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Associations between Body Image and Control, Existential Anxiety, Meaning, and Satisfaction with Life: Multiple Sclerosis vs. General Population

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Abstract

Body image is a multidimensional construct characterized by perceptions and assessments of the individual about own physical appearance. Multiple Sclerosis is a neurological disorder, with several consequences that, in some patients, have an impact on body image. Also, previous research on control and preliminary findings on existential anxiety, meaning and satisfaction with life, indicate associations with body image. Therefore, the purpose of this study was to investigate whether and in which way Body Image is related to Control (Desire for Control and Locus of Control), Existential Anxiety, Meaning in Life (Presence of Meaning and Search for Meaning in Life) and Satisfaction with Life, in two different groups, adults and individuals with Multiple Sclerosis. Empirical results have been derived from a sample of 638 participants (543 adults and 95 individuals with Multiple Sclerosis), reporting on seven questionnaires. Results indicated significant relations among Body Image dimensions and the remaining variables. Also, significant mean differences between the two groups emerged, regarding Body Shape Dissatisfaction, Existential Anxiety, Presence of Meaning in Life, Satisfaction with Life and Locus of Control. Additionally, explanatory models predicting Body Image dimensions were identified. Overall, the current study provides evidence that the examined variables have an impact on Body Image, revealing a new perspective on understanding of body image. Finally, research limitations and suggestions for future research are outlined.

Keywords

Body Image, Control, Existential Anxiety, Meaning in Life, Satisfaction with Life, Multiple Sclerosis

1. Introduction

Body image is a multidimensional construct characterized by perceptions and assessments of the individual about own physical appearance (Cash & Pruzinsky, 2004). It is a mental image of the size, shape and contour of our own bodies, as well as of our feelings regarding these characteristics and parts of our bodies (Slade, 1988). Although body image is a complex and multifaceted construct (Cash & Pruzinsky, 1990), in contemporary Western society, the major focus has been concentrated on the body's appearance (Tiggemann, 2004). Body dissatisfaction, which manifests as a negative subjective evaluation of one's physical body (American Psychiatric Association, DSM-5 Task Force, 2013), seems to be common among men and women in developed and developing nations (Karazsia et al., 2017).

Body image has not been extensively examined in populations diagnosed with a chronic medical illness, such as Multiple Sclerosis (MS). MS is a chronic demyelinating autoimmune disorder affecting the central nervous system (Koutsouraki et al., 2010). Many environmental and lifestyle risk factors are crucial in determining the disease occurrence (Ghaderi & Alikhademi, 2024). It is estimated that MS affects 2.8 million people worldwide (Logroscino et al., 2018; Walton et al., 2020), and it is the most common cause of neurological disability among young people aged between 20 and 50 years (Higuera et al., 2016). Disability-related factors, such as limitation of the ability to perform daily activities and life roles, uncertain prognosis, prolonged course of medical treatment and rehabilitation interventions, psychosocial stress associated with the incurred trauma or disease process itself, and sustained financial losses, create a profound effect on the life of people with a chronic illness or disability (Livneh & Antonak, 2005). Consequently, MS frequently causes the development of physical and emotional changes (Mohr & Cox, 2001). Such changes may affect the structure of the body image, which includes satisfaction with appearance, concern for one's own body and social well-being (Thompson, 2004), and subsequently lead to body dissatisfaction (Pfaffenberger et al., 2011; Stevens et al., 2019). In this regard, it has been found that people with MS show greater body dissatisfaction compared to general population (Pfaffenberger et al., 2011).

Existential anxiety is commonly defined as the expression of ultimate concerns about life itself (van Bruggen et al., 2014). The present study employs Tillich's (1952) theory of existential anxiety, which revolves around three related domains of apprehension: 1) fate and death, 2) emptiness and meaninglessness, and 3) guilt and condemnation (Weems et al., 2004). Traditional existential theory (i.e. Yalom, 1980) states that all individuals develop some form of existential anxiety at some point in their lives. As such, individuals with MS are likely to express existential anxiety, since it has been found that many individuals when confronted with a diagnosis of a serious illness wrestle with emotional and existential concerns (Steinhauser et al., 2017).

Meaning in life has been defined as "*the sense made of, and significance felt*

regarding, the nature of one's being and existence" (Steger et al., 2006); a concept developed in the context of explaining psychological well-being (Czekierda et al., 2017). Additionally, creating and finding meaning is a key cognitive process activated when an individual is faced with life challenges (Park & Folkman, 1997). The meaning model (Park, 2010) assumes that one's level of meaning in life may depend on adaptation to life stressors or challenges. Diagnosis and treatment of a severe or life-threatening illness, like MS, is one such challenging and stressful situation (Czekierda et al., 2017), which may affect meaning in life. Considering the above, a question arises about the role of meaning in life, as conceptualized by Steger et al. (2006), when people experience a chronic illness, like multiple sclerosis.

Satisfaction with Life is an indicator of health and general well-being that leads to a general feeling of physical and mental health, usually associated with a greater longevity (Mincu & Tascu, 2015). Satisfaction with life, which refers to the cognitive evaluation of subjective well-being (Lucas & Diener, 2009) has been related to body image (Góngora, 2014); specifically, negatively to body dissatisfaction (Brannan & Petrie, 2011). Life satisfaction can be affected by many different interconnected dimensions of wellness, and as a result, dissatisfaction in one dimension can lead to dissatisfaction in another dimension (Myers & Sweeney, 2005). As body satisfaction has been found to be a predictor of life satisfaction in people having a health problem (Mincu & Tascu, 2015), the role of satisfaction with life is also discussed in the present research, with respect to body image.

