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Emotion regulation strategies and psychosocial well-being in adolescence

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Abstract: To study whether and how emotion regulation (EmR) strategies are associated with adolescents' well-being, 633 Italian adolescents completed a survey that measured, using the emotion regulation questionnaire (ERQ), the strategies of cognitive reappraisal (CR) and expressive suppression (ES), and their relationship with several well-being measures. Factor analysis and reliability results confirmed the validity of ERQ to assess adolescents' regulation strategies. Correlation and regression results showed that a greater reliance on CR was positively associated with better well-being outcomes for most indicators, especially life satisfaction, social support perception, and positive affect; greater preference for ES conversely was associated with lower well-being level for all indicators, including psychological health, emotional loneliness, and negative affect. Neither gender nor age differences were observed for CR and ES; CR and ES were positively correlated with each other. Both analysis of variance and regression results showed gender to be a significant factor for well-being indicators (e.g. males' higher positive affect and life satisfaction than females'), whereas age was associated with differences in psychological health only, with 16-year olds reporting the lowest health, and 14-year olds the highest. The

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PUBLIC INTEREST STATEMENT

In becoming adults, adolescents face many changes, including neurological and cognitive ones, and new tasks, associated with their developing social identity. Do adolescents regulate their intense, new and often disrupting emotional experiences to feel better, comply with social demands, be accepted by others (friends, family, etc.)? The study found that boys and girls, 14–19-year olds, reappraise the emotional event to better cope with it, changing its subjective meaning, so that it becomes more positive to them, with fewer negative implications. Adolescents are also likely to suppress the overt display of their emotions, not letting others know what they feel. Adolescents' frequency of use of either strategy type is related to their well-being: reappraising results in better psychological outcomes (greater life satisfaction, perception of social support, more positive emotions, etc.), whereas suppressing implies greater loneliness, negative emotions, etc. Training programs might help adolescents rely more on the better strategy.

findings overall show that adolescents' well-being is related to preferred EmR strategies, mirroring associations found in the adult population. The study results also suggest the need to further explore this relationship in adolescence.

Subjects: Childhood and Adolescence; Cognition & Emotion; Cognitive Psychology

Keywords: emotion regulation; reappraisal; suppression; adolescence; well-being; health; affect; loneliness; life satisfaction

1. Introduction

The emotions we feel and express are very important for our psychosocial and physical well-being, e.g. they might promote goal achievement, facilitate interpersonal interactions, and guide behavior to enhance health promotion. However, felt emotions are not always functional, adaptive. For example, they might make us choose a socially inappropriate or risky course of action, or they might disrupt an important interpersonal bond. In such instances, regulating one's emotions is necessary to appropriately respond to environmental demands (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Gross, 2007; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). Emotion regulation (EmR) is conceived as "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson, 1994, p. 27), a process that might be activated at any phase of emotional responding, through strategies that involve conscious or unconscious processes.

The study of EmR is pursued in many disciplinary fields, from neuroscience to developmental, personality, social, and clinical psychology, and in health-related literatures (Gross, 2007). Due to the complexity of the construct and its partial overlap with other self-regulatory strategies (coping strategies especially; see Compas, 2009; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Kashdan, Barrios, Forsyth, & Steger, 2006; Zimmer-Gembeck & Skinner, 2011), several definitions of the EmR process, and of its strategies, can be found in the literature. Indeed, most recent reviews stress the *complexity* of the EmR construct, its multidimensionality, and thus the need to consider its many facets, such as distinguishing between *implicit* and *explicit* processes in relation to goal accomplishment, or considering the effects on EmR of *contextual variables*, including culture, features of the eliciting situation, and individual characteristics, and analyzing the interactions among such facets (see Aldao, Sheppes, & Gross, 2015; Aldao & Tull, 2015; Ford & Mauss, 2015; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Raver, 2004; Zeman, Cassano, Perry-Parrish, & Stegall, 2006).

The ever-growing literature on EmR shows that it is a central aspect of people's affective functioning, influencing well-being, positively or negatively as a function of how effectively people manage their emotional responses to everyday events. For instance, inappropriate or difficult regulation may lead the person to experience longer or more severe negative affect (e.g. anger or/and anxiety), interpersonal difficulties, behavioral and health problems, and lesser resilience to stressful events (Aldao et al., 2010, 2015; Gross, 2007; Moore, Zoellner, & Mollenholt, 2008; Webb, Miles, & Sheeran, 2012).

