

## Article

# Investigation of Loneliness and Social Support in Patients with Eating Disorders: A Case-Control Study

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**Abstract:** Loneliness and, to a lesser degree, social support are considered under-researched topics in the literature on eating disorders (ED). This study attempted to expand the relevant body of research by examining loneliness in combination with social support in ED patients and in healthy controls (HC). Binge-eating problems, emotional eating, resilience, anxiety, and depression symptoms were also assessed. Thirty-two patients with ED and twenty-nine HC completed the following measures: *UCLA Loneliness Scale*, *Social Support Questionnaire—Short Form*, *Binge Eating Scale*, *Emotional Eating Scale*, *Connor–Davidson Resilience Scale*, *Hospital Anxiety and Depression Scale*, and the *Eating Disorder Examination Questionnaire*. Eating-disorder patients showed higher levels of loneliness and lower levels of social support—both in terms of perceived availability and satisfaction—than HC. Anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED) subgroups did not differ significantly on either of these variables. In ED patients, loneliness was only correlated with Social Support Satisfaction (negatively) and depressive symptomatology (positively). Patients with ED appear to be lonelier and less satisfied with their social support compared to HC. We found similar levels of loneliness and social support between AN, BN, and BED sufferers. Decreased social support satisfaction and elevated symptoms of depression could account for ED patients’ high levels of loneliness.

**Keywords:** loneliness; social support; eating disorders; anorexia nervosa; bulimia nervosa; binge eating; depression; anxiety; resilience; emotional eating



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## 1. Introduction

Eating Disorders (ED) are severe, frequently chronic, mental disorders that are common in women, and they are associated with physical and psychosocial sequelae [1–3], an increased risk of mortality, premature death, and suicide [4–6]. Consequentially, a sufficient volume of studies on ED have been conducted; the focus of research, however, has largely revolved around their clinical treatment [7], with the majority of studies being quantitative evaluations of ED treatment effectiveness [8]. In contrast, studies focusing on the non-clinical elements that make up the experience of suffering from an ED (e.g., daily management, coping) are more limited [7].

Loneliness falls into this category, too. Though a widely accepted definition of loneliness is still lacking [9] (p. 73), [10], Perlman and Peplau [11] defined loneliness as: “the unpleasant experience that occurs when a person’s network of social relations is deficient in some important way, either quantitatively or qualitatively” (p. 31), a definition that remains widely used [9] (p. 75) and emphasizes that loneliness is (a) a subjective, (b) unpleasant experience that causes pain to the individual, and (c) is an aftereffect of insufficient social ties [11] (p. 32). There is substantial research data indicating that loneliness negatively affects both mental and physical health [10,12].

According to the only systematic review that examined the relationship between loneliness and ED, anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED) share a connection with this emotional experience. Specifically, the emotional experience is said to contribute to their symptomatology, while the patients' adverse interpersonal relationships aggravate the disorders and further intensify feelings of loneliness [13]. Nonetheless, the relationship between loneliness (or the subjective perception of social isolation) and disordered eating behavior has not been widely studied [14], as the number of papers on ED/disordered eating and the aforementioned emotion is limited [15].

Most studies on the subject of ED (or disordered relationships with food) and loneliness mainly focus on binge eating [15]. The feeling of loneliness (or disconnection from other people) appears to be frequently associated with food consumption and/or binge-eating behaviors, whether they are part of an ED (such as BED, BN) or observed in non-clinical populations (e.g., [14,16,17]). Therefore, even though some research has examined loneliness in ED, it has mostly examined this feeling as a possible predictor of binge-eating episodes/behavior. In contrast, while a prior study has pointed to high levels of loneliness in ED patients (see [18]), data measuring the patients' overall levels of loneliness appear to be rare, especially with regard to quantitative evaluations in AN sufferers.

The way one perceives their relationships plays a decisive role in loneliness [13]. This particular emotional experience appears to be closely linked to the concept of social support [19], which has been described as *"a social network's provision of psychological and material resources intended to benefit an individual's ability to cope with stress"* [20] (p. 676), and could, perhaps, be viewed as complementary to the concept of loneliness. A very large volume of research has now been conducted on the relationship between social support and health [21]. Ample evidence has revealed that low levels of social support and both physical and mental health are positively correlated [22], with the relation being stronger especially in terms of perceived social support [23,24].

Studies conducted more than 20 years ago (e.g., [25,26]) indicated that the relationship between ED and social support has not been adequately investigated. The passage of time, however, does not seem to have changed the landscape drastically, as, according to a review on the subject, the number of studies on social support and social networks of ED patients (albeit exceeds those on loneliness) is not large, and therefore, no definitive conclusions have emerged [27].

Based on previous evidence, AN and BN patients appear to demonstrate deficits in their social networks in structural (i.e., size), as well as in functional aspects (i.e., adequacy of support), as BN sufferers, in addition to a more restricted social network, seemed to be dissatisfied with their social support in comparison with controls [26]. Subsequent studies have produced similar findings (lower levels of social support and/or reduced satisfaction in BN patients [28,29], in AN patients [30], and in studies featuring both AN and BN patients [31]), while the same findings also apply to prior research in undergraduate students who met the diagnostic criteria for BN [32]. Although the mechanism by which social support affects bulimic symptomatology is unknown, most studies suggest that low levels of social support are associated with increased bulimic symptoms [33].

Literature on the subject is not devoid of conflicting findings as some studies did not report low levels of social support or satisfaction in patients with ED or relevant symptomatology (e.g., [34,35]), and there are also studies in which ED diagnosis did not seem to be of great importance with regard to aspects of the patients' social support (e.g., [36,37]). Furthermore, concerning the available data, some caution is warranted, as a sizeable number of studies that have investigated the relationship between interpersonal functioning (which includes the concept of social support) and eating psychopathology: (a) did not control for comorbidity with psychopathological entities such as depression, and (b) in several cases, the study samples came from non-clinical populations [38].

