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Validation of a Psychosocial Intervention on Body Image in Older People: An Experimental Design

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Abstract

For most people, body satisfaction is crucial to develop both a positive self-concept and self-esteem, and therefore, it can influence mental health and well-being. This idea has been tested with younger people, but no studies explore whether body image interventions are useful when people age. This research validates a specific program designed for older people (IMAGINA Specific Body Image Program). This is done by employing a mixed experimental design, with between-subject and within-subject comparisons that focus on body satisfaction before and after experimental treatment, comparing two groups. Using this experimental methodology makes it possible to identify the effect of the intervention in a group of 176 people. The score obtained with the Body Shape Questionnaire (BSQ) was the dependent variable, and the IMAGINA program was the independent one. As for age, gender, relationship status, season, and residence environment, these were controlled variables. There were significant differences in body satisfaction between the two programs, obtaining better results with IMAGINA. The controlled variables had a much less significant effect than the treatment. Therefore, it is possible to improve body satisfaction in older adults through interventions similar to the one presented here.

Introduction

In Western societies, looking good, healthy, and young is very important to feel right, fit in, interact with others, and be successful, becoming a core element of the self-concept and self-esteem. How satisfied one person is with her/his body depends on personal perception, specifically, with how s/he feels, perceives, imagines, and reacts to physical appearance and body functioning[1,2]. Following this definition, it is possible to identify two qualitatively different dimensions within this construct. On the one hand, there is the perceptive dimension, which depends on evaluating the size, shape, and proportions of the body itself; on the other

hand, there is the cognitive-emotional domain (i.e., 'body satisfaction'[3]), which is the subject of this research.

Essentially, body satisfaction is a person's degree of acceptance of his or her physical appearance[4], which is bad if this assessment affects self-confidence negatively and positive when it increases personal confidence in interacting with others[5,6]. Traditionally, it has been considered that when a person ages and enters the last stage of life (taking age 50 as the cut-off point for middle age), body image concerns decrease substantially. In other words, it is believed that perceptual distortions about body image typical in adolescence and youth[6,7,8] are rare in older people[9,10]. The reason is that the focus of concern shifts from weight and fitness to other significant physical defects more associated with lack of health and physical decline.

In this line, the scientific literature has shown that the main concerns about the physical appearance of older people focus on the signs of aging, such as loss of fitness, wrinkling and aging skin, hair loss and grey hair, body odor, among others[11,12]. It has also been argued that the perception of these aging signs plays an evolutionary and adaptive role, since it allows people to become progressively aware of aging, thus helping to accept the transformation and deterioration of physical appearance. Although this may be right, it is no less true that aging awareness negatively influences body satisfaction. Not in vain, the widespread phenomenon of 'midlife crisis' refers to a tipping point in which the person starts to realize that s/he is aging and, in some cases, this comes along with experiencing depressive symptoms which, if not properly addressed, can interfere with personal wellbeing and mental health[11,13].

The psychological and emotional implications derived from the senescence awareness have been studied[14]. In that sense, the deterioration of the physical appearance has been considered the most unmistakable sign that someone can experience regarding the arrival of senescence[15]. This is coupled with the feeling of playing an irrelevant and undervalued social role [16]. Therefore, self-identification as an 'older person' is irremediably linked to a gradual acceptance of new limitations and unfavorable circumstances. Thus, the older person begins to experience difficulties and emotional problems, such as anxiety, stress, or depression. Shortly, the person may self-identify with negative social roles while poorly accepting the physical limitations associated with aging[17,18].

In different age groups, such as adolescents and youth, it is known that satisfaction and body image can improve with intervention programs[1,19]. Examples of this are the well-known interventions of Cash (1997)[20] and PICTA (Preventive program on body image and eating disorders in Spanish) by Maganto, del Río and Roiz (2002)[21], as well as some more recent programs (Kilpela et al., 2016)[22], Halliwell et al. (2016)[23], McCabe et al. (2017)[24] or Bailey, Gammage and Van Ingen (2019)[25]. However, none of them target mature people and focus mainly on females, except for the intervention developed by Sánchez-Cabrero (2012)[26] called 'IMAGINA' that this study aims to validate. Let us suppose that a therapeutic intervention on body image can contribute to self-acceptance and develop a positive self in young people. There is no reason for not applying it and intervening in older people who face radical changes in their bodies[27,28,29].

The experimental design is the most effective methodology for determining causal relationships and evaluating whether a therapeutic intervention produces improvements. First, it is necessary to isolate the intervention effect from the rest of the intervening variables, something that in the social sciences is

very costly and complex since the factors that can influence are almost innumerable. Second, it also requires a pre-post treatment comparison, comparisons between control and experimental groups, the randomization of the participants in the conditions of control and treatment, as well as the study of the most relevant intervening variables. Thus, this experiment follows two main objectives: (1) to analyze the improvement in body image satisfaction of persons over 50 years of age enrolling in a specific program of body satisfaction compared with the progress gained in a general program (non-specific); (2) to examine the relationship between body satisfaction and intervening variables such as age, gender, relationship status, time of year of participation, and living either in a metropolitan or countryside residence.

Protocol

The Committee reviewed the Protocol on Scientific Conduct and Ethics of the Alfonso X el Sabio University. Also, a group of scientists external to the research team checked and approved the complete experimental process. To allowing participation in the study, it was necessary to sign an informed consent accepting to enroll in the program, as recommended by the Declaration of Helsinki[30]. Before enrollment, it was ensured that none of the participants would suffer any psychological stress or harm resulting from the intervention.

1. Carry out the field study

NOTE: The experimental design follows a mixed design, with between-subject measurements (experimental and control groups) and repeated measurements before and after treatment. This experimental design makes it possible to isolate the effect of treatment (the results obtained in a specific body satisfaction program) from other variables related to the individual differences since body satisfaction was measured before and after treatment. The study also compares the treatment with what happened when participating in a non-specific intervention program (control group) isolating the manipulation effect during the intervention. Participants were randomly allocated in the experimental and control conditions, guarantying the optimal conditions for the experiment to be conducted.

1. Selection of research tools

    1. Choose a psychosocial program aimed at improving body image in older people adequate to the goal of the study. In this case, the option chosen was IMAGINA program by Sánchez-Cabrero (2012)[26] as it meets all the requirements.

        NOTE: The criterion to select the experimental instrument were the following: (1) it had to be a program specifically for body satisfaction; (2) it must be perfectly adapted to older people; (3) it must be a group-program emphasizing social interaction between participants; (4) it has to last 6 to 10 session of 60-120 minutes each, so attitudinal and behavioral changes could be achieved consistently.

    2. Choose a general psychosocial program for older people to work in groups that meet all the required conditions and serve as a control comparison. In this experiment, the program is 'Promoting Healthy Aging: Consistent Health', run by the Spanish Red Cross[31] since it was the best option available.

        NOTE: The criterion to select the control program are that (1) it must build upon positive social interaction without focusing on body image; (2) it must be designed for working in groups; (3) it must be appropriate for older people; (4) it must have

a schedule similar to the experimental intervention program.

3. Choose a scientific instrument to evaluate body image satisfaction in older people. The Body Shape Questionnaire (BSQ) by Cooper, Taylor, Cooper, and Fairburn (1987)[33] was regarded as the most suitable instrument for the research goals.

   NOTE: The criterion to select the scientific instrument to evaluate body satisfaction in old age were that (1) it must be a peer-reviewed and published instrument; (2) it measures body satisfaction and has convergent validity with other scientific instruments; (3) it must be short and simple to adapt to the older population (3) it must be translated to Spanish and scaled for the Spanish population.

4. Design a questionnaire (**Supplementary File 1**) to gather all demographic data and intervening variables to control in this study.

   NOTE: The sociodemographic data regarding age, gender, and relationship status was gathered with an ad hoc specific questionnaire. Age was treated as a quantitative and discrete variable and the rest as dichotomous categorical variables. As for 'season of the year' and 'residence environment', this information was registered by the researcher in charge of the experiment.