Another concept, investigated in our study—that emerged from literature review as related to body dissatisfaction (Donovan & Penny, 2014; Murray et al., 2017; Tiggemann & Raven, 1998)—is that of Control. Control is one of the main psychological constructs which has been shown to be related to physical and mental health (Skinner, 1996). This paper pays attention to two alternative constructs, included under the general "umbrella" of control: Desire for Control and Locus of Control. Desire for Control (DC) is defined as the extent to which people are generally motivated to see themselves in control of the events in their lives (Burger, 1992). Locus of Control (LOC) refers to where someone places the primary causation of events in their life. Humans can interpret events as being either a result of one's own actions or external factors (Rotter, 1966). Regarding the role of DC and LOC in body dissatisfaction for individuals with MS, the literature is rather limited and mainly focuses on the relationship between Health LOC and MS (Bragazzi, 2013). Therefore, it remains to be seen what challenges may arise for people with MS.

Additionally, limited research attention has been devoted to the potential influence of body image on social interaction or social activities. Taking into consideration literature, which imposes emphasis on the positive relation between social-emotional isolation and body image dissatisfaction (Zaitsoff et al., 2009), a question arises whether perceived body image affects social interaction or social activities; since social interactions are common in the daily lives of most individuals and are thus likely to be related to body dissatisfaction (Mills et al.,

2014).

Body image in MS populations has only recently begun to be examined (i.e. Stevens et al., 2019). Therefore, the purpose of the present study was to explore associations between different dimensions of Body Image and Existential Anxiety, Meaning in Life, Satisfaction with Life and Control in individuals suffering from MS against a group drawn from the general population of Greece. Additional aims were to identify differences between the two groups, regarding the examined variables of the study, as well as to address explanatory models of different body image dimensions. If variables examined in the present study, are found to have a significant impact on Body Image dimensions, future research could explore the effectiveness of interventions targeted at improving body image and, consequently, other health outcomes in people with MS. Based on the aims of the study, the following research hypotheses were developed:

1) Body Dissatisfaction is positively related to Existential Anxiety, Search for Meaning, Desire for Control and external LOC, regardless of the sample group.

2) MS participants present higher scores in Body Dissatisfaction, Existential Anxiety, Search for Meaning, Desire for Control and external LOC.

3) Existential Anxiety, Satisfaction with Life and Desire for Control are common prediction variables in all dimensions of Body Image.

4) The presence of Multiple Sclerosis affects social interaction and social activities of the participants.

2. Method

2.1. Participants and Procedure

A sample of 638 questionnaires was collected from two population groups (**Table 1**), in Greece. The first sample included 95 participants with Multiple Sclerosis (MS). Participants were members of the Association of People with Multiple Sclerosis (SAmSKP), a nonprofit organization established solely by people with MS. Inclusion criteria for participating in the study were being older than 18 years and being diagnosed with MS, while exclusion criterion, patients unable to follow the test instructions. Following the approval by the management of the organization, the questionnaire in "Google Forms" was forwarded electronically to their members. Participating in the research was voluntary, while members were informed about the aims of the study, via an explanatory note preceding the questionnaire. Responses were registered automatically to the account of the investigators in order to preserve anonymity. A second sample of 543 adults was drawn from the general population using snowball sampling. Participants were informed about the purpose of the study, the profile of the researchers and the university conducting it, through an explanatory note preceding the questionnaires. The process of collecting the questionnaires lasted 2 years and was completed in 2018. **Table 1** shows the socio-demographic characteristics of the two groups of the sample.

Table 1. Socio-demographic characteristics of MS and general population participants

	MS Participants		General Population Participants	
	$N = 95$	Relative Frequencies %	$N = 543$	Relative Frequencies %
Sex				
Female	78	82.1	376	69.2
Male	17	17.9	167	30.8
Age				
18 - 29	19	20.0	124	22.8
30 - 39	39	41.1	165	30.4
40 - 49	18	18.9	105	19.4
50 - 59	13	13.7	81	14.9
60+	6	6.3	68	12.5
***BMI**				
Underweight: <18.5	2	2.1	21	3.9
Normal: 18.5 - 24.9	49	32.6	320	58.9
Overweight: 25.0 - 29.9	26	19.0	146	27.1
Obesity: 30.0 - 39.9	18	27.4	51	9.2
Extreme Obesity: 40.0+		18.9	5	.9
Marital Status				
Single	48	50.5	254	46.8
Married	39	41.1	226	41.6
Divorced	6	6.3	38	7.0
Widowed	2	2.1	25	4.6
Educational Level				
Primary School	1	1.1	27	5.0
Junior High School			11	2.0
Senior High School	18	18.9	68	12.5
Vocational School	13	13.7	46	8.5
University	43	45.2	228	42.0
Postgraduate Studies	20	21.1	163	30.0
Professional Status				
No Employment	20	21.1	59	10.9
Occasional Employment	7	7.4	42	7.7
Partial Employment	6	6.3	17	3.1
Full Employment	36	37.8	332	61.1
Retiree	19	20.0	59	10.9
Student	7	7.4	34	6.3

Note: *BMI classification according to National, Heart, Lung and Blood Institute and U.S. Department of Health & Human Services.

