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# Effects of Behavioral Activation on the Quality of Life and Emotional State of Lung Cancer and Breast Cancer Patients During Chemotherapy Treatment

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## Abstract

Research suggests that the progressive abandonment of activities in cancer patients are related to depression and worse quality of life. Behavioral activation (BA) encourages subjects to activate their sources of reinforcement and modify the avoidance responses. This study assesses the effectiveness of BA in improving quality of life and preventing emotional disorders during chemotherapy treatment. One sample of lung cancer patients and another of breast cancer patients were randomized into a BA experimental group (E.G.<sub>lung/4sess</sub>. $n = 50$ ; E.G.<sub>breast/6sess</sub>. $n = 33$ ) and a control group (C.G.<sub>lung/4sess</sub>. $n = 40$ ; C.G.<sub>breast/6sess</sub>. $n = 35$ ), respectively. In each session and in follow-ups (3/6/9 months), all participants completed different assessment scales. The results

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converge to show the effectiveness of BA, encouraging cancer patients to maintain rewarding activities which can activate their sources of day-to-day reinforcement and modify their experience avoidance patterns. BA appears to be a practical intervention which may improve social and role functioning and the emotional state of cancer patients during chemotherapy treatment.

**Keywords**

behavioral activation, cancer, quality of life, anxiety, depression

**Introduction**

The availability of material and social support has a direct influence on the ability of patients to effectively cope with cancer and on their quality of life (Hughes et al., 2014; Luszczynska, Pawlowska, Cieslak, Knoll, & Scholz, 2013). It is, however, true that, in an attempt to minimizing suffering, relatives and health workers sometimes take over certain everyday decisions and responsibilities of the patient beyond what the patient's physical state might justify. At the same time, patients, in an attempt to feel better, and following what is encouraged by society, may delegate or abandon daily tasks and shield themselves, or attempt to do so, from worries or negative thoughts or experiences. This results in a progressive abandonment of activities. In different studies into the quality of life of cancer patients, it has been observed that changes in daily activities, in particular, in interpersonal relationships and in leisure time have been consistently related to a depressed emotional state, negative assessment of quality of life, tiredness, insomnia, and pain (ACTION Study Group, 2017; Foster, Wright, Hill, Hopkinson, & Roffe, 2009). When treatment ends, although a gradual recovery of the majority of day-to-day activities is observed, this is always smaller among patients with a more accentuated depressive state (Jefford et al., 2017; Scheffold et al., 2014).

By using the avoidance strategy, although emotional distress is relieved in the short term, patients also reduce the possibility of maintaining the rewarding elements of what, until then, has been their lives. Furthermore, the greater the effort made to control/avoid an experience (thoughts, emotions), the more importance it adopts, with the result that patients may become trapped by the very conditions which they are attempting to avoid, leading, contrary to their intentions, to an increase in the distress (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). This psychopathologization of the disease could help to explain the emotional changes and deterioration in the quality of life of cancer patients. Around one-third of all those diagnosed with cancer will

develop a mental health comorbidity, being the most prevalent subclinical mood disturbance (Grassi et al., 2016).

In line with this idea, it has been suggested that the ideal response to cancer cases could well be one oriented toward behavioral activation (BA) and modifying the pattern of behavioral avoidance from the first moments of diagnosis and treatment. When designing the present study, BA therapy (Hopko, Bell, Armento, Hunt, & Lejuez, 2005; Hopko, Lejuez, Ruggieroc, & Eifert, 2003; Jacobson, Martell, & Dimidjian, 2001) was chosen as a reference because of the emphasis placed on the environment within which each subject lives. BA encourages subjects to commit to tasks which can activate their sources of reinforcement in everyday life, thus maintaining and/or increasing healthy behavioral patterns and reducing or eliminating illness behavior and, at the same time, modifying the behavioral avoidance pattern. This therapy has been shown to be useful with cancer patients suffering from depression in various studies (Hopko et al., 2008; Hopko et al., 2015; Hopko, Clark, Cannity, & Bell, 2016; Hopko et al., 2013; Sturmey, 2009).

However, the usefulness of BA with recently diagnosed cancer patients and with the aim of promoting quality of life during chemotherapy treatment has been less widely studied (Fernández, Villoria, Fernández, & González, 2014; Fernández, Padierna, et al., 2011). The present study evaluates the effectiveness of BA in improving quality of life and preventing emotional disorders during chemotherapy treatment in lung and breast cancer patients, two of the most common types of cancer.

Lung cancer and breast cancer are two distinct and different oncological diseases in their clinic, treatment, and prognosis. In addition, due to the higher prevalence of breast cancer among women and lung cancer among men, there are clear sociodemographic differences between these patients, such as those related to gender roles and functionality in the different domains of daily life (Hashim et al., 2016). These clinical and epidemiological peculiarities recommend the need of analyzing independently the effectiveness of BA for each type of cancer. However, these life context differences are a key element to assess the validity of the contextual approach and procedures of BA in oncological patients.

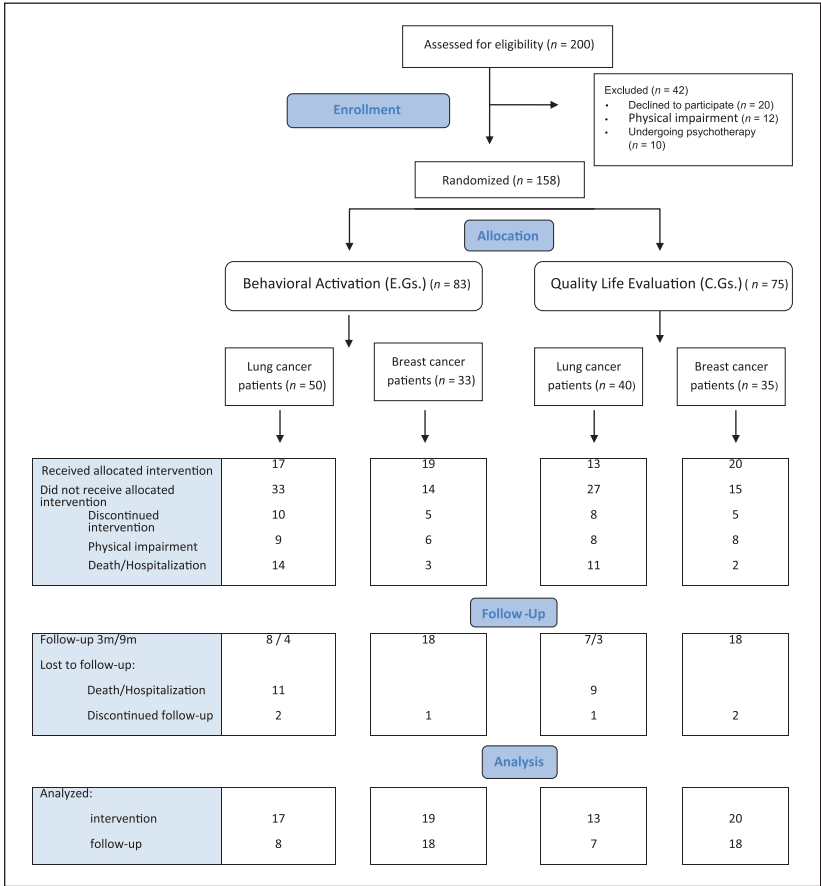
## **Method**

### ***Subject Recruitment***

In a Hospital Oncology Unit over a period of 12 months, a consecutive pre-selection was made of all the patients over the age of 18 who received a first diagnosis of lung or breast cancer (independently of the initial state of the