2. Sampling method

   1. Request the collaboration of a non-profit organization (NGO) that carries out psychosocial programs of group-application for older people in different locations.

   2. Select ten different locations to apply the experimental and control psychosocial programs. Half of them lived in the countryside (places with less than 1000 residents), and the other half lived in metropolitan towns and cities.

3. Application of experimental and control interventions

   1. Perform the pre-treatment measurement of BSQ. Individual measures were gathered with paper and pen, but the participants were in the same space as their cluster group.

   2. Do over eight sessions of both psychosocial programs (control and experimental) in ten locations.

      NOTE: The programs were under the same person's supervision at two different seasons of the year: summer and winter. In both cases, the activities were done in the evening, for 4 weeks, and twice a week. In both programs, participants worked in groups, having playful activities and social gatherings, which drastically reduced participants' withdrawal.

   3. Gather the post-treatment measurement of the BSQ.

      NOTE: Individual applications were gathered with paper and pen, but the participants were in the same room with their cluster group. This was made right after finishing the sessions. The BSQ was not applied to those individuals who did not come to all sessions. Consequently, results from 10% of the sample were omitted in the final analyses.

2. Digitize the data obtained in the field study

1. Open the statistical software and go to **File Menu | New | Data**, click on the **Data** icon and then go to **Variable**

View (**Figure 1**) and create a statistical variable for each one of the following variables shown in **Table 1**.

Variable Name	Type	Values	Measure	Description
BSQ Pre-treatment measurement	Numerical	34-204	Scale	Numerical result obtained in the pre-treatment
BSQ Post-treatment	Numerical	34-204	Scale	Numerical result obtained in the measurement post-treatment
Experimental Condition	Dichotomous variable	{0, CONTROL} / {1, EXPERIMENTAL}	Nominal	Whether or not the participant has been in the experimental or control condition
Gender	Dichotomous variable	{0, Man} / {1, Woman}	Nominal	The biological gender of the participant
Age	Numerical	50-85	Scale	The age of the participants measured in years
Stable Relationship Status	Dichotomous variable	{0, With a current partner} / {1, Without a current partner}	Nominal	Whether or not the participant is in a formal relationship
Environment of Residence	Dichotomous variable	{0, Rural} / {1, Urban}	Nominal	Whether or not the participant lives in countryside (locality of fewer than 1000 inhabitants) or metropolitan (locality of more than 1000 inhabitants)

Season of intervention	Dichotomous variable	{0, Cold} / {1, Warm}	Nominal	Whether or not the treatment took place in winter or summer

Table 1: Main characteristics of the research statistical variables. Detailed description of the main characteristics of the research variables in their digitization process.

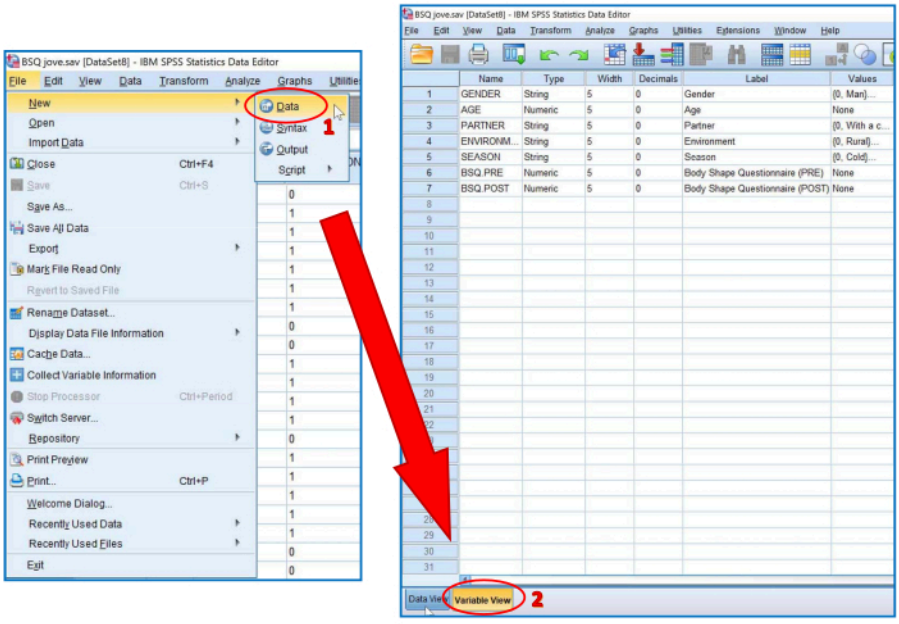

Figure 1: How to import variables data to the statistical software package. (1) Click on the **Data** icon; (2) Click on **Variable View** icon. Please click here to view a larger version of this figure.

2. Go to **Data View** in the statistical software (**Figure 2**), and, for each participant, fill in the data of the pre- and post-measures of the BSQ test. Do the same with the demographic and attributive data of the questionnaire.
   NOTE: The results obtained with the BSQ and the information regarding the study's socio-demographic data were collected in paper and pen, so it was necessary to digitalize it one by one.

   1. Create a new variable with the difference between the pre- and post- BSQ measurement in the statistical software (data obtained with the test). To do so, go to **Transform | Compute Variable**, and in the pop-up menu assign a number in **Target Variable** gap, then select the pre-treatment variable from the menu **Type & Label…** and move it to **Numeric Expression** gap, then click on the subtraction icon (-) on the calculator.
   2. After, select the post-treatment variable from the **Type & Label** menu and move it again to **Numeric Expression** gap. Finally, click on the OK, and then

the variable that accounts for the difference between pre- and post-measurement is created (**Figure 3**).

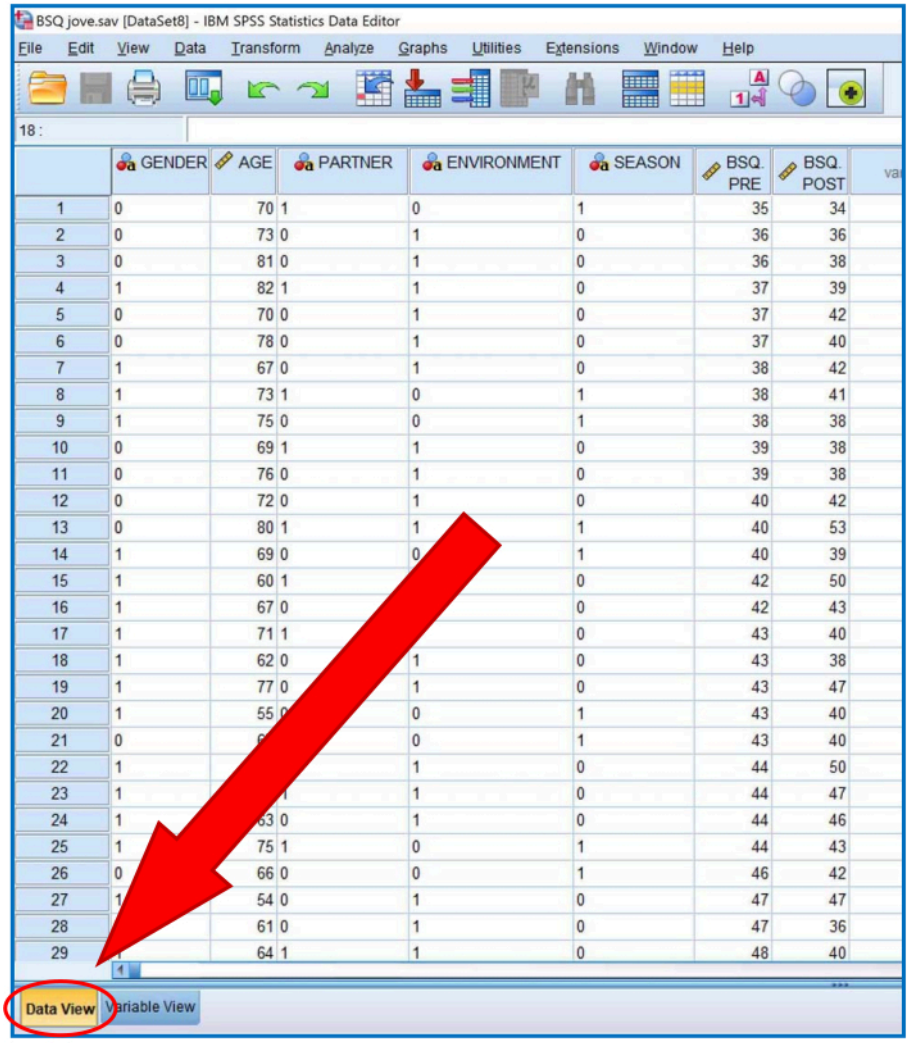

Figure 2: How to import research data to the statistical software package. Select **Data View** icon. Please click here to view a larger version of this figure.

