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Coping strategies and perceived social support in fibromyalgia syndrome: Relationship with alexithymia

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(Article begins on next page)

1 **Coping strategies and perceived social support in fibromyalgia**
2 **syndrome: relationship with alexithymia**

3

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32 collection and analysis, decision to publish, or preparation of the manuscript.

33 **Abstract**

34 Fibromyalgia (FM) is a chronic pain syndrome characterised by high levels of
35 psychological distress and alexithymia, a personality disposition affecting
36 emotional self-awareness. The main aim of the present study was to investigate
37 for the first time the relationship between alexithymia and coping strategies on
38 one hand, and alexithymia and perceived social support on the other, in a sample
39 of FM patients. To reach this aim, 153 FM patients completed a battery of tests
40 assessing coping strategies, perceived social support, alexithymia, psychological
41 distress and pain intensity. Four regression analyses were performed to assess
42 whether alexithymia was still a significant predictor of coping strategies and
43 perceived social support, after controlling for psychological distress. High levels
44 of both psychological distress and alexithymia were found in our sample of FM
45 patients. Regarding coping strategies, FM patients reported higher scores on
46 problem-focused coping, with respect to the other two coping strategies. The
47 regression analyses showed that the externally-oriented thinking factor of
48 alexithymia significantly explained both problem- and emotion-focused coping,
49 while the difficulty-describing feelings factor of alexithymia proved to be a
50 significant predictor of perceived social support. Only the variance of
51 dysfunctional coping ceased to be uniquely explained by alexithymia (difficulty
52 identifying feelings factor), after controlling for psychological distress,
53 particularly anxiety. These results highlight a negative relationship between
54 alexithymia and both the use of effective coping strategies and the levels of
55 perceived social support in FM patients. An adequate assessment of both
56 alexithymia and psychological distress should therefore be included in clinical
57 practice with these patients.

Keywords: fibromyalgia; alexithymia; coping strategies; perceived social support; psychological distress.

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1 **Introduction**

2 Fibromyalgia (FM) is a chronic pain syndrome, characterised by chronic,
3 widespread musculoskeletal pain (Mease, 2005; Mease et al., 2009). The whole
4 symptomatology is not restricted to pain, but often includes a series of other
5 conditions, such as physical and mental fatigue, disrupted or non-restorative sleep,
6 headache, cognitive impairment and psychological distress (Mease, 2005;
7 Schmidt-Wilcke & Clauw, 2011).

8 Among the psychological factors, the high prevalence of anxiety (13-64%) and
9 depression (20-80%) disorders has been well-established (Montoya et al., 2005;
10 Fietta et al., 2007). More recently, researchers have also started to focus their
11 attention on alexithymia, a personality trait that makes individuals incapable of
12 adequately recognising their own emotions. Alexithymia is characterised by
13 difficulty in identifying and describing subjective feelings, difficulty in
14 distinguishing between feelings and bodily sensations of emotional arousal,
15 restricted imagination processes, and an externally oriented cognitive style
16 (Sifneos, 1972; Taylor et al., 1997). Most of the studies have reported high levels
17 of alexithymia in FM patients, suggesting the presence of a deficit in emotional
18 self-awareness (Castelli et al., 2012; Di Tella et al., 2015; Di Tella et al., 2017;
19 Sayar et al., 2004; Steinweg et al., 2011).

20 The presence of alexithymic traits has been found to be positively related with
21 maladaptive behaviours in different disorders (Fonagy et al., 2002; Kooiman et
22 al., 2004; Montebanocci et al., 2004; Waldstein et al., 2002), suggesting that
23 alexithymia may negatively affect the ability of an individual to adequately cope
24 with his/her condition. Generally, coping strategies are an attempt made by a
25 person to face an unpleasant situation and have been defined as “*cognitive and*

26 *behavioural efforts to master, reduce, or tolerate the internal and/or external*
27 *demands that are created by the stressful transaction”* (Lazarus & Folkman, 1984,
28 p. 843). Many authors have tried to classify different types of responses to stress.
29 In particular, Lazarus & Folkman (1984) identified two main coping strategies:
30 (1) problem-focused coping, aimed at controlling or solving the current problem
31 by acting on the factors of the stressful event; (2) emotion-focused coping, aimed
32 at regulating the emotional experience arising from the stressful event. Problem-
33 focused coping appears to be more effective in situations where individuals
34 believe that they may be able to have some control over the situation; whilst
35 emotion-focused coping seems to be more effective in situations which
36 individuals perceive as overwhelming and beyond their control (Folkman &
37 Lazarus, 1980; Lazarus & Folkman, 1984).

38 In addition to problem- and emotion-focused coping, another type of coping has
39 been identified: dysfunctional coping, which is based on not accepting the
40 problem or refusing to think about it, and includes a series of ineffective
41 behaviours, such as giving up with the problem or denying that the stressful event
42 ever happened (Carver et al., 1989).