disease) and whose treatment was to be any form of chemotherapy. The presence of emotional disorders was not an inclusion criterion. The presence of severe physical and/or cognitive deterioration and/or receiving psychotherapy treatment was considered an exclusion criterion. The oncologist informed the patients of the objectives of the study in the same session in which he or she explained the recommended oncological treatment. Immediately afterward, a psychologist received the patients, explained in detail the procedure of the study, and asked for their consent to participate. If this was given, the psychologist assigned the participants at random (using a computer program) either to the experimental group, which was to be the object of the BA intervention, or to the quality of life assessment control group. In total, there were 90 participants with lung cancer (C.G.<sub>lung</sub>:  $n = 40$ /E.G.<sub>lung</sub>:  $n = 50$ ) and 68 with breast cancer (C.G.<sub>breast</sub>:  $n = 35$ /E.G.<sub>breast</sub>:  $n = 33$ ). When designing the intervention, great efforts were made to prevent the substantial sample losses which are so frequent in this type of research (National Research Council, 2010). These measures included reducing the personal and economic cost involved in going to the hospital to participate in the study by programming the sessions of the intervention at the same time as the routine chemotherapy sessions and, furthermore, allowing patients to choose at what precise moment (e.g., before or after the consultation with the doctor) they preferred. In cases involving physical deterioration and/or hospitalization, available support resources were activated to facilitate the continuation of the interventions, always respecting the protocol of each intervention. Despite these efforts, a significant percentage of the patients did not complete the intervention. The principal motive for this was physical deterioration with hospitalization and/or death as a result of the disease and/or oncological treatment. Remaining losses were intermittent and due to totally random causes losses (missing at random (MAR), and missing completely at random (MCAR), respectively; see Little & Rubin, 2002). Checks were carried out to ensure that random losses were proportional in the experimental and control groups in each of the study samples, and that the subjects lost in each of the groups, experimental and control groups for each of the samples, had similar characteristics. It was found that no bias had been produced. The assignment and composition of the sample in the different moments of the study are shown in Figure 1.

The clinical and sociodemographic data of the participants are shown in Table 1. For the sociodemographic and clinical variables, in each type of cancer studied, there are no statistically significant differences between experimental and control groups. Although the number of patients in each group is different, the binomial test indicated that the proportions of the total sample observed in each of the groups were not different from 50% ( $p = .343$ ).



**Figure 1.** Study flow diagram.

Note. E.G.s. = experimental groups; C.G.s. = control groups.

### Assessment Scales

- Clinical Protocol (ad hoc) includes clinical and sociodemographic data and completed during the first consultation by the oncologist and psychologist.
- The Karnofsky Performance Status (KPS) scale (Karnofsky, Abelman, Craver, & Burchenal, 1948) is a gold standard scale used for quantifying the functional status of cancer. The KPS is an 11-point rating scale ranging from *normal functioning* (100) to *dead* (0). The KPS was

**Table I.** Demographic and Clinical Characteristics of Samples.

Demographic and clinical characteristics	Lung cancer		Breast cancer	
	C.G.	E.G.	C.G.	E.G.
Age ( <i>Mdn</i> ± <i>SD</i> )	60.92 ± 8.33	61.87 ± 9.29	53.65 ± 11.16	52.88 ± 12.79
Range	34-78	35-78	31-79	32-78
Male	90	74	3.4	
Gender (%)				
Female	10	26	96.6	100
Number of children ( <i>Mdn</i> ± <i>SD</i> )	1.75 ± 1.29	1.95 ± 1.20	1.65 ± 1.11	1.64 ± 1.31
Number of people in household ( <i>Mdn</i> ± <i>SD</i> )	1.54 ± 1.01	1.78 ± 0.96	1.65 ± 1.07	1.64 ± 1.18
Marital status (%)				
Single/divorced	16.2	12.7	17.2	28.0
Married	75.7	78.7	72.4	56.0
Widowed	8.1	8.5	10.3	16.0
Education (%)				
Illiteracy	5.4	8.5	6.9	
Primary school	64.9	53.2	48.3	44.0
Secondary school	27.0	29.8	31.0	32.0
University	2.7	4.3	13.8	20.0
Employment (%)				
Unemployed			3.4	8.0
Employed	5.4	4.3		8.0
Sick leave	29.7	34.0	48.3	48.0
Housewife	8.1	6.4	41.4	20.0
Retired	56.8	55.3	6.9	16.0
Original tumor (%)				
Nonmicrocytic epidermoid	63.3	43.5		
Nonmicrocytic adenocarcinoma	30	48.6		
Invasive ductal carcinoma			85.7	90.9
Ductal carcinoma in situ			8.6	6
Clinical stage (%)				
I			20	18.2
II-A			48.6	45.4
II-B				30.4
III-A/B/C			28.6	
III-A	33	28.9		
III-B	33	32.4		
IV	30	32		
Chemotherapy (%)				
Cisplatin + Gemcitabine	79	78.2		
Carboplatin + VP16	8	12		
Taxotere + CEF			55.7	53.8
Taxotere + CEF + Herceptin			30	31.9

Note. C.G. = control group; E.G. = experimental group; CEF = cyclophosphamide, epirubicin, fluorouracil.

shown to have good reliability and validity (Sorensen, Klee, Palshof, & Hansen, 1993). It was completed by the oncologist in each session and for each patient.

- The Hospital Anxiety and Depression Scale (HADS) is a 14-item scale with two subscales, Anxiety and Depression (Zigmond & Snaith, 1983). The total HADS score ranges from 0 to 42, whereas the subscales range from 0 to 21. In the Depression and Anxiety subscales, scores of 8 to 10 or more than 10 are considered to indicate possible or probable cases, respectively. In psycho-oncology, the HADS score has been proven to be an accurate instrument in identifying cancer patients with depression (Katz, Kopek, Waldron, Devins, & Tomlinson, 2004) and anxiety (Walker et al., 2007). It was completed by the patient in each session.
- The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire. EORTC QLQ-C30 (Aronson et al., 1993) is a questionnaire designed to assess the quality of life of cancer patients and comprises a global Health-Related Quality of Life Scale (two items) and five functional scales: Physical Functioning (five items), Role Functioning (two items), Emotional Functioning (four items), Cognitive Functioning (two items), and Social Functioning (two items). There are three symptom scales—Fatigue (three items), Nausea and Vomiting (two items), and Pain (two items)—and six single items relating to dyspnea, insomnia, loss of appetite, constipation, diarrhea, and financial difficulties. Of the 30 items, 28 are scored on 4-point Likert-type scales and the remaining two items (29 and 30 for global health status) are scored on modified 7-point linear analog scales. Scores were derived from mutually exclusive sets of items, with scale scores ranging from 0 to 100 after linear transformation. Higher scores for the functional and the global health status/quality of life (GHS-QoL) scales indicated a higher level of functioning and a better quality of life (QoL), respectively, whereas higher scores in symptom scales represented a higher level of symptoms. The QoL subscale has high internal consistency with Cronbach's alpha ranging between .82 and .89 (Holzner et al., 2004). The EORTC QLQ-C30 questionnaire has been previously used in cancer patients with good validity and reliability in Spain (Arraras et al., 2011). It is completed by the patient in every session from the second cycle of chemotherapy onward.
- The Functional Well-Being (FWB) scale (Padierna, 2003), a single-item linear analog self-assessment, indicates the cancer patient's functional well-being (score ranges from 0 to 10). The FWB showed a highly significant correlation with multiple item measures of the



quality of life and showed good sensitivity to changes in cancer patients (Padierna, 2003). It was completed by the patient in each session.