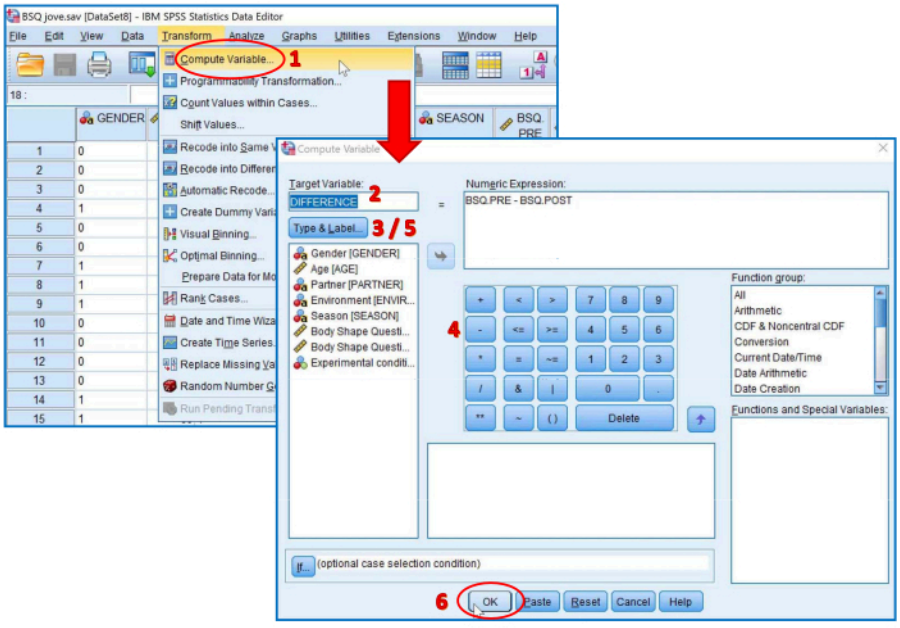

Figure 3: How to create a new variable with the difference between the pre- and post-measurement of the BSQ test in the statistical software. (1) Click on **Transform | Compute Variable**; (2) Assign a number in **Target Variable** gap; (3) Select the pre-treatment variable from the menu **Type & Label…** and move it to **Numeric Expression** gap**;** (4) Click on the **Subtraction** icon (-) on the calculator; (5) Select the post-treatment variable from the **Type & Label menu** and move it to **Numeric Expression** gap; (6) click on the **OK** icon. Please click here to view a larger version of this figure.

3. Statistical analyses

1. Look at the reliability and consistency of BSQ measurement and retest with the Intraclass Correlation Coefficient (ICC) with the statistical software package.
    1. To this end, select the **Analyze Menu | Scale | Reliability Analysis**, move the pre and post-treatment BSQ measurements used in the experiment to the **Reliability Analysis** dialogue box.
2. Click on **Statistics…** and choose **Intraclass Correlation Coefficient** and the options **Two-Way Mixed** and **Consistency**. Finally, click on the **OK** icon to generate the desired output (**Figure 4**).

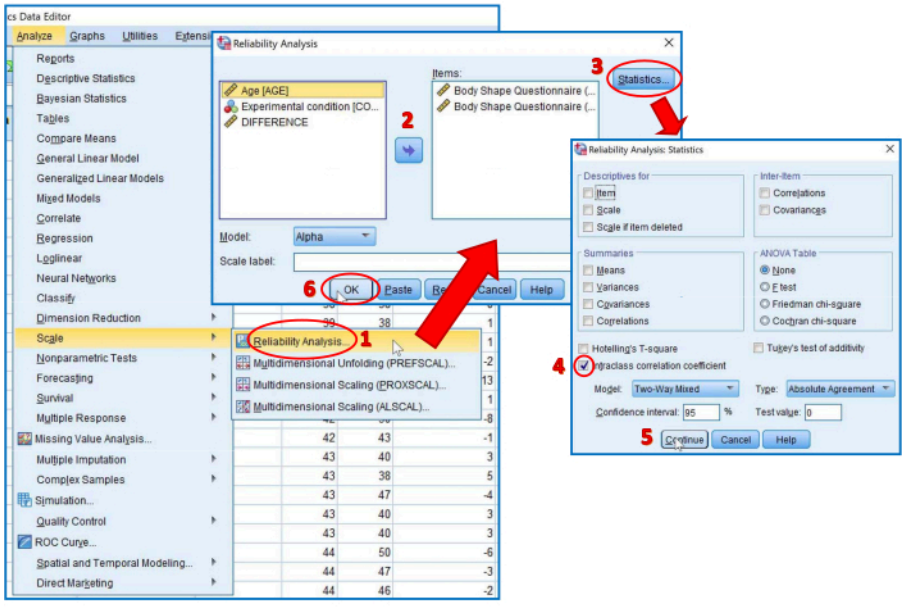

Figure 4: How to assess the internal consistency of the questionnaire. Select **Analyze Menu | Scale | Reliability Analysis**. (1) Move the variables used in the experiment to the **Reliability Analysis** dialogue box; (2) Click on the **OK** icon. Please click here to view a larger version of this figure.

NOTE: The pre and post-treatment BSQ measurements had excellent reliability and consistency values (ICC=0.916).

2. Run the descriptive analysis with the statistical software package. Start with descriptive statistics such as the arithmetic mean and the standard deviation (SD) for the quantitative variables 'BSQ pre-treatment', 'BSQ post-treatment', and 'Pre-post difference'. First globally, then taking into account each category of the other variables included in the study. Finally, study the frequency distribution in the categorical intervening and controlled variables.

1. To do this analysis, select **Analyze Menu | Descriptive Statistics | Frequencies** and, after the output, **analyze | Descriptive Statistics | Descriptive** (**Figure 5**). To specify the descriptive statistics of the quantitative variables for each condition of the categorical variables, select the option **Split File** in the main menu, and in the pop-up menu choose the categorical variable to be analyzed and select the option '**Organize output by groups**'; then click on **OK** (**Figure 6**).

2. Repeat this process for each categorical variable considered in the study (experimental condition, time of year, gender, marital status and residence).