43 The use of effective coping strategies can be influenced by different factors, such
44 as the subjective appraisal of the situation (i.e., as a threat and/or a challenge), the
45 employment of previous models, and the presence of certain personality
46 characteristics, all of which can condition the evaluation of a situation as being
47 more or less stressful (Berjot & Gillet, 2011; Besharat, 2010). Since alexithymic
48 individuals typically have difficulties in identifying and describing their own
49 feelings (Bagby & Taylor, 1997; Sifneos, 2000), they are less likely to go to
50 others for support and to regulate feelings of distress via imaginative mental

51 activities (Besharat, 2010). Alexithymic individuals might consequently find it
52 more difficult to cope with stressful events and might feel less supported by
53 significant others. Indeed, together with effective coping strategies, adequate
54 perceived social support is an important resource for an individual to be able to
55 count on in a difficult situation, such as the diagnosis of a chronic disease.
56 The available evidence supports the idea of a relationship between alexithymia
57 and maladapted patterns of coping, both in clinical and healthy populations
58 (Besharat, 2010; Parker et al., 2005; Parker et al., 1998; Tominaga et al., 2014;
59 Vingerhoets et al., 1995). However, to the best of our knowledge, no study has so
60 far examined the association between alexithymia and coping strategies or
61 alexithymia and perceived social support in a sample of FM patients.
62 The present study therefore addressed two main objectives. The first, to evaluate
63 the types of coping strategies used, the levels of perceived social support and the
64 prevalence of alexithymia and psychological distress (depression and anxiety) in a
65 group of FM patients. The second, to investigate the relationship between
66 alexithymia and coping strategies on one hand, and alexithymia and perceived
67 social support on the other, controlling for potentially competing factors, such as
68 anxiety and depression. In particular, we hypothesised that high levels of
69 alexithymia will be negatively related to the ability of FM patients to cope
70 adequately with stressful events, with a consequent lower use of adaptive coping
71 strategies, or to seek social support.

72

73 **Materials and methods**

74 *Participants and procedure*

75 One hundred and eighty female participants with FM were consecutively recruited

76 from the Fibromyalgia Integrated Outpatient Unit (FIOU), a multidisciplinary unit
77 based on the collaboration between rheumatologists, psychologists and
78 psychiatrists at the “XXX” hospital of Turin. All patients had a main diagnosis of
79 FM, made by an expert rheumatologist. The inclusion criteria were as follows:
80 over 18 years old, a sufficient educational level (>5 years) or knowledge of the
81 Italian language, and no presence or history of a neurological or severe psychiatric
82 disorder, according to an expert psychiatrist examination. One hundred and fifty-
83 three FM patients met the inclusion criteria and made up the final sample of
84 patients enrolled in the study.

85 The study was approved by the “XXX” hospital ethics committee and was
86 conducted in accordance with the Declaration of Helsinki. All the participants
87 gave their written informed consent to the study.

88

89

90 *Measures*

91 *Coping strategies*

92 The coping strategies were assessed using the Italian version of the short form of
93 the Coping Orientations to Problems Experienced scale (Brief COPE) (Carver,
94 1997; Conti, 2000).

95 The Brief COPE is a self-report measure which consists of 28 items. The
96 participants are instructed to report what they usually do under stress on a 4-point
97 scale ranging from 1 (never do) to 4 (always do). The items can be classified into
98 14 coping strategies (subscales), each with two items, which can be grouped into
99 three main types of coping, according to the classification by Coolidge et al.
100 (2000). This is based on the original by Carver (1997), but includes “denial” in

101 dysfunctional coping.
102 The three types of coping are: *problem-focused coping*, which comprises three
103 coping strategies (active coping, instrumental support and planning); *emotion-*
104 *focused coping*, which includes five (acceptance, emotional support, humour,
105 positive reframing and religion); and *dysfunctional coping*, which comprises six
106 (behavioural disengagement, denial, self-distraction, self-blame, substance use
107 and venting).
108 The Brief COPE has shown good psychometric properties regarding the internal
109 consistency (Cronbach α scores: 0.72-0.84), test-retest reliability (Pearson's r :
110 0.51-0.71) and construct validity (Cooper et al., 2008).

111

112 *Social support*

113 As an index of social support, the total score of the Italian version of the
114 Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988;
115 Prezza & Principato, 2002) was used. This is a validated self-report measure of
116 subjectively assessed social support. The MSPSS consists of 12 items, each
117 scored on a seven-point Likert-type scale. This scale has shown good internal
118 consistency (Cronbach α scores: 0.87-0.94) and test-retest reliability (Osman et
119 al., 2014).