Although various EmR models, and related measures, have been proposed in the literature (including Garnefski, Kraaij, & Spinhoven, 2001; Shields & Cicchetti, 1997; Yap, Schwartz, Byrne, Simmons, & Allen, 2010; for reviews, see Aldao et al., 2010; Gross, 2007), the most frequently adopted theoretical framework is the "process model of EmR" by Gross (1998) (for a review of experimental studies, see Webb et al., 2012; for an update and extension of the model, see Sheppes, Suri, & Gross, 2015). Within the process model, Gross and John (2003) (John & Gross, 2004) theoretically focused on two strategies, i.e. cognitive reappraisal (CR) and expressive suppression (ES), among the several ones located along the emotion process timeline, and operationalized them in two self-report subscales forming the emotion regulation questionnaire (ERQ; Gross & John, 2003). CR is defined as an *antecedent-focused strategy*, a form of conscious cognitive change that involves construing the emotion-eliciting situation in a way that changes its emotional impact with the aim

of decreasing it and/or making it more positive. CR is hypothesized to be an effective strategy in modifying the impact of the *emotional experience*. ES is instead a *response-focused strategy*, a form of response modulation that involves inhibiting the ongoing emotion-expressive behavior in the situation. ES is hypothesized to be a less effective strategy than CR is, in that it does not modify the *impact* of the emotional subjective experience, for instance, in terms of physiological activation (Gross, 1998), simply decreasing or suppressing the expression of the felt emotion.

Several studies in the literature show that CR and ES are related to various psychological outcomes. More specifically, in adults, CR is positively associated with psychological health, including greater life satisfaction (e.g. Haga, Kraft, & Corby, 2009), positive affect (e.g. Balzarotti, John, & Gross, 2010; Cabello, Salguero, Fernández-Berrocal, & Gross, 2013), self-esteem, better social relationships (John & Gross, 2004), and lesser stress-related symptoms (e.g. Loughheed & Hollenstein, 2012; Moore et al., 2008). Conversely, ES is linked with higher negative costs in terms of cognitive, affective, and social consequences and is more expensive in terms of individual resources (John & Gross, 2004), being associated with greater negative affect (e.g. Gross & John, 2003), lower life satisfaction (e.g. Haga et al., 2009), felt inauthenticity in social relationships (associated in turn with lower perceived social support), greater negative social exchange and communication with others (John & Gross, 2004; Lebowitz & Dovidio, 2015), and with a higher risk in the development and maintenance of depression and anxiety (e.g. Moore et al., 2008). Other studies, using *different* regulation measures, converge with the just reported findings in showing the negative effects of suppression on psychophysical health, and the positive effects of reappraisal, in addition to showing the effects of other regulation strategies too, such as rumination and avoidance associated with negative effects, and the positive effect of problem-solving (Aldao et al., 2010; Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Compas, 2009). As more experimental studies on EmR processes and strategies—including CR and ES strategies—become available, findings on their habitual use, their effectiveness or adequacy, and their relation to culture values and EmR norms become more nuanced and specific. For instance, Webb et al. (2012) review of ERQ experimental studies shows that ES is effective when it involves suppressing the *expression* of emotion rather than its experience (e.g. suppressing its physiological component, a difficult process to implement), whereas CR is more effective if it focuses on the *eliciting stimulus* rather than on the emotional response itself. Lebowitz and Dovidio's (2015) studies showed a negative association of ES with empathic concern and an increased social distance, whereas CR had opposite effects. Soto, Lee, and Roberts (2016) showed that culture influences the physiological consequences of ES, with European Americans showing greater reactivity (increase in skin conductance levels) than Asian Americans, a difference related to the emphasis that the latter collectivistic group places on cultural moderation. In studies with Italian (Balzarotti et al., 2010) and Spanish adults (Cabello et al., 2013), i.e. with members of cultures that are collectivistically more than individualistically oriented, negative affect was not associated with either CR or ES, contrary to results obtained with American participants by Gross and John (2003). In sum, there is growing evidence that in adulthood, EmR processes and strategies have a crucial role for individuals' emotional functioning and well-being (see Aldao et al., 2010; Augustine & Hemenover, 2008; Sheppes et al., 2015; Tull & Aldao, 2015). The literature also suggests that preferred, habitual EmR processes and strategies in adulthood are based on experiences and learning that occurred in previous developmental stages (John & Gross, 2004; Morris et al., 2007; Tull & Aldao, 2015).

Despite the literature findings and indications discussed above, studies assessing EmR processes in adolescence, and their association with well-being, are instead few, typically concerned with the assessment of coping strategies rather than with other forms of EmR, and often limited to early or middle adolescence, i.e. up to 16 years at most, as the 13–16-year range coincides with mandatory school attendance in many Western countries (e.g. Flouri & Mavroveli, 2013; Garnefski, Legerstee, Kraaij, Van den Kommer, & Teerds, 2001; Perry-Parrish & Zeman, 2011; Zimmer-Gembeck & Skinner, 2015).

Adolescence, typically defined as spanning the teenage years' age range (see Spear, 2000), is instead a crucial life period in which several physical, cognitive, emotional, and behavioral changes occur, including those in attachment patterns that imply changes in emotional experiences about

self, parents, and peers (Cooper, Shaver, & Collins, 1998). Such changes imply frequent new and intense emotional experiences—more so than occurs in other developmental stages (Larson, Moneta, Richards, & Wilson, 2002; Silk, Steinberg, & Morris, 2003)—that might need to be regulated, such as the emotional experiences related to social interaction conflicts (e.g. with peers and/or parents) and risk-taking options. Compared with other life stages, adolescence is also a period of increased emotional instability, characterized by a higher frequency of both internalizing (e.g. depression) and externalizing (e.g. antisocial behaviors) disorders (Compas et al., 2001; Steinberg, 2005; Zeman et al., 2006). Crucial is that during adolescence, prefrontal cortical regions that support regulatory functions are not yet fully developed, whereas motivational reward cues are particularly salient, leading to greater risk of suboptimal choices due to weaker EmR and less effective goal-oriented behavior (for detailed discussions, see Casey, Jones, & Hare, 2008; Silvers, Buhle, & Ochsner, 2014; Somerville & Casey, 2010; Spear, 2000; Steinberg, 2005).

