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**Depression, Positive and Negative Affect, Optimism and Health-Related Quality of Life in Recently Diagnosed Multiple Sclerosis Patients: The Role of Identity, Sense of Coherence, and Self-efficacy**

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## **Depression, positive and negative affect, optimism and health-related quality of life in recently diagnosed multiple sclerosis patients: the role of identity, sense of coherence, and self-efficacy**

### **Abstract**

The study was aimed at describing the levels of depression, positive and negative affect, optimism and health-related quality of life in a group of recently diagnosed multiple sclerosis (MS) patients (up to three years since the diagnosis), taking into account gender, age, and disease duration differences, and at investigating the role of identity, sense of coherence, and self-efficacy in MS on patients' depression, positive and negative affect, optimism, and health-related quality of life. The cross-sectional study involved 90 MS patients (60% women; age:  $M = 37$ ,  $SD = 12$ ) with Expanded Disability Status Scale (EDSS) between 1 and 4 (mild to moderate disability). Patients completed measures of Depression (CESD-10), Positive and Negative Affect (PANAS), Optimism (LOT-R), Health-related Quality of Life (HRQOL) (SF-12), Identity Motives, Sense of Coherence (SOC), and Self-efficacy in MS (SEMS). Depression scores were near the cut-off level for clinically significant depressive symptoms, and negative affect was higher and health-related quality of life was lower than those in the general population. Women and younger patients reported better adjustment as time passes since the diagnosis. Results of multiple regressions indicated that higher sense of coherence was related to higher mental health, lower negative affect and lower depression. Higher self-efficacy in MS was predictive of greater positive affect and lower negative affect, whereas higher identity satisfaction was predictive of higher positive affect and optimism and lower depression. The results suggest the usefulness of

addressing identity redefinition, sense of coherence and self-efficacy in psychological interventions aimed at promoting patients' adjustment to MS.

**Keywords** Multiple sclerosis, health-related quality of life, optimism, positive and negative affect, self-efficacy, sense of coherence

## Introduction

Multiple sclerosis (MS) is a chronic neurological disease characterized by a variety of disabling symptoms, including fatigue and pain, disturbances in sensation and vision, motor difficulties, spasticity, bladder and bowel problems, and cognitive impairment. Multiple sclerosis affects more women than men (the proportion is approximately 3:1) (Sellner et al., 2011), and it is usually diagnosed between the ages of 20 and 40 years. The course of the illness is highly unpredictable and, in most cases, characterized by relapses and periods of symptom remission. The MS etiology remains unknown, and at present no resolute cure is available. All of these aspects have psychological consequences for the patients, and affect their adherence to therapies, as well as the global quality of life and adjustment to the illness (Dennison, Moss-Morris & Chalder, 2009; Sà, 2008). Research has shown that MS patients have a reduced quality of life compared with the general population in both physical and psychological domains, due to functional impairment, fatigue, psychological distress, and limitations in social relationships (McCabe & McKern, 2002). Moreover, they report higher rates of depressive symptoms compared with the general population and patients with other chronic neurological illnesses, with a lifetime frequency of clinically significant depression of around 50% (Feinstein, 2011; Patten, Berzins, & Metz, 2010; Sà, 2008). Many reports have investigated diverse psychological correlates of MS patients' adjustment to the illness (Dennison, Moss-Morris & Chalder, 2009) with the ultimate goal of implementing effective interventions.

The present study was aimed at extending this area of research, by addressing some limitations of previous studies. First of all, there is a paucity of research considering a broader definition of adjustment to MS, not only limited to the negative aspects, but also including the positive ones

(Bassi et al., 2014). In particular, some studies showed that two crucial indicators of positive adjustment are positive affect (Pakenham & Cox, 2009; Pakenham & Fleming, 2011) and optimism (Fournier, de Ridder & Bensing, 2002). While negative affect represents a subjective distress and an unpleasant engagement with the environment, positive affect represents the extent to which an individual feels enthusiastic, active, and determined. In previous studies, positive affect was found to be related to both decreasing depression (Hart, Vella, & Mohr, 2008) and increasing adherence to therapies (Treadaway et al., 2009) among MS patients. Optimism, defined as the tendency to believe that one will generally experience good outcomes in life (Scheier & Carver, 1985), has proved to be a key variable for patients' resiliency — optimistic individuals are more likely to use adaptive coping strategies to face difficulties, to engage in valued goals, and to get opportunities from the illness experience (Carver & Scheier, 1994). In particular, among MS patients, optimism was found to be positively related to their adjustment, in terms of increasing benefit-finding and decreasing depression (Hart, Vella, & Mohr, 2008), as well as increasing perception of control over the illness (Sinnakaruppan et al., 2010). In the present study, optimism was considered an indicator of positive psychological adjustment to MS, in accordance with other research on chronic illness (Fournier, de Ridder & Bensing, 2003; Symister & Friend, 2003).