- The Physical Well-Being (PWB) scale (Padierna, 2003), a single-item linear analog self-assessment, indicates the cancer patient's physical well-being (score ranges from 0 to 10). The PWB showed a highly significant correlation with multiple item measures of the quality of life and showed moderate sensitivity to changes in cancer patients. It was completed by the patient in each session.

## *Procedures*

The session protocol for the experimental and control groups was designed to be integrated into the routine of the chemotherapy. Consequently, the number of sessions was the same as the number of cycles of chemotherapy received by each participant. The chemotherapy protocol consisted of a pattern of four cycles for the lung cancer patients and of six cycles for the breast cancer patients. The experimental and control groups with lung cancer patients were consequently given four sessions and breast cancer patients were given six. Furthermore, the sessions took place in the oncology section of the hospital. At some moment before each chemotherapy cycle, each participant was attended to individually by a psychologist (for 45 min). In each case, the intervention protocol which had been randomly assigned to each participant was followed. After the intervention, a follow-up was carried out every 3 months. In the follow-up assessment, all the participants were called to the hospital, where they completed the evaluation instruments under the supervision of a psychologist.

In the control groups, the same procedure was followed in all the sessions. During the session, the patients completed the standardized assessment instruments and then the psychologist asked them to describe their physical, role, social, cognitive, and emotional functioning. During the sessions, at no time was differential attention paid either to their problems or their skills in coping with the disease, nor were they given training in any psychological procedures.

In the experimental groups, the procedure was structured so as to, first, provide a contextual-functional explanation of the problems/limitations of oncology patients and, second, to activate the patient toward (a) maintaining/reestablishing beneficial activities and daily routines, (b) increasing rewarding activities, (c) eliminating illness behavior, and (d) modifying the pattern of behavioral avoidance. The initial session involved assessing the function of their behavior, establishing patient rapport and the introduction of the

treatment rationale. Patients began with self-monitoring to identify those daily activities which they were already carrying out. Due to the importance of self-monitoring in providing a contextualized description of behavior which makes it possible to adapt the design of the intervention to each individual case, steps were taken to make it easier for the patients to fulfill the self-monitoring and self-reports required of them throughout the intervention. Efforts were made to incorporate the self-reports into the daily routine of each individual patient, choosing those moments of the day in which filling them out least interfered with daily activities, while stressing the importance of, whenever possible, doing so as soon as possible after the behavior/situation took place. It was ensured that design of the self-report made it simple to fill out, and, above all, that throughout the intervention, patients understood the usefulness of the self-monitoring, thus making them more likely to continue with it.

Given the limited number of sessions used in this intervention, it was of the utmost importance for patients to understand, from the first session, the functional relationship between their behavior and the consequences which maintained and/or weakened it. For this reason, in the first session, apart from the self-monitoring of activities and emotions, each patient was asked to carry out a contextual observation of a specific behavior. This was of a particular healthy behavior and/or illness behavior and/or avoidance behavior which the therapist had identified during the interview as an objective of the intervention. Patients were taught to register a description of the behavior, the context in which it occurred, and its effects on themselves and on those close to them. This self-monitoring of specific behaviors programmed in the intervention was used in all sessions. As from the second session, the self-monitoring of activities also included an evaluation of pleasure and domain with special attention being paid to identifying values and goals within life areas which included family, social and intimate relationships, hobbies/recreation, and anxiety-producing situations. At the beginning of each session, the therapist and patient analyzed together all the behaviors reported by the patient, and at the end of each session, it was agreed what behaviors would be registered for the following session.

From the very beginning of the intervention, the self-monitoring of activities helped to establish, for each patient, a hierarchy of the therapeutic goals to be reached while the registers of specific programmed behaviors made it possible to implement, session by session, more specific therapeutic goals. Thus, functional analysis was the principal procedure used to determine goals and tasks for each case and in each session. The aim was that the patients, based on the description and contextual analysis of their own behavior, should propose concrete actions to increase their activities and to bring about

changes in the contingencies which maintained their illness behaviors or their avoidance responses to experiences/emotions. Efforts were made to ensure that actions programmed to provoke change were coherent with the patient's values. During the session, the patient/relatives proposed concrete activities/actions and, together with the therapist, a plan was drawn up regarding what to do and how to do it, as well as when, where, with whom, and so on. It was intended that the patient should not only learn alternative forms of response but also that he or she should learn to identify the moments at which acting in the alternative, programmed way would best lead to the consolidation of those actions. Only in cases in which the patient lacked the necessary skills to respond appropriately were specific techniques employed to practice the alternative response. The techniques employed were always specific to each case. Among the techniques most commonly employed in this intervention were rehearsal and modeling of behavior, elaboration of activity hierarchies, programming of behavior and contingency management, problem solving, practicing of social skills, relaxation, and mindfulness techniques (Fernández et al., 2011).

All interventions were carried out by clinical psychologists (authors of the study), who participated indistinctly in the application of the experimental protocol and the control. All had experience in BA. Audio recordings were made of the BA sessions to allow them to be supervised on a weekly basis by the principal researcher (first author), ensuring that the objectives/procedures of each intervention were followed correctly and evaluating the situation/progress of the participants.

### *Data Analysis*

Descriptive statistics were obtained for the control group and experimental group for each variable and assessment session for lung cancer and breast cancer patients. As frequently occurs in research carried out in the fields of the social sciences and health (Claret et al., 2009; Kobayashi, 2005), the assumption of normality was not met in all the variables. However, a number of studies have shown empirically that variations of the type found in this study are not statistically significant (Blanca, Arnau, López-Montiel, Bono, & Bendayan, 2013; Kirk, 2013). A repeated-measures design was used with one intersubject variable with two levels (C.G. and E.G.) and one intrasubject variable. The data analysis carried out was conditioned by the loss of data referred to previously. Although the motives for such abandoning or intermittent losses are well known in this field, it was first necessary to check that no selection bias had been produced, this being the most dangerous potential consequence of data loss (Meng, 2012). It was confirmed that the

characteristics of the patients who had abandoned were similar to those who continued in the intervention in each of the samples and experimental groups. As the loss of data was MAR and MCAR, the study of the evolution and tendency of the variables was carried out both with the sample of patients who completed the treatment and attended all the registers (per protocol analysis) and with all the initial subjects regardless of the loss of data (intention-to-treat analysis). The former was carried out both using the general linear model (GLM) and the mixed linear model (MLM). The latter was carried out only with the MLM (Carpenter & Kenward, 2008). In the GLM, the presence or absence of sphericity and degrees of freedom were corrected when necessary, as proposed by Greenhouse & Geisser and by Huynh & Feldt (Livacic-Rojas, Vallejo, & Fernández, 2007). The evolution of the variables was also examined using polynomial contrasts and the effect size ( $\eta^2$ ), and the posteriori power of the test was calculated. The estimation in the MLM was carried out using restricted maximum likelihood, and the Akaike information criteria (AIC) and Schwarz-Bayes information criterion (BIC) were used to examine four covariance structures (Compound Symmetry, First-Order Autoregressive, Heterogeneous First-Order Autoregressive, and Unstructured). Post hoc pairwise comparisons were carried out (within-subject factor) using the Bonferroni correction to control the error rate. The data were analyzed using SPSS (V.19.0), and the level of significance established a priori was .05.

## Results

Tables 2 and 3 show the descriptive data for all the participants at each moment of the intervention in the global measures of quality of life and emotional state and the results of the inferential analyses.