If adolescence, as suggested by the literature (Compas et al., 2001; Steinberg, 2005; Zeman & Shipman, 1997; Zeman et al., 2006), is a crucial period in the development and maturation of self-regulation patterns, then we might expect changes in EmR processes and strategies from childhood to late adolescence, with stability obtained in adulthood. Such developmental changes might be associated with changes in *maturational patterns* (e.g. Silvers et al., 2012 found an increase in how successful the modulation of emotional responses was from childhood to middle adolescence), as well as in *structural factors* and in the *knowledge increase* achieved by young and mature adults about costs and benefits of different forms of EmR (John & Gross, 2004; Sims, Hogan, & Carstensen, 2015). To illustrate, situations requiring suppression might be more frequent in adolescence and early adulthood than later on; out of life experience, adults might have learned to use CR, a healthy strategy, more than ES, a less healthy one. Several studies support such hypothesized developmental changes. For instance, Gullone, Hughes, King, and Tonge (2010) found that CR emerges in late childhood and is commonly used by early adolescence, and other studies report an increase in CR use during the lifespan (e.g. Gross & John, 2003; John & Gross, 2004; Sims et al., 2015). Findings on developmental changes in ES are instead more discordant. To exemplify, Gullone et al. (2010) found an ES decrease from middle adolescence to young adulthood, whereas Lougheed and Hollenstein (2012) found an ES increase by middle adolescence compared to younger age groups. Whether a decrease in ES occurs later in life is not at present very clear (see Sims et al., 2015).

A few studies, furthermore, showed that EmR difficulties in adolescence are linked with disorders such depression, anxiety, and problem behavior (Garnefski et al., 2001; McLaughlin et al., 2011). As regards the two specific strategies measured by ERQ, adolescents' ES showed positive associations with depression, whereas CR was negatively correlated with it in a study by Gullone and Taffe (2012), and adolescents' use of CR (but not of ES) was negatively linked with internalizing problems such as depression, anxiety, and social anxiety in a study by Lougheed and Hollenstein (2012).

In sum, our review of the EmR literature showed that most studies focused their attention on adults (e.g. only 4 out of 190 experimental studies on CR and ES reviewed by Webb et al., 2012 involved participants younger than 18 years), or on children and 13–16-year-old adolescents (e.g. Gullone et al., 2010; Shields & Cicchetti, 1997; Walden, Harris, & Catron, 2003). The analysis of regulation processes and strategies in adolescence, a critical period for their development, seems instead crucial to better understand individual differences in adolescents' well-being and adjustment (Silk et al., 2003; Silvers et al., 2012), and which factors are likely to account for the onset of psychosocial difficulties and psychopathology development (Aldao et al., 2010; Nolen-Hoeksema & Aldao, 2011; Siener & Kerns, 2012; Silk et al., 2003), possibly providing indications for the prevention of problems linked with dysfunctional regulation later on in adulthood.

1.1. Aims and hypotheses

The purpose of the present study was to contribute to a better understanding of the association that CR and ES, two EmR strategies, have with psychosocial well-being and functioning in adolescence, measuring well-being with a broad, extensive set of psychosocial health indicators, namely: felt

affect, loneliness, psychological health, and life satisfaction, thus allowing us to obtain a broader, reliable picture of adolescents' well-being and its association with EmR strategies. To study CR and ES in adolescents, we employed the ERQ measure (Gross & John, 2003), a self-report instrument. ERQ has been frequently adopted, as noted above, to assess adult EmR, including a study by Matsumoto, Yoo, and Nakagawa (2008) of young adults in 23 countries that showed that both CR and ES were associated with multiple indices of country-level adjustment, such as values about personal relationships (e.g. embeddedness and egalitarianism), and affective autonomy, overall showing the importance of cultural values and associated prescriptions as regards preferred EmR strategies. As earlier reported, ERQ was also employed in a few studies with adolescents.

As regulation strategies might display both intra- and inter-cultural variation (e.g. Haga et al., 2009; Matsumoto et al., 2008), to investigate regulation strategies in adolescence, we need to rely on a culturally and developmentally appropriate and valid instrument. Therefore, our study aimed also to test the validity of ERQ for Italian adolescents by exploring its structure and the reliability of its ES and CR subscales. Note that when the present study was designed and the data were collected (in 2010–2011), only two studies (Gullone & Taffe, 2012; Gullone et al., 2010) to our knowledge had used the ERQ measure and did so with Australian children and adolescents, using a slightly revised version of it by adapting item wording and response scale (age range of participants: 9–15 years in Gullone et al., 2010; 10–18 years in Gullone & Taffe, 2012).

In line with the quoted adult literature findings and the limited literature on adolescents, we hypothesized that CR is positively associated with positive affect, life satisfaction, and psychological health, and negatively associated with negative affect and emotional loneliness. We conversely expected ES to be associated with lower well-being levels.