Secondly, the present study focused on three crucial psychological aspects that have generally been considered separately in the literature — identity, sense of coherence and self-efficacy in dealing with MS difficulties. Identity is the sense of continuity and oneness that everyone experiences during one's life despite the continuous changes in their biological, psychological, and social lives (Bosma & Kunnen, 2001). Multiple sclerosis, like any other chronic illness,

represents a break in the sense of personal identity, both on the physical and social sides (Breakwell, 1983; Weinreich & Saunderson, 2003). Moreover, MS is usually diagnosed in young adulthood (20-30 years old), when people are defining their identity in various life contexts, particularly job and affective relationships. The patient's identity restructuring in diverse domains (physical, psychological, and social) has proven to be a key aspect for the psychosocial adjustment to the illness (Boeije et al., 2002; Irvine et al., 2009). Sense of coherence is defined by Antonovsky (1987) as the global individual way of perceiving and interpreting stimuli coming from both the internal and external world. MS threatens the individual's sense of coherence, because it is highly unpredictable, its origin is unknown, and no resolute cure is available. The recovery of sense of coherence in one's life after the diagnosis of MS has been proven to promote the patient's quality of life (Pakenham, 2007), and higher sense of coherence has been found to be related to lower depression (Gottberg et al., 2007). Patients can recover sense of coherence through the acceptance of the illness challenges, the search for new, realistic, and reachable goals, and the commitment in new aims evaluated as significant and worth engaging. These new goals could give the individual a sense of realization and personal value and the possibility of acting and making plans (Author, 2006). Finally, self-efficacy is the individual's appraisal of the extent to which he/she has the capabilities required to organize and realize the actions needed to obtain planned goals in a specific domain (Bandura, 1997). MS is characterized by multiple symptoms and disabilities, and patients are likely to experience a low self-efficacy in diverse life domains because of illness limitations: the negation of difficulties, as well as the overestimation of abilities might negatively influence self-efficacy levels. In this regard, self-efficacy has been demonstrated to positively influence the patient's psychological adjustment after controlling for clinical variables (Schmitt et al., 2014). In the theoretical

framework of our study, the three aspects are considered as tightly interconnected and interacting in a circular way: self-efficacy allows the individual to realize significant, coherent, and meaningful goals, through which one realizes his/her own identity, and this in turn might promote better adjustment to the illness (Author, 2010). In a previous study (Author, 2016), identity, sense of coherence, and self-efficacy in MS emerged as significant predictors of lower depression, lower negative affect, and higher positive affect among patients with long MS duration; however, these relationships have not yet been examined among recently diagnosed individuals.

Indeed, a third limitation of most research on the psychological aspects of MS is that studies generally considered patients with long disease duration, whereas research on the adjustment to MS and its psychological correlates among newly diagnosed patients is scarce. After an immediate reaction to the diagnosis that is often characterized by anger and negation, in the first period of the illness, patients are likely to experience anxiety, uncertainty, and psychological distress, although physical difficulties are generally limited (Giordano et al., 2011; Janssen et al., 2003). Some studies found that patients in the first years following the diagnosis reported a reduced quality of life (Klevan et al., 2014) and a high depression (Lode et al., 2009) compared with healthy controls, and that depressive and anxiety symptoms are linked to avoidance and emotion-focused coping strategies (Tan-Kristanto & Kiropoulos, 2015). Nonetheless, little is known on positive affect and optimism experienced by MS patients in an early phase of the illness and on the psychological correlates of their adjustment. Therefore, descriptive and explorative studies on this topic are needed. To our knowledge, this is the first study to describe the different facets of adjustment to MS among recently diagnosed patients, and explores,

altogether, the role of identity, sense of coherence, and self-efficacy on the adjustment to MS.

Beginning from this theoretical framework, the aims of the study were as follows:

1. To describe the levels of depression, positive affect and negative affect, optimism, and health-related quality of life (physical health and mental health) in a group of recently diagnosed MS patients (up to three years since the diagnosis), taking into account gender, age, and disease duration differences
2. To investigate the role of identity, sense of coherence, and self-efficacy in dealing with MS on patients' depression, positive and negative affect, optimism, and health-related quality of life (physical health and mental health)

With respect to the first aim, as found in other studies on recently diagnosed MS patients, depression scores were expected to be above the cut-off for clinically significant depressive symptoms (Lode et al., 2009), and the health-related quality of life was expected to be lower compared with the scores from the general population (Klevan et al., 2014). In accordance with research indicating psychological distress for MS patients in the first years following the diagnosis (Giordano et al., 2011; Janssen et al., 2003), positive affect was expected to be lower and negative affect higher compared with scores from the general population. As for levels of optimism, no specific hypothesis was formulated because normative scores from the general population are not available. Concerning gender and age differences, studies generally noted that women with MS cope with the illness better than men (Fraser and Polito, 2007; Miller and Dishon, 2006), and younger patients report better physical health (Buchanan et al., 2009) and lower depression (Amato & Zipoli, 2004; Jones et al., 2012) compared with older patients. Nonetheless, all of these studies involved patients with long disease duration. As for the role of

disease duration on adjustment, to our knowledge no comparative studies are available for recently diagnosed MS patients. The aim of our study was to explore if the adjustment to MS among recently diagnosed patients varies as a function of gender, age, and disease duration. Moreover, we explored if gender and age moderate the relationships between time since diagnosis and the different indicators of adjustment considered.

With respect to the second aim, starting from the literature on psychological correlates of MS patients' adjustment (Boeije et al., 2002; Gottberg et al., 2007; Irvine et al., 2009; Pakenham, 2007; Schmitt et al., 2014), high levels of identity satisfaction, sense of coherence, and self-efficacy in dealing with MS were expected to be linked to lower levels of negative affect and depression and to higher levels of positive affect, optimism and health related quality of life.