2.2. Measures

Participants reported their current height (h) in centimeters and current weight (w) in kilograms. The Body Mass Index (BMI) was calculated based on the for-

mula BMI = weight (kgr)/height (m)^2. Participants also completed a set of demographic characteristics—including age, gender, marital status, educational level and professional status—and two additional questions related to social interaction and social activities; the first one referring to "How often do you meet or go out with friends, relatives, etc.?" answered by "rarely, often, very often" and the second one "Compared to other people your age, how often would you say, you participate in social activities?" answered by "less than most people, about the same often, more often than most people", in order to enable us to test the hypothesis that the presence of Multiple Sclerosis affects social life.

Moreover, a set of seven well-known questionnaires, described below, followed the introductory questions of the above section. The questionnaires were translated, adapted and validated through back-translation into Greek.

2.2.1. Body Shape Questionnaire

Body Shape Questionnaire-8C (Evans & Dollan, 1993) is a short version of the BSQ (Cooper et al., 1987) measuring the extent of psychopathology of concerns about body shape. The questions refer to the subject's state over the past four weeks. Higher values on the BSQ indicate more body dissatisfaction. It is a one-dimensional instrument, with results of reliability analyses showing high internal consistency (.93), excellent test-retest reliability (r = .95), and high convergent validity. The internal consistency, measured by Cronbach's α, was α = .89 for the general population and α = .92 for MS participants.

2.2.2. Multidimensional Body-Self Relations Questionnaire-Appearance Scales

The Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS; Cash, 2000) is a self-report inventory comprising five subscales with good psychometric properties for males and females: 1) Appearance Evaluation assesses feelings of satisfaction or dissatisfaction with one's appearance and higher scores indicate greater feelings of satisfaction; 2) Appearance Orientation assesses the degree of investment in one's appearance; 3) Body Areas Satisfaction assesses satisfaction or dissatisfaction with specific body areas, weight, height, and muscle tone and higher scores indicate greater body satisfaction; 4) Overweight Preoccupation assesses fat anxiety, weight vigilance, dieting, and eating restraint; and 5) Self-Classified Weight assesses how the person perceives his or her weight, from very underweight to very overweight. The MBSRQ has strong convergent, discriminant, and construct validities (Cash, 2000). Internal consistencies for the subscales in the general population sample were α = .86 for appearance evaluation, α = .81 for appearance orientation, α = .79 for body areas satisfaction, α = .73 for overweight preoccupation, and α = .89 for self-classified weight; regarding the second sample, the internal consistencies were α = .87, α = .82, α = .83, α = .75 and α = .82, respectively.

2.2.3. Existential Anxiety Questionnaire

The Existential Anxiety Questionnaire (EAQ; Weems et al., 2004) assesses the

critical domains and sub-concepts (death - fate, meaninglessness - emptiness, condemnation - guilt) outlined in Tillich's (1952) work. Results of reliability analyses indicate that the EAQ has adequate internal consistency ($\alpha = .71$), a two-week test-retest reliability ($r = .72$, $p < .001$) and a factor structure consistent with theory (Weems et al., 2004). In this study, the internal consistency was $\alpha = .71$ for the general population sample, and $\alpha = .73$ for MS participants.

2.2.4. The Meaning in Life Questionnaire

The Meaning in Life Questionnaire (MLQ; Steger et al., 2006) assesses two dimensions of meaning in life—Presence and Search for Meaning in Life. The Presence of Meaning subscale measures how full respondents feel their lives are of meaning. The Search for Meaning subscale measures how engaged and motivated respondents are in efforts to find meaning or deepen their understanding of meaning in their lives. The MLQ has excellent reliability, test-retest stability, stable factor structure, and convergence among informants. Internal consistencies for the subscales, in the general population sample, were $\alpha = .83$ for presence and $\alpha = .84$ for search, and for MS sample $\alpha = .82$ and $\alpha = .87$, respectively.

2.2.5. The Satisfaction with Life Scale

The Satisfaction with Life Scale (SwLS; Diener et al., 1985) assesses an individual's global judgment of life satisfaction as a whole, providing an integrated judgment of how a person's life is going. It is one of the most widely used wellbeing measures, demonstrating good psychometric properties (Pavot & Diener, 2008). In this study, the internal consistency measured by Cronbach's alpha was $\alpha = .85$ for general population sample, and $\alpha = .87$ for MS sample.

2.2.6. The Desirability of Control Scale

The Desirability of Control Scale (DCS; Burger & Cooper, 1979) is a self-report questionnaire designed to assess individual differences in the general concept of Desire of Control (DC) (the degree that people are motivated to see themselves having control of the events occurring in their lives). The questionnaire has good internal consistency (.80), test-retest reliability (from .69 to .75) as well as concurrent and discriminant validity (Burger, 1992; Burger & Cooper, 1979). In this study, Cronbach's alpha was $\alpha = .70$ for general population sample, and $\alpha = .74$ for MS participants.

2.2.7. The Multidimensional Locus of Control

The Levenson Multidimensional Locus of Control Inventory (MLOC-IPC Scales; Levenson, 1973a) measures the extent to which people believe that events in their lives are controlled by themselves (internal locus of control), or by powerful others and chance (external locus of control). The scale, which measures Locus of Control as a multidimensional construct, contains 24 items divided into three subscales (eight items each), one measuring "internal" locus of control, one measuring "powerful others" dimension of external locus of control and the third one measuring the "chance" dimension of external locus of control, all rated on a

six-point Likert scale. This measure was constructed and validated in USA by Levenson, reporting good convergent validities and reliability values, ranging between mid .60 s and mid .70 s (Levenson, 1973b). Regarding the present study, internal consistencies for Internal LOC was $\alpha = .52$, for Powerful Others LOC $\alpha = .73$ and for Chance LOC $\alpha = .71$ for the general population sample, and $\alpha = .57$, $\alpha = .61$ and $\alpha = .72$ respectively, for the MS sample.