Taking into account that which was previously described regarding the literature on the subject, we considered the utility of a quantitative study that would investigate loneliness in combination with social support in patients with ED (to our knowledge, the first of its kind), comparing them to a group of healthy controls. Specifically, we could expand the relevant body of research and contribute towards consistent literature in a research field that appears to be insufficiently studied.

In the context of this investigation, we deemed that the additional assessment of the following variables could be of value, as they appear to be relevant to the subject: binge eating, emotional eating, and resilience. Emotional eating refers to the tendency for food consumption in response to negative—or even positive—emotional states [39]. Similar to binge eating, which is part of the clinical presentation of ED [4,40], studies have shown that feelings of loneliness are among the contexts in which (over)eating in response to emotions is observed (e.g., [41,42]). Resilience has been described as a measure of a person's ability to handle stress or adversity and achieve a positive adaptation to it [43]. It may, perhaps, be viewed as a different way to assess the resources that are available to a person. A positive association has been found between resilience and social support [43,44], with findings indicating that social relationships and social support/connection are factors that contribute to resilience (e.g., [45,46]).

Thus, the present study attempted to examine loneliness along with the complementary concept of social support in ED patients and in healthy subjects, while also assessing the participants' levels of binge eating, emotional eating, resilience, ED symptomatology, anxiety, and depression. Additionally, comparisons were performed within the ED patients group (AN vs. BN vs. BED subgroup) to check for differences between the three main ED diagnoses.

## 2. Materials and Methods

### 2.1. Sample/Participants

The study's sample consisted of 32 patients with eating disorders (AN, BN, BED, atypical ED) and 29 healthy controls, matched for sex, age, and years of education. The majority of patients ( $n = 18$ ) were recruited through the Eating Disorders Units of the 1st and 2nd Department of Psychiatry (Medical School of the National and Kapodistrian University of Athens), at Eginition Hospital and "Attikon" University Hospital, respectively. Due to COVID-19 restrictions, the rest of the participants were recruited online. More specifically, 12 patients were found via online groups/forums that were either created for patients with ED or featured mental-health-related content. Two more patients were recruited through the Greek division of the self-help group Overeaters Anonymous. Twelve of the thirty-two patients were suffering from anorexia nervosa (AN), ten patients were suffering from bulimia nervosa (BN), eight patients were suffering from binge-eating disorder (BED), and two patients presented with an atypical ED. Patients needed to report or be diagnosed with an eating disorder to be included in the study. Suffering from other severe ailments or disorders on the spectrum of schizophrenic and other psychotic disorders was set as an exclusion criterion. The healthy controls—which were also recruited online—were free of any psychiatric history, with the exception of 1 subject who reported that they had visited a doctor for mental-health-related issues at one point in their life.

### 2.2. Procedures

The 18 patients that were recruited through Eginition Hospital and "Attikon" University Hospital filled out the study's questionnaires on-site, after they were first handed an information sheet and consent form to read and sign. The rest of the participants followed the required procedures online, through a Google Form that provided the necessary information regarding the study and required the subjects' consent. Hospital patients had received their ED diagnosis after a clinical interview with an experienced psychiatrist. The clinical interviews were based on the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Patients who were recruited through internet-based methods, in

addition to their statement of suffering from an ED, were asked to report whether they had been diagnosed by a mental health practitioner. Reported levels of ED psychopathology were also factored into the decision for inclusion in the study.

### 2.3. Materials

Either on-site or remotely, participants were administered a questionnaire designed to gather demographic data, and the following questionnaires/scales:

1. The Greek version of the Eating Disorder Examination Questionnaire (EDE-Q 6.0) [47,48] was used to assess for the presence and severity of cognitive and behavioral aspects of eating disorders. This instrument contains questions that are designed to spot disordered attitudes towards food, body shape and body weight (4 Subscales: Restraint, Eating Concern, Shape Concern, and Weight Concern). Answers are given on a 7-point scale (0–6). A global score can also be calculated as an indication of the severity of the subject's ED psychopathology [48].
2. The Greek version of the UCLA Loneliness Scale [49–52] was used to measure the participants' subjective feelings of loneliness and isolation. The scale consists of 20 items scoring from 1 to 4 on a Likert-type scale. High scores on this scale indicate high levels of loneliness.
3. To gather data on the subjects' social support, a Greek version of the Social Support Questionnaire—Short Form (SSQ-6) was used [49,50,53]. Both semi-structural and functional aspects of social support can be measured with this instrument, as it consists of 6 questions with two parts each. Part A requires the subject to name the number of people (0–9) they can turn to for social support (Subscale SSQ-6 Number). Part B employs a 6-point Likert-type scale that the subject uses to indicate the degree to which they are satisfied/dissatisfied with the social support that they are provided with (Subscale SSQ-6 Satisfaction) [50,54].
4. Binge Eating Scale (BES) [55], which comprises 16 groups of statements that refer to cognitive, behavioral, and affective features of binge-eating episodes, was used as a measure of binge-eating problems. It has been translated—but not yet validated—into Greek by F. Gonidakis and M. Karapatsia.
5. Emotional Eating Scale (EES) [56], also translated—but not yet validated—into Greek by F. Gonidakis and M. Karapatsia, was selected as a way of assessing the degree to which emotions are connected to food consumption. EES comprises of a list of 25 different emotions that can be categorized into three groups, based on the emotion/emotional state that they are related to: anger/frustration (Subscale EES I-Anger/Frustration), anxiety (Subscale EES II-Anxiety), and depression (Subscale EES III-Depression). By using a 5-point scale, subjects rate the intensity of the urge to eat that they feel as a response to each of the emotions listed.
6. The subjects' resilience levels were measured with the use of the 25-item scale created for that purpose by Connor and Davidson in 2003 (CD-RISC-25) [43], which has also been translated and validated in Greek [57]. All items on the scale are in the form of a statement and answers are given on a 5-point Likert-type scale according to the subject's degree of agreement/disagreement with each of them.
7. Hospital Anxiety and Depression Scale (HADS) [58] was used to assess the participants' levels of anxiety and depression. Half of the items on this short, self-rated scale refer to symptoms of anxiety (subscale HADS-A), while the rest refer to depressive symptomatology (subscale HADS-D), with four possible answers for each item (0–3). HADS has been validated in Greek [59].