## **Materials and methods**

### ***Participants***

The study included 90 MS patients recruited at a multiple sclerosis clinic centre (Regional Referral Multiple Sclerosis Centre – CRESM, Torino, Italy), 61.1% of whom were women, whose ages ranged from 20 to 65 years ( $M = 37$  years,  $SD = 12$ ). All patients had received a definitive diagnosis of MS within the past 3 years, and the majority of them (57.8%) had been diagnosed by less than a year (disease duration:  $M = 1.59$  years,  $SD = .76$ ). Most patients (94.5%) had a relapsing-remitting MS, and the Expanded Disability Status Scale (EDSS) score ranged from 1 to 4.<sup>1</sup> None of the patients had clinically significant cognitive deficits of severe

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<sup>1</sup> The Expanded Disability Status Scale (EDSS) score (Kurtzke, 1983), the most widely used measure of disability in MS, is evaluated by a neurologist. The EDSS score varies between 1 and 10. In our study, the participants' EDSS

psychiatric problems — this information was obtained from the patients' case sheets compiled by the neurologist at the MS Centre during routine examination. Majority of the participants are married or living with a partner (55.6%), hold a high school diploma (57.8%), and are employed (74.4%). The characteristics of the study participants are presented in Table 1.

*INSERT TABLE 1*

***Procedure and measures***

The participants completed an anonymous self-report questionnaire, which was administered by a member of the research team, who explained the aims of the study and later collected the questionnaires in a closed envelope after the forms had been duly filled out. The questionnaire included socio-demographic variables and measures of the study variables. The study was approved by the Hospital Ethics Committee, and participants gave written informed consent for participation in the study.

*Depression* was assessed through the Italian validation of the 10-item Center for Epidemiologic Studies Depression Scale (CES-D-10; Fava et al., 1983), which evaluates the frequency of depressive symptoms during the past week (e.g., "I was bothered by things that usually don't bother me"). Each item is scored on a 4-point scale ranging from 0 ("rarely or none of the time") to 3 ("most or all of the time"). The scale ranges from 0 to 30, with a cut-off score of 10 or higher indicating the presence of significant depressive symptoms. Cronbach's alpha was 0.84.

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scores ranged between 1 (no disability) and 4 (autonomous, able to walk without aid or rest some 500 meters, moderate neurological deficits in diverse functional systems), therefore representing patients with mild to moderate levels of disability.

*Positive and Negative Affect* were evaluated using the Italian validation of the Positive Affect and Negative Affect Schedule (PANAS; Terracciano, McCrae & Costa, 2003). It comprises two mood scales: Positive Affect (PA) (10 items) and Negative Affect (NA) (10 items); each item is rated on a 5-point scale (from 1 = “never” to 5 = “always”) to indicate the number of times the respondent feels this way (e.g., positive: “interested”; negative: “scared”) in their daily living. Each scale ranges from 10 to 50. Cronbach’s alpha was 0.81 for the Positive Affect scale and 0.87 for the Negative Affect scale.

*Optimism* was evaluated using the Italian validation of the Life Orientation Test-Revised (LOT-R) (Chiesi et al., 2013). It comprises 10 items — 3 positive (e.g., “In uncertain times, I usually expect the best”), 3 negative (e.g., “If something can go wrong for me, it will”), and 4 fillers (e.g., “It’s easy for me to relax”). Each item is rated on a 5-point scale (from 0 = “strongly disagree” to 4 = “strongly agree”). The total score for the scale ranges between 0 and 24, with 0-13 corresponding to low optimism, 14-18 to moderate optimism, and 19-24 to high optimism. Cronbach’s alpha was 0.83.

*Health-related quality of life* was assessed using the Italian version of the SF-12 Health Survey (Apolone et al., 2005), which is the short version of the SF-36 and represents a validated and widely used self-report instrument assessing health status. It is composed of 12 items, which provide measures of Physical Health (PCS-12) (e.g., “Does your health limit you in climbing one flight of stairs?”; the range of responses include “Yes, limited a lot”, “Yes, limited a little”, and “No, not limited at all”) and Mental Health (MCS-12) (e.g., “How much of the time during the past 4 weeks did you feel calm and peaceful?”; responses ranged from 1 = “all of the time” to 6 = “none of the time”). For each scale, the standardized scores ranged from 0 to 100 (mean score =

50;  $SD = 10$ ). Cronbach's alpha was 0.81 for the Physical Health Scale (PCS-12) and 0.85 for the Mental Health Scale (MCS-12).

*Identity* was evaluated through the Identity Motives Scale (Manzi, Vignoles & Regalia, 2010), which considers six identity motives (self-esteem, efficacy, continuity, belonging, distinctiveness, and meaning) through 12 items, both positive (e.g., "When I think about my future, I think I will feel proud") and negative (e.g., "When I think about my future, I think I will feel powerless"). Each item ranges from 1 ("extremely disagree") to 5 ("extremely agree"). For the aims of the present study, scores for the six subscales were summed up. The total score for the scale ranges between 12 and 60. Higher scores represent greater identity satisfaction, whereas lower scores represent a perceived threat to the identity. Cronbach's alpha was 0.77.

*Sense of Coherence* was examined using the Italian validation of the Sense of Coherence scale (SOC) (Barni & Tagliabue, 2005). The scale includes 11 items, which are evaluated on a 7-point scale from 1 to 7. Anchors are specific for each item — for example, "How often do you have the feeling that there's little meaning in the things you do in your daily life?"; the responses included "Very often/rarely or never", "Doing the thing you do every day is...", and "a source of deep pleasure and satisfaction/a source of pain and boredom". The total score for the scale ranges from 11 to 77. Cronbach's alpha was 0.84.