3. Results

3.1. Correlations

Pearson correlation coefficients to assess the relationship of BSQ and the five dimensions of MBSRQ with each of the following variables, Existential Anxiety, Satisfaction with Life, Search for and Presence of Meaning in Life, Desire for Control and LOC, were conducted separately for the two samples—general population and MS participants, as presented in Table 2 and Table 3. We noted that: 1) Existential anxiety, Search for Meaning in Life and LOC Chance were positively related to Body Shape Dissatisfaction for both groups, 2) Existential Anxiety and LOC Chance were positively related to Overweight Preoccupation for both groups, 3) Satisfaction with Life, Presence of Meaning in Life, Desire for Control and Internal LOC were positively related to Appearance Evaluation and Body Areas Satisfaction for both groups, and 4) Existential Anxiety was statistically significant correlated with Self-Classified Weight only for MS group. Moreover, in all tests, no differences in the direction of correlation (positive/negative) between the two groups were noticed. The magnitudes of the statistically significant correlations for general population sample were small to moderate and rather medium to large for MS group, according to Cohen's (1988) scale.

Table 2. Correlations between body image dimensions and existential anxiety, satisfaction with life, search for and presence of meaning in life, desire for control, locus of control (general population participants, $N = 543$).

	BSD	App. Ev.	App. Or.	BAS	Ov. Pr.	SCW
EA	.297***	−.280***	.102*	−.306***	.190***	.059
SwL	−.202***	.353***	−.007	.403***	−.097*	−.051
SfM	.205***	−.105*	.144**	−.167***	.197***	.015
PofM	−.199***	.278***	.011	.305***	−.088*	−.032
DC	−.045	.209***	.000	.193***	−.074	−.004
LoC *Internal*	−.107*	.196***	.023	.211***	−.075	−.051
LoC *Powerful Others*	.137**	−.200***	.034	−.166***	.136**	.069
LoC *Chance*	.135**	−.186***	.065	−.136**	.138**	.028

Note: *$p < .05$, **$p < .01$, ***$p < .001$. Abbreviations: BSD: Body Shape Dissatisfaction; App. Ev.: Appearance Evaluation; App. Or.: Appearance Orientation; BAS: Body Areas Satisfaction; Ov. Pr.: Overweight Preoccupation; SCW: Self-Classified Weight; EA: Existential Anxiety; SwL: Satisfaction with Life; SfM: Search for Meaning; PofM: Presence of Meaning; DC: Desire for Control; LoC: Locus of Control.

Table 3. Correlations between body image dimensions and existential anxiety, satisfaction with life, search for and presence of meaning in life, desire for control, locus of control (MS participants, $N = 95$).

	BSD	App. Ev.	App. Or.	BAS	Ov. Pr.	SCW
EA	.425***	−.482***	.184	−.567***	.225*	.257*
SwL	−.074	.454***	.116	.559***	−.025	−.168
SfM	.239*	.146	.222*	.068	.137	−.016
PofM	−.050	.262*	.042	.397***	.084	−.002
DC	.081	.362***	.117	.448***	.034	.004
LoC *Internal*	.026	.301**	.038	.401***	.065	−.111
LoC *Powerful Others*	.140	−.310**	−.007	−.278**	.151	−.004
LoC *Chance*	.232*	−.300**	−.014	−.423***	.236*	−.049

Note: *$p < .05$, **$p < .01$, ***$p < .001$. Abbreviations: BSD: Body Shape Dissatisfaction; App. Ev.: Appearance Evaluation; App. Or.: Appearance Orientation; BAS: Body Areas Satisfaction; Ov. Pr.: Overweight Preoccupation; SCW: Self-Classified Weight; EA: Existential Anxiety; SwL: Satisfaction with Life; SfM: Search for Meaning; PofM: Presence of Meaning; DC: Desire for Control; LoC: Locus of Control.

3.2. The Comparison of Means between General population and MS Participants' Importance of BMI and Age

T-test for two independent samples and ANCOVA were employed to examine which of the discussed variables show statistically significant differences between the MS and the general population group. BMI and Sex were used as covariates in the analyses; BMI, because it seems that body image and eating disorder psychopathology are influenced by the aforementioned variable (Stevens et al., 2016), and Sex, because it seems that men and women with higher levels of body dissatisfaction are at greater risk of eating disorders (Stice & Shaw, 2002; Tod & Edwards, 2015) and recent studies have also paid increased attention to men's body image issues (Edwards et al., 2013). Results are reported before and after controlling for BMI and Sex (**Table 4**).

Table 4. Comparison of Means (M) and Standard Deviations (SD) between general population and participants with MS, before and after controlling for BMI and Sex.

