

Reducing negative aging stereotypes via educational intervention in older people: A randomized controlled study

Abstract

Anti-ageism interventions traditionally target younger individuals. We analyzed the effect of an educational intervention that combined an infusion of aging content with videos to reduce negative stereotypes toward aging in a randomized controlled study of 56 community-dwelling older adults. The experimental group received a single one-hour information session and video viewing on ageism; the control group viewed one hour of videos unrelated to ageism. Repeated-measures ANOVA indicated that the experimental group reported a significantly reduced Negative Stereotypes Toward Aging Questionnaire (CENVE) total score along with an independent measure of the character–personality factor in this questionnaire one week and one month after the intervention compared to baseline. The control group showed no changes. This work reports for the first time that a one-hour information session about aging combined with video viewing on ageism can efficiently reduce negative stereotypes of aging in older people in the short and medium term.

Keywords: Ageism; Aging Stereotypes; Community-dwelling adults; Information; Indirect Interaction

Introduction

Ageism is defined as "prejudice of one age group over another age group" (Butler, 1969) and today is more prevalent than sexism and racism (Ayalon, 2014). Ageism negatively affects the physical, psychological, and social health of older people (Chang et al., 2020; Levy et al., 2020). For example, a recent study during the COVID-19 pandemic reported that positive self-perceptions of aging are associated with increased resiliency in older adults (Losada-Baltar et al., 2020).

Discriminatory behaviors are the most explicit form of ageism and are present at multiple levels, including individual, interpersonal, and institutional levels (Iversen et al., 2009). Age discrimination manifests consciously or unconsciously through stereotypes, prejudices, and behaviors (Levy & Banaji, 2002). Stereotype embodiment theory (Levy, 2009) suggests that stereotypes act unconsciously within individuals, generating expectations about aging that act as self-fulfilling prophecies (Levy & Leifheit-Limson, 2009). This represents a barrier to healthy behaviors and negatively affects people's health (Andrews et al., 2017). Thus, adjusting stereotypes to more positive views of aging has the potential to improve the health of older adults.

According to the World Health Organization's Global Report of Ageism, the three main strategies to reduce ageism are policies and laws, educational interventions, and intergenerational contact (World Health Organization, 2021). However, most published studies of educational interventions focused on young participants, such as university students and health care workers (Chonody, 2015; Burnes et al., 2019), while excluding older people. Chang et al. (2020) admitted in their bibliographic review that "older people were excluded from health research, such as trials in cardiology, internal medicine, nephrology, neurology, and preventive medicine too" (p. 7). Yet excluding older people from research is

itself an example of ageism and thus further contributes to age discrimination while doing little to improve the health of older adults.

Negative stereotypes of aging are associated with multiple modifiable and non-modifiable multidimensional variables that vary with older people's sex and place of residence (Blinded for Review, 2022). Education level is the variable most frequently associated with the perception of aging, so it follows that educational interventions are most commonly used to address ageism (Freeman et al., 2016; Menéndez et al., 2016). Although a high educational level is associated with fewer negative stereotypes of aging, highly educated people are not free from showing ageist attitudes, including healthcare students and workers (Chang et al., 2020; Godoy et al., 2017). Interventions that combine information of attitudes toward aging and ageism with other methods, such as intergenerational contact, have obtained the greatest improvements in attitudes and knowledge about aging (Burnes et al., 2019; Lytle & Levy, 2019; Lytle et al., 2021). Multiple interventions have applied positive (Shih et al., 2012) and negative stereotypes of aging (Armstrong et al., 2017) in samples of older people to analyze their effect on health, yet few experimental studies have focused on addressing ageism. Further, existing studies report mixed results regarding efficacy, limiting the ability to design and execute effective anti-ageism interventions (Stuart-Hamilton & Mahoney, 2003). Previously, only Brothers and Diehl (2017) successfully improved the view of older people's aging through the Aging^{Plus} intervention program, which combined education with physical activity.

