spain 2.1	4.24 (0.36)	10.0/12 (83.33%)	0/9 (0.00%)
	Spain 2.2	4.04 (0.35)	11.4/12 (95.00%)	0/10 (0.00%)

Colours: blue – Pilots 1 results; yellow – Pilots 2 results.

Table 5. Results of the tests of participants in Pilots 1 and Pilots 2 for all sites.

PILOTS 1								PILOTS 2									
Germany (n=11)	Germany (n=11)	France (n=9)	France (n=9)	Spain (n=17)	Spain (n=17)	Total (N=37)	Total (N=37)	Germany (n=9)	Germany (n=9)	France (n=10)	France (n=10)	Spain 2.1 (n=9)	Spain 2.1 (n=9)	Spain 2.2 (n=10)	Spain 2.2 (n=10)	Total (n=38)	Total (n=38)

Table 6. Results of participants' improvement and enjoyment after the implementation of the programme in Pilot 1 and Pilot 2 in all of the sites

PILOTS 1				PILOTS 2				
Germany (n=11)	**France (n=9)**	**Spain (n=17)**	**Total (n=37)**	**Germany (n=9)**	**France (n=10)**	**Spain 2.1 (n=9)**	**Spain 2.2 (n=10)**	**Total (n=38)**