*Self-efficacy in dealing with multiple sclerosis* was evaluated through the Self-efficacy in Multiple Sclerosis scale (SEMS) (Author, in press). The SEMS is a 15-item scale characterized by two correlated dimensions: Goal setting (items referring to the perceived ability of planning activities, maintaining social life, and asking for support) and Symptoms management (items referring to the perceived ability of facing physical disabilities, fatigue, and negative emotions

related to MS). Each item is scored on a 5-point Likert scale (ranging from 1 = “completely unable” to 5 = “completely able”). The total score for the scale ranges from 15 to 75. The SEMS was validated in a sample of 203 MS patients and underwent Rasch analysis. The scale was characterized by good item functioning (all the items reported acceptable fit statistics, and the response categories allowed to discriminate between individuals with different ability), measurement invariance (with respect to gender and disease duration), and good concurrent validity (positive correlations with positive affect, sense of coherence and coping strategies and negative correlations with depression and negative affect). With respect to subscales reliability, the coefficients were satisfactory (Cronbach’s alpha = 0.90 for Goal setting and 0.87 for Symptoms management).

### ***Statistical analysis***

With respect to the first aim, a factorial analysis of variance was performed for each indicator of adjustment. Means and standard deviations of depression, positive and negative affect, optimism, and health-related quality of life (physical health and mental health) were compared with available data from the normative population through *t*-test statistics ( $p < .001$ ). Gender, age (20-35 and 36-65 years), and disease duration (one, two, or three years since diagnosis) were entered as factors between subjects. Since the impact of a chronic illness is different in relation to the specific developmental tasks of each period of the life span (Hendry & Kloep, 2002), we chose to consider two balanced age groups (20-35 and 36-65 years) that represent two distinct periods of the life span (emerging adulthood and adulthood, respectively) ( $N=48$ , 53.3% aged between 20 and 35 years;  $N=42$ , 46.7% aged between 36 and 65 years). Concerning interactions, the effects of gender  $\times$  disease duration and age  $\times$  disease duration were examined. Only statistically

significant results are presented. The significant interactions were further investigated by testing the simple main effects of gender and age for each year since the diagnosis.

As for the second aim, preliminary correlations between the study variables were performed. Then, a hierarchical multiple regression was performed for each indicator of adjustment (depression, positive and negative affect, optimism, physical health, and mental health). Gender (0 = women, 1 = men), age (0 = 20- to 35-year-olds, 1 = 36- to 65-year-olds), and disease duration (one, two, or three years since diagnosis) were entered in the first step as control variables, when correlated with the dependent variables. Identity, sense of coherence, and self-efficacy in MS were entered as predictors in the second step. The percentage of missing data was around 4%. When at least 70% of the scale items were answered, the scale score was calculated by substituting the missing values with the mean of items that were answered (Enders, 2010).

## Results

### ***Descriptive statistics***

Descriptive results concerning depression, positive and negative affect, optimism, and health-related quality of life (separately for physical and mental health) are presented in Table 2.

#### *INSERT TABLE 2*

As for depression, participants had a mean score of 9.5 ( $SD=5.9$ ), and 44.3% of them ( $N=39$ ) reported a score equal to or greater than the critical cut-off of 10, which indicates the presence of significant depressive symptoms. No statistically significant differences emerged for gender, whereas the effects of age ( $F_{1, 79} = 13.95, p < .001, \eta^2 = .08$ ) and disease duration ( $F_{2, 79} = 3.76,$

$p = .028$ ,  $\eta^2 = .09$ ) were statistically significant. In particular, depression scores were higher for older people and for patients in the third year after the diagnosis. Concerning interactions, the effects of gender  $\times$  disease duration ( $F_{2, 79} = 6.42$ ,  $p = .003$ ,  $\eta^2 = .14$ ) was statistically significant. As time passed since the diagnosis, the levels of depression decreased for women and increased for men. In particular, the simple effects analysis revealed that women and men significantly differed three years after the diagnosis ( $F_{1, 79} = 11.12$ ,  $p = .001$ ) (Figure 1).

*INSERT FIGURE 1*

In addition, the effect of age  $\times$  disease duration was statistically significant ( $F_{2, 79} = 7.88$ ,  $p = .001$ ,  $\eta^2 = .17$ ). As time passed since the diagnosis, depression scores decreased for younger patients (20-35 years) and increased for older patients (36-65 years). In particular, the two age groups significantly differed three years after the diagnosis ( $F_{1, 79} = 19.49$ ,  $p < .001$ ; Figure 2).