The paucity of research specifically investigating the use of CR and ES in adolescence, especially its middle and late phases, made it difficult to make empirically based hypotheses as regards gender and developmental trends in adolescence. However, as regards gender, we turned to the literature on socialization practices and emotion norms. According to this literature, in Western society, traditionally, girls are educated more than boys to focus on their own and others' emotions, and boys more than girls are educated to inhibit and control their emotional expression, especially as regards powerless emotions such as sadness (e.g. Fischer & LaFrance, 2015; Hess, 2015; Underwood, Coie, & Herbsman, 1992); emotion norms, including feeling and display rules (e.g. Haga et al., 2009; Zammuner, 2000), are likewise gendered. We thus expected, due to cultural values compliance, males to avoid expressing their emotions more than females, and expected females to engage in reappraisal as much as or more than males.

As regards the age variable, on the basis of the previously discussed literature on developmental aspects of regulation, we expected older adolescents to be both more *willing* and *able* to regulate their emotions if and when necessary, such as in order to feel better, or because of contextual demands. Growing older, from early to middle and late adolescence, typically implies a need to pay more attention to situational demands and social constraints, and to comply with social norms in order to strengthen one's social ties, be accepted by peers and adults, and successfully cope with emotional events. We therefore expected older adolescents to rely more than younger ones on both strategy types, on the one hand, because compliance with social demands and norms is likely to be greater in older than younger adolescents and, on the other hand, because the situational sensitivity itself (as well as the cognitive-maturity level underlying it) is likely to be more pronounced in older than in younger adolescents. From these viewpoints, adolescents might perceive both CR and ES as appropriate regulation strategies, and employ one or the other, or actually both, according to their goals and situational context (flexibility, implying context variability, in the use of specific strategies is a construct much stressed in recent theoretical reviews; e.g. Aldao et al., 2015). Finally, we expected the use of CR, a cognitively demanding strategy, to increase with age, whereas the use of suppression, a cognitively simpler-to-apply strategy, though perhaps not easy to implement successfully, was expected to decrease or to remain stable.

2. Method

2.1. Participants and procedure

The sampling procedure used in the study attempted to obtain a representative sample of adolescents enrolled in different kinds of senior high schools, in grades I–V, theoretically attended by 14–18-year olds. To this end, the principals of various schools in the north of Italy were contacted and given information about the study aims and procedure, the anonymity of adolescents' answers, etc. After excluding students whose age was above 19 years, and those who had not completed most measures here discussed, including the ERQ (i.e. after screening for missing data), the final sample of participants included 633 (58% females) Italian high school students, 14–19-year olds (M age = 16.65, SD = 1.62), attending grades I–V in various school types, namely: lyceums (scientific, linguistic, classic, etc.: 68.5%), and technical and professional or vocational schools (e.g. those forming students to become accountants, to work in the hotel industry, to be machinists or electricians, and/or to do social work or health care: 31.5%); N for each grade: I = 107, II = 100, III = 80, IV = 116, and V = 220. After obtaining parents' and school councils' permissions (e.g. some schools gave permission only for some grades and not others due, for instance, to students' program engagements), the study was briefly presented during school time to each class group in turn, following the schedule approved by the school and the involved class teachers. Students were assured of the confidentiality of their answers. Data were collected from 2010 to 2011. In initial phases of the study, participants answered a pen-and-pencil questionnaire, whereas later participants filled in an online survey. In both cases, adolescents were tested on other measures not considered in this study, including recognition of facial emotion expressions and knowledge of the emotion lexicon, as emotional intelligence ability measures, and alexithymia levels and preferred coping strategies (partial results, mostly on data collected with the pen-and-pencil questionnaire were reported by Agnoli, Zammuner, Galli, & Valentini, 2011; Zammuner, Agnoli, Berto, Bernardello, & Quattrocchi, 2011). All participants completed the survey on a strictly voluntary basis, in about forty minutes on average for both versions. They either answered the pen-and-pencil questionnaire in their classroom, after they had been instructed on the study, or answered the online version using school computers but during their free time. Online participants were returned a short individual online report about how their results in various measures compared with the overall peer sample means. Collecting data on enrolled school students implied that the sampling did not include adolescents who had dropped out from school.

2.2. Measures

EmR strategies were assessed with the ERQ (Gross & John, 2003), recently validated in Italian with a sample of adults (Balzarotti et al., 2010). ERQ is composed of two subscales: CR, 6 items, such as *When I want to feel more positive emotion (such as joy or amusement) I change what I'm thinking about* and ES, 4 items, such as *When I am feeling negative emotions I make sure not to express them*. Response options were on a seven-point Likert-type scale ranging from 0 (strongly disagree) to 6 (strongly agree).

Psychosocial well-being. Well-being in adolescents was assessed with reference to four variables, measured by four self-report scales that included six subscales in total. Participants' scores were averaged over each subscale.