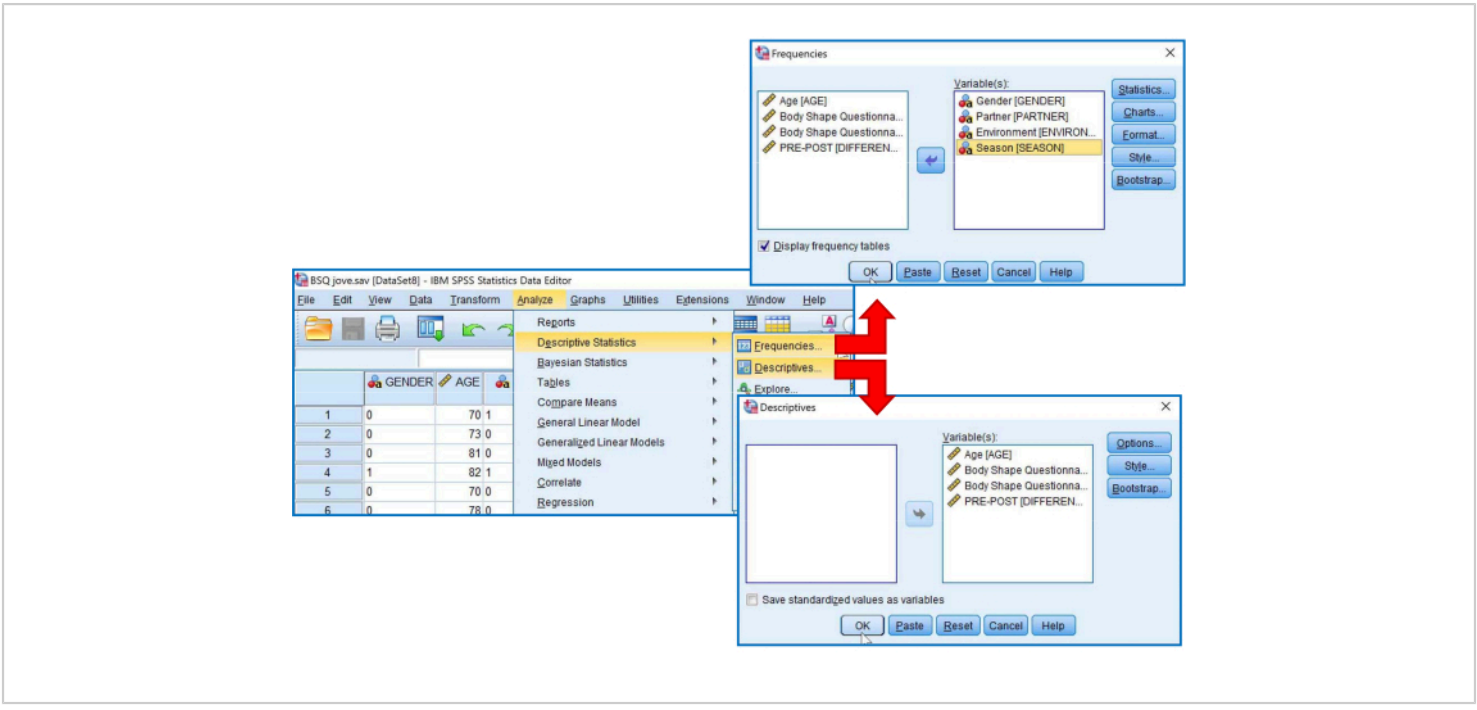

Figure 5: How to carry out the descriptive analysis of the data. Select **Analyze Menu | Descriptive Statistics | Frequencies** and, after the output, **Analyze | Descriptive Statistics | Descriptive**. Please click here to view a larger version of this figure.

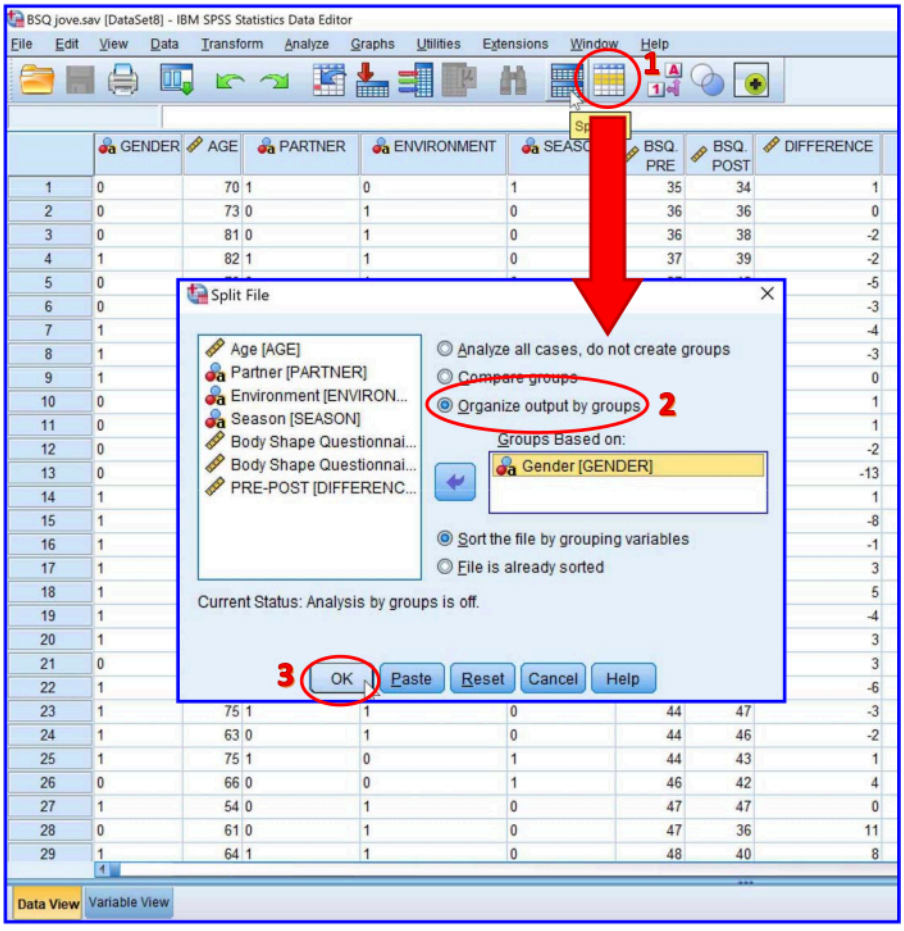

Figure 6: How to specify the descriptive statistics of the quantitative variables for each condition of the controlled nominal intervening variables. (1) Click on **Split File** icon; (2) Choose the categorical variable to be analyzed and select the option **Organize output by groups;** (3) Click on the **OK** icon. Please click here to view a larger version of this figure.

3. Conduct a paired samples Student's t-test with the statistical software package to examine body image before and after participating in the two conditions (between-subject IV effect).
    1. To this end, select **Analyze Menu | Compare Means | Paired samples t-Test**, and in the **Paired samples t-test** dialogue box, put BSQ pre-treatment and BSQ post-treatment as Variable 1 and 2 (**Figure 7**).
    2. To specify the paired samples Student's t-test according to each categorical variable (experimental condition, gender, marital status, time of year and place of residence) select **Split File** option in the main menu, and in the pop-up menu choose the categorical variable to be analyzed and select the option '**Organize output by groups**' and click on OK (**Figure 6**).

3. Repeat this process before each analysis for each nominal variable (time of year, gender, marital status and residence).

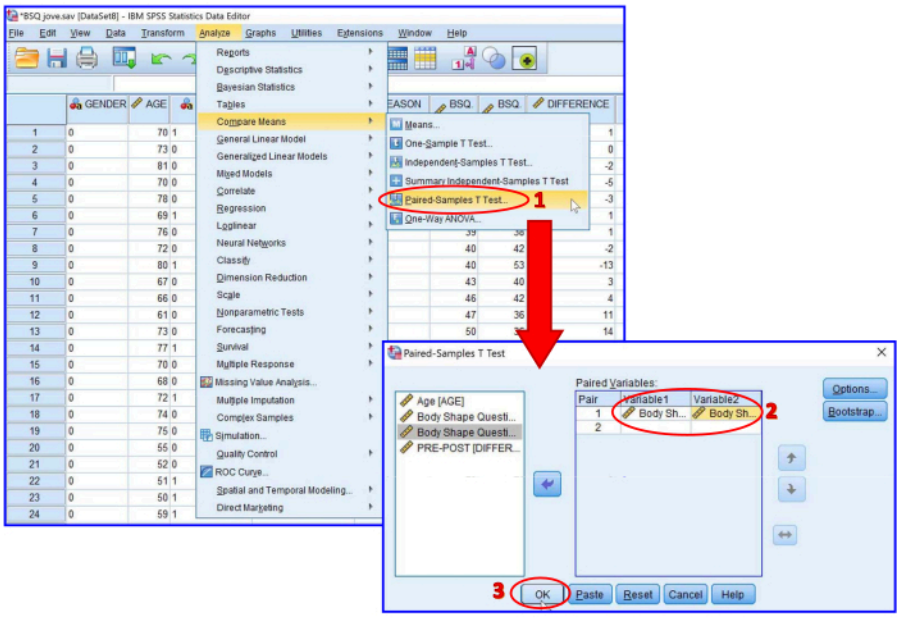

Figure 7: How to conduct Paired samples Student t-Test analysis. (1) Select **Analyze Menu | Compare Means | Paired samples t-Test**; (2) put BSQ pre-treatment and BSQ post-treatment as Variable 1 and 2; (3) Click on the **OK** icon. Please click here to view a larger version of this figure.