120 The total score was calculated by averaging the results for all items.

121

122 *Alexithymia*

123 Alexithymia was assessed using the Italian version of the Toronto Alexithymia
124 Scale (TAS-20) (Bagby et al., 1994; Taylor et al., 2003; Bressi et al., 1996). The
125 subjects were asked to indicate the extent to which they agreed or disagreed with

126 each statement on a five-point Likert scale. The results provide a TAS-20 total
127 score, and three subscale scores that measure different aspects of alexithymia:
128 difficulty identifying feelings (DIF), which measures the inability to distinguish
129 specific emotions and to tell emotions from the bodily sensations of emotional
130 arousal; difficulty describing feelings (DDF), which assesses the inability to
131 verbalise one's emotions to other people; and externally-oriented thinking (EOT),
132 which evaluates the tendency of individuals to focus their attention externally and
133 not on the inner emotional experience (Lumley et al., 2007; Taylor et al., 2003).
134 The TAS-20 cut-off scores are as follows: ≤ 51 no alexithymia, 52–60 borderline
135 alexithymia, ≥ 61 alexithymia. This scale has shown good internal consistency and
136 test-retest reliability, as well as convergent, discriminant and concurrent validity
137 (Taylor & Bagby, 2004), and is currently one of the most utilised instruments in
138 the study of alexithymia.

139

140 *Psychological distress*

141 The presence of depressive and anxiety symptoms was assessed using the Italian
142 version of the Hospital Anxiety and Depression Scale (HADS) (Zigmond &
143 Snaith, 1983; Costantini et al., 1999). This consists of 14 items on a range of 0 to 3
144 and is divided into two subscales, one for depression (HADS-D) and one for
145 anxiety (HADS-A). Each subscale score ranges from 0 to 21, with a score of 8 or
146 more suggesting a clinically relevant level of depression/anxiety symptoms
147 (Zigmond & Snaith, 1983). The HADS has shown good concurrent validity, test-
148 retest reliability and internal consistency (Cronbach α scores: = 0.82-0.90)
149 (Bjelland et al., 2002; Smarr & Keefer, 2011).

150 Throughout the paper, the term “psychological distress” will be used with

151 reference to depression and anxiety subscales considered together.

152

153 *Pain evaluation*

154 As an index of pain intensity, a Visual Analogue Scale (VAS), ranging to 0 (No
155 pain) to 10 (Extreme pain), was used to assess the average intensity of pain in the
156 previous week (McCormack et al., 1988). The VAS has shown good test–retest
157 reliability and construct validity for the evaluation of pain in patients with
158 different rheumatic diseases (Hawker et al., 2011).

159

160 *Statistical analyses*

161 All the statistical analyses were conducted using IBM SPSS Statistics, version
162 22.0.

163 Indices of asymmetry and kurtosis were used to test for normality of the data. The
164 values for asymmetry and kurtosis between – 1 and + 1 were considered
165 acceptable in order to prove normal univariate distribution. On the basis of these
166 values, all of the variables resulted normally distributed.

167 Since the three types of coping of the Brief COPE (i.e., problem-focused coping,
168 emotion-focused coping and dysfunctional coping) range differently, we
169 calculated them on the same scale of dysfunctional coping (12-48) in order to
170 make them comparable to each other. From then on, only the adjusted scores were
171 reported.

172 One-sample t-tests were used to compare the mean scores of our FM patients on
173 the MSPSS and TAS-20 and those of the Italian population (Prezza & Principato,
174 2002, for the Italian normative data of the MSPSS; Bressi et al., 1996, for the
175 Italian normative data of the TAS-20).

176 Pearson correlations were then computed to evaluate the possible relationships
177 between alexithymia and coping strategies, perceived social support,
178 psychological distress (depression and anxiety), and demographical/clinical
179 variables (age, educational level, duration of illness and pain intensity).
180 Finally, hierarchical multiple regression analyses were run to assess whether
181 alexithymia was still a significant predictor of coping strategies and perceived
182 social support when competing predictors (depression and anxiety) were
183 controlled for. Coping strategies and perceived social support were used as
184 outcome variables. The predictor groups were entered into the regression model
185 according to the following schema: potentially confounding variables (age,
186 educational level, duration of illness and pain) in the first block, alexithymia in the
187 second, and competing predictors (depression and anxiety) in the third one.
188 To avoid unnecessary reductions in statistical power, confounding and competing
189 predictors variables were included in the regression models only when they were
190 significantly correlated with the outcome variables ($p < 0.05$). Collinearity was
191 assessed through the statistical factor of tolerance and Variance Inflation Factor
192 (VIF).

193

194 **Results**

195 *Descriptive data*

196 The data on the demographic and clinical characteristics of the FM sample are
197 presented in **Table 1**.

198 Regarding coping strategies, FM patients reported higher scores on problem-
199 focused coping, with respect to the other two coping strategies (i.e., emotion-
200 focused coping and dysfunctional coping). Concerning, instead, the MSPSS, the

