

Exploring meta-worry and perceived parenting behaviors in adolescents' anxiety

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Abstract

Background: This study explores how metacognitive beliefs about worry (Wells, 2005) and perceived parenting (e.g., psychological control, emotional availability and autonomy-granting) contribute to adolescents' anxiety. Method: A sample of 191 community adolescents completed self-report questionnaires on anxiety levels (RCMAS), metacognitive beliefs about worry (MCQ-C) and maternal and paternal perceived parenting. The same procedure was replicated with a group (n = 14) of anxiety-referred adolescents. Results: Metacognitive beliefs were associated with adolescent's reported anxiety, with girls reporting less positive beliefs and higher anxiety than boys. Anxiety-referred adolescents reported higher negative meta-worry (responsibility and harmful) and cognitive monitoring beliefs than non-clinical control. Correlations between anxiety and parenting change according to parents' and adolescents' gender. In regression analysis, negative meta-worry resulted the most robust predictor of anxiety, followed by low paternal emotional availability and high control for boys, and by low autonomy-granting and

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monitoring meta-beliefs for girls. Conclusions: Findings partially support the extension of adults' metacognitive model of worry to adolescents. The stronger support comes from the role of negative beliefs in predicting anxiety levels. Further research with a larger clinical sample is needed for deepening how adolescent's gender and perceived parenting interact with specific meta-beliefs increasing the risk of anxiety disorders.

Keywords: Metacognition; Anxiety; Parenting; Adolescents.

1. Introduction

Studies on cognitive-emotional processes involved in adolescent's anxiety have recently investigated worry as central component (Ellis & Hudson, 2010). Worry is a chain of verbal thoughts that are repetitive and primarily related to potential negative outcomes (Vasey & Daleiden, 1994). Worry is a common experience in children's life but it is not necessarily a pathological phenomenon. Children report that their worrying help them to cope with a difficult event more effectively (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998), so worrying seems to facilitate problem-focused coping as observed in adults (Kelly, 2008). However, when worry becomes excessive and relatively uncontrollable, it interferes with children's functioning (poor problem solving confidence, low perceived control, avoidance strategies) and it is associated with distress and increased anxiety (Borkovec, Robinson, Pruzinsky, & DePree, 1983).

Studies indicate that already between 8 and 13 years old children are aware that worry can be difficult to control and cause emotional problems; in addition, children with pathological and pervasive anxiety (generalized anxiety disorder, GAD) report more intense worry and negative beliefs about uncontrollability of worry than children without anxiety (Muris *et al.*, 1998). Therefore this "pathological worry" perpetuates and intensifies emotional distress and it appears involved in childhood anxiety disorders (Wilson, 2010).

However, it is only with the cognitive development and the appearance of metacognition (the awareness and understanding of one's own thoughts) that children become able to recognize the emergence of worry states. Metacognitive beliefs make also children aware of the negative features of worry and its pervasive interference on cognitive functioning and emotional well-being.

A model in which the metacognitive processes about worry are central was developed by Wells (2000) for explaining anxiety symptoms in adults. Wells' metacognitive model is also useful for understanding how normal worry becomes dysfunctional and contributes to the maintenance of anxiety disorders (GAD particularly).

According to the metacognitive model of GAD (Wells, 2000), the intensity or content of worries are not as dysfunctional as the metacognitive beliefs about worry (that is, worry about worry). The *positive beliefs* are based on the advantages or benefits of worrying as a coping strategy (for example, "If I worry, I'll be prepared") and the occurrence of these beliefs

does not differentiate individuals with or without GAD. The *negative beliefs* include the thoughts of uncontrollability or dangerousness of cognitive experiences (“Worrying will make go crazy”). In other words, positive beliefs lead to increased worry, but when levels of worry get excessive people become to be worried about the negative consequences (worry is harmful for thinking). These negative beliefs (*meta-worry*) active also a cycle of attempts to suppress “dangerous” thoughts and monitoring of thinking that is associated with negative emotions and distress. Adults with pathological generalized anxiety (GAD) report a greater need to control worry and they believe that their worry is harmful. Therefore, according to Wells’ model of GAD the metacognitive processes can explain how worry is involved in the control and maintenance of emotional disorders.

Recently, a robust corpus of research extends Well’s metacognitive model from adults to children, because cognitive mechanism about advantages/dangerousness of worry have been observed in children and adolescents, regardless their levels of anxiety (Bacow, May, Brody, & Pincus, 2010; Smith & Hudson, 2013; Thielsch, Andor, & Ehring, 2015; Lønfeldt, Marin, Silverman, Reinholdt-Dunne, & Esbjørn, 2017). Negative beliefs about “brooding” and the cognitive monitoring of these internal processes have been reported in anxious children (Bacow, Pincus, Ehrenreich, & Brody, 2009). Smith and Hudson (2013) found that clinical children endorsed significantly more negative and positive meta-cognitive beliefs than non-clinical children. Even if applying Well’s model to children reveals some differences related to children’s cognitive and socio-emotional development, these studies confirm that meta-cognitive beliefs about worry are positively associated with emotional symptoms in youth.

In developmental studies, inconsistent findings emerged regarding the different weight of positive or negative beliefs about worry in explaining anxiety symptoms. Cartwright-Hatton and colleagues found that youths with clinical anxiety report more negative beliefs if compared to non-clinical control group (Cartwright-Hatton, Mather, Illingworth, Brocki, Harrington, & Wells, 2004), whereas Bacow and collaborators (2009) did not confirm these differences. Inconsistent findings were also reported for positive beliefs: Esbjørn and colleagues found that adolescents with GAD have significantly more positive beliefs than control group (Esbjørn, Lønfeldt Nielsen, Reinholdt-Dunne, Sømhovd, & Cartwright-Hatton, 2015), but Bacow and collaborators (2010) did not confirm these findings. Other questions remain regarding gender differences: some studies report that levels of metacognition are similar between boys and girls (Ellis & Hudson,

2011; Benedetto, Di Blasi, & Pacicca, 2013), whereas in other studies higher levels of metacognition are observed among adolescent girls (Bacow *et al.*, 2009). Wells' metacognitive model of GAD (2005) does not consider gender differences in adult population, so developmental studies can be useful, especially considering the higher incidence of internalizing problems among girls (Rapee, Schniering, & Hudson, 2009).