4. Conduct One-Way ANOVA analysis with the statistical software package to see the effect of each program (intergroup IV effect), gender, relationship status, time of year, and place of residence.
    1. To this end, select **Analyze Menu | Compare Means | One-Way ANOVA** (**Figure 8**), and in the **One-Way ANOVA** dialogue box, put the variables BSQ pre-treatment, BSQ post-treatment and the pre-post difference in the **Dependent List** and the experimental condition variable as the **Factor**.
    2. Repeat this process for each of the nominal variables (experimental condition, gender, relationship status, time of year and place of residence). The output shows the statistical significance of the BSQ pre-treatment, BSQ post-treatment and the pre-post difference as a discrete quantitative variable by comparing means with the Snedecor's F distribution (non-considering equality of variances).

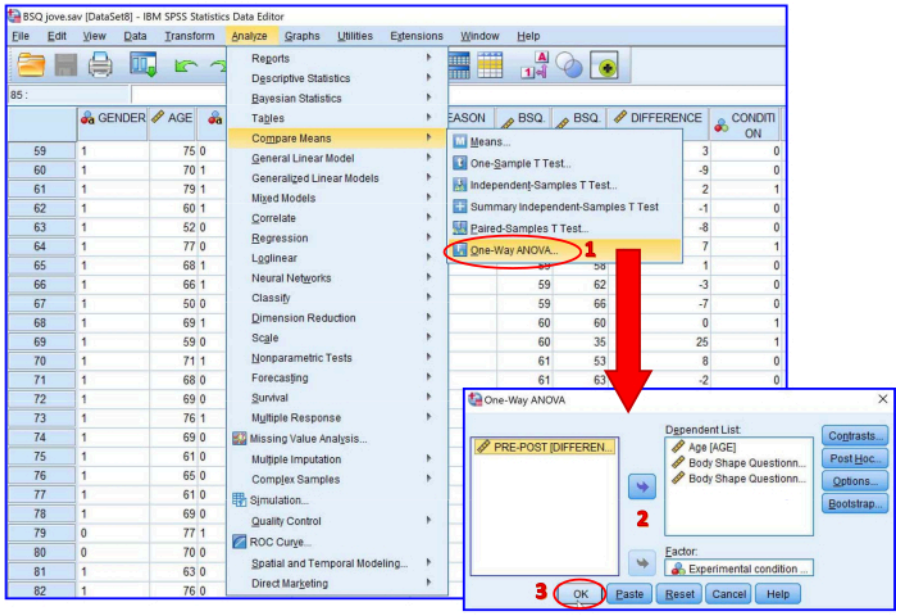

Figure 8: How to conduct One-Way ANOVA analysis. (1) Select **Analyze Menu | Compare Means | One-Way ANOVA**; (2) put the variables BSQ pre-treatment, BSQ post-treatment and the pre-post difference in the **Dependent List,** and the experimental condition variable as the **Factor**; (3) Click on the **OK** icon. Please click here to view a larger version of this figure.

5. Conduct Repeated Measures ANOVA analysis with the statistical software package using the Pillai's Trace and Wilks' Lambda statistics, as they offer opposite and complementary results of the inter-intragroup effect of independent variables.
    1. To this end, select **Analyze Menu | General Linear Model | Repeated Measures**, and in the **Repeated Measures** dialogue box, assign a name in the **Within-Subject Factor Name** box (e.g., PRE-POST), put '2' in the **Number of Levels** box and in the **Measure Name** box put BSQ. Finally, click on '**Define**' icon to switch to the variable selection box (**Figure 9**).
    2. Within that pop-up menu, select the pre- and post-measures of the test BSQ as Within-Subjects Variables, the experimental condition as Between-Subjects Factor (s), and all the sociodemographic variables (time of year, gender, age, marital status and residence environment) as Covariates.
    3. Before obtaining the analysis result, click on Model and select 'Full factorial'; then go to 'Options' and choose 'Estimates of effect size' (see **Figure 10**). Finally, repeat the whole process but instead of choosing 'Full factorial' in Model choose the option 'Build custom terms', combining the variable 'Condition' with all the sociodemographic variables

(time of year, gender, age, marital status and residence environment) using for this purpose the icon 'By *'.

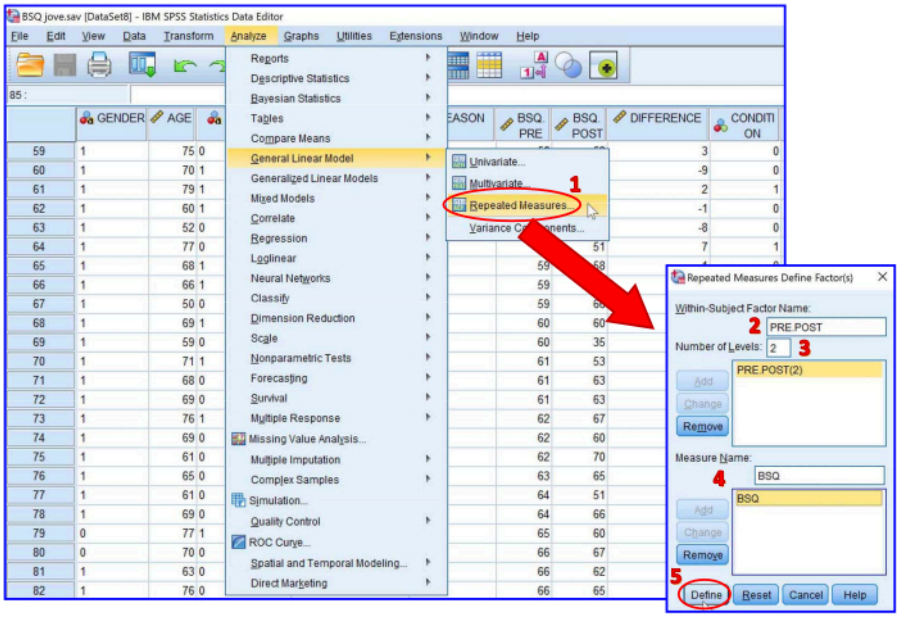

Figure 9: How to configure Repeated Measures ANOVA analysis. (1) Select **Analyze Menu | General Linear Model | Repeated Measures**; (2) Assign a name in the **Within-Subject Factor Name** box; (3) Put '2' in the **Number of Levels** box and click on **Add** icon; (4) Put BSQ in the **Measure Name** box and click on **Add** icon; (5) Click on the **Define** icon. Please click here to view a larger version of this figure.