Another type of educational intervention methodology scarcely studied in the literature is exposure as an indirect interaction, which includes use of videos, guest speakers, panel discussions, and observations (Chonody, 2015; Cramer et al., 1997). Of these, videos are the least used, although videos can be an easy and feasible method to address ageism, especially when combined with information (Blanco-Molina & Pinazo-Hernandis, 2016;

Braun et al., 1998), with intergenerational contact (Lytle et al., 2021), or with both information and intergenerational contact (Mellor et al., 2015). Further, Burnes et al.'s (2019) meta-analysis of anti-ageism educational interventions indicates that only 24% of studies included control groups, only 19% included follow-up measurements, and only 8% used randomized controlled designs. Additionally, when control groups were used, they either were not subjected to specific activities or those activities were not reported (Lucchetti et al., 2017; Mellor et al., 2015; Merz et al., 2018). Single-session interventions have also been poorly studied, although they have achieved favorable results from university students and adult workers (Blanco-Molina & Pinazo-Hernandis, 2016; Stuart-Hamilton & Mahoney, 2003).

Considering these significant gaps in the literature on anti-ageism interventions, the aim of this study was to design and apply a single-session infusion of aging content combined with video viewing to reduce negative stereotypes toward aging of community-dwelling older people.

Method

Study design

Participants in this randomized-controlled experiment were randomly assigned (1:1) to an experimental group that participated in a one-hour single-session infusion of aging content session combined with video viewing on ageism, or a control group that attended a one-hour video session unrelated to age discrimination. Participants were not informed of their group assignment and thus were blinded to the experiment. Recruitment was carried out in three community centers in Basque Country in April–May 2019.

The study population had a mean age of 76.02 ± 6.01 years, 45 (80.4%) were women, 28 (50%) were married, 41 (73.2%) had only primary education, and 42 (75%) received the lowest retirement pensions (<847.52 €/month). All individuals participated in community center activities. None of the sociodemographic variables differed significantly between experimental and control groups ($p \geq 0.05$) ([Supplemental material 1](#)).

After signing informed consent, participants conducted three structured individual interviews, each lasting 15 minutes, in private rooms in community centers. Participants completed the first interview (PRE) one week before the assigned intervention. In this interview, participants completed the mini-cognitive examination (MEC) ([Lobo et al., 1979](#)), Barthel index ([Mahoney & Barthel, 1965](#)), and Negative Stereotypes Toward Aging Questionnaire (CENVE) ([Blanca et al., 2005](#)) and provided sociodemographic variables. The second and third interviews were assessed one week (POST) and one month (FOLLOW-UP) after the intervention, respectively; only the CENVE was completed in the second and third interviews. See [Supplemental material 2](#) for intervention schedule.

Data collection and interviews were carried out by trained experts. The project was conducted in accordance with the Declaration of Helsinki and approved by a Human Research Ethics Committee.

Inclusion and exclusion criteria, recruitment, and randomization

In total, 250 community-dwelling older people (80.4% women) who attended community centers in the Basque Country (Spain) and participated in activities offered by these centers were invited to participate, and 74 people agreed to take part in the research. Inclusion criteria were ≥ 60 years old, not suffering from cognitive impairment [mini-cognitive examination (MEC) score > 23] ([Lobo et al., 1979](#)), and not reporting severe functional impairment (Barthel index ≥ 50) ([Mahoney & Barthel, 1965](#)). Exclusion criteria

were diagnosis of schizophrenia, non-schizophrenic psychosis, or psychiatric pathologies with delusional symptoms. All 74 individuals who agreed to participate met the inclusion and exclusion criteria, but only 56 (75.68%) community-dwelling older people completed the study.

Once the informed consent was signed, participants were assigned randomly and blindly to their corresponding group (experimental or control). Participants did not know their group assignments. See [Supplemental material 3](#) for the study participant flow-chart.

Older people who participated in this intervention were volunteers who did not receive economic compensation but were provided a report with the results derived from the study.