### 2.4. Statistical Analysis

The statistical analysis was performed with the use of IBM's SPSS Statistics 25.0. Shapiro–Wilk and Kolmogorov–Smirnov tests were run to examine whether the data of each variable were distributed normally. To ensure that the patients group did not differ significantly from the HC group on gender, age, years of education, and household

living arrangement (living alone/living with others), Pearson's Chi-square and Mann–Whitney *U* tests were performed, each time as dictated by the nature of the data. In order to compare the two groups' (ED Patients vs. HC) loneliness, social support, binge-eating problems, emotional eating, resilience, and anxiety and depression levels, a series of independent samples *t*-tests and the equivalent non-parametric test, Mann–Whitney *U*, were performed, as appropriate. One-way ANOVA and Kruskal–Wallis tests were used for comparisons between 3 groups (AN vs. BN vs. BED) and were followed by Bonferroni or Tukey's post hoc tests for multiple comparisons. Correlations between loneliness, social support, and the various continuous variables of the study (resilience, ED symptoms/features, binge-eating problems, emotional eating, body mass index (BMI), anxiety and depression symptoms, age, years of education) were calculated using either Pearson's *r* or the non-parametric equivalent, Spearman's  $\rho$ . In order to examine whether any of the independent variables that correlated with loneliness, as well as the group and household living arrangement variables, could perhaps predict its levels, a multiple linear regression analysis was performed. A second multiple linear regression analysis (stepwise) was performed with the aim of identifying possible predictors of loneliness in the ED patients group.

### 3. Results

The study's most relevant demographic data are presented in Table 1. No statistically significant differences were found between the ED patients and the HC group with regard to gender, age, years of education, and household living arrangement.

**Table 1.** Demographic data of participants (total and per group).

	Total (N = 61)	Patients (n = 32)	Controls (n = 29)	<i>p</i> -Value
Gender				
Male, <i>n</i> (%)	4 (6.6)	2 (6.3)	2 (6.9)	0.919 <sup>a</sup>
Female, <i>n</i> (%)	57 (93.4)	30 (93.7)	27 (93.1)	
Age, mean (Sd)	33.3 (11.7)	34.0 (11.9)	32.5 (11.6)	0.613 <sup>b</sup>
Years of Education, mean (Sd)	15 (2.0)	14.8 (2.0)	15.4 (2.0)	0.241 <sup>b</sup>
Household Living Arrangement				
Living with others, <i>n</i> (%)	45 (73.8)	22 (68.8)	23 (79.3)	0.349 <sup>a</sup>
Living alone, <i>n</i> (%)	16 (26.2)	10 (31.3)	6 (20.7)	

<sup>a</sup> Pearson's  $\chi^2$ , <sup>b</sup> Mann–Whitney *U*, Sd: Standard deviation.

Comparisons between the two groups of the study showed that ED patients recorded significantly higher scores in loneliness ( $p < 0.001$ , effect size = 5.40), binge-eating problems ( $p < 0.001$ , effect size = 5.53), emotional eating—in all three subscales—(EES I:  $p = 0.012$ , effect size = 2.59, EES II:  $p = 0.009$ , effect size = 2.32, EES III:  $p = 0.034$ , effect size = 0.27), anxiety ( $p < 0.001$ , effect size = 3.76), and depression ( $p < 0.001$ , effect size = 3.86). In contrast, ED patients exhibited lower levels of social support on both relevant subscales (SSQ-6 Number:  $p < 0.001$ , effect size =  $-0.66$ , SSQ-6 Satisfaction:  $p = 0.001$ , effect size =  $-0.96$ ) and were also lower in resilience ( $p < 0.001$ , effect size =  $-3.94$ ) (Table 2).

Comparisons between patients based on their diagnosis showed statistically significant differences in binge eating and emotional eating scores. More specifically, patients with AN scored lower than patients with BN on binge eating ( $p = 0.049$ ). With regard to emotional eating, patients with AN showed lower scores than patients with BN on all three subscales of the EES (EES I:  $p = 0.002$ , EES II:  $p = 0.002$ , EES III:  $p = 0.001$ ), and also lower scores when compared with BED patients (EES I:  $p = 0.001$ , EES II:  $p = 0.001$ , EES III:  $p = 0.002$ ). BN patients and BED patients did not differ in a statistically significant way in either of these two variables (BES:  $p = 0.960$ , EES I,II,III:  $p = 0.999$ ). No significant differences were detected between the three groups of patients (AN, BN, BED) on loneliness ( $p = 0.968$ ),



social support (Subscale SSQ-6 Number:  $p = 0.353$ , Subscale SSQ-6 Satisfaction:  $p = 0.494$ ), resilience ( $p = 0.460$ ), and anxiety ( $p = 0.669$ ) or depression ( $p = 0.666$ ) scores (Table 3).

**Table 2.** Comparisons between ED patients and HC for the variables: loneliness, social support, resilience, binge eating, emotional eating, anxiety, depression, and ED symptoms/features.