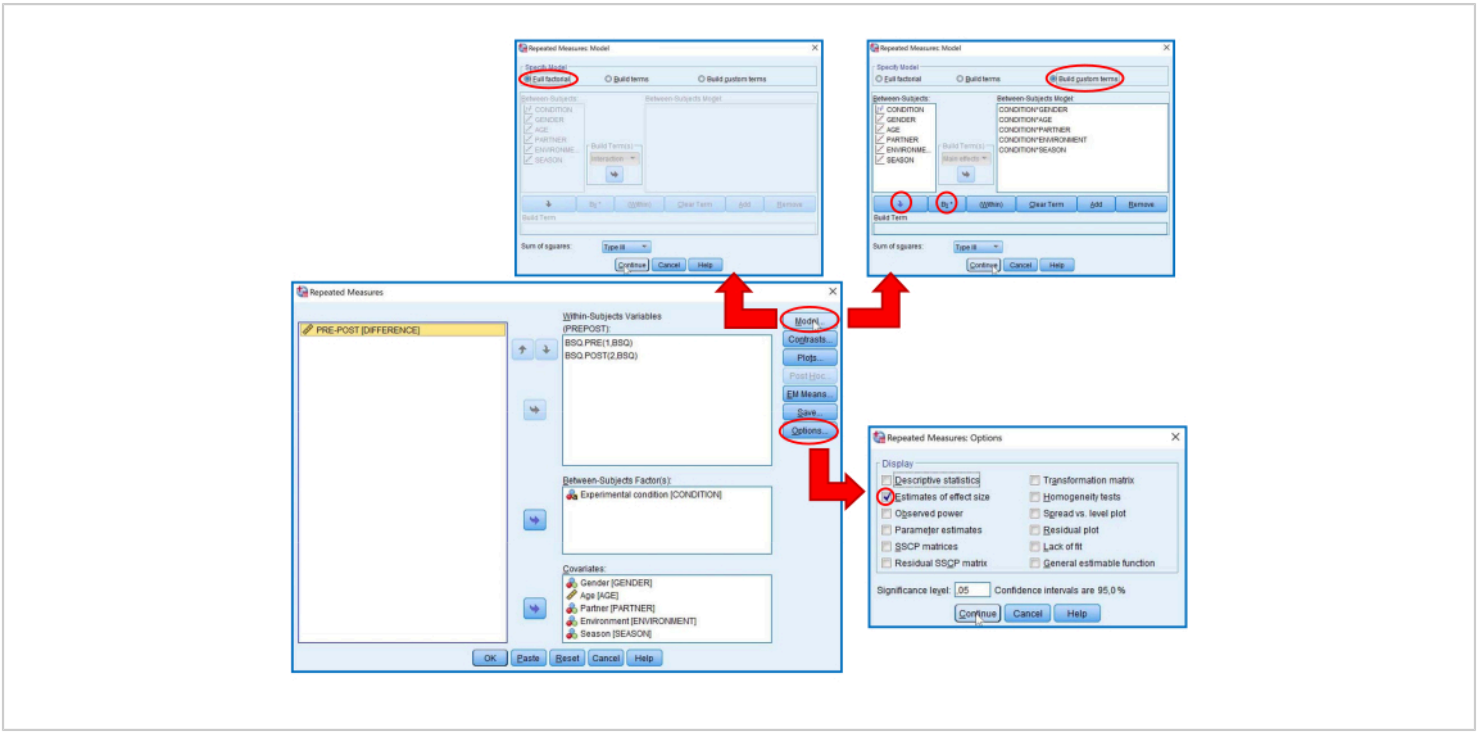

Figure 10: How to select variables to conduct Repeated Measures ANOVA analysis. Select the pre- and post-measures of the test BSQ as Within-Subjects Variables and the experimental condition as Between-Subjects Factor (s). Please click here to view a larger version of this figure.

Representative Results

The experimental research followed a mixed design, with between-subject measurements (experimental and control groups) and repeated measurements before and after treatment.

IMAGINA program by Sánchez-Cabrero (2012)[26] was selected as the experimental therapeutical program to increase body image satisfaction of older adults in Spain. It has eight group-sessions of 90-120 minutes duration each, aiming at entertaining and engaging participants, using activities previously designed and tested, which are dynamic and requires active participation, teamwork, and individual reflection. Body image and self-esteem are expected to improve through social participation, communication, body image workshops, and healthy nutrition information. Emotional intelligence is also tackled, as the program activities foster positive relationships among participants while re-evaluating unrealistic and harmful self-expectations on physical appearance. Also, this program is specific for body image interventions and, consequently, it is the best option for testing to what extent it is useful. Finally, the pilot phase's satisfaction survey showed excellent acceptance (scoring 9 out of 10).

The 'Promoting Healthy Aging: Consistent Health' program for the older people[31], run by the Spanish Red Cross, was selected as the control instrument. The 'Promoting Healthy Aging: Consistent Health' program has been applied for the

last five years as a psychosocial instrument to promote health collectively with outstanding approval. Its time duration is the same as IMAGINA (8 sessions of 90-120 minutes), and it also has group enrollment. It fosters social contact without targeting body image issues. The program includes joyful group activities and healthy habits training based on the 'Exercise book and mental agility activities for the elderly' published by the Spanish Red Cross[32].

This research took place in the North-West of Spain, which suffers severe aging population problems. Participant selection was done with cluster sampling, identifying ten groups of people over fifty years old. Half of them lived in the countryside (places with less than 1000 residents), and the other half lived in metropolitan towns and cities. A total of 176 people participated selflessly and with no economic reward. Participants were allocated to the control and experimental conditions (half in the general program and half in 'IMAGINA'), ensuring a similar distribution in both groups. And the same was done with the variables time of year and residence environment. The arithmetic mean of the sample's age was 64.03 with a standard deviation 64.03, with a standard deviation (SD) of ± 8.06. Participants were 146 women (83%) and 30 men (17%), 93 over 65 years of age (retired according to the Spanish labor system), and 83 under 65 years of age (active population in terms of labor). There were 15 singles, 37 widows/widowers, 117 participants in a formal relationship, and only 7 separated or divorced. Regarding residence and the season of intervention, 63 live in countryside and 113 came from metropolitan areas, 84 were enrolled in the program during winter and 92 during summer. All of them were white (European-Caucasian) since this place of Spain is very homogeneous, racially speaking.

As Dependent Variable (VD) in the experimental research was selected the Body Shape Questionnaire (BSQ) by Cooper, Taylor, Cooper, and Fairburn (1987)[33], translated and scaled to Spanish language and culture by Raich et al. (1996)[34]. The main characteristics are:

- The instrument consists of 34 items following a Likert scale (from 1 (never) to 6 (always).
- It has proven to be a reliable scientific tool by several studies that used it, and has a Cronbach's α between 0.95 and 0.97.
- It has good external validity with other similar scientific instruments, such as the body dissatisfaction subscale of the EDI[35] (Eating Disorders Inventory) or the MBSRQ[36] (Multidimensional Body Self-Relations Questionnaire).
- Final score between 34 and 204.
- Scoring above 110 indicates discontent with body image (Cooper et al., 1987)[33].

BSQ was the chosen scientific tool because it is one of the most used instruments in this scientific field[37,6]. Also, it has been adapted to other languages and cultures on multiple occasions, for example, Brazil[38], Colombia[39], Norway[40], and Korea[41], among others. Its psychometric attributes are excellent, and it has been scaled to Spanish language and culture. From a lexical perspective, the BSQ is simple and brief enough to use with older people, avoiding tiredness when responding to it; even people with low literacy skills find it easy to respond. Since the BSQ has been widely used, it is possible to compare this research with other studies conducted with younger participants, allowing us to examine body dissatisfaction across different stages and moments of life. The last motivation for using BSQ is that no other body satisfaction tool for older people has been scientifically validated. Thus, creating a new scientific instrument would

cause significant reliability problems, making it impossible to compare this research with previous literature.

The results obtained make it possible to examine the experimental condition's effect: the benefits of participating in a body image program for older people. This is done by examining differences with the control condition and intrasubject variability (pre-treatment measured).

Regarding the first research goal, **Table 2** shows the effect size in the experimental and control groups before and after participants took place in them (Cohen's d), and the difference between these two moments with a Paired Samples Test.