Infusion of aging content combined with video viewing

The experimental group's one-hour intervention was delivered by members of the research team and consisted of the following content: information consisting of an infusion of content covering demographic aging in the Basque Country (increase in life expectancy and decrease in the birth rate), definition of ageism, consequences of ageism on the health of older people, and refutation of the 15 items of the CENVE with practical examples and empirical data. This is an example of the CENVE item refutation exercise:

“Severe memory problems and cognitive impairment are suffered by most people over 65 years old. What do you think about that?”

- A recent national study estimated a prevalence of 18.5% for cognitive impairment in people aged 65 or over who attend primary care. Although this percentage increases with age, it does not include all older people. In older age groups, such as those over 85 years of age, the prevalence of cognitive impairment stands at 45.3% (Vega-Alonso et al., 2018).

- Another national study estimated the prevalence of cognitive impairment at 19%, 14.7% for cognitive impairment without dementia, and 4.9% for dementia. The prevalence of cognitive impairment increased with age, ranging from 13% in people between 65 and 69 years old to 43.8% in people 85 years old or older ([Rodríguez-Sánchez et al., 2011](#)).

“Therefore, we could say that although the prevalence of cognitive impairment increases with age, this percentage does not reach all people in these age groups.”

Participants were not provided with the CENVE items as part of the exercise.

Immediately, the participants viewed two videos about positive ([AtresMedia, 2017](#)) and negative ([MarketingDirecto, 2016](#)) examples of aging in the media. After each video, the experimenters directed a debate and Q&A session. These two activities were considered within the framework of video viewing because the addressed contents were aspects from each video, and not as an independent methodology. The nomenclature "infusion of aging content combined with video viewing" was selected based on studies by [Cramer et al. \(1997\)](#) and [Chonody \(2015\)](#), which both distinguished several types of anti-ageism educational interventions in their works: information (unit on aging, aging course, and infusion of aging content), direct exposure (intergenerational contact), exposure as indirect interaction (videos, guest speakers, panel discussions, and observations), creative activities, and discussion.

The directed debate and open questions were guided by the experimenter and were focused on addressing issues such as approaching aging as a natural process and not a disease, and promoting the heterogeneity of the aging process and among older people. Below is an example of the presentation of the open questions of a positive example video ([AtresMedia, 2017](#)):

- *“What do you think of the image of an older woman who has worked in industry and at home at the same time?”*

- *“Can an older person be a non-conformist and adapt to their environment?”*
- *“Is intergenerational cooperation necessary to solve the problem of retirement pensions?”*
- *“It is curious how the older woman in the video rejects the attempt to make her intervention in the program funny and asks for a serious analysis of the situation.”*

Control group

The control group participated in a separate one-hour session unrelated to ageism in which they viewed two videos: a short film on dementia ([Fundació Uszheimer, 2012](#)), and a short film on sexuality in people older ([Alvaro Oliva, 2012](#)). The session ended with a directed debate and open questions. Participants were asked about various aspects of the videos without mentioning ageism. In the first video, questions were raised around, e.g., their opinion about the video, knowledge of similar situations in their social circle, and the role of the family in the care of older people with dementia. The second video addressed topics around the opinion of the participants about the video, the behaviors and differences of the characters during the video short, previous knowledge about the *Kama Sutra*, and the usefulness of sexual education during youth.

Experimental and control conditions were matched on time.

Statistical analysis

After reviewing the literature, we estimated a ≥ 4.2 difference between total mean CENVE scores in the first (PRE) and second (POST) interviews. Therefore, accepting an alpha risk of 0.05, and a beta risk of 0.2 in a bilateral contrast, we calculated that 23 subjects were required in the experimental group and 23 in the control group to detect significant differences. Common standard deviation was assumed to be ~ 6.8 , and the correlation

coefficient between initial and final measurements would be 0.8. We estimated a loss-to-follow-up rate of 26%.

Dependent variables were CENVE and its corresponding factors (I: health, II: motivational–social, and III: character–personality). Normality of quantitative variables was analyzed using the Kolmogorov-Smirnov normality test ($n > 50$). Once normality was determined, we assessed homogeneity of experimental and control groups ($p \geq 0.05$) using Student's t-tests for parametric quantitative variables, Mann–Whitney U test for non-parametric variables, or chi-square test for categorical variables. Sociodemographic variables were considered for descriptive purposes only.