	Group	<i>n</i>	Mean	Sd	Statistic	<i>p</i> -Value	Effect Size (Cohen's <i>d</i> )
UCLA Loneliness Scale	Patients	32	51.03	10.58	87.00	<0.001 <sup>b</sup>	5.40
	HC	29	34.66	7.37			
SSQ-6 Number (Social Support)	Patients	32	2.24	1.40	−4.71	<0.001 <sup>a</sup>	−0.66
	HC	29	4.48	2.19			
SSQ-6 Satisfaction (Social Support)	Patients	32	4.28	1.28	235.00	0.001 <sup>b</sup>	−0.96
	HC	29	5.26	0.67			
CD-RISC-25 (Resilience)	Patients	32	50.71	16.32	−3.91	<0.001 <sup>a</sup>	−3.94
	HC	29	66.17	14.38			
Binge Eating Scale (BES)	Patients	32	21.72	11.36	86.00	<0.001 <sup>b</sup>	5.53
	HC	29	5.48	3.78			
Emotional Eating Scale (EES)							
EES I—Anger/Frustration	Patients	32	16.81	13.59	290.00	0.012 <sup>b</sup>	2.59
	HC	29	8.17	7.47			
EES II—Anxiety	Patients	32	14.81	10.65	284.00	0.009 <sup>b</sup>	2.32
	HC	29	7.83	6.91			
EES III—Depression	Patients	32	9.34	6.38	2.17	0.034 <sup>a</sup>	0.27
	HC	29	6.38	4.13			
HADS-A (Anxiety)	Patients	32	12.59	3.67	59.00	<0.001 <sup>b</sup>	3.76
	HC	29	5.86	2.60			
HADS-D (Depression)	Patients	32	10.69	3.67	8.76	<0.001 <sup>a</sup>	3.86
	HC	29	3.90	2.29			
EDE-Q Global score	Patients	32	3.11	1.52	9.24	<0.001 <sup>a</sup>	1.12
	HC	29	0.57	0.32			

<sup>a</sup> Independent samples *t*-test; <sup>b</sup> Mann–Whitney *U*; Sd—standard deviation; HC—healthy controls; SSQ-6—Social Support Questionnaire—Short Form; CD-RISC-25—Connor–Davidson Resilience Scale; HADS—Hospital Anxiety and Depression Scale; EDE-Q—Eating Disorder Examination Questionnaire.

In the total sample, the scale used to assess loneliness levels showed strong negative correlations with both social support subscales (SSQ-6 Number:  $r = -0.571$ , SSQ-6 Satisfaction:  $r = -0.582$ ) and with the CD-RISC-25 scale for resilience ( $r = -0.532$ ). Strong or moderate positive correlations were observed between the UCLA Loneliness Scale and the EDE-Q global score ( $r = 0.532$ ) as well as its four subscales (EDE-Q Restraint:  $r = 0.338$ , EDE-Q Eating Concern:  $r = 0.474$ , EDE-Q Shape Concern:  $r = 0.557$ , EDE-Q Weight Concern:  $r = 0.524$ ), while strong positive correlations were noted with the Binge-Eating Scale ( $r = 0.501$ ), and with the HADS subscales for anxiety ( $r = 0.625$ ) and depression ( $r = 0.695$ ) (Table 4).

In the patients group, loneliness scores were found to be significantly correlated with the social support subscale for satisfaction in a negative fashion (SSQ-6 Satisfaction:  $r = -0.544$ ) and with the HADS depression subscale in a positive fashion (HADS-D:  $r = 0.467$ ) (Table 4). The multiple linear regression analysis ( $F(2,29) = 10.432$ ,  $p < 0.001$ ,  $R^2 = 0.418$ ) identified SSQ-6 Satisfaction ( $B = -3.79$ ,  $p = 0.004$ ) and HADS-D ( $B = 1.04$ ,  $p = 0.020$ ) as statistically significant predictors of the patients' scores on the UCLA Loneliness Scale.

Both social support subscales showed a negative correlation with loneliness in the HC group (SSQ-6 Number:  $r = -0.373$ , SSQ-6 Satisfaction:  $r = -0.456$ ). No significant correlations were found between loneliness levels and the following continuous variables in the total sample or in any of the two groups (ED patients, HC): Emotional eating (Subscales EES I, II, and III), BMI, age, and years of education (Table 4). Detailed results for the rest of the continuous variables for the total sample and for each of the two groups (ED patients, HC) are shown in Tables A1–A3 of the Appendix A, respectively.

**Table 3.** Comparisons between ED patients based on their diagnosis for the variables: loneliness, social support, resilience, binge eating, emotional eating, anxiety, depression, and ED symptoms/features.