*INSERT FIGURE 2*

Concerning positive and negative affect, scores were compared with those of the PANAS Italian validation sample (age:  $M=27.9$ ,  $SD=9.8$ ; 63% women) (Terracciano et al., 2003). With respect to negative affect, patients reported higher scores ( $M=25.7$ ,  $SD=7.3$ ) than the general population ( $M=20.9$ ,  $SD=6.5$ ;  $p < .001$ ), whereas the positive affect scores ( $M=34.6$ ,  $SD=6.4$ ) did not differ from those of the general population ( $M=33.0$ ,  $SD=5.9$ ;  $p=ns$ ). As for positive affect, no differences emerged for gender, age, and disease duration ; the same was also true for gender  $\times$  disease duration interaction and age  $\times$  disease duration interaction. With respect to negative affect, a main effect emerged for gender ( $F_{1, 78} = 5.35$ ,  $p = .023$ ,  $\eta^2 = .06$ ), with men reporting higher negative affect than women. No differences were found for age or disease duration . The gender  $\times$  disease duration interaction was statistically significant ( $F_{2, 78} = 7.46$ ,  $p = .001$ ,  $\eta^2 =$

.16), with negative affect decreasing for women and increasing for men as time passes since the diagnosis. In particular, the mean difference between men and women was statistically significant three years after the diagnosis ( $F_{1, 78} = 12.24, p = .001$ ; Figure 1). Also, the age  $\times$  disease duration interaction was significant ( $F_{2, 78} = 3.85, p = .026, \eta^2 = .09$ ), with negative affect decreasing for younger patients (20-35 years) and increasing for older patients (36-65 years). The difference between the two age groups was significant three years after the diagnosis ( $F_{1, 78} = 6.60, p = .012$ ; Figure 2).

As for optimism, participants reported a mean score of 14.8 ( $SD=5.6$ ), representing a moderate level of optimism (35 [40%] reported low optimism, 27 [30%] reported moderate optimism, and 26 [30%] reported high optimism). No differences emerged for gender, age, and disease duration. The gender  $\times$  disease duration interaction was not significant, whereas the effect of age  $\times$  disease duration was statistically significant ( $F_{2, 79} = 4.04, p = .021, \eta^2 = .09$ ). Optimism gradually increased for younger patients (20-35 years) and decreased for older patients (36-65 years) as time passed since the diagnosis. Specifically, younger and older patients showed differences three years after the diagnosis ( $F_{1, 79} = 6.51, p = .013$ ; Figure 2).

Finally, concerning the health-related quality of life, the scores of study participants were compared with those of the SF-12 Italian validation sample (age range, 14-75 years; 52% women) (Apolone et al., 2005). Both physical health ( $M=46.6, SD=9.7$ ) and mental health scores ( $M=45.3, SD=11.0$ ) were lower than the normative values from the non-clinical population (physical health:  $M=50.0, SD=9.5$ ; mental health:  $M=50.1, SD=9.9$ ) ( $p<.001$ ). The physical health was higher for younger patients ( $F_{1, 80} = 7.59, p = .007, \eta^2 = .09$ ), whereas the main effects of gender and disease duration were not significant. Also, gender  $\times$  disease duration interaction

and age  $\times$  disease duration interaction were not significant. The mental health scores were higher for younger patients ( $F_{1,80} = 4.57, p = .036, \eta^2 = .05$ ), whereas no differences emerged for gender and disease duration. The interaction gender  $\times$  disease duration was not significant, whereas a moderating role of age was observed ( $F_{2,80} = 4.63, p = .013, \eta^2 = .10$ ). The mental health scores increased for younger patients (20-35 years) and decreased for older patients (36-65 years) over time. Specifically, the difference between the two age groups was significant three years after the diagnosis ( $F_{1,80} = 9.33, p = .003$ ; Figure 2).

### ***Regression analysis***

Preliminary correlation analyses showed that identity, sense of coherence, and self-efficacy in MS were positively correlated to each other ( $r = .49$  to  $.61$ ). Moreover, all three variables were negatively correlated with depression ( $r = -.40$  to  $-.59$ ) and with negative affect ( $r$  ranging from  $-.46$  to  $-.60$ ) and positively correlated with optimism ( $r = .44$  to  $.61$ ) and positive affect ( $r = .43$  to  $.59$ ). Positive correlations emerged between identity, sense of coherence, and self-efficacy in MS and mental health ( $r = .26$  to  $.53$ ), whereas physical health was only moderately correlated with identity ( $r = .26$ ). Concerning control variables, only age was negatively correlated with physical health ( $r = -.30$ ) (Table 3).

### *INSERT TABLE 3*

Since gender and disease duration did not correlate with any of the dependent variables, and age only correlated with physical health, a hierarchical regression analysis controlling for age was performed only for physical health. For all other indicators of adjustment, the regression analyses included only identity, sense of coherence, and self-efficacy in MS as predictors.

As for depression, the model accounted for 39% of the variance, and significant predictors included identity ( $\beta = -.38, p=.002$ ) and sense of coherence ( $\beta = -.33, p=.003$ ), where higher depression was related to lower identity satisfaction and lower perceived sense of coherence (Table 4).

*INSERT TABLE 4*

As for positive affect, the model accounted for 38% of the variance, and the significant predictors were identity ( $\beta = .25, p=.041$ ) and self-efficacy in MS ( $\beta = .39, p<.001$ ) — where higher positive affect was associated to higher identity satisfaction and perceived self-efficacy in dealing with MS. Significant predictors of negative affect were sense of coherence ( $\beta = -.44, p<.001$ ) and self-efficacy in MS ( $\beta = -.24, p=.038$ ), with the model explaining 38% of the variance. Lower negative affect was associated to higher sense of coherence and self-efficacy in dealing with MS. Concerning optimism, the model accounted for 37% of the variance, and the only significant predictor was identity ( $\beta = .47, p<.001$ ), indicating that higher optimism was associated to higher identity satisfaction. As for mental health, the model explained 23% of the variance, and the only significant predictor was sense of coherence ( $\beta = .47, p<.001$ ), showing that higher mental health was associated to higher sense of coherence (Table 4).