With respect to the analysis conducted with patients who completed all the registers (per protocol analysis), only the results obtained by means of the GLM are shown, because they are very similar to those obtained with the MLM. The MLM results given are those which correspond to the intention-to-treat analysis. As is pointed out in the text, they do not differ significantly, which is not unexpected given the loss mechanism.

1. Evolution and trend of FWB, PWB, KPS and EORTC QLQ-C30. Global Quality of Life (HRQoL).
  - 1.1. *Breast cancer patients*: In all the sample, satisfactory initial scores can be observed for functional well-being (FWB < 7), physical well-being (PWB < 7), and for the global status of quality of life (QLQ-C30. HRQoL > 70). The doctor also gave an extremely positive assessment of the general state of the partici-



**Table 2. (continued)**

Descriptive	Breast cancer												Lung cancer													
	FWB		PWB		KPS		HRQoL		HAD-A		HAD-D		FWB		PWB		KPS		HRQoL		HAD-A		HAD-D			
	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT		
2nd follow-up	7.5	1.6	7.5	1.8	90	—	75.4	21.2	5.6	4.6	3.7	4.1	6.8	3.2	6.8	3.2	86.6	5.7	78.3	16.2	2.40	2.41	1.6	1.6		
3rd follow-up	7.4	1.5	7.4	1.5	90	—	79.1	21.1	5.2	5.2	3.4	3.9	7.2	1.5	7.0	2.0	90	—	75	21.5	1.50	1.29	0.5	0.5		
Inferential	$F^A_C$	$p$	$F$	$p$	$F^B_L$	$p$	$F^C_C$	$p$	$F^D_B$	$p$	$F^E_B$	$p$	$F^F_C$	$p$	$F^G_C$	$p$	$F^H_C$	$p$	$F^I_L$	$p$	$F^J_L$	$p$	$F^K_A$	$p$	$F^L_D$	$p$
GLM <sup>(T)</sup>	8.43	.007			34.32	.056	51.82	.038	49.80	.005	36.16	.021	19.80	.009	410.47	.007	55.35	.082					93.59	.094		
GLM <sup>(b)</sup>																										
MLM <sup>(T)</sup>	23 <sub>A</sub>	.01			43.25 <sub>A</sub>	.000			93.14 <sub>H</sub>	.000	32.84 <sub>S</sub>	.03	52.08 <sub>S</sub>	.09	76.09 <sub>A</sub>	.000							103.1 <sub>A</sub>	.02		
MLM <sup>(c)</sup>													36.08	.02									117.2	.01	124.9	.03
MLM <sup>(b)</sup>									71.92	.07																

Note. Brackets I, T, or G represent the source of variation: interaction, time, and groups, respectively. Superscripts of the F test  $F^{1-9}$  = degrees of freedom of the source of variation and corresponding contrasting term; in patients with breast cancer, these are, respectively:  $^1 = 1$ ;  $^{29}$ ;  $^2 = 7$ ;  $^{131.53}$ ;  $^3 = 1$ ;  $^{14}$ ;  $^4 = 7$ ;  $^{173.28}$ ;  $^5 = 1$ ;  $^6 = 1$ ;  $^{23}$ ;  $^7 = 7$ ;  $^{259.67}$ ;  $^8 = 1$ ;  $^{23}$ ;  $^9 = 7$ ;  $^{185.56}$ , and, in patients with lung cancer are, respectively:  $^1 = 1$ ;  $^{12}$ ;  $^2 = 4$ ;  $^{126.22}$ ;  $^3 = 1$ ;  $^{109.18}$ ;  $^4 = 1$ ;  $^{12}$ ;  $^5 = 4$ ;  $^{122.68}$ ;  $^6 = 1$ ;  $^7 = 4$ ;  $^{25.16}$ ;  $^8 = 1$ ;  $^9 = 1$ ;  $^{10} = 4$ ;  $^{103.21}$ ;  $^{11} = 4$ ;  $^{90.45}$ ;  $^{12} = 1$ ;  $^{95.5}$ .  $F^{A-H}$  = effects size ( $\eta^2$ ); in GLM (F) breast cancer, these are, respectively:  $A = .225$ ;  $B = .236$ ;  $C = .189$ ;  $D = .299$ ;  $E = .211$ , and, in patients with lung cancer are, respectively:  $a = .45$ ;  $b = .46$ ;  $c = .57$ ;  $d = .33$ ;  $e = .45$ .  $F_{C,G}$  in GLM, indicate if the trend is linear, quadratic, or cubic, respectively.  $S_{A,H,N}$  in the F empirical value in MLM indicates the covariance structure that best adjusted to the data: Compound Symmetry, First-Order Autoregressive, Heterogeneous First-Order Autoregressive, and Not Structured, respectively. — = the value is constant for all patients and there is consequently no variability;  $p$  = level of significance; FWB = Functional Well-Being; PWB = Physical Well-Being; KPS = Karnofsky Performance Status; C.G. = control group; E.G. = experimental group; GLM = general linear model; MLM = mixed linear model; M = mean; DT = standard deviation.

**Table 3.** Descriptive and Inferential Statistics in Experimental and Control Patients of Breast Cancer and Lung Cancer Samples on Functional Scales of the EORTC QLQ-C30: PF, RF, CF, EF, and SF.

Descriptive	Breast cancer															Lung cancer																											
	PF			EF			CF			RF			SF			PF			EF			CF			RF			SF															
	M	DT	M	M	DT	M	DT	M	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT													
C.G.																																											
1st session	84	84	78.06	25.2	90	19.8	85.63	22.2	82.78	26.80	68.82	28.89	79.03	22.05	91.67	16.06	71.21	36.80	83.33	22.4	80.83	22.44	81.43	18.3	87.50	21.5	86.81	13.8	86.11	16.05	70.77	30.13	75.64	21.91	92.31	14.62	71.79	38.12	79.49	34.8			
2nd session	77	23.64	82.54	22.1	89.68	17.1	86.51	16.3	90.48	14.50																																	
3rd session	80	21.52	80.16	19.8	88.09	20.5	84.92	21.1	85.71	22.54																																	
4th session	80	27.44	84.80	16.9	87.04	14.6	87.05	18.5	88.89	18.96	71.11	26.67	77.78	26.02	92.59	12.11	77.78	34.36	90.74	22.2	82.22	18.01	87.75	15.6	85.29	20.3	87.96	22	92.71	12.12	71.43	36.25	79.76	36.28	85.71	20.25	83.33	31.91	90.48	25.2			
Last session	90	12.37	86.11	16.6	90.74	15.3	90.74	14.3	97.22	8.57	60.00	—	80.56	26.79	88.89	19.25	94.44	9.62	94.44	9.62	83.64	19.63	84.85	21.6	84.85	17.4	89.39	18.6	93.94	11.24	80.00	—	90.00	—	100	—	100	—	100	—			
1st follow-up	83.64																																										
2nd follow-up																																											
3rd follow-up																																											
E.G.																																											
1st session	75.20	24	70.83	22.9	85.42	16.5	80	19.8	81.25	26.61	71.30	21.60	80.33	21.76	87.68	19.60	74.06	26.82	81.16	28.5	77	20.80	76.59	18.5	86.51	17.9	77.78	19.3	76.98	22.65	74.12	23.20	94.44	12.78	94.44	11.43	87.96	15.97	87.96	14.9			
2nd session																																											
3rd session																																											
4th session																																											
5th session																																											

(continued)