			No Variables Controlled (Independent Sample T-test)			After Controlling for BMI and Sex (ANCOVA Models)			
	General Population ($N = 543$)	MS Population ($N = 95$)		95% CI on MD				95% CI on B	
	M (S.D)	M (S.D)	$t_{(635)}$	[LL, UL]	d	$F_{(1, 633)}$	B	[LL, UL]	η^2
Body Shape Dissatisfaction	20.78 (8.02)	26.41 (10.66)	−4.91***	[−7.9, −3.36]	−.67	24.39***	−4.30	[−6.01, −2.59]	.037
Appearance Evaluation	3.5 (.72)	3.34 (.85)	1.89	[−.01, .32]	.21	.49	.05	[−.09, .19]	
Appearance Orientation	3.29 (.6)	3.24 (.65)	.71	[−.08, .18]	.08	1 .76	.09	[−.04, .22]	

Continued

Body Areas Satisfaction	3.54 (.59)	3.39 (.68)	2.28*	[.02, .28]	.25	1.43	.07	[−.05, .19]	
Overweight Preoccupation	2.39 (.91)	2.52 (1.02)	−1.27	[−.33, .07]	−.14	.01	.01	[−.18, .19]	
Self-Classified Weight	3.23 (.63)	3.27 (.8)	−.42	[−.21, .14]	−.05	3.34	.10	[−.01, .2]	
Existential anxiety	4.73 (2.8)	5.72 (2.96)	−3.16**	[−1.61, −.38]	−.35	7.81**	−.88	[−1.5, −.26]	.012
Satisfaction with Life	23.52 (5.95)	21.16 (6.77)	3.49**	[1.03, 3.68]	.39	12.43***	2.41	[1.07, 3.76]	.019
Search for Meaning	20.59 (6.73)	20.3 (7.14)	.39	[−1.19, 1.79]	.04	.14	.29	[−1.22, 1.8]	
Presence of Meaning	24.81 (5.29)	23.53 (5.91)	2.14*	[.19, 2.46]	.24	4.7*	1.31	[.12, 2.5]	.007
Desire for Control	101.03 (11.36)	99.55 (13.01)	1.15	[−1.06, 4.02]	.13	.46	.87	[−1.66, 3.4]	
LoC Internal	32.3 (6.21)	30.34 (6.61)	2.82**	[.59, 3.34]	.31	6.49*	1.79	[.41, 3.18]	.010
LoC Powerful Others	15.78 (8.09)	21.33 (8.05)	−6.19***	[−7.32, −3.77]	−.69	37.29***	−5.43	[−7.18, 3.69]	.056
LoC Chance	18.09 (7.96)	18.33 (6.98)	−.27	[−1.95, 1.47]	−.03	.002	−.04	[−1.76, 1.66]	
BMI	24.25 (4.46)	25.19 (4.71)	−1.87	[−1.91, .49]	−.21				

Note: *$p < .05$, **$p < .01$, ***$p < .001$. Abbreviations: LL: Lower Limit of Confidence Interval (CI); UL: Upper Limit of Confidence Interval (CI); MD: Mean Difference between males and females; B: unstandardized regression coefficient; LoC: Locus of Control; BMI: Body Mass Index. Cohens' *d*: Measures for effect size; small = .20, medium = .50 and large = .80. Eta-squared (η^2): Measures for effect size; small = .01, medium = .06 and large = .14. η^2 measures are computed only for significant *F* values.

Cohen's *d* and eta-squared (η^2) were used to calculate the effect sizes of the two procedures. Effect sizes for T-test were calculated and reported on Mean Differences (MD) and on unstandardized regression coefficients (B) for ANCOVA (Cohen, 1988). Before controlling for BMI and Sex, results indicated that the means of Body Shape Dissatisfaction, Existential Anxiety and Powerful Others LOC differ significantly, with MS participants presenting higher mean scores than general population participants. The effect sizes (Cohen's *d*) for Body Shape Dissatisfaction and Powerful Others were rather large ($d = -.67$, $d = -.69$ respectively) and rather medium for Existential Anxiety $d = -.35$. On the other hand, results indicated higher means of Body Areas Satisfaction, Satisfaction with Life, Presence of Meaning and Internal LOC for the general population participants compared to MS participants. The effect sizes (Cohen's *d*) were small for Body Areas Satisfaction ($d = .25$), Presence of Meaning ($d = .24$) and Internal LOC ($d = .31$), and rather medium for Satisfaction with Life ($d = .39$). Non-significant differences between the means of the two groups were found for Appearance Evaluation, Appearance Orientation, Overweight Preoccupation, Self-Classified Weight, Search for Meaning, DC, Chance LOC and BMI (**Table 4**).

After controlling for BMI and Sex, the above variables that presented statistically significant differences between the two groups, remained the same, apart from the mean scores of Body Areas Satisfaction, which did not show statistically significant difference anymore. Moreover, the magnitude of the differences ranges from small to medium. Specifically, the effect sizes (eta-squared) were rather medium for Body Shape Dissatisfaction (η^2 = .037), medium for Powerful Others LOC (η^2 = .056) and small for Existential Anxiety (η^2 = .012), Satisfaction with Life (η^2 = .019), Presence of Meaning (η^2 = .007) and Internal LOC (η^2 = .010) (Table 4).

3.3. The Explanatory Models of Body Image Dimensions

Explanatory models to test and interpret the effect of a set of predictors that includes Existential Anxiety, Satisfaction with Life, Search for Meaning in Life, Presence of Meaning in Life, Desire for Control, Internal and External LOC, BMI, Age, Sex, Group indicator (general population/MS individuals) as well as Social Interaction and Social Activities on Body Shape Dissatisfaction (BSQ) and the five dimensions of MBSRQ, were developed. For the last two explanatory variables, main effects and interaction with Group indicator were tested. Only the models, for which ANCOVA analysis showed rather large and large predictability (R^2; small = .02; medium = .13; large = .26; Cohen, 1988), are presented in Table 5. Also, it should be noted that, only independent variables and interactions tested, that presented a statistically significant effect on body image dimensions, are included in Table 5.