To evaluate differences in CENVE between experimental and control groups (pairwise comparison), measure effect size of the intervention, and compare CENVE mean scores in experimental and control groups over time, we used mixed-design (group x time) repeated-measures ANOVA. Effect size of the intervention was described through the partial Eta squared parameter (η^2_p) (Cohen, 1988): small (0.01), medium (0.06), or large (0.14). Pairwise comparisons between the means of the total CENVE and its three factors one week before (PRE), one week after (POST), and one month after the intervention (FOLLOW-UP) were analyzed using a paired t-test. A statistically significant association was considered as $p < 0.05$.

Measures

Age stereotypes

CENVE assesses the cognitive dimension of ageism through the perception of aging and negative stereotypes of aging (Blanca et al., 2005). The questionnaire's 15 items are divided into three factors: I: health (items 1, 4, 7, 10, and 13), II: motivational–social (items 2, 5, 8, 11, and 14), and III: character–personality (items 3, 6, 9, 12, and 15) (Supplemental

material 4). Likert 1–4 responses are provided according to the level of conformity with the stereotype, with a maximum score of 20 for each factor and 60 for the total score. A higher score indicates a greater presence of negative stereotypes of aging. The questionnaire has high internal consistency (Cronbach's alpha = 0.89) (Menéndez et al., 2016) and is the most widely used tool to study ageism in Spanish-speaking communities (Rosell et al., 2020).

Sociodemographic variables

Sociodemographic variables were obtained from participants during the interviews: age, sex, marital status, education level, current retirement salary, retirement age, number of children and grandchildren, number of community center activities in which they participate, religiousness, number of medications taken, number of chronic diseases, anthropometric data, and time as a caregiver.

Screening for cognitive and functional impairment

MEC is a screening tool for cognitive impairment in Spanish older people (Lobo et al., 1979). The scale's maximum score is 35, and its items are distributed in five dimensions of cognition: orientation, fixation, concentration and calculation, memory, and language and construction.

The Barthel index was used to screen for autonomy for activities of daily living (Mahoney & Barthel, 1965). This tool is validated in Spanish (González et al., 2018). It consists of 10 activities: bathing, dressing, grooming, going to the toilet, walking, moving from a bed to chair, stairs, bladder control, bowel control, and feeding. These activities are scored into categories according to the level of autonomy. The maximum index score is 100 points, with higher scores indicating greater autonomy.

Results

Effect of the intervention on CENVE

There were no significant differences between the PRE scores of the total CENVE ($F = 2.695, p = 0.106$), CENVE factor I: health ($F = 3.339, p = 0.073$), CENVE factor II: motivational–social ($F = 1.298, p = 0.260$), and CENVE factor II: character–personality ($F = 1.939, p = 0.169$) between the experimental group and the control group (Supplemental material 1).

Differences in CENVE scores (total and factor-specific) between experimental and control groups during the study and size of the intervention effect in each group are shown in Table 1. Pairwise comparison of the means in experimental and control groups are shown in Table 2. There were significant differences between total CENVE scores in experimental and control groups throughout the intervention (group x time: $F = 9.062, p < 0.001, \eta^2_p = 0.255$). The experimental group had a large intervention effect size ($\eta^2_p = 0.530$), while that of the control group was small ($\eta^2_p = 0.001$). When comparing total mean CENVE scores of the groups in pairs, the intervention improved the perception of aging in the POST measurement ($\bar{x}1 - \bar{x}2 = 4.414, p < 0.001$) and FOLLOW-UP ($\bar{x}1 - \bar{x}3 = 2.897, p = 0.013$) in the experimental group. There were no significant differences between the second and third measurements ($\bar{x}2 - \bar{x}3 = -1.517, p = 0.115$) in the experimental group, so it could be said that the POST measurement improvement remained stable in the FOLLOW-UP. There was no difference between means in the control group (Table 2).