201 FM group reported a mean score which was not significantly different from that
202 of the Italian population (Prezza & Principato, 2002) (FM group vs. Italian
203 population, mean \pm SD: 5.1 ± 1.3 vs. 5.3 ± 1.1 ; $t(109) = -1.19$, $p = 0.182$).
204 As far as psychological distress was concerned, the FM patients presented high
205 levels of depressive and anxiety symptoms, with 56.5% of the patients exceeding
206 the cut-off point for the anxiety subscale (HADS-A ≥ 8), while 63.6% exceeding
207 the cut-off point for depression (HADS-D ≥ 8).
208 Finally, on the TAS-20, FM patients reported significantly higher scores on the
209 total score compared to Italian normative data (Bressi et al., 1996) (FM group vs.
210 Italian population, mean \pm SD: 51.6 ± 13.5 vs. 44.7 ± 11.3 ; $t(152) = 6.31$, $p <$
211 0.001), DIF factor (20.1 ± 7.3 vs. 14.6 ± 6.0 ; $t(152) = 9.26$, $p < 0.001$), and EOT
212 factor (18.1 ± 5.0 vs. 17.1 ± 4.9 ; $t(152) = 2.34$, $p = 0.021$). No significant
213 difference was found on the DDF factor (FM group vs. Italian population, mean \pm
214 SD: 13.4 ± 4.9 vs. 13.1 ± 4.8 ; $t(152) = 0.83$, $p = 0.410$).

215 -----

216 **Table 1 about here**

217 -----

218

219 *Correlation Analyses*

220 The results of the bivariate correlations are presented in **Table 2**. Significant
221 negative correlations were found between alexithymia (total and EOT) and
222 problem-focused coping, and between alexithymia (total, DDF and EOT) and
223 emotion-focused coping; while significant positive correlations were found
224 between alexithymia (total and DIF) and dysfunctional coping, and between all
225 the alexithymia scores (total, DIF, DDF and EOT) and psychological distress

226 (both anxiety and depression). Finally, lower scores on perceived social support
227 (MSPSS) were significantly correlated with higher scores on alexithymia (total,
228 DIF and DDF).

229 -----

230 **Table 2 about here**

231 -----

232

233 *Multiple regressions*

234 Hierarchical multiple regression analyses were performed in order to investigate
235 whether alexithymia was a significant predictor of coping strategies and perceived
236 social support, after controlling for potentially competing predictors (depression
237 and anxiety). Since the variables of age, educational level, duration of illness, and
238 pain intensity did not correlate with the outcome variables, they were no longer
239 included in the regression analyses.

240 Regarding problem-focused coping, no significant correlation emerged between
241 this variable and psychological distress, so the regression analysis was performed
242 with only alexithymia scores as predictor variables. The full model of the
243 alexithymia total and the EOT factor scores to predict problem-focused coping
244 was statistically significant, $R^2 = .11$, $F(2, 150) = 9.51$, $p < 0.001$; adjusted $R^2 =$
245 $.10$ (Table 3). Only the alexithymia EOT factor ($\beta = -0.30$, $p = 0.003$) was a
246 significant predictor of the model, while the TAS-20 total score was not
247 significant ($\beta = -0.05$, $p = 0.609$).

248 As far as emotion-focused coping was concerned, the full model of alexithymia,
249 anxiety and depression to predict emotion-focused coping (Model 2) was
250 statistically significant, $R^2 = .13$, $F(3, 149) = 7.09$, $p < 0.001$; adjusted $R^2 = .11$;

251 $\Delta R^2 = .07$, $\Delta F(2, 149) = 6.25$, $p = 0.002$ (**Table 3**). In this case, both the
252 alexithymia EOT factor ($\beta = -0.18$, $p = 0.028$) and depression ($\beta = -0.33$, $p =$
253 0.004) were significant predictors in the final model, while the TAS-20 total score
254 ($\beta = 0.05$, $p = 0.713$), the DDF factor ($\beta = -0.03$, $p = 0.768$), and the HADS-A (β
255 $= 0.08$, $p = 0.470$), were not found to be significant predictors.

256 With regard to dysfunctional coping, however, the alexithymia DIF factor ceased
257 to uniquely predict dysfunctional coping with the introduction to the model of
258 psychological variables, specifically anxiety (**Table 3**). The full model of
259 alexithymia, anxiety and depression to predict dysfunctional coping (Model 2) was
260 statistically significant, $R^2 = .01$, $F(4, 148) = 3.94$, $p = 0.005$; adjusted $R^2 = .07$;
261 $\Delta R^2 = .03$, $\Delta F(2, 148) = 2.66$, $p = 0.074$ (**Table 3**). Anxiety ($\beta = 0.28$, $p = 0.027$)
262 was the unique contributor of the final model, while the TAS-20 total score ($\beta = -$
263 0.14 , $p = 0.372$), the DIF factor ($\beta = 0.25$, $p = 0.110$), and the HADS-D ($\beta = -$
264 0.11 , $p = 0.381$), were not significant predictors.

265 Finally, with regard to MSPSS, the full model of alexithymia, anxiety and
266 depression to predict perceived social support (Model 2) was statistically
267 significant, $R^2 = .21$, $F(5, 103) = 5.61$, $p < 0.001$; adjusted $R^2 = .18$; $\Delta R^2 = .12$,
268 $\Delta F(2, 103) = 7.63$, $p = 0.001$ (**Table 4**). In this case, both the alexithymia DDF
269 factor ($\beta = -0.41$, $p = 0.018$) and depression ($\beta = -0.32$, $p = 0.028$) were significant
270 predictors of the final model, while the TAS-20 total score ($\beta = 0.50$, $p = 0.070$),
271 the DIF factor ($\beta = -0.09$, $p = 0.639$), and the HADS-A ($\beta = -0.18$, $p = 0.227$),
272 were not significant predictors. In all the regression analyses, the statistical factor
273 of tolerance and VIF showed that there was no multicollinearity between the
274 variables.