Table 5. ANCOVA analysis including statistical significant effects of explanatory variables on body image dimensions.

	Body Image														
	Body Shape Dissatisfaction			Appearance Evaluation			Body Areas Satisfaction			Overweight Preoccupation			Self-Classified Weight		
Explanatory Variables	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
EA	33.11	<.001	.05	12.46	<.001	.02	14.43	<.001	.02	8.41	.004	.01	4.79	.029	.01
SwL				40.55	<.001	.06	50.19	<.001	.08				3.86	.050	.01
SfM	11.96	.001	.02							18.75	<.001	.03			
DC	4.42	.036	.01	12.44	<.001	.02	9.36	.002	.02						
BMI	113.98	<.001	.16	189.23	<.001	.24	114.08	<.001	.16	101.19	<.001	.14	589.14	<.001	.49
Sex	51.10	<.001	.08	13.87	<.001	.02	19.29	<.001	.03	35.76	<.001	.06	33.15	<.001	.05
Group Indicator*	18.80	<.001	.03										5.07	.025	.01
Group Indicator × Social Interaction	6.01	.003	.02	4.72	.009	.02				3.28	.038	.01			
R^2	.34			.42			.38			.23			.51		
Adj. R^2	.32			.40			.36			.21			.49		

Note: *Group Indicator: differentiates individuals between general population and individuals with MS. Abbreviations: EA: Existential Anxiety; SwL: Satisfaction with Life; SfM: Search for Meaning; DC: Desire for Control; BMI: Body Mass Index. Only statistically significant effects were included.

Results showed that, regarding Body Shape Dissatisfaction, the following variables emerged as statistically significant, explaining 34% of the variance: Existential Anxiety, Search for Meaning, Desire for Control, BMI, Sex, Group indicator and Group indicator × Social Interaction (Table 5). For the rest of the dependent variables—that is the five dimensions of the MBSRQ—the corresponding explanatory variables and model's explanatory power were as follows: 1) Appearance Evaluation: Existential Anxiety, Satisfaction with Life, Desire for Control, BMI, Sex, Group indicator × Social Interaction (R^2 = .42), 2) Body Areas Satisfaction: Existential Anxiety, Satisfaction with Life, Desire for Control, BMI, Sex (R^2 = .38), 3) Overweight Preoccupation: Existential Anxiety, Search for Meaning, BMI, Sex, Group indicator × Social Interaction (R^2 = .23) and 4) Self-Classified Weight: Existential Anxiety, Satisfaction with Life, BMI, Sex, Group indicator (R^2 = .51) (Table 5). Regarding Appearance Orientation, the resulting model was statistically significant but showed rather medium predictability R^2 = .11 (the variable is not included in Table 5). The independent variables predicting the model were Existential Anxiety, Search for Meaning and Sex. In conclusion, results presented in Table 5, indicated that all models display large or rather large predictability.

4. Discussion

The aim of the present study was to investigate whether and in which way Body Image is associated with Existential Anxiety, Meaning in Life, Satisfaction with Life and Control, in two different groups: general population and MS participants. As body dissatisfaction seems to be common among men and women in developed and developing nations (Karazsia et al., 2017) and has not been extensively examined in populations, with a chronic medical illness—as Multiple Sclerosis (MS)—this research attempted to contribute to the field of body image disturbances.

As hypothesized, results of the correlations—taking into consideration both groups—revealed a significant positive relation between Body Shape Dissatisfaction—which mostly refers to body shape concerns, fat anxiety and dieting practices—and Existential Anxiety, Search for Meaning in Life and External LOC. On the other hand, greater feelings concerning one's appearance or specific body areas, weight, height and muscle tone indicated greater Satisfaction with Life, Presence of Meaning in Life, Desire for Control and Internal LOC. Contrary to prediction, our hypothesis about Desire for Control being positively related to body dissatisfaction was not confirmed. On the contrary, Desire for Control was positively related to feelings of satisfaction with appearance and specific body parts.

Concerning mean differences, we observe that our hypothesis was partially confirmed. Regarding body image, the two groups presented significant differences only in Body Shape Dissatisfaction variable and in Body Areas Satisfaction. Nevertheless, literature seems to associate body image dissatisfaction with poorer phys-

ical functioning, suggesting that body image dissatisfaction may be an important intervention target for people suffering from or at risk of impaired health (Wilson et al., 2013). This result enhances our findings, in the sense that MS individuals may be experiencing higher body image dissatisfaction rather than the general population sample, if symptoms become apparent.

Also, MS participants presented lower Satisfaction with Life, as hypothesized; a result that could be associated with or attributed to body dissatisfaction, if we consider literature where Brannan and Petrie (2011) found that Satisfaction with life has been negatively related to body dissatisfaction, and Góngora (2014) that a high level of satisfaction with life was associated with lower body dissatisfaction. However, this is only a hypothesis, as dissatisfaction with life can be credited to many other factors rather than body dissatisfaction. Additionally, literature is limited for body image in people with MS, concerning mostly people with eating disturbances and results cannot be discussed on the basis of cause and effect.