Experimental group (n=88)								Control group (n=88)							
Pre-test		Post-test		Pre-Post				Pre-test		Post-test		Pre-Post			
M	*SD*	*M*	*SD*	*M*	*SD*	*p*	*Cohen's d*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*p*	*Cohen's d*
71.9	24.2	65.1	21.4	6.75	9.34	0.000	0.721	69.2	22.7	68.5	20.9	0.75	7.97	0.38	0.094

Table 2: Means and standard deviations of the BSQ test in both conditions and moments (pre, post) and pre-post-test difference (paired samples test). Abbreviations, M = Mean; SD = Standard Deviation; p = probability value or significance. This table has been modified from Sánchez-Cabrero et al.[2].

The output of the paired samples test (between-subject effect) shows that the improvement is higher in the IMAGINA body image program than in the general (M=6.75 versus M=.75), and this is statistically significant (t =6.782, p =.000). The improvement is not significant in the control condition (t =.883, p =.380), showing a remarkable result of the IMAGINA body image program compared with the NGO program (Cohen's d=.721 versus .094). The results obtained allow us to identify the effect of both conditions (experimental and control) and differences between them. More specifically, a multivariate analysis will be performed to see whether the effect of IMAGINA was higher than the control program.

Table 3 shows a One-Way ANOVA (intergroup effect), which compares BSQ in the experimental and control condition at each moment (pre- and post-treatment) as well as between the two moments (pre-post difference). These results show that the between-subject design is robust, since both pre (F=.56, p =.455) and post-condition (F=.443, p =.506) show non-significant mean differences between both conditions. On the contrary, there is a significant improvement in BSQ in the pre-post difference (F=12.734, p =000), which indicates good performance of the BSQ test, supporting what had been observed in the previous analyses.

Pre-test			Post-test			Pre-Post			
F	*p*	*Eta squared*	*F*	*p*	*Eta squared*	*F*	*p*	*Eta squared*	

0.56	0.455	0.003	0.443	0.506	0.003	12.734	0.000	0.068	

Table 3: BSQ differences in both moments (One-way ANOVA). Abbreviations, F = Snedecor's F; p = probability value or significance. This table has been modified from Sánchez-Cabrero et al.[2].

Finally, this paper concludes with the global results obtained in the experimental and control conditions. **Table 4** shows the output of the Repeated measurements ANOVA (inter-intra group effect), pointing to the effectiveness of the IMAGINA body satisfaction program (experimental condition) over the non-specific one (control condition). Examining a moderation effect in the results of 'Condition variable' (by adding gender, age, marital status, season of year, and residence environment as covariable) makes it possible to see that the multivariate contrasts of inter-intra group interaction effect are statistically significant (p =.000).

Effect	Statistical tools	Value	F	Gl. hyp.	Gl error	*p*	*Partial Eta Squared*
BSQ differences between the PRE and POST test	Pillai's Trace	0.038	6.586	1	169	0.011	0.038
	Wilks' Lambda	0.962	6.586	1	169	0.011	0.038
Impact of the variable "Condition" (inter) over the PRE and POST treatment measurement of the BSQ test (intra)	Pillai's Trace	0.079	14.432	1	169	0.000	0.079
	Wilks' Lambda	0.921	14.432	1	169	0.000	0.079
Intercept	*MS*=1659627.56		1729.82	1	174	0	0.909
MS= Mean Square							

Table 4: Multivariate Test. Abbreviations, F = Snedecor's F; p = probability value or significance; Hyp. DF = Hypothesis Degrees of Freedom; Error DF = Error Degrees of Freedom; MS = Mean Square. This table has been modified from Sánchez-Cabrero et al.[2].

Concerning the second objective of this study, i.e., the role that intervening variables played in body satisfaction differences, **Table 5** shows the arithmetic mean and SD of BSQ in both conditions and moments of measurement by gender, marital status, season of year, and environment of residence, as well as the size effect (Cohen's d), between these two moments of measurement and the resultant Paired Samples test.

	Experimental group (n=88)				Control group (n=88)			
	Pre-test	Post-test	Pre-post		Pre-test	Post-test	Pre-post	
	M (SD)	*M (SD)*	*M (SD)*	*p (Cohen's d)*	*M (SD)*	*M (SD)*	*M (SD)*	*p (Cohen's d)*
Gender								
WOMAN (n=146)	71,9 (25,2)	65,3 (22,0)	6,6 (9,85)	0,000 (0,673)	72,3 (21,4)	71,3 (19,8)	1,07 (8,29)	0,277 (0,129)
MAN (n=30)	71,5 (18,8)	63,9 (18,2)	7,57 (6,1)	0,000 (1,239)	55,2 (24,0)	55,9 (21,6)	-,69 (6,37)	0,672 (0,109)
Marital status								
With a current partner (n=117)	73,9 (23,5)	67,1 (21,9)	6,76 (10,26)	0,000 (0,437)	71,3 (23,6)	68,4 (22,2)	2,9 (7,23)	0,004 (0,184)
Without a current partner (n=59)	68,5 (25,3)	63,4 (21,3)	5,09 (8,8)	0,002 (0,218)	64,3 (20,0)	66,5 (16,9)	-2,2 (7,7)	0,153 (0,183)
Time of year								
Summer (n=92)	72,1 (21,2)	67,7 (20,0)	4,40 (9,46)	0,003 (0,465)	70,2 (22,5)	69,4 (20,1)	0,78 (8,93)	0,562 (0,088)
Winter (n=84)	71,6 (27,5)	62,2 (22,8)	9,44 (8,54)	0,000 (1,104)	68,2 (23,1)	67,5 (21,8)	0,72 (6,93)	0,499 (0,104)
Place of residence								
Rural (n=63)	70,2 (18,4)	66,0 (19,1)	4,21 (8,69)	0,008 (0,484)	65,6 (20,6)	64,6 (17,8)	0,93 (9,28)	0,593 (0,100)

Urban (n=113)	72,9 (27,3)	64,6 (22,9)	8,35 (9,45)	0,000 (0,887)	71,0 (23,6)	70,3 (22,1)	0,66 (7,33)	0,491 (0,090)

Table 5: Age, gender, marital status, time of year, and environment of residence differences (paired samples test). Abbreviations, M = Mean; SD = Standard Deviation; p = probability value or significance. This table has been modified from Sánchez-Cabrero et al.[2].

Men were more satisfied with their physical appearance than women, which is more evident after taking part in the experimental condition with the specific body image program (Post-test). Indeed, the difference between the measure of the BSQ before and immediately after the intervention is statistically significant for both genders just in the experimental condition after taking part in IMAGINA program (Women: t =5.756, p=.000; Men: t =4.646, p =.000).

Regarding the relationship status, participants within a relationship are more unhappy with their physical appearance in the pre- and post- treatment condition. This happens both in the control and experimental groups, indicating that lacking partner is positively related to body image satisfaction; however, this also improves their body satisfaction more significantly during their participation in IMAGINA (M=6.76 versus M=5.09). These results are significant for participants with or without relationships in the experimental condition.

The season of year of the program did not affect significantly individuals in the control group, but it affected those in the experimental group (IMAGINA program). IMAGINA program got higher scores in winter than in summer (M= 9.44 and M= 4.40, respectively), although the improvement was significant in both times of the year (p=.003 and p=.000, respectively).

Finally, regarding the residence environment, the improvement was higher for metropolitan individuals (M=8.35) than in countryside individuals (M=4.21) in the experimental condition. The size of the effect is significant in the experimental group but not in the control one, as it happens with the rest of the sociodemographic variables. Again, none of the groups of the control condition obtained significant results.

As can be seen, gender, season of year, and residence environment have less effect on body satisfaction in control groups than in the IMAGINA program groups (experimental condition), as shown by Cohen's d. More specifically, looking at the intergroup (IV) effect in **Table 6**, it is possible to see how the output obtained in the One-Way ANOVA show that most of the significant differences are in the pre-post differences. Besides, the pre-post difference has more effect size (Eta Squared) than the pre- and post-measures alone.