Finally, for physical health, the first model explained 7% of variance, and age emerged as a significant predictor ( $\beta = -.29, p=.007$ ), indicating better physical health for younger people. After entering the predictors in the second step, the model explained 8% of the variance, but the observed increase in  $R^2$  was not statistically significant. Age remained the only significant predictor ( $\beta = -.26, p=.020$ ), whereas the effect of psychological variables was not statistically significant (Table 5).

*INSERT TABLE 5*

## **Discussion**

The study was aimed at describing diverse facets of adjustment to MS (depression, positive and negative affect, optimism, and health-related quality of life) in an early phase of the illness, and investigating the role of identity, sense of coherence, and self-efficacy on patients' adjustment to MS, taking into account gender, age, and disease duration differences. With respect to the first aim, consistent with the literature, patients from our study reported depressive symptoms (Lode et al., 2009) and lower quality of life, in both physical and mental health, compared with the general population (Klevan et al., 2014). The results on positive and negative affect indicated, as expected, that negative affect was higher in MS patients compared with healthy individuals, whereas levels of positive affect were similar to those of the general population (Terracciano et al., 2003). Compared with a previous Italian study on MS patients with longer disease duration (Bassi et al., 2014), we found higher levels of negative affect. Levels of optimism were slightly lower compared with mean scores reported in other studies involving MS patients with longer disease duration (Fournier, de Ridder & Bensing, 2002, 2003). The results might be influenced by time since diagnosis, as well as by other variables, including cultural factors, and the results warrant further research. Globally considered, our findings seem to confirm that the period after the diagnosis can be lived by patients as a time of psychological distress and unpleasant emotions. Nonetheless, the negative adjustment of patients seems to be balanced by the presence of the positive dimensions of positive affect and optimism. As suggested in our study and in other research on chronic diseases (Wikman, Wardle & Steptoe, 2011), and specifically on MS

(Bassi et al., 2014; Pakenham & Cox, 2009; Pakenham & Fleming, 2011; Fournier, de Ridder & Bensing, 2002), the inclusion of positive affect and optimism as measures of adjustment allowed a more complete analysis of the patients' adjustment to MS.

Some interesting results emerged about the moderating role of gender and age on the relationships between time since diagnosis and psychological adjustment to MS. As for the moderating role of gender, men seem to experience greater psychological difficulties in terms of increasing depression and negative affect as time passes since the diagnosis. Conversely, women experience psychological difficulties, particularly in the first year after the diagnosis; then they report decreasing depression and negative affect, globally showing better adjustment compared with men. Previous research indicated that the quality of life for male MS patients showed more sensitivity to the limitations in physical conditions and that they are less able to buffer the debilitating aspects of MS than female MS patients (McCabe, McKern & McDonald, 2004; Miller & Dishon, 2006). Our study enriches these previous findings, showing an interesting gender difference in the adjustment to MS in an early period of the illness. Concerning the moderating role of age, younger patients seem to better adjust to the illness as time passes since the diagnosis in terms of decreasing depression and negative affect and increasing optimism and mental health. Conversely, older patients seem to globally experience a worse adjustment in terms of increasing depression and negative affect and decreasing optimism and mental health. The result is consistent with studies reporting higher quality of life (Solari et al., 1999) and lower depression (Jones et al., 2012) for younger MS patients. Moreover, it has to be considered that people of different ages face challenges of the chronic illness in different ways in relation to individual resources, as well as specific developmental tasks that characterize each period of the

life span (Hendry & Kloep, 2002). Overall, further research is warranted in order to deepen our knowledge on gender and age differences in the adjustment to MS among recently diagnosed patients.

With respect to the second aim, our study indicates that identity, sense of coherence, and self-efficacy give a specific contribution to diverse aspects of adjustment to MS, in line with research indicating the multifaceted nature of adjustment and the role of specific psychological correlates (Dennison et al., 2010). Sense of coherence was a predictor of lower depression and negative affect, and higher mental health, which is consistent with previous studies (Gottberg et al., 2007; Pakenham, 2007). Among recently diagnosed MS patients, the attribution of sense of coherence in one's life after the diagnosis can contrast psychological difficulties and promote the health-related quality of life. In particular, even if physical health might decrease with age, our results indicate that the sense of individual realization and continuity in one's life might promote mental health. As stressed by Antonovsky (1987), sense of coherence reflects the individual's ability to respond to stressful situations through the ability to understand what is happening (comprehensibility), the perception of having resources to deal with the situation (manageability), and the ability to find meaning in the situation (meaningfulness). These characteristics may explain its central role on the individual adjustment to MS and, in general, on health (Eriksson & Lindstrom, 2006). Concerning the other two predictors considered in the study, identity was related to depression, optimism and positive affect, whereas self-efficacy in MS was related to both positive and negative affects. On the one hand, the patients who engage themselves in a process of identity redefinition following the diagnosis and who elaborate a new self-image, including the chronic illness, are more likely to experience lower depression, higher

optimism, and higher positive affect. On the other hand, our study indicates that patients who feel they have the ability to deal with physical and psychological difficulties due to the illness and to define new goals and strategic action in relation to the individual's limitations, are likely to experience higher positive affect and lower negative affect. The result is in line with the self-efficacy theory, which underlines the relationships between self-efficacy and emotions (Bandura, 1997) and indicates the relevance of perceived self-efficacy in day-to-day living with respect to the affective experience. A final consideration concerns physical health, whose unique predictor was age. On the one hand, the result is consistent with findings from the SF-12 validation study (Apolone et al., 2005), where physical health was found to decrease with age in the general population. On the other hand, the non-significant correlation between physical health (PCS-12) and mental health (MCS-12), consistent with the SF-12 validation study (Apolone et al., 2005), suggests that physical health and mental health are two distinct dimensions of the health-related quality of life. For this reason, they are supposed to have different predictors: whereas mental health is more related to psychological variables, physical health is expected to be more related to variables like MS course, symptom severity, and level of disability. The examination of these illness-related variables is beyond the scope of the present study; nonetheless, they would be worth considering in future research.