	Eating Disorder	n	Mean	Sd	Statistic	p-Value	Effect Size (Eta Squared)	Multiple comparisons	
								Bulimia Nervosa	Binge-Eating Disorder
UCLA Loneliness Scale	Anorexia Nervosa	12	51.75	12.43	0.033	0.968 <sup>a</sup>	0.002		
	Bulimia Nervosa	10	50.60	10.15					
	Binge-Eating Disorder	8	51.63	10.24					
SSQ-6 Number (Social Support)	Anorexia Nervosa	12	2.17	1.39	1.082	0.353 <sup>a</sup>	0.074		
	Bulimia Nervosa	10	2.57	1.65					
	Binge-Eating Disorder	8	1.60	0.89					
SSQ-6 Satisfaction (Social Support)	Anorexia Nervosa	12	4.13	1.27	0.723	0.494 <sup>a</sup>	0.051		
	Bulimia Nervosa	10	4.60	1.19					
	Binge-Eating Disorder	8	3.88	1.51					
CD-RISC-25 (Resilience)	Anorexia Nervosa	12	49.47	16.89	1.553	0.460 <sup>b</sup>	0.065		
	Bulimia Nervosa	10	46.40	18.37					
	Binge-Eating Disorder	8	57.13	14.74					
Binge Eating Scale (BES)	Anorexia Nervosa	12	15.49	8.59	3.699	0.038 <sup>a</sup>	0.215	0.049	0.119
	Bulimia Nervosa	10	26.60	12.32					
	Binge-Eating Disorder	8	25.25	10.36					
Emotional Eating Scale (EES)									
EES I–Anger/Frustration	Anorexia Nervosa	12	4.67	4.91	17.549	<0.001 <sup>b</sup>	0.558	0.002	0.001
	Bulimia Nervosa	10	24.70	12.53					
	Binge-Eating Disorder	8	26.50	10.73					
EES II–Anxiety	Anorexia Nervosa	12	5.42	5.62	17.539	<0.001 <sup>b</sup>	0.542	0.002	0.001
	Bulimia Nervosa	10	21.00	8.94					
	Binge-Eating Disorder	8	22.25	8.65					
EES III–Depression	Anorexia Nervosa	12	3.67	2.77	15.752	<0.001 <sup>a</sup>	0.538	0.001	0.002
	Bulimia Nervosa	10	13.30	5.89					
	Binge-Eating Disorder	8	13.38	5.07					
HADS-A (Anxiety)	Anorexia Nervosa	12	13.33	4.58	0.407	0.669 <sup>a</sup>	0.029		
	Bulimia Nervosa	10	12.20	3.85					
	Binge-Eating Disorder	8	11.88	2.42					
HADS-D (Depression)	Anorexia Nervosa	12	11.42	4.19	0.413	0.666 <sup>a</sup>	0.030		
	Bulimia Nervosa	10	11.00	4.16					
	Binge-Eating Disorder	8	9.88	2.17					
EDE-Q Global score	Anorexia Nervosa	12	3.05	1.59	0.062	0.940 <sup>a</sup>	0.005		
	Bulimia Nervosa	10	3.23	1.47					
	Binge-Eating Disorder	8	3.27	1.46					

<sup>a</sup> One-way ANOVA; <sup>b</sup> Kruskal–Wallis test.

**Table 4.** Correlations between each continuous variable of the study and loneliness for the total sample and by group.

	UCLA Loneliness Scale		
	Total Sample	Patients	HC
SSQ-6 Number	−0.571 **	−0.323	−0.373 *
SSQ-6 Satisfaction	−0.582 **	−0.544 **	−0.456 *
CD-RISC-25	−0.532 **	−0.341	−0.346
EDE-Q Global score	0.532 **	0.013	−0.181
EDE-Q Restraint	0.338 **	0.064	−0.362
EDE-Q Eating Concern	0.474 **	−0.073	−0.162
EDE-Q Shape Concern	0.557 **	0.056	0.017
EDE-Q Weight Concern	0.524 **	0.010	−0.208
BES	0.501 **	−0.040	0.113
EES I-Anger/Frustration	0.223	0.139	−0.186
EES II-Anxiety	0.221	0.144	−0.184
EES III-Depression	0.102	−0.040	−0.113
Body mass index (BMI)	−0.004	0.029	−0.010
HADS-A	0.625 **	0.127	0.259
HADS-D	0.695 **	0.467 **	0.322
Age	0.030	0.064	−0.076
Years of Education	−0.174	−0.086	−0.034

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

The multiple linear regression analysis in the total sample, with the UCLA Loneliness score as the dependent variable and the variables that were found to be correlated with loneliness as independent variables, resulted in a statistically significant model ( $F(12,48) = 7.147$ ,  $p < 0.001$ ) which explained 64.1% of the variance ( $R^2 = 0.641$ ). Subscale SSQ-6 Satisfaction emerged as a significant predictor of loneliness levels ( $B = -2.94$ ,  $p = 0.024$ ), signifying that an increase by one unit on said social support subscale is accompanied by a decrease in the loneliness score (Table 5).

**Table 5.** Multiple linear regression analysis with UCLA Loneliness Scale as the dependent variable (total sample).

	B	Std. Error	t	p-Value	95% C.I.
Group					
Patients	6.40	4.22	1.52	0.136	(−2.08,14.87)
HC	Reference cat.				
Household Living Arrangement					
Living with others	0.21	2.66	0.08	0.937	(−5.13,5.56)
Living alone	Reference cat.				
SSQ-6 Number	−0.52	0.70	−0.75	0.457	(−1.93,0.88)
SSQ-6 Satisfaction	−2.94	1.26	−2.33	0.024	(−5.48,−0.41)
CD-RISC-25	−0.09	0.09	−1.01	0.320	(−0.28,0.09)
EDE-Q Global score	3.55	7.72	0.46	0.647	(−11.97,19.07)
EDE-Q Restraint	−0.85	2.44	−0.35	0.730	(−5.76,4.07)
EDE-Q Eating Concern	−1.96	2.97	−0.66	0.512	(−7.94,4.01)
EDE-Q Shape Concern	−1.00	3.76	−0.26	0.792	(−8.56,6.57)
BES	−0.05	0.17	−0.27	0.791	(−0.39,0.3)
HADS-A	0.19	0.44	0.43	0.672	(−0.7,1.08)
HADS-D	0.63	0.47	1.33	0.189	(−0.32,1.58)

The data presented in this study are available in supplementary material.

#### 4. Discussion

According to our findings, ED patients show elevated levels of loneliness and diminished social support (both in terms of perceived availability and satisfaction) in comparison with healthy controls. No significant differences were found between patients who reported



or had received different ED diagnoses, as patients with AN, patients with BN, and BED patients reported similar levels of loneliness and social support.