**Table 3. (continued)**

Descriptive	Breast cancer												Lung cancer											
	PF		EF		CF		RF		SF		PF		EF		CF		RF		SF					
	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT				
Last session	61.33	24.46	73.81	25.1	78.20	24.8	57.78	35.5	67.86	30.29	56.36	30.75	93.94	9.92	90.91	13.67	88.79	31.70	93.94	11.2				
1st follow-up	81.25	15.44	81.77	21.9	91.67	16.1	75.49	16.7	73.96	32.19	62.50	12.82	88.54	22.24	94.92	8.30	70.83	37.53	95.83	11.7				
2nd follow-up	83.33	17.15	76.39	22.3	85.18	25.5	81.48	19.7	82.41	20.98	68.00	22.80	93.33	10.87	96.67	7.46	86.67	13.94	93.33	14.9				
3rd follow-up	81.67	19.92	80.55	23.3	87.50	18.9	79.17	25.7	87.50	20.26	75.00	19.15	89.58	10.49	95.83	8.34	100	—	100	—				
Inferential	$F^A_C$	$p$	$F$	$p$	$F^{B_L}_C$	$p$	$F^{C_C}_C$	$p$	$F^{D_L}_C$	$p$	$F^{E_L}_C$	$p$	$F$	$p$	$F^{F_L}_C$	$p$	$F^{G_L}_C$	$p$	$F^{H_L}_C$	$p$				
GLM <sub>(T)</sub>	112.84	.002			64.76	.04	96.76 <sub>L</sub>	.017							56.53	.034	66.69	.032						
GLM <sub>(I)</sub>					43.61	.072			14.09 <sub>C</sub>	.078					38.15	.021								
MLM <sub>(T)</sub>	35.49 <sub>S</sub>	.000			72.33 <sub>S</sub>	.03	1024.2 <sub>N</sub>	.000											72.4 <sub>N</sub>	.010				
MLM <sub>(G)</sub>	33.07	.09			87.98	.01	113.97	.050					33.60	.06										
MLM <sub>(I)</sub>					51.96 <sub>X</sub>	.08									42.30 <sub>X</sub>	.09								

Note. Superscripts of the  $F$  test  $F_{(1,1)}$  = degrees of freedom of the source of variation and corresponding contrasting term. In patients with breast cancer, these are, respectively: <sup>1</sup> = 1; <sup>2</sup> = 6; <sup>213.72</sup>, <sup>3</sup> = 1; <sup>50.04</sup>, <sup>4</sup> = 1; <sup>20</sup>, <sup>5</sup> = 6; <sup>141.90</sup>, <sup>6</sup> = 1; <sup>22</sup>, <sup>7</sup> = 6; <sup>216.70</sup>, <sup>8</sup> = 1; <sup>42.93</sup>, <sup>9</sup> = 1; <sup>21</sup>, <sup>10</sup> = 6; <sup>36.96</sup>, <sup>11</sup> = 1; <sup>50.27</sup> and, in patients with lung cancer, are, respectively: <sup>1</sup> = 1; <sup>8</sup>, <sup>2</sup> = 1; <sup>45.93</sup>, <sup>3</sup> = 1; <sup>8</sup>, <sup>4</sup> = 3; <sup>60.55</sup>, <sup>5</sup> = 1; <sup>8</sup>, <sup>6</sup> = 1; <sup>8</sup>, <sup>7</sup> = 3; <sup>22.08</sup>, <sup>F<sub>(D-B-d)</sub></sup> = effects size ( $\eta^2$ ). In GLM (F) breast cancer, these are, respectively: <sup>A</sup> = .141; <sup>B</sup> = .153; <sup>C</sup> = .178; <sup>D</sup> = .244 and, in patients with lung cancer, are, respectively: <sup>a</sup> = .33; <sup>b</sup> = .505; <sup>c</sup> = .450; <sup>d</sup> = .455. — = the value is constant for all patients and there is consequently no variability. Rest, see Table 2;  $p$  = level of significance; PF = Physical Functioning; RF = Role Functioning; CF = Cognitive Functioning; EF = Emotional Functioning; SF = Social Functioning; C.G. = control group; E.G. = experimental group; GLM = general linear model; MLM = mixed linear model; M = mean; DT = standard deviation.



pants ( $KPS > 90$ ; see Table 2). As the treatment sessions progress, increasingly negative assessments can be observed, the worst being around the fifth or last session. From then onward, in the follow-ups, the patients' and the doctor's assessment of all conditions improve. This cubic trend over time is statistically significant in the variables FWB, QLQ-C-30.HRQoL, and KPS, but not in PWB (see Table 2).

- 1.2. *Lung cancer patients*: With regard to these patients, in Table 2 it can be seen that, from the very beginning, both the way in which the patients assess their functional well-being (FWB), physical well-being (PWB), and global quality of life status (HRQoL) and the assessment made by the doctor (KPS) are limited. Nevertheless, the scores of the lung cancer patients show a peak of improvement coinciding with the third and fourth treatment sessions. This is particularly noticeable in the FWB and PWB scales. This peak is more pronounced in the E.G. than in the C.G. Furthermore, in the E.G., from the first measures, a clear linear trend can be observed which is not present in the C.G. This improvement gradually disappears, however, in the follow-up. Table 2 shows the cubic trend in the scores related to these two variables. The best assessment made by the doctor of the E.G. patients' global functioning is statistically significant over time. The global assessment of quality of life (QLQ-C-30. HRQoL) does not vary significantly either from one group to another or over time.
2. Evolution and trends of Anxiety (HAD-A) and Depression (HAD-D).
  - 2.1. *Breast cancer patients*: In these patients (Table 2), the most striking thing is that, although more anxiety (HAD-A) is detected than depression (HAD-D), in neither of these conditions does the mean value for the group reach clinical values. In depression, as in the variables discussed above, there is a peak (greater in the E.G. than in the C.G.), indicating a worse state, coinciding with the last treatment session and, following that, a gradual improvement. Anxiety, on the contrary, diminishes slowly in the C.G. from one session to the next, reaching its lowest score in the last session and then increasing in the follow-up. In the E.G., in contrast, the levels of anxiety undergo a systematic and more stable fall during the treatment, which, furthermore, is maintained in the follow-ups. This interaction between time and the group is statistically significant (see Table 2).
  - 2.2. *Lung cancer patients*: In this sample (Table 2), the mean levels of anxiety (HAD-A) and depression (HAD-D) are not clinically

relevant. These patients appear to show more depression than anxiety, particularly in the E.G. In both variables and over time, there is only improvement in the E.G., which shows a gradual decrease in the mean values and deviations. Although the trend analysis using the GLM does not detect this fact, possibly due to the gradual depletion of the sample, with the MLM the difference between the groups is detected.

3. Evolution and trends of Physical Functioning, Role Functioning, Cognitive Functioning, Emotional Functioning, and Social Functioning (EORTC QLQ-C30). Table 3 shows the data regarding the evolution of the different types of functioning which gauge quality of life as measured by the QLQ-C-30 in all the participants.

- 3.1. *Breast cancer patients*: In this sample, there are noticeable differences between the experimental group and the control group. The functioning of the C.G. in the different areas evaluated during the treatment is satisfactory and is maintained with no changes, or only extremely subtle ones, in the follow-ups. In the E.G., functioning deteriorates during the treatment; although coinciding with the last session, there is a change in the trend, the negative appraisals reach their lowest point, and there is a sharp increase in functioning in all areas in the follow-up. This different behavior of the two groups is statistically significant in all the functioning variables except in the QLQ-C-30.EF (see Table 3).