More specifically, positive and negative felt emotions were investigated with the positive and negative affect scale (PNA; e.g. Zammuner & Galli, 2005). Participants reported the frequency with which they felt each of six positive and eight negative emotions in the last 15 days, e.g. *joy*, *cheerfulness*; *anger*, *sadness*, and *guilt*. Response options were on a six-point scale, from 0 (never) to 5 (very often).

Adolescents' life satisfaction was assessed using the five-item life satisfaction scale (LSS; Diener, Emmons, Larsen, & Griffin, 1985; e.g. Zammuner & Galli, 2005), with six-point response options ranging from 0 (false of myself) to 5 (true of myself).

The general health questionnaire (GHQ-12 items) evaluated participants' perception of their health level. The scale (Goldberg et al., 1997; Politi, Piccinelli, & Wilkinson, 1994) assesses participants' ability to carry out normal daily activities, to cope with everyday problems, and measures general dysphoria, anxiety, and depression. Responses options were on a six-point scale, from 0 (not at all) to 5 (much). To make GHQ results easier to follow, we reversed the response scores to items whose phrasing indicated illness rather than health (e.g. *I have been feeling unhappy and depressed; I felt I couldn't overcome difficulties*). Thus, the mean scale score in this study indicates perceived positive health level, rather than perceived illness.

Loneliness was measured with an 11-item scale (de Jong Gierveld, 1987; Zammuner, 2008) assessing in two subscales perception of two facets of loneliness, namely, emotional and social loneliness, with six-point response options ranging from 0 (false of myself) to 5 (true of myself). Given item phrasing of the social loneliness subscale (e.g. *There are many people I can trust completely; There are enough people I feel close to*), social loneliness scores actually indicate lack of social loneliness, i.e. indicate perception of social support, a term that we will henceforth use to make results easier to follow.

2.3. Statistical analyses

A preliminary analysis was performed to establish the structural equivalence of the ERQ with previously obtained results, especially those with Italian adults (Balzarotti et al., 2010). Taking into account that an unconstrained exploratory procedure might offer stronger structural evidence than an unreplicated constrained confirmatory procedure (e.g. Matsumoto et al., 2008), we computed an exploratory factor analysis on the 10 ERQ items.

Descriptive and reliability analyses were performed for all subscales for the total sample. Gender and age differences in EmR strategies, as well as with regard to the six subscales measuring the four well-being variables, were tested by means of a multivariate analysis of variance (MANOVA), with sex and age as between-subject factors. Post hoc Bonferroni tests were computed to compare differences between age groups. To explore the relationships between EmR and well-being variables, that is, positive and negative felt emotions, life satisfaction, emotional and social loneliness, and health, zero-order Pearson correlations were computed. Expected relationships among the variables were finally assessed in a set of stepwise multiple regression analyses, testing each well-being variable outcome as a dependent variable in turn, with gender categories and age entered in the first step of the regression, and CR and ES added in the second step. All data analyses were performed using the SPSS version 21 statistical package.

3. Results

The exploratory factor analysis, with normal Varimax rotation, that was performed on the ERQ measure extracted two factors using the Kaiser criterion, accounting for 53.80% of the total variance. Item communality values ranged from .365 to .639, with a mean value of 0.54. KMO (.80) and Bartlett test (1749.63 df 45, $p < .000$) values indicated sampling adequacy. The six items for CR loaded on factor 1 (30.88% variance; eigenvalue 3.30), and the four items for ES loaded on Factor 2 (2.92% variance; eigenvalue 2.08), with item factor loadings, for each factor, ranging from .60 to .79 for CR, and .65 to .70 for ES. The factor solution thus indicated that for our adolescent age group, ERQ had the same two factor structure previously obtained for adults (e.g. Balzarotti et al., 2010; Gross & John, 2003). Reappraisal and suppression scores were therefore created by averaging the items loading on them. Cronbach's standardized alphas for both scales across the entire adolescent sample were acceptable: CR .81, ES .70, and similar to those obtained in previous studies, including that by Gullone and Taffe (2012) who already observed that the lower reliability coefficient for ES is accounted for by its smaller number of items in comparison to the CR subscale.

Descriptive analyses (means and SD) of the tested variables are reported in Table 1, together with alpha reliability values and correlational results. Overall, adolescents' mean scores on EmR strategies showed that they use CR more than ES, similar to Australian adolescents (Gullone & Taffe, 2012)

Table 1. Emotion regulation (EmR) strategies and psychosocial well-being variables: Mean and SD scores, reliability alpha values (in the diagonal), and zero-order Pearson correlation values

	1	2	3	4	5	6	7	8
	EmR reappraisal	EmR suppression	Psychological health	Life satisfaction	Emotional loneliness	Social support perception	Negative affect	Positive affect
1. EmR_reappraisal	.81							
2. EmR_suppression	.182**	.70						
3. Psychological health	.088*	-.218**	.84					
4. Life satisfaction	.213**	-.155**	.444**	.84				
5. Emotional loneliness	-.032	.287**	-.381**	-.299**	.83			
6. Social support perception	.170**	-.331**	.219**	.364**	-.539**	.89		
7. Negative affect	-.002	.093*	-.587**	-.311**	.262**	-.096*	.75	
8. Positive affect	.171**	-.200**	.386**	.419**	-.302**	.416**	-.144**	.73
Mean (min-max)	3.16 (0-6)	2.00 (0-6)	3.02 (0-5)	2.67 (0-5)	1.50 (0-5)	3.62 (0-5)	2.24 (0-5)	3.25 (0-5)
Standard deviation	1.12	1.14	0.91	1.08	1.13	1.20	0.85	0.92

*Level of significance at $p < .05$.