[Insert Table 1 about here]

[Insert Table 2 about here]

CENVE factor I: health scores did not significantly differ over time between experimental and control groups (group x time: $F = 2.765, p = 0.072, \eta^2_p = 0.094$) (Table 1). However, the experimental group showed a trend for a more positive perception of health in

the POST measurement ($\bar{x}_2 - \bar{x}_1 = -1.379, p < 0.001$) and FOLLOW-UP ($\bar{x}_3 - \bar{x}_1 = -1.207, p = 0.001$) compared to PRE, and this improvement seemed stable ($\bar{x}_2 - \bar{x}_3 = -0.172, p < 0.587$) (Table 2). The control group did not report significant changes in the perception of health in the POST measurement ($\bar{x}_1 - \bar{x}_2 = 0.333, p = 0.320$), but surprisingly the number of negative health stereotypes one month later was significantly lower than in the PRE measurement ($\bar{x}_3 - \bar{x}_1 = -0.556, p = 0.045$).

CENVE factor II: motivational–social scores also did not significantly differ over time between experimental and control groups (group x time: $F = 1.844, p = 0.168, \eta^2_p = 0.065$) (Table 1). The experimental group had more positive motivational-social scores in the POST measurement compared to PRE ($\bar{x}_2 - \bar{x}_1 = -0.862, p = 0.029$), but the differences were not significant at FOLLOW-UP ($\bar{x}_1 - \bar{x}_3 = 0.552, p = 0.168$) (Table 2).

As opposed to factors I and II, CENVE factor III: character–personality scores significantly differed between the experimental and control groups over time (group x time: $F = 8.053, p = 0.001, \eta^2_p = 0.233$) (Table 1). The intervention effect size of the experimental group was large ($\eta^2_p = 0.405$) and greater than the control group ($\eta^2_p = 0.037$). Further, character–personality scores of the experimental group significantly improved in the POST measurement ($\bar{x}_1 - \bar{x}_2 = 3.000, p < 0.001$) and FOLLOW-UP ($\bar{x}_1 - \bar{x}_3 = 2.690, p = 0.001$) compared to PRE, and this improvement remained stable ($\bar{x}_2 - \bar{x}_3 = -0.310, p = 0.307$) (Table 2).

Discussion

This work showed that a single one-hour session combining a session of an infusion of aging content with videos on ageism was enough to improve community-dwelling older people's perception of aging one week after the intervention, and this improvement remained stable after one month. Educational interventions that combined information (infusion of

aging content) with exposure as an indirect interaction (videos), aimed at older adults, performed in a single session, and with control groups, randomization, and with a third measurement are scarce in the literature.

Educational interventions that combined information with exposure as an indirect interaction have targeted younger populations ([Brothers & Diehl, 2017](#)). Studies combining information with group discussions reduced ageism in health care students and workers ([Lucchetti et al., 2017](#); [Mellor, et al., 2015](#); [Merz et al., 2018](#); [Stuart-Hamilton & Mahoney, 2003](#)). Similar outcomes occurred with educational interventions that combined information with video viewings, which improved attitudes toward aging in these health care samples ([Blanco-Molina & Pinazo-Hernandis, 2016](#); [Braun et al., 1998](#); [Lytle et al., 2021](#)). Thus, information combined with exposure as an indirect interaction could also be effective to reduce ageism in older people.

Our work agrees with [Blanco-Molina & Pinazo-Hernandis \(2016\)](#) and [Stuart-Hamilton & Mahoney \(2003\)](#), who reported that information combined with exposure as an indirect interaction in a single session can be an efficient means to combat ageism in younger populations. However, anti-ageism interventions aimed at older people employ other methodologies. For example, [Abrams et al. \(2008\)](#) analyzed the effect of intergenerational contact sessions on the effect of negative stereotypes in a sample of older people with a mean age of 69.14 years, and they concluded that intergenerational contact alleviates the effects of negative stereotypes of aging. They were also aware that intergenerational contact may not be available to all older people, so other methodologies may therefore be required to fight ageism. Further, [Herrera et al. \(2010\)](#) studied the relationship between twenty bi-weekly cognitive stimulation program sessions and the level of aging stereotypes in a group with a mean age of 74.8 years and mild cognitive impairment. They reported that a cognitive stimulation program could reduce negative stereotypes in older adults.