The study has some limitations. First of all, the study involved a rather small and not representative sample; thus, caution must be used in generalizing the results to the population of the recently diagnosed MS patient. The study was essentially explorative in nature, because little is known about patients' adjustment to MS in an early phase of the illness and on the role of the considered psychological predictors. Further research involving a larger sample would allow

investigators to evaluate if the results observed in this preliminary study are confirmed.

Secondly, the cross-sectional design prevents the causal interpretation of results: identity, sense of coherence, and self-efficacy in MS are likely to influence depression, positive and negative affect, optimism, and the health-related quality of life; however, the process must be considered as bidirectional. A longitudinal research design would allow a deeper analysis of the relationships among the variables, in the meantime, taking into account the illness evolution along time. Thirdly, concerning measures, some aspects of identity may overlap with sense of coherence and self-efficacy, even if the results of correlation analysis suggest a non-collinearity among these variables. Finally, the study did not include measures concerning pharmacological therapies because their role, with respect to depression and positive and negative affects, is still controversial (Sà, 2008). Similarly, we did not include information about MS course; both aspects could be considered in a future research.

The study presents several suggestions for the psychological intervention with recently diagnosed MS patients. In particular, identity, sense of coherence, and self-efficacy emerged as psychological aspects contributing to the patients' adjustment in a differentiated, but synergic manner. A comprehensive intervention based on giving new sense of coherence to one's life, redefining self-image in relation to possibilities and limitations due to the illness, and recovering a sense of self-efficacy in daily experiences could allow recently diagnosed patients to experience better adjustment to MS in terms of reduced depression and negative affect, and increased positive affect, optimism, and mental health. The role of self-redefinition, meaning-making, and self-efficacy on MS adjustment has been demonstrated by reviews on the efficacy of cognitive-behavioral therapy (Dennison & Moss-Morris, 2010), and it has been also

confirmed by a previous study that evaluated the effectiveness of a group-based cognitive-behavioral intervention targeting patients with long disease durations (Author, 2014). The present study adds to this knowledge, by highlighting the importance of considering all of these aspects for newly diagnosed patients and indicating their role not only on depression and quality of life, but also on optimism and positive affect.

### **Compliance with Ethical Standards**

**Funding:** This study was funded by the Cocco Foundation, Pinerolo, Torino (Italy).

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Ethical approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent:** Informed consent was obtained from all individual participants included in the study.

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Table1

*Characteristics of study participants (N= 90)*

Gender, women, n (%)	55	61.1
Age, years, M (SD) (range 20-65)	37	12.0
Age groups, n (%)		
20-35 years	48	53.3
36-65 years	42	46.7
Disease duration, n (%)		
up to 1 year	52	57.8
2 years	23	25.6
3 years	15	16.7
Multiple sclerosis type, n (%)		
Relapsing remitting	85	94.5
Primary progressive	1	1.1
Secondary progressive	4	4.4
Marital status, n (%)		
Married/living with a partner	50	55.6
Separated/divorced/widow	9	10.0
Single	31	34.4
Education, n (%)		
At least 8 years (middle school diploma)	16	17.8
At least 13 years (high school diploma)	52	57.8
More than 13 years (degree)	22	24.4
Employment, n (%)		
Employed	67	74.4
Unemployed/student/retired	23	25.6

Table 2

Means and standard deviations of depression, positive and negative affect, optimism, and health-related quality of life (physical and mental health) by gender, age, and disease duration (Factorial ANOVA)

	Depression		Positive affect		Negative affect		Optimism		Health-related quality of life		Physical health N (M) (SD)	Mental health N (M) (SD)
	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)		
Total	88	9.51 (5.89)	87	34.56 (6.36)	87	25.73 (7.31)	88	14.82 (5.57)	89	46.56 (9.66)	89	45.29 (10.92)
<b>Gender</b>												
Women	53	9.50 (5.71)	53	34.29 (6.12)	53	25.42 <sub>a</sub> (7.43)	54	14.83 (5.35)	54	45.64 (10.16)	54	45.63 (10.90)
Men	35	9.51 (6.22)	34	34.99 (6.79)	34	26.22 <sub>b</sub> (7.20)	34	14.80 (5.99)	35	47.97 (8.79)	35	44.77 (11.10)
<b>Age</b>												
20-35	48	8.49 <sub>a</sub> (5.63)	47	34.68 (6.60)	47	25.54 (7.44)	46	14.99 (5.31)	48	49.29 <sub>a</sub> (8.17)	48	45.73 <sub>a</sub> (10.89)
36-65	40	10.72 <sub>b</sub> (6.03)	40	34.43 (6.16)	40	25.96 (7.24)	42	14.64 (5.91)	41	43.37 <sub>b</sub> (10.37)	41	44.78 <sub>b</sub> (11.07)
<b>Disease duration</b>												
1 year	51	9.53 <sub>a</sub> (5.47)	49	34.00 (6.22)	49	26.80 (6.65)	51	14.62 (5.45)	51	45.54 (9.96)	51	46.44 (10.72)
2 yrs	22	9.03 <sub>a</sub> (4.26)	23	35.00 (7.06)	23	25.16 (7.45)	22	14.52 (6.30)	23	48.22 (9.64)	23	43.32 (10.44)
3 yrs	15	10.10 <sub>b</sub> (8.97)	15	35.73 (5.90)	15	23.10 (8.78)	15	15.94 (5.05)	15	47.50 (8.80)	15	44.40 (12.50)

Note. Means with different subscripts are significantly different at p<.05.