	Pre-test			Post-test			Pre-post		
	F	*p*	*Eta squared*	*F*	*p*	*Eta squared*	*F*	*p*	*Eta squared*
Gender									

	WOMAN	0.001	0.97	0.017	1.779	0.184	0.012	10.576	0.001	0.068
	MAN	2.809	0.105	0.091	1.264	0.270	0.043	2,120	0.156	0.070
Marital status										
	With a current partner	0.355	0.552	0.003	0.100	0.752	0.001	5,525	0.020	0.046
	Without a current partner	0.483	0.49	0.008	0.369	0.546	0.006	11,200	0.001	0.164
Time of year										
	Summer	0.057	0.812	0.001	1.499	0.225	0.019	3.929	0.051	0.049
	Winter	1.224	0.271	0.013	0.014	0.905	0.000	9.288	0.003	0.089
Place of residence										
	Rural	0.014	0.906	0.000	0.321	0.573	0.005	1.635	0.206	0.026
	Urban	0.858	0.356	0.008	0.058	0.809	0.001	11.949	0.001	0.097

Table 6: BSQ inter analysis by age, gender, marital status, time of year, and environment of residence across conditions (One-way ANOVA). Abbreviations, F = Snedecor's F; p = probability value or significance. This table has been modified from Sánchez-Cabrero et al.[2].

Finally, **Table 7** shows the multivariate analyses with repeated measures (between-intragroup effect) that show that age, gender, having a stable partner, season of year, and environment of residence do not interfere with the effectiveness of the treatment (IMAGINA program) as the effect is non-significant.

Effect	Statistical tool	Value	F	Gl. hip.	Gl. error	*p*	*Partial Eta Squared*
Impact of the variable **Gender (inter)** over the PRE and POST	Pillai's Trace	0.003	0.266	2	165	0.767	0.003
	Wilks' Lambda	0.997	0.266	2	165	0.767	0.003

treatment measurement of the **BSQ (intra)** test keeping in mind the variable **Condition (inter)**							
Impact of the variable **Age (inter)** over the PRE and POST treatment measurement of the **BSQ (intra)** test keeping in mind the variable **Condition (inter)**	Pillai's Trace	0.030	2.558	2	165	0.081	0.03
	Wilks' Lambda	0.970	2.558	2	165	0.081	0.03
Impact of the variable **Marital status (inter)** over the PRE and POST treatment measurement of the **BSQ (intra)** test keeping in	Pillai's Trace	0.028	2.389	2	165	0.095	0.028
	Wilks' Lambda	0.972	2.389	2	165	0.095	0.028

mind the variable **Condition (inter)**							
Impact of the variable **Time of Year (inter)** over the PRE and POST treatment measurement of the **BSQ (intra)** test keeping in mind the variable **Condition (inter)**	Pillai's Trace	0.010	0.804	2	165	0.449	0.010
	Wilks' Lambda	0.990	0.804	2	165	0.449	0.010
Impact of the variable **Place of Residence (inter)** over the PRE and POST treatment measurement of the **BSQ (intra)** test keeping in mind the variable	Pillai's Trace	0.011	0.882	2	165	0.416	0.011
	Wilks' Lambda	0.989	0.882	2	165	0.416	0.011

Condition (inter)							

Table 7: Multivariate contrasts of age, gender, marital status, time of year and environment of residence (inter and intra analyses). Abbreviations, F = Snedecor's F; p = probability value or significance; Hyp. DF = Hypothesis Degrees of Freedom; Error DF = Error Degrees of Freedom; MS = Mean Square. This table has been modified from Sánchez-Cabrero et al.[2].

Results displayed in **Tables 5-7** show that applying a between-subject design in the IMAGINA intervention was indeed effective and played a more powerful role than the rest of the controlled intervening variables, which have been traditionally considered of great relevance on body image in previous studies on this subject.

Supplementary File. Please click here to download this figure.

Discussion

This experimental work supports the positive consequences of participating in a body satisfaction program in older people by examining satisfaction values before and after the intervention and comparing experimental and non-experimental groups. Also, the control of other intervening variables improves the reliability and validity of the results obtained.

The most critical step of the protocol was the selection of the program applied in the control group. It was necessary to replicate the same experimental conditions to isolate the effect generated by the IMAGINA program[26]. The results show no differences between both conditions in the duration of treatment, in the social interaction and entertainment levels. Therefore, it is likely that body satisfaction differences between both conditions are due to the specific benefits of IMAGINA. To make this comparison, it was crucial to have a reliable tool, the BSQ by Cooper, Taylor, Cooper and Fairburn (1987)[32], which was scaled to Spanish participants by Raich et al. (1996)[33]. It is a quick, simple, and standardized test for the Spanish population that has provided us with clear and meaningful results. Despite its advantages, one main shortcoming of using the BSQ is that it was not meant for the older population. However, up to date, there are no instruments aimed at this particular age group, so it was the best option for this study. Another relevant limitation of this research is the lack of body image programs for mature and old age, which narrowed the options to just one alternative. In this sense, IMAGINA has proven to be very useful in light of the effects obtained. The data indicate that those enrolled in the IMAGINA body image program increased their body image satisfaction and acceptance, whereas those who enrolled in a non-specific program did not experience any remarkable progress. These differences between the two groups (improvement of 6.75 points in the experimental condition vs. 0.75 in the control condition, p =.000) reinforce the message that self-image satisfaction can be developed that has been posited by body image theorists [42,43]. These results are also consistent with other studies that pointed out that tailored programs are much better than general interventions[22,24,25,28,44,45]. Finally, it has been proven to

a reasonable extent that the IMAGINA program by Sanchez-Cabrero (2012)[26] is effective for older participants.

These results have major implications for clinical and scientific research, since they indicate that intervention on body image at all ages are effective and brings positive outcomes. Contrary to what was traditionally believed, they show that physical appearance still matters in the last phases of life. For this reason, body image interventions with older people may complement other medical or psychological actions addressing depression or moods-problems. However, more scientific information on body image satisfaction in old age is needed, particularly about shortcomings as well as about and positive effects on mood and social interaction. Therefore, to make more sounded claims, it would be necessary to continue investigating the potential benefits of body satisfaction programs for older people, both preventive and palliative.

In western societies, physical appearance has become a matter of great importance for people. This is partly due to the role of the Internet, TV, magazines, and other media, making people always compare themselves with the 'ideals or standards of beauty'[46,47]. This is even a reality for older people who, in theory, are not the target[1,44,48,49]. Despite its social and health importance, body image satisfaction has not benefitted from the same scholarly attention as other issues, at least in Spain, where there are no similar studies. Consequently, comparisons are hard to do. However, the BSQ scores of participants were akin to those previously reported. For instance, female participants scored 71.9 and 72.3 (experimental and control group, respectively), which is lower but similar to the 84.7 of Cooper et al. (1987)[32] and the 84.75 of Raich et al. (1996)[33]. Baile et al. (2002) research[37] with more than 500 teenagers found 81.2 in females of 15-16 years old, and 79.49 for females of 17-19 years. Recently, Conti et al. (2009)[38] reported a value of 73.9 in Brazilian adolescents, 88.3 for girls and 57.1 for boys, pointing to a gender gap. Finally, a Fernández-Bustos et al. (2015)[6] study with more than 500 female teenagers and pre-teenagers also reported similar scores. Nevertheless, no specific mean and SD values were provided. A comparison between their scores and the ones obtained here with a sample over fifty years old (M=70.54; SD=23.44.) shows that the range that includes 68% of the results (i.e., the area around one standard deviation over the arithmetic mean) overlaps in more than 60% of the cases, allowing us to conclude that people over fifty years old have similar body dissatisfaction levels as teenagers and young adults.

As seen, older people are concerned with their image and with being far from beauty and health social standards. This is true for both genders, although it is experienced differently by men and women, and it depends on social variables like being or not in a formal relationship. Getting older means accepting ourselves in a society that applauds youth, beauty, and rejects the contrary. For this reason, more research should guide actions and interventions with at-risk groups (i.e., children and older people) that are not the main subjects of advertising and marketing content but are affected by them.

Disclosures

The authors have nothing to disclose.

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