To our knowledge, the Aging^{Plus} intervention program of [Brothers & Diehl \(2017\)](#) and our study are the only ones to fight ageism through educational interventions in older people, although our studies are quite different methodologically. First, in Brothers & Diehl's study, the previous intervention consisted of four weekly educational sessions of two hours combined with a goal of physical activity over four weeks. Second, the Aging^{Plus} intervention had a sample with a mean age of 65.26 years, which is eleven years younger than the participants in our study (76.02 years). Finally, the Aging^{Plus} intervention had no control group.

It is noteworthy that improvements due to our intervention remained stable after one month, a similar post-test period as used in some of the previous studies ([Leung et al., 2012](#); [Olson, 2003](#)). However, other studies considered widely variable post-test periods, including just one week ([Lytle & Levy, 2019](#); [Pacala et al., 1995](#)), six months ([Braun et al., 1998](#); [Merz et al., 2018](#)), and eight months ([Cummings et al., 2006](#); [Lucchetti et al., 2017](#)). Still others reported improvements in the perception of aging in an immediate post-test ([Blanco-Molina & Pinazo-Hernandis, 2016](#); [Mellor et al., 2015](#)). A systematic review by [Burnes et al. \(2019\)](#) indicated that only 19% of articles included a follow-up measurement; the stipulated times for follow-up were between two weeks ([Lytle & Levy, 2019](#)) and 16 months ([Hwang et al., 2013](#)) after the pre-intervention measurement. As in our work, these authors did not find significant differences between the post-test and follow-up measurements, so the changes remain stable. According to cognitive dissonance ([Festinger, 1957](#)), reinforcement is essential to maintain positive attitudes over time, so ongoing interventions may be needed to achieve longer-term changes in perceptions of aging.

Control groups are not a frequent methodological aspect in the literature of educational anti-ageism interventions. In her systematic review, [Chonody \(2015\)](#) concluded that only 20.69% of studies had a control group. Curiously, most previous studies did not

detail whether the control groups participated in a specific activity, or did not explain the nature of the activity (Lucchetti et al., 2017; Mellor et al., 2015; Merz et al., 2018; Olson, 2003). Other studies, however, reported that control groups participated in classes or subjects without relation to ageism (Lytle & Levy, 2019), or in a video viewing about education in wallpaper (Lytle et al., 2021). Several of these studies agreed that there were statistically significant post-test differences between experimental and control groups, a fact that reflects the effect of the experimental conditions' interventions (Lytle & Levy, 2019; Olson, 2003), and that the control groups did not report changes after their respective interventions (Mellor et al., 2015; Merz et al., 2018). Therefore, we could say that the findings of those studies are repeated in our research. In this way, our work, along with Lytle & Levy (2019), is one of the few that details the participation of the control group in any specific activity.

Personality is a concept opposed to the homogeneity of baseline functional, cognitive, and health characteristics presented by the sample. According to Mroczek and Spiro III (2003), personality is a unique process in each individual that presents significant inter-individual differences. Several factors closely linked to personality have also been associated with people's attitudes toward aging: fear of aging (Galton et al., 2020; Greenberg et al., 1986) and expectation of older people's role in society (Kornadt et al., 2019; Tajfel & Turner, 1979). Therefore, several parts of our intervention have been able to influence the reduction of character-personality stereotypes. First, when it comes to refuting CENVE items, stereotyped personality traits of older people (e.g., "get irritated easily and grumpy," "more rigid," "like a child," "worse defects," and "senile") are denied. In video viewing, stereotyped traits of older people (e.g., "gossip," "feeling of burden," and "sadness") are also refuted in the negative visual example of older people in the media (MarketingDirecto, 2016), whereas positive traits (e.g., "hard workers," "non-conformity," "intergenerationality," and "avoid parody of the older group") are promoted in the positive visual example (AtresMedia, 2017).