- 3.2. *Lung cancer patients*: In these patients, the depletion of the sample as the sessions progressed makes it difficult to generalize about the results. Even so, in the C.G., the variables of Physical, Emotional, and Cognitive Functioning do not change throughout the intervention while role and social functioning improve in the follow-up. In the E.G., physical condition is what changes most, deteriorating from one session to another until reaching its lowest point in the last session. In all other areas, scores are higher than in the C.G. and there is progressive improvement, this being most evident in the follow-up. Among these patients, the different behavior of the groups is statistically significant in the variables of Cognitive, Role, and Social functioning (see Table 3).

4. Evolution of the disease symptomatology (Symptom Scales of the EORTC QLQ-C30)

- 4.1. *Breast cancer patients*: Table 4 shows those variables referring to the assessment of symptoms in which changes took place during the intervention. Four aspects stand out above the rest. First, the E.G. group patients have higher scores in all symptoms. Second,

**Table 4.** Descriptive and Inferential Statistics in Experimental and Control Patients of Breast Cancer Sample on Symptom Scales of the EORTC QLQ-C30.

Descriptive	Nausea/ vomiting			Loss of appetite			Constipation			Diarrhea			Insomnia			Pain			Fatigue			Dyspnea		
	M	DT	M	M	DT	M	M	DT	M	DT	M	M	DT	M	DT	M	M	DT	M	DT	M	M	DT	
C.G.																								
1st session	8.89	14.34	7.78	16.80	20	29.81	11.11	20.22	25.56	31.18	17.22	21.21	24.81	23.65	22.15	24.81	23.65	22.15	24.81	23.65	22.15	24.81	23.65	22.15
2nd session	10.42	18.26	6.94	16.96	25	31.47	4.17	11.26	25.00	28.23	13.19	19.65	23.61	15.13	14.95	23.61	15.13	14.95	23.61	15.13	14.95	23.61	15.13	14.95
3rd session	9.52	15.43	1.59	7.27	17.46	24.99	11.11	16.10	26.67	27.78	14.29	19.92	25.40	18.97	14.81	25.40	18.97	14.81	25.40	18.97	14.81	25.40	18.97	14.81
4th session	11.11	16.94	12.70	22.30	11.67	16.31	4.76	11.95	19.05	19.92	16.71	23.08	23.28	22.19	10.03	23.28	22.19	10.03	23.28	22.19	10.03	23.28	22.19	10.03
5th session	8.33	13.10	11.11	19.80	5.56	17.15	11.11	19.80	24.07	33.93	11.11	16.17	27.78	22.95	12.78	27.78	22.95	12.78	27.78	22.95	12.78	27.78	22.95	12.78
Last session	5.56	16.17	7.41	24.40	9.26	19.15	1.85	7.86	15.69	20.81	4.81	22.79	17.90	25.89	10.78	17.90	25.89	10.78	17.90	25.89	10.78	17.90	25.89	10.78
1st follow-up	0	—	0	—	12.96	25.92	1.85	7.86	13.73	20.61	10.18	17.28	12.96	17.57	10.78	12.96	17.57	10.78	12.96	17.57	10.78	12.96	17.57	10.78
2nd follow-up	0	—	0	—	21.21	30.81	3.03	10.05	21.21	22.47	12.12	18.40	18.18	24.48	13.48	18.18	24.48	13.48	18.18	24.48	13.48	18.18	24.48	13.48
E.G.																								
1st session	14.00	20.79	33.33	37.27	13.33	25.46	21.33	28.67	28.00	32.89	22.92	24.97	29.11	21.59	9.23	29.11	21.59	9.23	29.11	21.59	9.23	29.11	21.59	9.23
2nd session	19.84	27.19	25.00	21.29	15	22.88	17.46	17.06	33.33	33.33	15.87	16.22	29.10	22.63	11.95	29.10	22.63	11.95	29.10	22.63	11.95	29.10	22.63	11.95
3rd session	18.33	24.72	30.00	30.40	18.33	27.52	10.00	15.67	35.00	33.29	25.00	26.21	38.89	17.47	14.81	38.89	17.47	14.81	38.89	17.47	14.81	38.89	17.47	14.81
4th session	24.56	31.11	19.30	23.08	19.30	30.05	7.02	17.84	22.81	27.34	18.42	22.15	39.18	26.55	16.72	39.18	26.55	16.72	39.18	26.55	16.72	39.18	26.55	16.72
5th session																								

(continued)

**Table 4. (continued)**

Descriptive	Nausea/ vomiting			Loss of appetite			Constipation			Diarrhea			Insomnia			Pain			Fatigue			Dyspnea			
	M	DT	p	M	DT	p	M	DT	p	M	DT	p	M	DT	p	M	DT	p	M	DT	p	M	DT	p	
C.G.																									
Last session	27.78	31.29	28.89	37.51	11.11	16.27	15.56	24.77	28.57	28.81	24.44	26.63	50.00	32.54	11.11	27.22									
1st follow-up	10.78	16.60	7.84	18.74	21.57	31.05	1.96	8.08	19.61	23.74	13.72	14.71	26.80	23.91	7.84	18.74									
2nd follow-up	2.78	8.57	5.56	17.15	9.26	15.36	1.85	7.86	33.33	33.33	20.37	25.28	23.46	20.13	12.96	23.26									
3rd follow-up	4.17	10.36	2.78	9.62	11.11	16.41	0	—	22.22	25.95	16.66	15.89	19.44	23.27	11.11	21.71									
Inferential	F	p	F	p	F	p	F	p	F	p	F	p	F	p	F	p									
GLM <sub>(T)</sub>	18.56 <sub>C</sub>	.008 <sup>a</sup>	55.75 <sub>C</sub>	.025 <sup>c</sup>	<sup>10</sup> 3.02 <sub>L</sub>	.010 <sup>e</sup>	<sup>12</sup> 15.95 <sub>L</sub>	.001 <sup>f</sup>	<sup>15</sup> 5.42 <sub>B</sub>	.030 <sup>g</sup>	<sup>16</sup> 14.17 <sub>C</sub>	.001 <sup>h</sup>	<sup>17</sup> 86 <sub>C</sub>	.010 <sup>i</sup>	<sup>21</sup> 5.53 <sub>L</sub>	.028 <sup>j</sup>									
GLM <sub>(I)</sub>	<sup>25</sup> 13 <sub>C</sub>	.033 <sup>b</sup>	<sup>26</sup> 17 <sub>C</sub>	.022 <sup>d</sup>																					
MLM <sub>(T)</sub>	37.35 <sub>H</sub>	.000	75.45 <sub>H</sub>	.000			<sup>13</sup> 5.90 <sub>H</sub>	.000						<sup>18</sup> 6.89 <sub>N</sub>	.000										
MLM <sub>(G)</sub>	45.91	.02	<sup>21</sup> 3.49	.000										<sup>19</sup> 2.18	.070										
MLM <sub>(I)</sub>			<sup>22</sup> 6.2 <sub>H</sub>	.020	<sup>11</sup> 2.38 <sub>N</sub>	.050	<sup>14</sup> 2.25 <sub>H</sub>	.040						<sup>20</sup> 6.18 <sub>N</sub>	.020										