275 -----

276 **Tables 3 and 4 about here**

277 -----

278

279 **Discussion**

280 The present study aimed to investigate, for the first time, the relationship between
281 alexithymia and coping strategies, and alexithymia and perceived social support in a
282 sample of FM patients. To reach this goal, the following two objectives were
283 addressed. First, we evaluated the prevalence of alexithymia, psychological
284 distress, the types of coping strategies used and the levels of perceived social
285 support in a group of FM patients. Second, we investigated the relationship
286 between alexithymia and coping strategies on one hand, and alexithymia and
287 perceived social support on the other, controlling for psychological distress. Our
288 analyses showed three main results: (1) a significant predictor role of the
289 alexithymia EOT factor in explaining both problem-focused coping and emotion-
290 focused coping, (2) a significant predictor role of the alexithymia DIF factor in
291 explaining dysfunctional coping, which is no longer present after controlling for
292 psychological distress, in particular anxiety, and (3) a significant predictor role of
293 the alexithymia DDF factor in explaining perceived social support, which is still
294 present after controlling for psychological distress.

295 With regard to the first aim of this study, the results showed significantly higher
296 scores on alexithymia (i.e., TAS-20 total, DIF and EOT factors scores) in our
297 group of FM patients compared to the Italian normative data (Bressi et al., 1996).

298 These results confirm previous studies evaluating the prevalence of alexithymia in
299 FM patients, highlighting impairments in the recognition of their own emotions
300 (Di Tella & Castelli, 2016; Sayar et al., 2004; Steinweg et al., 2011).

301 In the same way, the FM patients presented high levels of depressive (64%) and
302 anxiety (57%) symptoms, corroborating once again the high prevalence of
303 psychological distress reported in most studies on FM syndrome (Montoya et al.,
304 2005; Fietta et al., 2007; Castelli et al., 2012).

305 However, as far as the three types of coping investigated are concerned, i.e.
306 problem-focused coping, emotion-focused coping and dysfunctional coping, our
307 group of FM patients reported higher scores on problem-focused coping, with
308 respect to the other two coping strategies.

309 To the best of our knowledge, only few previous studies analysed coping
310 strategies in FM patients (Boehm et al., 2011; Alok et al., 2014). In their study,
311 Boehm et al. (2011) found significantly higher scores on problem-focused coping
312 compared with emotion-focused coping, in a sample of FM sufferers. These
313 results, together with ours, might suggest that FM patients mainly use coping
314 strategies directed at seeking and providing resources to control or solve the
315 source of the problem (i.e., active coping, instrumental support and planning).

316 Although problem-focused coping appears to be generally more effective in
317 handling distress (Assumpção et al., 2009; Ransom et al., 2005), it does not seem
318 to work in those situations where it is beyond the individual's control to remove
319 the source of distress (Wartella et al. 2009). FM is a syndrome that has only
320 recently been recognised and whose causes are yet poorly understood (Abeles et
321 al., 2007). Consequently, FM patients may wait a long time for a diagnosis and
322 appropriate treatment, and thus perceive their condition as uncontrollable or
323 unpredictable. The use of problem-focused strategies, which tend to be more
324 effective in high-control situations, might thus be counterproductive in handling a
325 low-control condition, as FM can be. This could also explain the lack of a

326 significant association between problem-focused coping and both anxiety and
327 depression, suggesting that an emotion-focused approach could be more effective
328 in handling psychological distress in FM patients.

329 Finally, with regard to perceived social support, our group of FM patients
330 reported a mean score in line with that of the Italian population (Prezza &
331 Principato, 2002). However, previous studies showed a lack of social support in
332 FM patients (Arnold et al., 2008; Bernard et al., 2000). Arnold et al. (2008)
333 revealed, through a series of focus groups, that FM patients were unable to plan
334 events or take part in regular social activities, due to the unpredictability of FM
335 symptoms. In addition, they reported not being able to care for their own family,
336 with consequences on childcare and marital life. In the same way, Bernard et al.
337 (2000) reported that only 1.5% of the FM patients felt that others were
338 sympathetic with regard to their condition, while 85.6% felt that people thought
339 that they exaggerated their symptoms. Moreover, the evaluation of perceived
340 social support in FM patients should take in account not only the amount of
341 support reported by the patients, but also the type of support they received.

342 Indeed, the impact of social support on pain-related disability might depend on the
343 extent to which it fosters functional autonomy (i.e., the ability to perform
344 activities of daily living without assistance; Pinsonnault et al., 2003) or functional
345 dependence (i.e., the need for assistance to carry out activities of daily living;
346 Katz et al., 1963). A recent study of Matos et al. (2016) have, in fact, shown that
347 in a chronic pain condition, pain-related social support might be adaptive or
348 maladaptive, depending on the extent to which it promotes functional autonomy
349 or dependence.