Remarkably, the anti-ageism educational interventions in which the CENVE has been used do not delve into each intervention's effect on each of this tool's factors (Blanco-Molina & Pinano-Hernandis, 2016; Sarabia & Castanedo, 2015).

Intervention reduced the scores of health and motivational–social stereotypes. However, although there were significant differences within the intervention group, *time x group* interaction did not reach significance (see Table 1 and Table 2). Because sample size was calculated for total CENVE, the lack the intervention's effect on health and motivational–social stereotypes could be caused by the sample being underpowered for the factors of CENVE. For these reason, the results for mentioned stereotypes are far from conclusive.

Finally, Burnes et al. (2019) reported in their meta-analysis that educational interventions aimed at students and health professionals are typically longer, with an average duration of 12.6 weeks. However, in our study, a one-hour single-session intervention appeared sufficient to improve the perception of aging and character–personality of a sample of older people. Thus, our results indicate that interventions to reduce ageism in older adults do not need to be time-consuming and expensive. Lytle et al. (2022) reached the same conclusion, but these authors reduced age discrimination and improved the behavior of undergraduate students through a single-session online intergenerational friendship intervention. While one-session educational interventions remain understudied, such a feasible intervention structure may serve to ease the way for participants to engage in new, longer educational interventions (Couper & Pratt, 1999).

Limitations and strengths

Our study has several strengths, although it also has limitations. The sample consisted of community-dwelling older adults, majority women, without severe functional and

cognitive impairment, who participated in community center activities, so the results may be limited to this specific population. Additionally, the research team performed follow-up measurements one week and one month after the intervention, although longer measurements would have been useful to investigate the long-term effects of the intervention. Finally, although the sample size had been adequately adjusted to detect statistically significant changes in the total CENVE, it was not sufficient for the health, motivational–social, and character–personality components of the questionnaire. Thus, the sample may be underpowered for the CENVE components.

Regarding the strengths of this work, this educational intervention has several methodological characteristics that are rare in the literature. First, we know of very few previous anti-ageism educational interventions that target older people. Second, single-session information combined with videos are poorly studied yet efficient methodology to confront ageism. Third, randomization enables homogeneity between groups and masking of the participants, thus allowing greater accuracy of the results. Fourth and last, follow-up and control groups are not frequently reported in anti-ageism educational interventions.

Implications and conclusions

Older people are frequently excluded from research on anti-ageism educational interventions. The inability to learn is a frequent stereotype of older adults (Godoy et al., 2017), yet older people have different physical (health or physical strength), cognitive (working memory), economic (retirement), social (social networks and support), emotional (emotional stability, sensitivity and mood), and motivational (self-efficacy) resources to adapt to their dynamic environment and to continue learning (Martinčeková & Škrobáková, 2019). Therefore, there is no reason to exclude older people from educational interventions. Accordingly, our analysis of a one-hour, single-session intervention combining information

and videos in a sample of older people showed reduced negative stereotypes of aging and character–personality in participants, and this improvement remained stable at both one week and one month after the intervention. Educational interventions that combined information with video viewing are useful to reduce ageism and improve perception and attitudes toward aging, and this work gives hopeful results on the effectiveness of this type of intervention in older people. Proposing future interventions that address additional components of ageism apart from stereotypes or beliefs (cognitive dimension), such as prejudices (affective dimension) and discriminatory behaviors (behavioral dimension), would be interesting. Combining information and exposure in the form of indirect contact (videos) with direct exposure (intergenerational contact) in longer interventions and in larger samples of older people could also provide a step forward in the fight against ageism in older people.