**Level of significance at $p < .01$.

and generally to young adults. On average, however, Italian adolescents use both strategies, ES especially, comparatively less than young university students, i.e. the young adults tested by Haga et al. (2009) in three countries (Norway, Australia, and the USA), the Italian ones tested by Balzarotti et al. (2010), and the Spanish ones tested by Cabello et al. (2013), after adjusting for the response scale options' differences, whose range was 0-6 in our study, but 1-7 in all previous studies; for instance, ES score was 3.82 for Italian young men in Balzarotti et al. (2010), 3.80 for Spanish men, and 3.23 for our adolescent boys. In other words, our results indirectly suggest that the use of regulation strategies does increase from adolescence to early adulthood, and that such an increase is likely to affect ES maybe more than CR. Of note as regards the latter ES subscale is also the fact that Italian adolescents endorsed least of all the ES item "I control my emotions by not expressing them" (mean 0.92, SD 1.29), whereas they endorsed most of all the item "I keep my emotions to myself" (mean 2.79, SD 1.65). We will discuss further these results in a later section.

The mean results moreover showed that adolescents experienced positive more than negative affect, reported a sufficiently good psychological health level, quite low levels of emotional loneliness, a medium level of life satisfaction, and high levels of perceived social support, i.e. absence of social loneliness. Altogether, the mean results indicate that the tested sample is on average comprised of "healthy" adolescents.

Turning now to individual differences, the results of the MANOVA analysis, with sex and age (i.e. 14-19 years) as between-subject factors, and the EmR strategies and well-being indicators as dependent variables, showed that sex was a significant multivariate factor ($F_{8,613} = 3.41, p < .001$). Between-subjects tests showed gender to be a significant factor for three well-being variables, namely, positive affect ($F_{1,620} = 4.10, p < .05$; means: M 3.35, SD .90, F 3.18, SD .93), life satisfaction ($F_{1,620} = 14.44, p < .001$; means: M 2.84, SD 1.04, F 2.55, SD 1.09), and social support perception ($F_{1,620} = 8.29, p < .001$; means: M 3.81, SD 1.16, F 3.48, SD 1.20), and marginally for psychological health ($F_{1,620} = 2.85, p < .10$; means: M 3.10, SD .86, F 2.97, SD .94). The age variable was significant only for the between-subjects test for psychological health ($F_{5,620} = 2.75, p < .05$). Post hoc Bonferroni test showed that 16-year olds reported a lower health level than 14-year olds (mean difference value is .49, $p < .01$; means: 16-year olds 2.79, SD .97, 14-year olds 3.28, SD .88). Finally, the sex by age interaction was significant for positive affect ($F_{5,620} = 2.41, p < .05$). Inspection of the interaction

means showed that boys reported, as already stated above, more positive affect than girls; for 17-year olds, this trend reversed, with girls reporting more positive affect than boys (means: M 3.03, SD 1.03, F 3.21, SD 98). In sum, the analysis of variance showed a clear effect of gender on well-being, with boys reporting somewhat greater well-being than girls on three out of the six indicators, and two “local”, and not easy-to-interpret effects for the age variable. The MANOVA results did not confirm the expected gender and age differences in preferred EmR strategies.

Correlational analyses (see Table 1) showed that CR was significantly and positively associated with ES (r .182), an unexpected result with regard to data obtained in previous studies. CR was significantly and positively associated with (in decreasing magnitude) life satisfaction, social support perception, positive affect, and psychological health, with r values ranging from .088 to .213; it was not instead negatively associated with the two indicators of ill-being, i.e. emotional loneliness and negative affect. ES was significantly correlated, in the hypothesized directions, with all psychosocial well-being measures. ES's highest correlations were with loneliness ($-.331$, for emotional loneliness, .287 for social support) and the lowest with negative affect (.930). Finally, all well-being variables were significantly inter-correlated; r values ranged from $-.096$, for negative affect with social support, to $-.585$, for negative affect with psychological health. Psychological health actually was the index showing on average the highest correlation values with the other well-being indicators.

As stated, stepwise linear regression analyses were performed, testing each well-being variable outcome as a dependent variable in turn, with sex and age entered in the first step of the regression, and CR and ES added in the second step. The results showed that the first regression model, with gender and age as predictors, was significant for life satisfaction, social support, and psychological health. However, as the variables that were significant predictors in Model 1 remained significant in the final Model 2 when CR and ES were entered as predictors, in Table 2 we report only the final Model 2 results, together with the R^2 values specifying the increment in explained variance with respect to Model 1.