350 Future studies are thus needed to clarify both these aspects, i.e., the levels and the

351 type of perceived social support in FM patients, in order to improve their
352 interpersonal communication skills and social networks.

353 As far as the second goal of this study is concerned, we investigated whether
354 alexithymia was a contributing factor in explaining the coping strategies used and
355 perceived social support, beyond the effect of psychological distress.

356 While few studies have analysed coping strategies as well as social support, this is
357 the first to investigate the possible impact of alexithymia on coping strategies and
358 perceived social support in a sample of FM patients.

359 As far as problem-focused coping is concerned, negative correlations emerged
360 between this variable and the alexithymia total and EOT scores, while no
361 correlation was found with psychological distress. A multiple regression analysis
362 was thus run with only alexithymia scores as predictor variables. The results
363 showed that the EOT alexithymia factor was the variable that best explained the
364 variance of problem-focused coping. In the same way, the EOT alexithymia
365 factor, together with depression, proved to be a significant predictor of emotional-
366 focused coping variance. The EOT factor reflects an individual's difficulty in
367 recognising his/her own emotional reaction associated to an experience, because
368 of a tendency to focus thinking on the factual aspects of the events themselves and
369 not on their emotional impact. Individuals with high EOT scores are thus less able
370 to cope with the stress of a difficult situation by acting directly on the source of
371 the event. The fact that problem-focused coping strategies are used less may
372 therefore be partly due to difficulties in identifying the source of the stress and
373 working toward an appropriate solution for the problem (Tominaga et al., 2014).

374 Similarly, individuals with high EOT scores tend to use emotion-focused coping
375 strategies less, as they cannot focus their attention on the psychological/emotional

376 experience related to the stressful situation.

377 A different pattern of results was found, however, with dysfunctional coping. In
378 this case, alexithymia, in particular the DIF factor, ceased to be a significant
379 predictor when psychological variables, specifically anxiety, were introduced to
380 the model. These results might suggest a possible effect of anxiety in mediating
381 the relationship between alexithymia DIF factor and dysfunctional coping
382 strategies. The DIF alexithymia factor represents an individual's difficulty in
383 correctly distinguishing emotions from physical sensations. As a consequence, the
384 individual might misinterpret his/her emotional arousal as a sign of disease, and
385 with FM patients this could lead to a further worsening of their painful condition
386 (Lumley et al., 1996; Tuzer et al., 2011). In addition, alexithymia might interfere
387 with adequate emotion regulation processes, resulting in increased negative
388 affects such as anxiety, which in turn may lead FM individuals to use more
389 dysfunctional coping strategies to deal with stressful situations.

390 The association between anxiety, alexithymia and dysfunctional coping strategies
391 has also been found in previous studies carried out on healthy samples (Grant et
392 al., 2004; Stewart et al., 2002; Tómasson & Vaglum, 1995). In particular, Stewart
393 et al. (2002) showed in a healthy sample of students that high levels of anxiety
394 sensitivity, alexithymic coping (i.e., an individual tendency to suppress emotions),
395 and experiential avoidance (i.e., an individual propensity to avoid certain
396 unpleasant private events) were positively related to an increased likelihood of
397 drinking for internal or external reasons (i.e., coping or conformity).

398 This evidence suggests thus the importance of an adequate assessment and
399 treatment of both alexithymia and anxiety disorders in order to reduce the
400 tendency of FM patients to employ dysfunctional coping behaviours (Castelnuovo

401 et al., 2016).

402 Finally, with regard to perceived social support, the alexithymia DDF factor, was
403 found to be a significant predictor in explaining the variance of the MSPSS, even
404 after controlling for psychological distress. To the best of our knowledge, no
405 previous study has shown this kind of association in FM patients. This said,
406 former studies on other syndromes found a negative association between
407 alexithymia scores and social support (Fukunishi & Rahe, 1995; Tominaga et al.,
408 2014).

409 In particular, Tominaga et al. (2014) investigated the relationship between
410 alexithymia and coping in a group of patients with somatoform disorder, finding a
411 specific association between DDF scores and social support coping strategies.
412 Patients who display difficulties in describing feelings may experience trouble
413 with social interactions and a lack of interpersonal communication, which may
414 lead, in turn, to less social functioning and to social support being sought less.

415 A previous study of Lumley et al. (1996) has also shown that in healthy
416 individuals the DDF factor of alexithymia was related only to new relationships
417 (i.e., the presence of a steady relationship or close friends), but not to those that
418 are predetermined and independent of one's personality (i.e., family bonds),
419 suggesting that alexithymia might be negatively associated only to relationships
420 that require interpersonal skill and emotional awareness to develop and maintain.