Ageism is a public health problem since it severely impairs the physical, psychological, and social health of older people (Chang et al., 2020); increases physical and psychological abuse toward older people in the family environment (Pillemer et al., 2015); generates problems in the health system such as increased use of health resources, economic spending, and reduction in care quality (Dong, 2015; Levy et al., 2020); propagates inequalities in the work environment (Gabriel & Herranz, 2019) and dissemination of stereotyped images in the media (Levy et al., 2018); and many more problems. So, future educational interventions aimed at older people are required to fully understand their effect on this age group. To end ageism, older people cannot be excluded from research aimed at fighting this type of discrimination.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Tables

Table 1. Comparison of total CENVE and its three factors one week before the intervention (PRE), one week after the intervention (POST), and one month after the intervention (FOLLOW-UP), and effect of the intervention in the experimental and control groups over time

		Experimental group (N=29)					Control group (N=27)		
		F (group x time)	η^2_p	M	\pm SD	η^2_p	M	\pm SD	η^2_p
Total CENVE	PRE	9.062***	0.255	35.10	\pm 7.38	0.530	36.07	\pm 3.44	0.001
	POST			30.69	\pm 6.77		35.96	\pm 3.90	
	FOLLOW-UP			32.21	\pm 5.92		36.0	\pm 3.39	
Factor I: Health	PRE	2.765	0.094	11.31	\pm 2.11	0.484	11.63	\pm 1.42	0.149
	POST			9.93	\pm 1.81		11.30	\pm 1.56	
	FOLLOW-UP			10.1	\pm 1.47		11.07	\pm 1.00	
Factor II: Motivational– social	PRE	1.844	0.065	11.90	\pm 2.19	0.160	12.11	\pm 1.76	0.004
	POST			11.03	\pm 2.35		12.15	\pm 1.51	
	FOLLOW-UP			11.34	\pm 2.58		12.22	\pm 1.81	
Factor III: Character– personality	PRE	8.053**	0.233	13.45	\pm 4.05	0.405	12.33	\pm 1.8	0.037
	POST			10.45	\pm 2.44		12.52	\pm 1.97	
	FOLLOW-UP			10.76	\pm 2.63		12.70	\pm 1.82	

CENVE = Negative Stereotypes Toward Aging Questionnaire; η^2_p = partial Eta squared parameter.

* p <0.05; ** p <0.01; *** p <0.001.

Table 2. Difference between mean total CENVE scores and its three factors one week before the intervention (PRE), one week after the intervention (POST), and one month after the intervention (FOLLOW-UP) in the experimental and control groups.

		Experimental group (N=29)		Control group (N=27)	
		Differences between means (I-J)	<i>p</i>	Differences between means (I-J)	<i>p</i>
Total CENVE					
PRE	POST	4.414	<0.001	0.111	0.858
	FOLLOW-UP	2.897	0.013	0.074	0.916
POST	PRE	-4.414	<0.001	-0.111	0.858
	FOLLOW-UP	-1.517	0.115	-0.037	0.939
FOLLOW-UP	PRE	-2.897	0.013	-0.074	0.916
	POST	1.517	0.115	0.037	0.939
Factor I: Health					
PRE	POST	1.379	<0.001	0.333	0.320
	FOLLOW-UP	1.207	0.001	0.556	0.045
POST	PRE	-1.379	0.001	-0.333	0.320
	FOLLOW-UP	-0.172	0.587	0.222	0.425
FOLLOW-UP	PRE	-1.207	<0.001	-0.556	0.045
	POST	0.172	0.587	-0.222	0.425
Factor II: Motivational–social					
PRE	POST	0.862	0.029	-0.037	0.890
	FOLLOW-UP	0.552	0.168	-0.111	0.767
POST	PRE	-0.862	0.029	0.037	0.890
	FOLLOW-UP	-0.310	0.365	-0.074	0.779
FOLLOW-UP	PRE	-0.552	0.168	0.111	0.767
	POST	0.31	0.365	0.074	0.779
Factor III: Character–personality					
PRE	POST	3	<0.001	-0.185	0.579
	FOLLOW-UP	2.69	0.001	-0.370	0.331
POST	PRE	-3	<0.001	0.185	0.579
	FOLLOW-UP	-0.310	0.307	-0.185	0.510
FOLLOW-UP	PRE	-2.69	0.001	0.370	0.331
	POST	0.31	0.307	0.185	0.510

CENVE = Negative Stereotypes Toward Aging Questionnaire.