Note. Superscripts of the F test  $F^{(1,2)} = \text{degrees of freedom of the source of variation and corresponding contrasting term}$ . These are, respectively: <sup>1,2,5,6,12</sup> = 1,23; <sup>3</sup> = 6; <sup>12,1,75</sup>; <sup>4</sup> = 1;59,62; <sup>7,9</sup> = 6;105,09; <sup>8</sup> = 1;55,61; <sup>10</sup> = 1;22; <sup>11</sup> = 6;335,22; <sup>13,14</sup> = 6;92,86; <sup>15</sup> = 1;21; <sup>16,16,17,21</sup> = 1;22; <sup>18,20</sup> = 6;32,93; <sup>19</sup> = 1;55,62. In  $p$ , superscripts<sup>a-j</sup> represent the  $\eta^2$  of polynomial analysis, where <sup>a</sup> = .271; <sup>b</sup> = .182; <sup>c</sup> = .200; <sup>d</sup> = .207; <sup>e</sup> = .267; <sup>f</sup> = .410; <sup>g</sup> = .205; <sup>h</sup> = .392; <sup>i</sup> = .263; <sup>j</sup> = .201. — = the value is constant for all patients and there is consequently no variability;  $p$  = level of significance; C.G. = control group; E.G. = experimental group; GLM = general linear model; MLM = mixed linear model. Rest, see Table 2; M = mean; DT = standard deviation.

both in the E.G. and the C.G., all the symptoms decrease when the treatment finishes, with the exception of dyspnea, which increases in the E.G. Third, the variables Nausea/Vomiting, Loss of Appetite, and Diarrhea are the first variables to disappear while the variables Constipation, Insomnia, Pain, and Fatigue do so more slowly. Finally, the difference in score between before and after the treatment is much greater, for all the variables, in the E.G. than in the C.G. All of these changes are shown to be statistically significant except the Pain variable.

- 4.2. *Lung cancer patients*: Table 5 shows the variables referring to the symptoms. During the chemotherapy treatment, the patients' symptoms, in general, appeared to be under adequate control. The data suggest that there is a greater presence of the majority of the symptoms in the C.G. and these are maintained over time, whereas the E.G. improves over the time studied. The differences between the groups indicate that the E.G. was in a better situation. However, given the small number of symptoms and, in particular, the loss of subjects, the data only show statistically significant differences with regard to Appetite, Constipation, and Fatigue. The statistical results are shown in the above tables. These should be viewed with caution due to the great loss of subjects during the study, above all among the lung cancer patients, despite the fact that the data were analyzed using the MLM to take this problem into account.

## Discussion

The aim of this study was to analyze the effect that a psychological intervention based on BA (Kanter et al., 2010) had on the quality of life and emotional state of patients with lung and breast cancer during chemotherapy treatment. The procedure was structured so as to obtain an active commitment from the subjects to beneficial and rewarding activities in their lives, despite their illness.

The conditions which define the quality of life of an oncological patient (symptoms, emotional state, and functioning) were evaluated by means of standardized questionnaires in each treatment session and in three 3-monthly follow-ups. The effects of the experimental intervention were measured in relation to a control group which attended the same number of sessions of the same duration but which were dedicated exclusively to evaluating quality of life. As this group received neither guidance nor training in any specific psychological procedure nor differential attention with regard to coping

**Table 5.** Descriptive and Inferential Statistics in Experimental and Control Patients of Lung Cancer Sample on Symptom Scales of the EORTC QLQ-C30.

Descriptive	Nausea/ vomiting		Loss of appetite		Constipation		Diarrhea		Insomnia		Pain		Fatigue		Dyspnea	
	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT	M	DT
<b>C.G.</b>																
1st session																
2nd session	6.06	9.68	21.21	31.78	22.73	29.79	6.06	13.16	34.85	34.85	16.67	28.17	37.63	28.99	16.67	30.43
3rd session	8.97	14.62	17.95	25.87	25.64	38.86	2.56	9.25	30.77	34.59	19.23	33.92	29.91	29.18	15.13	12.52
Last session	5.56	11.79	18.52	33.79	18.52	33.79	11.11	16.67	29.63	30.93	22.22	25.00	33.33	28.33	14.81	24.22
1st follow-up	0	—	23.81	31.71	19.05	37.80	4.76	12.60	24.76	12.60	30.95	39.00	36.98	33.25	19.52	16.27
2nd follow-up	0	—	0	—	0	—	22.22	19.25	22.22	38.49	16.67	28.87	29.63	27.96	22.22	38.49
<b>E.G.</b>																
1st session																
2nd session	2.90	8.18	13.04	26.09	7.25	14.06	4.35	11.48	26.09	37.55	18.84	23.19	37.54	21.93	12.90	9.60
3rd session	2.78	8.57	5.56	12.78	5.56	12.78	1.85	7.86	29.26	19.15	9.26	13.06	29.01	21.94	15.56	17.15
Last session	6.06	20.10	9.09	21.56	12.12	16.82	3.03	10.05	21.21	30.81	12.12	18.40	20.40	28.66	16.06	13.48
1st follow-up	6.25	12.40	4.17	11.79	4.17	11.79	0	—	20.17	33.03	14.58	24.30	28.89	26.56	14.17	11.79
2nd follow-up	0	—	0	—	0	—	3.33	18.26	20.00	29.81	6.67	14.91	23.33	13.61	13.33	18.26
3rd follow-up	0	—	0	—	0	—	0	—	16.67	19.24	8.33	16.67	23.89	10.64	8.33	16.67
Inferential	F	p	F	p	F	p	F	p	F	p	F	p	F	p	F	p
GLM <sup>(T)</sup>			16.18	.020	38.29	.010										
MLM <sup>(G)</sup>															38.79 <sub>C</sub>	.018 <sup>a</sup>

Note: Superscripts of the F test  $F_{1,3}$ = degrees of freedom of the source of variation and corresponding contrasting term. There are, respectively, <sup>1</sup> = 1; 50.30; <sup>2</sup> = 1; 52.20; <sup>3</sup> = 1; 8. In  $p$ , superscripts<sup>a</sup> represent the  $\eta^2$  of polynomial analysis, where <sup>a</sup> = .524, — = the value is constant for all patients and there is consequently no variability;  $p$  = level of significance; C.G. = control group; E.G. = experimental group; GLM = general linear model; MLM = mixed linear model. Rest, see Table 2.

strategies, it was considered an ideal way of eliminating the possibility that the results of the experimental intervention might be attributed simply to the extra attention patients taking part in the study received. Furthermore, as the intervention gave the control group patients the opportunity to express their worries and emotions to a specialized listener, it may have had some therapeutic value, although not of a specific nature. Consequently, the use of this type of control group does not only endow the results of the BA group with added value but also offer an ethical guarantee. The clinical and sociodemographic data of the participants appear to be representative of the population with lung and breast cancer. Before the intervention, the experimental groups and the control groups of each type of cancer were comparable in all the variables analyzed. The initial size of the groups was sufficiently big to guarantee adequate statistical analysis and to be able to generalize the results. However, the significant depletion of the sample due to death/hospitalization, albeit as a result of the evolution of the disease, could limit the strength of the results obtained. The data were analyzed using the MLM for those subjects who were lost during the study to take this problem into account.

In the lung cancer patients, over time, a favorable evolution of general state and health was observed. However, and despite the depletion of the sample due to deaths and hospitalization, significant differences were found between the two groups, in favor of the BA E.G. Nevertheless, the intervention was insufficient to maintain the improvement in the medium term. Brief varieties of BA have been applied successfully, although always using a greater number of sessions, between six and 12, than the four used with the lung cancer patients in this study (Hopko et al., 2011; Lejuez, Hopko, & Hopko, 2001).