421 Moreover, alexithymia has been associated with reduced empathy and
422 impairments in the recognition of others' facial emotions both in FM patients and
423 in other clinical or healthy populations (Di Tella et al., 2015; Grynberg et al.,
424 2012). In addition to the difficulties in accurately describing their own feelings,
425 such impairments may lead FM patients to substantial difficulties in interpersonal

426 contacts (e.g., interaction problems with family and friends, or social isolation).
427 Furthermore, poor psychosocial functioning and unsatisfactory relationships
428 might contribute to the genesis and continuation of chronic pain.
429 Taken together, as far as the first aim of this study is concerned, the results, apart
430 from showing high levels of both psychological distress and alexithymia,
431 highlight a great use of problem-focused coping strategies in our sample of FM
432 patients. As for the second aim, i.e., to explore the relationship between
433 alexithymia and coping strategies, and alexithymia and perceived social support,
434 we found that the externally-oriented thinking factor plays a key role in explaining
435 both problem-focused coping and emotion-focused coping, while the difficulty
436 describing feelings factor proves to be a significant predictor of perceived social
437 support, beyond the effect of psychological distress. Whereas with the
438 introduction of anxiety to the model, the difficulty identifying feelings factor
439 ceases to uniquely explain the variance of dysfunctional coping. In our sample of
440 FM patients, alexithymia thus seems to be negatively related to both the use of
441 effective coping strategies and the levels of perceived social support. The present
442 study has some limitations that should be considered. First, cross-sectional
443 designs do not allow certain conclusions about causal direction to be drawn.
444 Longitudinal studies are needed to better clarify the mutual influence of
445 alexithymia and psychological distress on both coping strategies and perceived
446 social support. Second, the use of explicit self-reported instruments paradoxically
447 requires the respondents to be aware of their reduced ability to identify and
448 describe feelings (Parling et al., 2010). Performance-based instruments or
449 structured interviews, less dependent on the patient's awareness, should be
450 employed in addition to traditional self-reported measures. Finally, no control

451 group was enrolled, so future studies should compare FM patients with other
452 clinical or healthy samples, in order to determine whether the observed
453 associations between alexithymia, coping strategies and perceived social support
454 are specific to FM syndrome.

455 In spite of these limitations, the findings reported in the present study represent, to
456 the best of our knowledge, the first contribution towards understanding the
457 relationship between alexithymia and both coping strategies and perceived social
458 support in a sample of FM patients.

459 Globally considered, these results highlight a negative relationship between
460 alexithymia, psychological distress, and both the use of effective coping strategies
461 and seeking social support.

462 An adequate assessment of both alexithymic traits and psychological distress in FM
463 patients is thus needed in order to allow clinicians to plan better-tailored treatments
464 aimed at improving coping strategies and social bonds, both of which are essential to
465 adequately deal with FM symptomology.

466 In particular, psychological interventions should take into account the specific
467 dimensions of alexithymia which appear to be more compromised in each FM
468 patient. The results of the present study showed a specific relationship between the
469 different alexithymia factors and the coping strategies or the perceived social support.

470 Therefore, patients with high scores on DIF factor may benefit from treatments aimed
471 at educating the individual about his/her own emotional dimension (e.g., learning to
472 distinguish a feeling from a somatic sensation and labelling the emotions), in order to
473 reduce negative affects (in particular anxiety levels) and consequently the use of
474 dysfunctional coping strategies. On the other side, interventions which attempt to
475 improve communication skills through assertion training, and seek the support of

476 others in stressful situations, may be appropriate for FM patients with high scores on
477 DDF dimension.

478 Finally, for patients with high scores on EOT factor, useful therapeutic approaches
479 may include techniques that support the understanding that physical symptoms can be
480 associated to a stressful situation, and aid in identifying the source of the problem, in
481 order to improve coping strategies (Tominaga et al., 2014).

482 A psychological intervention focusing on the specific alexithymic features should
483 thus be considered a key clinical aspect in the treatment of FM, in order to
484 improve both their coping strategies and the levels of social support.

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Table 1. Demographic and clinical characteristics of the FM patients ($N = 153$).

	Mean (SD)	n (%)	Range
Age	52.4 (10.0)		24-74
Years of education	10.5 (3.3)		5-18
Duration of illness (months)	88.2 (65.9)		0-288
VAS	7.1 (2.4)		0-10
<i>Coping types – Brief COPE</i>			
Problem-focused	35.2 (7.2)		6-24
Emotion-focused	30.2 (5.6)		10-40
Dysfunctional	24.8 (4.5)		12-48
<i>Social Support</i>			
MSPSS	5.1 (1.3)		1-7
<i>Psychological Distress</i>			
HADS-A	9.1 (4.5)		0-21
HADS-A score ≥ 8		87 (56.5)	
HADS-D	9.3 (4.2)		0-21
HADS-D score ≥ 8		98 (63.6)	
<i>Alexithymia</i>			
TAS-20 Total	51.6 (13.5)		0-100
Non-alexithymic		74 (48.1)	
Borderline		39 (25.3)	
Alexithymic		40 (26.0)	

TAS-20 DIF	20.1 (7.3)	0-35
TAS-20 DDF	13.4 (4.9)	0-25
TAS-20 EOT	18.1 (5.0)	0-40

VAS = visual analogue scale; Brief COPE = short for Coping Orientations to Problems Experienced; MSPSS = Multidimensional Scale of Perceived Social Support; HADS-A and HADS-D = Anxiety and Depression subscales of Hospital Anxiety and Depression Scale; TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; TAS-20 EOT = Externally-Oriented Thinking factor of Toronto Alexithymia Scale.