Contrary to our prediction, regarding Search for Meaning in Life, no statistically significant differences were observed. Thus, results indicated significant differences in terms of Existential Anxiety and Presence of Meaning in Life, as expected. Individuals with MS showed higher Existential Anxiety and less Presence of Meaning in Life. Literature suggests that many individuals, on the one hand, when confronted with a diagnosis of a serious illness, wrestle with emotional and existential concerns (Steinhauser et al., 2017), and on the other hand, when faced with life challenges, making and finding meaning is a key cognitive process activated (Park & Folkman, 1997)—explaining probably why people with MS in our study experience higher Existential Anxiety and less Presence of Meaning compared to general population sample; without disregarding the fact that people drawn from the general population sample may be also experiencing Existential Anxiety, because all individuals develop some form of existential anxiety at some point in their lives (i.e. Yalom, 1980).

Regarding results about Control, individuals with MS presented External LOC only in the higher Powerful Others dimension, whereas individuals from general population had more Internal LOC. We can assume that people with MS feel that their lives or the progress of their disease depends on something else (i.e. the physicians, the implementation and adequacy of the treatment, the symptom severity, etc.). The degree of focusing on external over internal LOC must be taken under consideration in counseling therapy since high Internal LOC seems to be associated with less disability (Gruber-Baldini et al., 2009). Individuals with a high internal LOC may be more motivated to adopt preventive strategies and engage in behaviors that maintain or maximize their daily function. Thus, greater internal LOC may actually modify the progression of disability (Gruber-Baldini et al., 2009). Additionally, contrary to prediction, neither group presented greater Desire for Control; this result could be probably explained by the notion that desire for control is a global construct concerning the majority of in-

dividuals, since control seems to be a basic human need (Bandura, 1977; Deci & Ryan, 1985).

Concerning explanatory models, although we hypothesized that Existential Anxiety, Satisfaction with Life and Desire for control would be significant in explaining all Body Image dimensions, results differed for each dependent body variable; one possible explanation may be that they address different aspects of Body Image. Through our research, new models in understanding body image emerged. More specifically: 1) three variables, Existential Anxiety, BMI and Sex are common in affecting all Body Image dimensions: 2) Existential Anxiety, Desire for Control, BMI and Sex are the common explanatory variables of Body Shape Dissatisfaction, Appearance Evaluation and Body Areas Satisfaction and 3) Existential Anxiety, BMI, Sex and Group Indicator × Social Interaction, are the common variables explaining Body Shape Dissatisfaction, Appearance Evaluation and Overweight Preoccupation. Concerning the last ascertainment, the effect of the level of Social Interaction of the individual, measured by the question "*How often do you meet or go out with friends*, *relatives*, *etc*.?" on body satisfaction/dissatisfaction or body weight preoccupation, differed between the two groups. Previous research and theory suggest that body image is a critical aspect of social development (Jovanovic et al., 1989; Langlois & Stephan, 1981; Sorell & Nowak, 1981). Recent research findings suggest that body dissatisfaction affects social interactions (Mills et al., 2014). Thus, the aim was to examine whether Body Image affects Social Interaction or Social Activities, since literature imposes emphasis on the positive relation between social-emotional isolation and body image dissatisfaction (Zaitsoff et al., 2009). Our findings indicated that the effect of Social Interaction on Body Image is different between the two groups, as shown by the significance of the interaction between Group and Social Interaction. Thus, our hypothesis that the presence or absence of Multiple Sclerosis interacts with Social Interaction and Social Activities on Body Image, was partially confirmed, because, contrary to prediction the variable "Social Activities" measured by the question "*Compared to other people your age*, *how often would you say*, *you participate in social activities*?" did not present significant interaction with Group indicator variable, complying with past research indicating that for both men and women, body image was unrelated to how socially active people were (Nezlek, 1999). Thus, regarding Body Image, the differences between the two groups were significant only in terms of interacting with other people and not in terms of social activities; a finding that needs further investigation, as these two variables were examined by a single question each. Perhaps a more elaborated measuring tool is needed.

Additionally, it is important to mention the significant effect of Sex and BMI, in terms of predicting body image dimensions. The effect of Sex is evident in the present research as an explanatory variable for all dimensions related to body image; a finding enhanced by literature, since prevalence estimates of body dissatisfaction, range from 11% to 72% among women and 8% to 61% among men

(Fiske et al., 2014). Although high levels of body dissatisfaction exist in both sexes (Riva et al., 2013), women show greater body dissatisfaction compared to men (Fallon et al., 2014; Frederick et al., 2016, 2020); indicating the importance of taking into consideration sex, when confronting body image issues. Additionally, it can be observed that the effect of BMI is evident in the present study across all body image dimensions and is consistent with previous research, indicating robust links between body image and BMI (Fallon et al., 2014; Frederick et al., 2020). The particular finding is not surprising, since the "thin ideal" is overvalued in Western countries (Swami et al., 2010; Frederick et al., 2022).

The current study addresses issues concerning Existential Anxiety, which despite the ample theoretical background available, yet is not often encountered in research literature regarding effects on body image. In the present study, it is observed that Existential Anxiety emerged as a key correlation or explanatory variable both for individuals drawn from general population and MS participants. Taking into consideration the results of the present study, we assume that the relationship of Existential Anxiety with body dissatisfaction constitutes a prominent and valuable new perspective in better understanding individuals with body image difficulties either confronting a diagnosis or not. Traditional existential theory (i.e. Yalom, 1980), states that all individuals develop some form of existential anxiety at some point in their lives. Engaging with the fundamental questions of existence is a universal human experience and most people have formed beliefs around existential issues (Allan & Shearer, 2012). Therefore, considering existential issues and making sense of one's existence may be important for optimal human functioning (Allan & Shearer, 2012). We suggest that, if important existential questions, such as those studied in our research that can be raised at any stage of human life, remain unresolved they can lead to pathological responses (i.e. body dissatisfaction). As Yalom (1980) suggests, since there is no way of dealing with existential issues other than by confronting them, many individuals develop convoluted ways of avoiding them. Moreover, although there were significant differences between the two groups, regarding body shape dissatisfaction, the correlation between body shape dissatisfaction and existential anxiety remained highly significant for both groups.