With regard to the rest of the variables that we assessed, ED patients were found to be less resilient than their counterparts in the HC group and, at the same time, reported more problems with binge eating, emotional eating, and were more afflicted by symptoms of anxiety and depression. In ED patients, loneliness was correlated positively with depression symptomatology and negatively with satisfaction from social support. Both variables were found to be predictive of loneliness levels in ED patients. Variables such as ED symptoms/features, resilience, binge eating, and anxiety were correlated significantly with loneliness in the total sample, but these findings did not hold true for the patients group. Emotional eating showed no significant correlation with loneliness in any of the two groups (ED patients, HC) or in the total sample.

The only factor that was found to predict the participants' (N = 61) loneliness levels in a statistically significant manner was the degree of satisfaction with social support. Other factors, such as the group (ED patient or HC), ED symptoms/features, household living arrangement (living alone or with others), resilience, binge-eating problems, and symptoms of anxiety or depression, did not appear to be predictive of loneliness.

Although research on loneliness in ED is in short supply, our results seem to be in accordance with previous findings in the limited available literature. Harney et al. [18] also found that patients with an active ED were experiencing more loneliness when compared with a control group (and in comparison with patients in partial or full remission from an ED as well). In a non-clinical sample, loneliness levels were higher in participants who met the criteria for BN than in participants who exhibited normal patterns of eating behavior [60]. Esplen et al. [61], using an expanded version of the UCLA Loneliness Scale designed to measure even the more severe experience of "borderline aloneness", reported that BN patients scored higher than patients with borderline personality disorder. Furthermore, in qualitative data from studies on AN sufferers, feelings of loneliness seem to repeatedly emerge as an experience that accompanies the disorder (e.g., [62,63]). Data from previous comparisons between the various ED diagnostic entities appear to be lacking, as loneliness in ED is an under-researched topic and the previous study of Harney et al. [18], due to its limited sample size, examined ED patients as one group.

While more studies have been conducted about social support in the field of ED research compared to the studies that have focused on loneliness, the amount of available data is not particularly large in this case either [27]. Our observations that ED patients lagged behind HC in terms of social support is in accordance with previous findings. Low levels of social support were found for ED patients compared with controls: in AN patients [30], BN patients [28], in a mixed sample of the two ED [31], and in a non-clinical BN sample [32]. The lower levels of satisfaction with social support that we found in the patients group is in agreement with existing evidence, as prior studies have also described BN sufferers as either unsatisfied or less satisfied with their social support than a control group [26,28,29]. The absence of significant differences that we observed between the three ED corroborates findings from past works, which similarly reported no remarkable differences between AN and BN patients with regard to social support levels [31] or satisfaction [37]. Likewise, Geller et al. [36] more recently found no association between social support satisfaction and "diagnostic status" (AN/BN/ED Not Otherwise Specified). Contrary to our results (and the above), one of the earliest studies in the field found that AN and BN patients differed in social support satisfaction [26], though it should be noted that: (a) those researchers measured satisfaction indirectly—by calculating the difference between the patients' "actual" and "ideal" social support—and (b) AN patients set lower standards for their "ideal" support from partners.

As expected by the psychopathology of their disorders, ED patients showed increased binge-eating problems in comparison with the HC group. Recurring binge-eating episodes are among the diagnostic criteria of both BN and BED, and they also frequently appear in the clinical presentation of AN, in patients with the binge-eating/purging type of the

disorder [4,40]. The patients' higher levels of emotional eating are consistent with previous findings in women with ED [64], patients with AN, BN [65], and in overweight/obese people with BED as well [66]. Our observations of reduced resilience levels in ED patients confirm the findings of two prior studies (see [67,68]).

Both in the total sample and the ED group, a negative correlation between loneliness and social support satisfaction was found, and, at the same time, there was a positive correlation between loneliness and symptoms of depression. The former result was unsurprising as, in addition to the literature reports that speak of a strong negative correlation between loneliness and perceived social support (see [69]), the two specific scales used in the present study have been found to be negatively correlated [53]. Similarly, as Russell, Peplau, and Cutrona [52] and Russell [51]—authors of the revised version of the UCLA Loneliness Scale and the 3rd version of the UCLA Loneliness Scale, respectively—found a positive correlation between their scales and depression, we expected the same relationship to be observed between the two variables, despite the fact that, in our study, a different tool was used to measure depressive symptomatology. The observed association between loneliness and depression aligns with existing evidence (e.g., [70,71]), that has been described as fairly robust [10].

Contrary to the results for the total sample, loneliness showed no significant correlation with resilience, ED symptoms/features (EDE-Q), or binge eating (BES) in the patients group. While evidence indicating a negative relationship between loneliness and resilience has only quite recently started to appear (see [72,73]), a considerable number of studies on clinical or non-clinical samples had previously pointed to a link between loneliness and disordered eating behavior/symptoms (e.g., [17,41,74]). Thus, we expected to observe a similar finding in our ED patients. An earlier study that also, unlike previous findings, failed to discover any significant relationship between bulimic symptomatology and loneliness in the female students of their sample, stated that the reasons behind that disagreement were not evident (see [15]). Regarding the present investigation, the limited power of our study needs to be taken into consideration.

Social support satisfaction was found to be predictive of loneliness levels. This finding does not come as a surprise, as loneliness and perceived social support have been described as conceptually related and a strong association has been observed between the two (see [69]). Furthermore, our result is in alignment with previous papers reporting that social support reduces feelings of loneliness or is protective against them (see [19,75]).

Comparisons between ED patients and controls showed significantly higher levels of loneliness in the former group; nonetheless, according to the results of the multiple linear regression analysis, the variable "Group" (Patient/HC) does not predict loneliness levels. Therefore, loneliness seems to occur independently of suffering from an ED.