Table 2. Pearson correlations between demographic/clinical variables, types of coping, perceived social support, alexithymia and psychological distress ($N = 153$).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	–												
2. Educational level	-.174*												
3. Duration of illness	.182	-.051											
4. VAS	-0.59	0.26	.041										
5. Problem-focused coping	-.108	.108	-.019	-.022									
6. Emotion-focused coping	-.082	.112	-.141	.008	.501**								
7. Dysfunctional coping	-.052	.034	-.117	.050	.321**	.177*							
8. MSPSS	.100	-.062	-.023	.033	.060	.179	-.130						
9. HADS-A	-.066	.017	.093	.424**	-.052	-.211**	.287**	-.383**					
10. HADS-D	-.024	-.003	.137	.381**	-.098	-.313**	.189*	-.400**	.750**				
11. TAS-20 Total	.039	-.122	.152	.298**	-.245**	-.221**	.192*	-.226*	.602**	.528**			

12. TAS-20 DIF	-.041	.004	.108	.269**	-.142	-.138	.250**	-.231*	.618**	.565**	.835**		
13. TAS-20 DDF	.087	-.063	.210*	.253**	-.120	-.171*	.064	-.276**	.491**	.388**	.816**	.583**	
14. TAS-20 EOT	0.82	-.270**	.040	.160	-.333**	-.227**	.087	-.007	.235**	.215**	.645**	.259**	.366**

VAS = visual analogue scale; MSPSS = Multidimensional Scale of Perceived Social Support; HADS-A and HADS-D = Anxiety and Depression subscales of Hospital Anxiety and Depression Scale; TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; TAS-20 EOT = Externally-Oriented Thinking factor of Toronto Alexithymia Scale.

* $p < .05$; ** $p < .01$

Table 3. Hierarchical multiple regressions predicting types of coping from alexithymia, anxiety and depression ($N = 153$).

Predictor variables	β	t	R^2	Adj R^2	F	ΔR^2	ΔF
<i>Problem-focused coping</i>							
<i>Model</i>			0.113	0.101	9.512**		
TAS-20 Total	-0.052	-0.512					
TAS-20 EOT	-0.300	-2.987**					
<i>Emotion-focused coping</i>							
<i>Model 1</i>			0.051	0.045	8.195**	0.051	8.195**
TAS-20 Total	-0.128	-1.240					
TAS-20 DDF	0.101	1.193					
TAS-20 EOT	-0.227	-2.863**					
<i>Model 2</i>			0.125	0.107	7.089**	0.073	6.252**
TAS-20 Total	0.047	0.368					
TAS-20 DDF	-0.027	-0.296					
TAS-20 EOT	-0.175	-2.217*					
HADS-A	0.084	0.725					
HADS-D	-0.333	-2.887**					
<i>Dysfunctional coping</i>							
<i>Model 1</i>			0.064	0.051	5.115**	0.064	5.115**
TAS-20 Total	-0.076	-0.505					
TAS-20 DIF	0.315	2.081*					
<i>Model 2</i>			0.096	0.072	3.942**	0.032	2.656
TAS-20 Total	-0.136	-0.896					

TAS-20 DIF	0.250	1.607
HADS-A	0.283	2.227*
HADS-D	-0.105	-0.878

TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; TAS-20 EOT = Externally-Oriented Thinking factor of Toronto Alexithymia Scale; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety and Depression Scale. * $p < .05$; ** $p < .01$

Table 4. Hierarchical multiple regression predicting perceived social support (MSPSS) from alexithymia, anxiety and depression ($N = 153$).

Predictor variables	β	t	R^2	Adj R^2	F	ΔR^2	ΔF
Model 1			0.098	0.072	3.787*	0.098	3.787*
TAS-20 Total	0.377	1.316					
TAS-20 DIF	-0.315	-1.573					
TAS-20 DDF	-0.399	-2.200*					
Model 2			0.214	0.176	5.611**	0.116	7.630**
TAS-20 Total	0.498	1.832					
TAS-20 DIF	-0.093	-0.470					
TAS-20 DDF	-0.413	-2.400*					
HADS-A	-0.178	-1.215					
HADS-D	-0.320	-2.224*					

TAS-20 = Twenty-item Toronto Alexithymia Scale; TAS-20 DIF = Difficult Identifying Feelings factor of Toronto Alexithymia Scale; TAS-20 DDF = Difficulty Describing Feelings factor of Toronto Alexithymia Scale; HADS-A and HADS-D = Anxiety and Depression subscales of the Hospital Anxiety and Depression Scale.

* $p < .05$; ** $p < .01$