The favorable evolution of the general state and health perceived in the oncological patients during their treatment with chemotherapy has been attributed to the sensation of control over the disease which the treatment offers them and, of course, to the effect of the treatment itself in terms of symptom management, functionality, and quality of life (Mannion, Gilmartin, Donnellan, Keane, & Waldron, 2014). These conditions could well also influence our results, although, if that were the case, they would be likely to affect the C.G. and the E.G. in a similar way. The disparate evolution of the two groups during the treatment, significantly more favorable in the E.G., would appear to support the usefulness of BA.

Physical state and symptoms related to the disease and to the treatment play an important part in the quality of life of oncological patients and affect their degree of functioning in other areas of daily life. On the whole, evaluated using the QLQ-C30, nausea and vomiting were found to be of little clinical relevance among the lung cancer patients, probably due to the type and

frequency of the chemotherapy administered. The most commonly found symptoms were fatigue, pain, insomnia, and dyspepsia, as has also been observed in other studies (Kristensen et al., 2017; Nishiura, Tamura, Nagai, & Matsushima, 2015). Despite the low incidence of symptoms and the loss of subjects during the intervention, the differences observed between groups and the evolution and trend of the symptomatology were more favorable in the E.G. The part played by the BA in improving the symptomatology of the E.G. can obviously only be attributed to the changes it produced in the patients' day-to-day behavior. Changes in the daily routines of patients and in their emotional state have previously been related to a favorable evolution of symptoms such as pain, insomnia, or appetite (Mas, Quantin, & Ninot, 2015; Tang et al., 2016; Valdes-Stauber, Vietz, & Kilian, 2013).

Functioning in different areas of daily life, evaluated using the QLQ-C30 role, social, and cognitive scales, was always greater in the E.G., but a statistically significant improvement was only observed when BA was applied. The C.G. appeared to maintain the same level of functioning throughout the intervention. The changes in the functioning of the patients in the E.G. are what best demonstrate the utility of BA as a means of promoting quality of life during oncological treatment.

The emotional state of the patients with lung cancer during the oncological treatment was, in general, good. The mean scores obtained with the HADS did not indicate the presence of a pathology of anxiety or depression in either of the two groups. Similar results have been obtained in previous studies and by other authors (Fernández et al., 2011; Fernández et al., 2013; Mitchell et al., 2011), although other studies have shown higher percentages of patients with emotional disorders following the diagnosis of cancer (Cardoso, Graca, Klut, Trancas, & Papoila, 2015; Cosci, Fava, & Sonino, 2015). These discrepancies are frequently attributed to differences in the procedures and evaluation instruments used and to clinical and sociodemographic differences among the participants (Walker et al., 2013). In our study, assuming that both groups can be considered to be representative of the target population from a clinical and sociodemographic point of view and that the evaluation instruments offer the required guarantees, there was shown to be a reduction in the anxiety and depression symptomatology of patients in the E.G. toward the end of the study. These results show the efficiency of BA, as previously demonstrated in treatment for depression in cancer patients (Hopko et al., 2008; Hopko et al., 2015; Hopko et al., 2013; Hopko et al., 2016).

To sum up, it would appear that the improvement in emotional state and in all the other areas of the quality of life of the E.G. can be attributed to the BA. However, the decrease in functioning of the patients in the E.G. in the follow-up indicates that the intervention was insufficient to maintain this change. In



this study, as the intervention was integrated into the hospital routine of the chemotherapy treatment, the number of sessions was extremely limited. Trying to improve the efficiency of the treatment very probably reduced its effectivity. Key conditions of BA such as the programmed monitoring of beneficial activities and reinforcement of healthy behavioral patterns may have been weakened by the premature ending of the sessions with the subsequent loss of functioning. It is, however, also important to take into account that, as time went by, the progressive deterioration caused by the disease clearly limited the ability of the patients to maintain beneficial life activities and that hospitalization and death resulted in the loss of many participants. The fact that only the E.G. showed a favorable evolution in all scales of functioning appears to confirm that, despite the disease, recovering daily routines was indeed a worthwhile objective for the participants and is beneficial for oncological patients.

In the breast cancer patients, the symptoms of the disease were shown to be under adequate control and the patients had a favorable perception of their general state and health at the beginning of the chemotherapy. However, with the passing of the sessions and, in particular, at the end of the treatment, a worsening of their state of health and a more negative assessment of their general state were detected. These results, which coincide with those observed by other authors, have been attributed to the effect of the toxicity accumulated during the chemotherapy (Gavric & Vukovic-Kostic, 2016). Even so, the fact that, during the treatment, the E.G. showed a more notable and progressive increase in physical symptoms and a greater deterioration of physical capacity is worthy of note. While in the lung cancer patients, the chemotherapy improved the symptoms of the disease, possibly facilitating the recovery of beneficial activities, in the breast cancer patients, the chemotherapy provoked symptoms which may have led to a loss of functioning in certain areas of daily life. It is nevertheless also true that, as with the lung cancer patients, only in the E.G. was there a statistically significant recovery of functioning. Among the breast cancer patients, it was also only in the E.G. that social and role functioning increased significantly. It would appear that the programming of beneficial activities and the reinforcement of healthy behavioral patterns, the key aims of BA, favored the improvement in the role and social functioning of both samples. This improvement in the breast cancer E.G. takes on even greater relevance if we take into account their higher level of symptomatology and also the fact that, from the beginning and throughout the treatment, the degree of informed functionality of the participants as a whole was always good. In the light of this peculiarity, it is possible to question the suitability of applying this

psychological approach indiscriminately to breast cancer patients. Several studies coincide in demonstrating how most breast cancer patients achieve a satisfactory degree of social and emotional adjustment during oncological treatment (Burgess et al., 2005; Paskett, 2015). These data should be interpreted in the context that defines breast cancer patients. In particular, the participants in this study were mainly women, housewives, and with family responsibilities. In our society, this fact could explain a greater desire and/or need to maintain daily activity despite the physical deterioration caused by chemotherapy. Household chores and looking after the family are still, in the majority of cases, the responsibility of women, and it is frequently difficult for others to take over these tasks. However, it can also be rewarding for the woman to maintain those functions which are beneficial in her life, especially when her aims in life are threatened by a disease like cancer. The fact that activities were maintained in both groups of breast cancer patients may explain why the emotional state of the participants did not significantly deteriorate during the treatment.

Just as the results of the intervention with the breast cancer patients can be related to certain factors in their life contexts, the same is true of the lung cancer patients. One such factor is the improvement in their physical state brought about by the chemotherapy, which may have facilitated the recovery of some activities. This increase in activity, in particular of leisure-related activities, was probably fomented by their social environment. The fact that the majority of these participants were middle-aged men, retired, or on sick leave and with social support made it easier for them to take an active part in this type of rewarding activities. As is always stressed in BA, it is in the social context of each person that both the conditions which maintain behavioral problems and those upon which change depends are to be found. On the whole, the results in both samples, breast cancer patients and lung cancer patients, converge to show the efficacy of BA in encouraging cancer patients to maintain rewarding activities which can activate their sources of day-to-day reinforcement and modify their experience avoidance patterns.

In conclusion, the results confirm the efficacy of BA therapy in improving quality of life (symptoms, emotional state, and functioning) during adjuvant chemotherapy treatment. It is also clearly necessary to repeat this intervention with larger samples to investigate the influence that the characteristics of the patients (sociodemographic, clinical), of the intervention (duration, number of sessions, moment of commencement), and of the therapeutic context have on the efficiency and effectivity of the BA in promoting quality of life in oncological patients.

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