The ED patients' elevated levels of loneliness could perhaps be explained by the relatively high levels of depressive symptoms found in this group. Their mean scores on the relevant HADS subscale were close to 11 (HADS-D: 10.69), which Zigmond and Snaith [58] have suggested as a cut-off threshold for clinical cases of depression [59]. Depressive symptomatology was the only variable other than satisfaction with social support showing a statistically significant correlation with loneliness in the patients group. As indicated by evidence on the subject, people who suffer from depression are 10 to 11 times more likely to experience loneliness compared to people without mental disorders [76]. Furthermore, as studies (e.g., [76,77]) have shown that feelings of loneliness seem to occur more frequently in people who are economically inactive, it might be worth mentioning that 21.9% of ED patients were unemployed/retired. In addition to the probable effect of depressive symptoms on the ED patients' loneliness levels, the mere fact of suffering from a mental disorder could be a factor to consider in and of itself. Loneliness appears to be very common in patients with mental disorders (see [69,78]), and findings have indicated that psychiatric comorbidity greatly increases the odds of feeling lonely [76].

**Limitations:** The study's relatively small sample size requires that our conclusions, especially in terms of comparisons between the three ED subgroups, are viewed with

a degree of reservation, and their preliminary character is taken into consideration. The recruitment of some participants via internet-based methods has some limitations. Specifically, it is possible that the accuracy of certain diagnoses was reduced, even though most of those patients stated that they had been diagnosed by a mental-health professional. In addition, this recruitment method (via online groups/forums) exposes the study to the risk of participation bias. For example, prospective participants might have opted in or out of the study upon seeing its subject. However, this possibility would apply to both groups of the study, as they both included participants that had been recruited online. A small number of patients ( $n = 6$ ) reported relatively low scores on the EDE-Q, implying that, perhaps, a portion of our group of patients might not have been fully representative of active ED patients. Finally, as this was a correlational study, no conclusions about possible causal relations between the variables can be drawn.

**Directions for future research:** Future studies could include another psychiatric group to investigate possible differences in loneliness and social support.

In summary, to our knowledge, this study is the first one to examine loneliness in combination with social support in ED patients. By examining these concepts together with a series of distinct—but seemingly related—variables (binge eating, emotional eating, resilience), the study attempted to provide a comprehensive approach to the subject. In contrast to some previous studies in the field that had examined if/how the feeling of loneliness was linked with specific ED related behaviors (e.g., binge-eating episodes), our focus was on estimating the patients' overall levels of loneliness. Moreover, the paper adds a quantitative study to the relevant ED literature, which, especially with regard to AN, appeared to be in shortage. Although further investigation is needed, this effort provides some preliminary evidence that loneliness levels are similar in AN, BN, and BED. By assessing loneliness in parallel with the patients' social support levels, further evidence is added to the research field of social support and social networks in ED, where final conclusions are yet to be reached (see [27]). Finally, by measuring depression and anxiety levels, the present investigation attempted to rectify a methodological limitation of previous efforts in the study of social functioning in ED (see [38]).

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/psychiatryint3020012/s1>, File S1: materials; Data Set S1: data.

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data presented in this study are available in supplementary material.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Correlation matrix for the variables: loneliness, social support, eating disorder symptoms/features, resilience, binge eating, emotional eating, BMI, anxiety and depression levels, age, and years of education for the total sample.

	UCLA Loneliness Scale	SSQ-6 Number	SSQ-6 Satisfaction	CD-RISC-25	EDE-Q Global Score	EDE-Q Restraint	EDE-Q Eating Concern	EDE-Q Shape Concern	EDE-Q Weight Concern	BES	EES I	EES II	EES III	BMI	HADS A	HADS D	Age
SSQ-6 Number	−0.571 **																
SSQ-6 Satisfaction	−0.582 **	0.507 **															
CD-RISC-25	−0.532 **	0.383 **	0.420 **														
EDE-Q: Global score	0.532 **	−0.471 **	−0.271 *	−0.400 **													
Restraint	0.338 **	−0.393 **	−0.138	−0.258 *	0.828 **												
Eating Concern	0.474 **	−0.377 **	−0.153	−0.323 *	0.889 **	0.750 **											
Shape Concern	0.557 **	−0.498 **	−0.322 *	−0.440 **	0.963 **	0.732 **	0.837 **										
Weight Concern	0.524 **	−0.427 **	−0.274 *	−0.354 **	0.956 **	0.716 **	0.819 **	0.913 **									
BES	0.501 **	−0.348 **	−0.252 *	−0.414 **	0.796 **	0.641 **	0.806 **	0.779 **	0.760 **								
EES I	0.223	−0.182	−0.231	−0.096	0.484 **	0.372 **	0.473 **	0.469 **	0.478 **	0.602 **							
EES II	0.221	−0.132	−0.190	−0.143	0.503 **	0.386 **	0.495 **	0.484 **	0.468 **	0.616 **	0.871 **						
EES III	0.102	−0.089	−0.104	−0.062	0.387 **	0.284 *	0.391 **	0.378 **	0.371 **	0.490 **	0.889 **	0.847 **					
BMI	−0.004	0.038	0.074	−0.041	−0.010	−0.077	−0.046	−0.012	0.059	0.081	0.421 **	0.390 **	0.416 **				
HADS-A	0.625 **	−0.398 **	−0.438 **	−0.513 **	0.720 **	0.546 **	0.714 **	0.729 **	0.705 **	0.747 **	0.325 *	0.306 *	0.157	−0.113			
HADS-D	0.695 **	−0.553 **	−0.466 **	−0.695 **	0.698 **	0.493 **	0.645 **	0.730 **	0.663 **	0.627 **	0.299 *	0.337 **	0.227	−0.134	0.748 **		
Age	0.030	−0.217	−0.062	0.160	0.062	0.083	−0.059	0.084	0.048	0.016	0.233	0.225	0.267 *	0.388 **	−0.127	0.023	
Years of Education	−0.174	0.135	0.059	0.268 *	−0.186	−0.208	−0.082	−0.139	−0.212	−0.076	−0.021	−0.097	−0.100	−0.259 *	−0.159	−0.117	0.034

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; EDE-Q—Eating Disorder Examination Questionnaire; BMI: Body Mass Index.**Table A2.** Correlation matrix for the variables: loneliness, social support, eating disorder symptoms/features, resilience, binge eating, emotional eating, BMI, anxiety and depression levels, age, and years of education for the ED patients group.