Another ascertainment is that the construct of Meaning in Life was a significant predictive factor for body image variables. Specifically, regarding Presence of Meaning in Life, the results of our study showed that is positively correlated with Appearance Evaluation and Body Areas Satisfaction—as other findings (Marco et al., 2017)—and Search for Meaning in Life for Body Shape Dissatisfaction and Overweight Preoccupation. Several recent studies have revealed a correlation between meaning in life and body dissatisfaction or eating pathology, showing that meaning in life constitutes a protective factor against eating disorders or body dissatisfaction (Góngora, 2014; Marco et al., 2017, 2019). Since low meaning in life seems to be associated with psychopathology (Marco et al., 2016; Psarra & Kleftaras, 2013) and the most important human motivation involves perceiving

and experiencing that one's life is meaningful (Frankl, 1988), we suggest that the absence of Meaning in Life may be an important agent in formatting body image disturbances in individuals with body image dissatisfaction, either having MS or not.

We also observed that Control was present in various ways in the analyses carried out in our research. Thus results showed that: 1) the differences between the two groups appear in relation to either Internal LOC or External as Powerful Others—with MS participants having higher External LOC, 2) there is a positive correlation of Desire for Control and Internal LOC with Appearance Evaluation and Body Areas Satisfaction but negative correlation between External LOC and those variables, with correlations being much higher in MS sample, and 3) Desire for Control is a predictive variable for Body Shape Dissatisfaction, Appearance Evaluation and Body Areas Satisfaction. Although there was no significant correlation between body shape dissatisfaction and Desire for Control within the sample, when the rest of predictors were controlled, Desire for Control was revealed as a statically significant predictor. The results are interesting in the following way. Although all variables that study body image from different aspects were examined, it seems that Desire for Control predicted only those concerning the degree of satisfaction with overall appearance and body parts and not those concerning only preoccupation with body weight (Overweight Preoccupation and Self-Classified Weight variables). From literature review control appears to be related to body dissatisfaction, especially to eating pathology (Donovan & Penny, 2014; Murray et al., 2017; Tiggemann & Raven, 1998). Thus, Control appears as concerns over eating and body weight and shape and the sense of control is often obtained by the continuous monitoring of a certain parameter (Fairburn & Harrison, 2003). According to our findings, satisfaction with one's appearance or with specific body parts—as expressed in each group—appeared to have a positive relation with Internal Control and Desire for Control; leading us to presume that control may not be just about monitoring a particular parameter (such as weight), and suggest that the focus on weight is not part of a global desire for control (Tiggemann & Raven, 1998). Control is a basic human need (Bandura, 1977; Deci & Ryan, 1985) and a complex construct, not only related to food and body aspects, but life in general (Rotter, 1966; Shapiro & Astin, 1998).

Overall, we suggest that our findings may hold important implications for practice, since mental health professionals may be directly involved in providing psychological care to an individual with MS. In such a situation, it would be useful to assess the individual's perceived control, or existential concerns and subjective well-being, and therefore identify the factors that may have an impact on the individuals' ability to adjust to the challenges of their chronic condition. Because of the meaning individuals attribute to their condition, clinicians could create an environment that allows clients to express existential concerns, help them explore or find meaning against their illness, and feel satisfied with their life.

5. Limitations

The present findings should be cast in light of methodological challenges and limitations. Although the overall sample size is adequate, the two sample groups are not of equal size. Furthermore, the number of male participants is not equivalent to that of female; although this may not affect the findings, since the size of the whole sample is large. Also, because the study was carried out with Greek participants, it remains unknown whether these results can be generalized to other non-Greek cultures. Additionally, measures used in the present study, though adapted into the Greek language bearing good internal consistency, are all self-reports and, therefore, the effects of "social desirability" cannot be ruled out. Another limitation of this study is the correlational nature of the results. The undoubted relationships among the variables, though ascertained, do not allow "cause and effect" conclusions. Finally, the sample of MS is small and no distinction has been made between the types of MS or the stage of the illness participants are.

6. Conclusion and Suggestions for Future Research

Despite identified limitations, it seems that the current study provides preliminary evidence that body image dimensions and the examined variables are associated. Overall, we could say that our findings have important implications for clinical practice. It appears that many factors add to the complexity of body image perception and experiencing a chronic illness, such as Multiple Sclerosis. The examined variables seem to have a significant impact on body image, enabling mental health professionals to incorporate them into clinical practice and thus enrich and deepen the therapeutic process. Therefore, new studies, concerning the understanding of eating pathology or body image disorders, could focus on including control dimensions, existential factors and satisfaction with life variables, in longitudinal quantitative and/or qualitative studies, employing clinical populations diagnosed with eating disorders or disabilities. Also important, are longitudinal studies that follow individuals with MS from diagnosis, with different questionnaires at different stages of the disease, in order to assess how the examined factors might change over the course of the disease.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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