The regression results (Table 2) on the whole confirmed that gender and EmR strategies are significantly associated with several facets of psychosocial well-being. More specifically, gender significantly contributed, with B values between $-.08$ and $-.13$, in the prediction of life satisfaction, social support perception, and psychological health, all higher in boys than in girls, whereas age was a significant but not very powerful predictor (mean B values were $-.08$) of psychological health and life satisfaction, both diminishing as age increases. The average contribution by gender to explained variance was about 1–2% (see R^2 and R^2 change values in Table 2).

On the whole, both the CR and ES regulation strategies significantly contributed to predict well-being levels, increasing explained variance when entered into the regression equation, by about 6–16%, with the exception of negative affect, that, although significantly so, was not much predicted at all by the considered variables. ES was generally a more powerful predictor (higher effect size) in the hypothesized direction of well-being variables than CR was, especially for psychological health, emotional loneliness, and social support perception (with B values between $-.24$ and $-.38$). Well-being facets that CR best contributed to predict were life satisfaction, social support perception, and positive affect (with B values between .21 and .23).

4. Discussion and conclusion

A preliminary aim of our study was to assess whether the ERQ (Gross & John, 2003) was a reliable instrument when used with an Italian adolescent population. The factor analysis results confirmed the two-factor structure of ERQ, i.e. the CR and expressive ES subscales, with individual items loading on the expected factor, and the reliability results showed acceptable alpha coefficients for both CR and ES, consistent with previous studies with adolescents (Gullone & Taffe, 2012) and young adults, most notably the ERQ validation in Italian (Balzarotti et al., 2010).

Table 2. Final regression model results for gender, age, and EmR strategies as predictors of well-being variables. Standardized beta coefficients, *t* values, explained variance (*R*²), *R*² change, and *F* values

	Psychological health		Life satisfaction		Emotional loneliness		Social support perception		Negative affect		Positive affect	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Gender ^a	-.079*	-2.02	-.133***	-3.46	.039	1.008	-.127***	-3.47	-.010	-.25	-.082*	-2.13
Age	-.088*	-2.24	-.080*	-2.08	.060	1.554	-.010	-.28	.070	1.74	-.023	-.584
Cognitive reappraisal	.119**	3.03	.234***	6.06	-.079*	-2.03	.229***	6.19	-.014	-.34	.208***	5.33
Expressive suppression	-.246***	-6.29	-.205***	-5.33	.305***	7.89	-.376***	-10.23	.099**	2.45	-.241***	-6.23
<i>R</i> ²	.076***		.105***		.094***		.180***		.014*		.091***	
<i>R</i> ² change ^b	.064***		.079***		.091***		.163***		.009*		.083***	
<i>F</i>	12.84***		8.23***		16.24***		34.44***		2.26*		15.76***	

Note: *F* indicates degrees of freedom: 4,628, except life satisfaction df 4,627.

*Level of significance at *p* < .05.

**Level of significance at *p* < .01.

***Level of significance at *p* < .001.

^aGender categories: 1 = male, 2 = female.

^b*R*² Change when the CR and ES strategies were entered in step 2 in the regression equation (gender and age were first entered in step 1).

Turning to the main aim of our study, namely whether and in what ways EmR strategies are associated with well-being, the study results confirmed our hypotheses that adolescents' greater use of CR is associated with higher level of psychosocial well-being, and their greater use of ES is associated with negative well-being outcomes, congruent with literature findings with adults.

Hypothesized gender and age effects on CR and ES preferences were instead not found. Note, however, that similar results as regards CR were obtained in previous studies: no age differences were found in children and adolescents (Gullone & Taffe, 2012) and in adults (Haga et al., 2009); no gender differences were found in Balzarotti et al. (2010), Cabello et al. (2013), and Gross and John (2003). CR thus appears to be an *early developing strategy*, without noticeable age differences, and a strategy that is equally endorsed by boys and girls.

The absence of gender differences as regards ES was not only unexpected, but actually more puzzling, given that previous studies, with adults, as well as with children and adolescents, consistently found higher ES scores in males, as in Cabello et al. (2013). As regards age, ES was found in previous studies to decrease with age in undergraduate students, i.e. young adults (Haga et al., 2009), whereas it did not decrease in the 10–18-year-old age group (Gullone & Taffe, 2012). Our results suggest that the use of ES is *low* in adolescence (recall that adolescents use ES significantly less than young adults), and is still ungendered, becoming a male gender coherent display rule only in adulthood when sex roles become more clearly defined. The absence of gender and age differences in Italian adolescents' use of ES might also reflect a new cultural trend, namely a lesser salience of gender-specific emotion rules in Western culture teenagers, or, more specifically, in the Italian ones. That is, variations in the specific cultural context within Western culture might play a role. Cabello et al. (2013), in commenting the absence of a relationship between ES and negative affect in their young Spanish adult sample, noted that the result was similar to that obtained with Italians by Balzarotti et al. (2010) and instead differed from results obtained with USA adults, and suggested that such results might be interpreted in terms of a specific culture context hypothesis: the Mediterranean culture is characterized by collectivist values more than individualistic ones, whereas the reverse is true for the USA. We thus are hypothesizing, as regards the gender similarity in the use of ES (and of

CR) found in our study, that Italian adolescents are not (yet?) sensitive to the Mediterranean traditionally greater collectivist orientation, and/or that such an orientation is itself diminishing in its younger members. We feel that this is a potentially interesting *post hoc* interpretation of our results that needs however to be explored and validated in further studies.