	UCLA Loneliness Scale	SSQ-6 Number	SSQ-6 Satisfaction	CD-RISC-25	EDE-Q Global Score	EDE-Q Restraint	EDE-Q Eating Concern	EDE-Q Shape Concern	EDE-Q Weight Concern	BES	EES I	EES II	EES III	BMI	HADS A	HADS D	Age
SSQ-6 Number	−0.323																
SSQ-6 Satisfaction	−0.544 **	0.543 **															
CD-RISC-25	−0.341	0.249	0.148														
EDE-Q: Global score	0.013	−0.198	0.177	−0.133													
Restraint	0.064	−0.193	0.130	−0.180	0.842 **												
Eating Concern	−0.073	−0.085	0.250	−0.089	0.928 **	0.679 **											
Shape Concern	0.056	−0.265	0.090	−0.210	0.954 **	0.741 **	0.855 **										
Weight Concern	0.010	−0.193	0.171	−0.018	0.943 **	0.701 **	0.849 **	0.900 **									
BES	−0.040	−0.006	0.209	−0.294	0.590 **	0.382 *	0.616 **	0.632 **	0.518 **								
EES I	0.139	−0.098	−0.028	−0.109	0.439 *	0.263	0.387 *	0.474 **	0.479 **	0.655 **							
EES II	0.144	−0.086	0.010	−0.136	0.367 *	0.214	0.332	0.417 *	0.376 *	0.541 **	0.879 **						
EES III	−0.040	0.006	0.084	−0.032	0.424 *	0.229	0.396 *	0.474 **	0.443 *	0.602 **	0.916 **	0.844 **					
BMI	0.029	−0.122	0.085	−0.116	0.257	0.025	0.246	0.344	0.312	0.548 **	0.691 **	0.692 **	0.681 **				
HADS-A	0.127	−0.114	−0.040	−0.348	0.592 **	0.531 **	0.631 **	0.508 **	0.498 **	0.480 **	0.212	0.142	0.070	0.045			
HADS-D	0.467 **	−0.532 **	−0.234	−0.601 **	0.349	0.371 *	0.294	0.370 *	0.253	0.270	0.192	0.152	0.105	−0.033	0.376 *		
Age	0.064	−0.246	−0.158	0.110	0.129	0.065	0.114	0.150	0.139	0.136	0.455 **	0.473 **	0.408 *	0.575 **	−0.160	0.077	
Years of Education	−0.086	0.121	0.018	0.202	−0.137	−0.107	−0.113	−0.140	−0.142	−0.086	−0.255	−0.320	−0.255	−0.321	−0.183	−0.014	−0.172

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

**Table A3.** Correlation matrix for the variables: loneliness, social support, eating disorder symptoms/features, resilience, binge eating, emotional eating, BMI, anxiety and depression levels, age, and years of education for the HC group.

	UCLA Loneliness Scale	SSQ-6 Number	SSQ-6 Satisfaction	CD-RISC-25	EDE-Q Global Score	EDE-Q Restraint	EDE-Q Eating Concern	EDE-Q Shape Concern	EDE-Q Weight Concern	BES	EES I	EES II	EES III	HADS A	HADS D	BMI	Age
SSQ-6 Number	−0.373 *																
SSQ-6 Satisfaction	−0.456 *	0.207															
CD-RISC-25	−0.346	0.155	0.345														
EDE-Q: Global score	−0.181	0.138	0.170	0.045													
Restraint	−0.362	−0.077	0.249	0.127	0.484 **												
Eating Concern	−0.162	0.052	0.26	0.055	0.611 **	0.403 *											
Shape Concern	0.017	0.023	0.011	−0.084	0.795 **	0.107	0.387 *										
Weight Concern	−0.208	0.282	0.183	0.127	0.783 **	0.120	0.294	0.553 **									
BES	0.113	0.026	−0.193	−0.063	0.526 **	0.238	0.370 *	0.415 *	0.452 *								
EES I	−0.186	0.224	−0.245	0.051	0.447 *	0.147	0.482 **	0.264	0.232	0.599 **							
EES II	−0.184	0.261	−0.091	0.082	0.597 **	0.315	0.572 **	0.397 *	0.404 *	0.619 **	0.860 **						
EES III	−0.113	0.170	−0.128	0.067	0.459 *	0.151	0.432 *	0.291	0.231	0.459 *	0.858 **	0.844 **					
HADS-A	−0.010	0.080	0.063	−0.203	−0.040	−0.139	−0.182	−0.214	0.156	−0.335	−0.217	−0.231	−0.242				
HADS-D	0.259	−0.022	−0.401 *	−0.584 **	−0.058	−0.232	−0.033	0.144	−0.052	0.343	0.133	0.202	0.186	−0.266			
BMI	0.322	0.021	−0.254	−0.575 **	−0.228	−0.381 *	−0.107	0.008	−0.276	0.058	0.038	0.062	0.146	−0.183	0.472 **		
Age	−0.076	−0.197	0.037	0.328	−0.105	0.005	−0.339	−0.093	−0.184	−0.157	0.018	0.000	0.152	0.259	−0.137	−0.131	
Years of Education	−0.034	0.062	−0.103	0.150	−0.166	−0.238	0.131	0.054	−0.263	0.164	0.326	0.209	0.174	−0.251	0.103	0.095	0.182

\*  $p < 0.05$ , \*\*  $p < 0.01$ .

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