Table 3

Bivariate correlations between the study variables

	1 Gender <sup>a</sup>	2	3	4	5	6	7	8	9	10	11
2 Age <sup>a</sup>	-.02										
3 Disease duration	-.12	-.14									
4 Depression	-.01	.18	-.04								
5 Positive affect	.06	.01	.11	-.41**							
6 Negative affect	.05	.03	-.19	.65**	-.26**						
7 Optimism	.03	-.02	.07	-.40**	.45**	-.48**					
8 Physical health	.12	-.30**	.10	-.34**	-.09	-.16	.07				
9 Mental health	-.05	-.06	-.10	-.70**	.35**	-.64**	.33**	-.07			
10 Identity	.17	-.18	-.13	-.59**	.53**	-.46**	.61**	.26*	.36**		
11 Sense of coherence	.07	.09	.06	-.57**	.43**	-.60**	.49**	.10	.53**	.60**	
12 Self-efficacy in MS	.14	.06	-.02	-.40**	.59**	-.50**	.44**	.12	.26*	.61**	.49**

Note. N ranged from 85 to 90.

<sup>a</sup> For gender and age, Spearman rho coefficients are presented.

\* p<.05; \*\* p<.01

Table 4

Regression analysis predicting depression (N= 85), positive affect (N= 84), negative affect (N= 84), optimism (N= 85), and mental health (N= 85)

	Depression			Positive affect			Negative affect			Optimism			Mental health		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
(Constant)	33.39	3.32		8.63	3.63		54.74	4.19		-7.42	3.17	-	14.22	6.92	
Identity	-.31	.09	-.38**	.21	.10	.25*	-.05	.12	-.05	.35	.09	.47***	.13	.20	.08
Sense of coherence	-.18	.06	-.33**	.05	.07	.09	-.30	.08	-.44***	.08	.06	.15	.47	.12	.47***
Self-efficacy MS	-.01	.07	-.01	.27	.08	.39***	-.19	.09	-.24*	.05	.07	.09	-.02	.14	-.02
Adj R <sup>2</sup>		.39			.38			.38			.37				.23
F (df)		19.04*** (3,82)			18.10*** (3,81)			18.19*** (3,81)			17.64*** (3,82)				9.64*** (3,82)

\* p&lt;.05; \*\* p&lt;.01; \*\*\* p&lt;.001

Table 5

*Hierarchical regression analysis predicting physical health (N= 85)*

Physical health			
	B	SE B	$\beta$
<b>Step 1</b>			
(Constant)	48.97	.14	
Age <sup>a</sup>	-5.57	2.02	.29**
Adj R <sup>2</sup>		.07	
F (df)		7.61** (1,84)	
<b>Step 2</b>			
(Constant)	36.99	6.79	-
Age <sup>a</sup>	-5.00	2.11	-.26*
Identity	.27	.20	.21
Sense of coherence	-.03	.12	-.03
Self-efficacy MS	.03	.14	.03
Adj R <sup>2</sup>		.08	
F (df)		2.89* (4,81)	

<sup>a</sup> 0= 20-35-year-olds; 1= 36-65-year-olds

\* p<.05; \*\* p<.01

Figure 1

Interaction effects of gender and disease duration on depression and negative affect

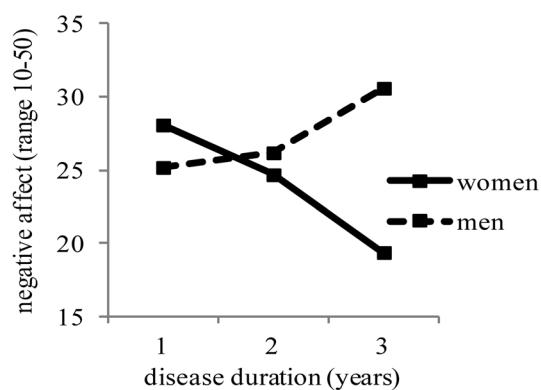
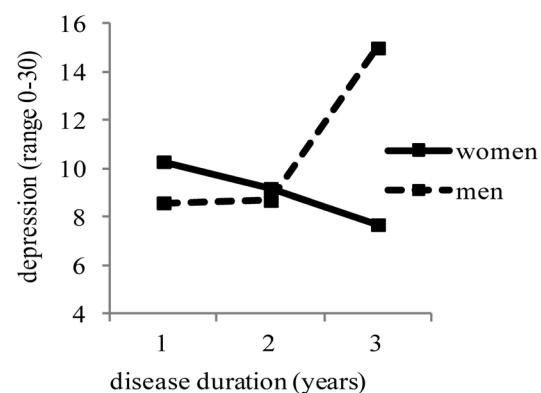


Figure 2

Interaction effects of age and disease duration on depression, negative affect, optimism, and mental health