As regards the hypotheses that CR positively impacts psychosocial well-being, whereas ES has a negative influence on it; the reported results of correlation and regression analyses showed that all associations between these two EmR strategies and well-being were in the hypothesized direction.

In line with results obtained in previous studies with adults (Balzarotti et al., 2010; Haga et al., 2009; John & Gross, 2004), adolescents who reported greater preference for CR experienced greater positive affect and life satisfaction than adolescents who reported a lower CR preference, suggesting that they have a higher probability of positive development and affective functioning. The obtained association of CR, furthermore, with lower emotional loneliness and especially with greater perceived social support (i.e. social loneliness), a result again consistent with adults', underlines the impact of CR on intrapersonal and social functioning in adolescence, suggesting the likelihood of greater instrumental support, emotional disclosure, and closer social relationships in adulthood (e.g. Balzarotti et al., 2010; Gross & John, 2003). Contrary to our hypotheses, and to previous findings with adults, CR was unrelated to negative affect in our study. This result might be interpreted as indicating that, although CR is a factor promoting adolescents' hedonically positive experiences, it does not protect them against experiencing negative ones.

As regards suppression, in line with our hypothesis, ES predicted worse well-being outcomes for all variables, coherently with the literature findings that suppressors report lower positive affect, life satisfaction, social closeness and support, and higher negative affect and depression compared with non-suppressors (e.g. Balzarotti et al., 2010; Gross & John, 2003; Haga et al., 2009; Nolen-Hoeksema & Aldao, 2011). In our study, the ES association with negative affect was a very weak one (B value .099), contrary to most previous findings, but similar to Italian (Balzarotti et al., 2010) and Spanish (Cabello et al., 2013) adults' results. Considering on the one hand the average very low frequency with which our Italian adolescent sample reported feeling negative emotions, and on the other hand the fact that they endorsed the most the ES item "I keep my emotions to myself", this result might simply indicate that ES is not the most salient regulation strategy for adolescents if and when feeling negative affect.

The association of ES with well-being outcomes was on the whole stronger than that of CR, a result (found in previous studies too; e.g. Gross & John, 2003; Study 4) that can be explained on the basis of the "process model of EmR" (Gross, 2001). That is, whereas CR may reduce the emotional experience impact, the use of ES, a response-focused strategy, does not modify it. Our study therefore confirms that regulation through CR is more adaptive than ES in terms of well-being consequences (Nezlek & Kuppens, 2008), but shows that ES has a more discriminant and salient impact on well-being than CR, more widespread consequences.

Although our study contributes to a better understanding of the relationship between EmR strategies and well-being in adolescence, some limitations should be considered. First, causal inferences are excluded due to the cross-sectional design of the study. Second, given the voluntary participation, a self-selection bias might have affected results, that is, if adolescents who did not complete the survey were, for instance, characterized by lesser well-being than that displayed by their peers in the present sample. Furthermore, the sample, as said, does not include dropouts, thus limiting the generalizability of results to the adolescent population (note that such issues are rarely acknowledged in studies whose sampling method is similar to the one adopted in our study). Third, given the use of self-report measures, results might have been influenced by social desirability biases—although one could argue that the voluntary and anonymous nature of adolescents' participation likely limited biased responding. Lastly, although the variance explained by regression models was, in some cases, limited, it was in line with previous findings (e.g. the variance increment due to

regulation strategies after controlling for personality was about 2–5% in Haga et al., 2009). This result points to the likely relevance of a *wider variety* of EmR strategies (e.g. including coping strategies) in the study of well-being, as well as to the need to assess regulation in more detailed and precise ways, such as by testing individual variability and flexibility as a function of contextual demands.

In sum, our study showed that the ERQ is a valid measure for assessing CR and ES with adolescents. As hypothesized, CR was positively linked with well-being, as assessed by a broad set of measures, whereas ES had an inverse relationship to it. The study provides additional evidence on the association between preferred regulation strategies and well-being and points to the importance of extending the study of EmR strategies to the adolescence period, possibly considering in greater detail both cultural and individual differences.

Further studies, especially longitudinal and experience-sampling ones, using ecological models that consider both individual (e.g. personality) and contextual social factors (e.g. socialization practices), are necessary to give valid answers to several still open questions, namely: Whether the use of regulation strategies are indeed stable within adolescence, and across developmental periods; What are the determinants of gender differences at various developmental stages; Which associations hold between regulation strategies and well-being in adolescence, and which factors are crucial in mediating them; Which cultural differences exist, across developmental periods, and to which factors can they be ascribed; The answers to such questions on adolescents' regulation processes and strategies will enable us to gain a better understanding of adolescents' well-being, a complex construct itself whose level results from the influence of many variables and for whose measure different and appropriate indicators are necessary.

The study findings, although limited by being the result of self-report measures, have implications for developmental interventions aimed at promoting well-being, namely: our results suggest that intervention effectiveness might be increased by training adolescents to master the use in their daily life of adaptive EmR strategies, while limiting the use of ES.

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Competing Interests

The authors declare no competing interest.

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