In fact, in children, unlike in adults, other individual and experiential variables can contribute to the genesis of anxiety disorders. Researches evidence the role of individual factors (e.g., temperament, emotional reactivity, etc.), genetics and life events in increasing children's vulnerability to pathological worry and anxiety (Wilson, 2010). Among environmental influences, family factors and especially parent-child interactions have been extensively explored. In the literature children's anxiety symptoms, even if not caused by parental behaviors, are often associated with anxious rearing (Grüner, Muris, & Merckelbach, 1999), parental expressed anxiety (Waite & Creswell, 2015), low warmth and high-control parenting style (Ballash, Leyfer, Buckley, & Woodruff-Borden, 2006).

Parental influences on childhood emotional disorders have been represented in two broad dimensions (McLeod, Wood, & Weisz, 2007): first, lack of warmth (from poor emotional support to rejecting behaviors) and second, parental control. Lower levels of warmth resulted in parents of anxious children (Rapee *et al.*, 2009); it was hypothesized that lack of emotional support or reciprocity compromises emotion regulation in children, thus increasing their sensitivity to anxiety (Hudson, Comer, & Kendall, 2008). The dimension of control refers to an excessive parental regulation of children's activities that interferes with the development of their autonomy, self-esteem and perception of mastery (Barber, 1996). Children who suffer excessive parental control may believe to be no effective and then to maintain a state of alert, with increased distress and the risk of anxiety symptoms (Nanda, Kotnick, & Grover, 2012)

McLeod and colleagues (2007) have further distinguished in the psychological control the parental overinvolvement (as support given to the child when it is not needed) from the lack of autonomy-granting (where a parent fails to promote independence in thinking or decision-making). When parents are highly controlling, even if children could act independently (e.g., in novel tasks or context), children may experience decreased perception of control, negative emotions and anxiety. Parental autonomy-granting is crucial in adolescence, when a developmental task for youths is making their

own choices and functioning independently from the family (Manzi, Regalia, Pelucchi, & Fincham, 2012). In a recent review, Waite, Whittington and Creswell (2014) concluded that parental control, particularly autonomy-granting, may represent more specific correlates with adolescent's anxiety, whereas the findings linking perceived parental rejection/lack of warmth are somewhat less consistent.

Furthermore, recently scholars have focused their attention on differential parenting, focusing on the father role. In fact, most studies are conducted on mother-child relationships and reveal associations between children's anxiety and maternal lack of warmth or overcontrolling behaviors (Hudson & Rapee, 2001). The role of father in early development of anxiety symptoms, particularly social anxiety, was recently emphasized by some studies, suggesting that maternal/paternal parenting behaviors are differentially linked to children anxiety (Bögels, Stevens, & Majdandžić, 2011). Fathers of anxious children exhibit more controlling and less autonomy-granting behaviors than fathers of non-anxious children (Bögels & Phares, 2008). The fathers' influence endures during adolescence (Waite *et al.*, 2014). Such preliminary studies confirm the pivotal role that the presence or the lack of paternal figure may have in relation to the development of children anxiety and confirm the need for more research in this sense.

The present studies explore the relative contribute of meta-cognitive beliefs and perceived parenting to adolescents' anxiety levels. In study 1, following Wells' model (2005) we investigate the relationships between the metacognitive components of worry and anxiety levels in a community sample of adolescents. Second, we test to what extent high parental psychological control, lack of autonomy-granting and low emotional availability are linked with anxiety symptoms. The hypothesis to test were:

- RQ 1. Adolescents with high levels of anxiety report more dysfunctional metacognitive beliefs, especially danger and uncontrollability about worry;
- RQ 2. Adolescents with high levels of anxiety perceive less support autonomy, emotional availability and high levels of psychological control from their parents;
- RQ 3. Third, since previous studies reports gender differences in metacognition (Bacow *et al.*, 2009), we hypothesized that girls reported higher scores than boys on the meta-cognitive awareness of worry;

- RQ 4. Finally, due to the theoretical and empirical evidence on gender differences in parenting, we examined the independent influences of paternal and maternal behaviors on adolescents' anxiety levels.

2. Study 1

2.1. Method

2.1.1. Participants

A total of 191 non-referred students between the ages of 13-18 were randomly recruited inside of public high schools in Messina (southern Italy). With regard to the gender distribution, a balanced percentage of males ($n = 98$) and females ($n = 93$) resulted. The adolescents' mean age was 16.5 years ($SD = 1.79$) and 16.3 years ($SD = 1.72$) for boys and girls, respectively.

2.1.2. Procedure

For participating to the study, informative letters containing the proposal and the informed consent form were mailed to the families. Students aged 18 or more completed their informed consent form for voluntary participation in school classes. After acquisition of the written informed consent forms, the questionnaires were collectively administered in the classrooms by an undergraduate student in Psychology (about 20 min.).

2.1.3. Measures

All students were administered a demographic form and a questionnaire packet containing the measures reported below (RCMAS-2, MCQ-C, LEAP, PCS and POPS).

- *Revised Children's Manifest Anxiety Scale* (RCMAS-2; Reynolds & Richmond, 2008). It is a self-report (49 items) questionnaire measuring anxiety's nature and level in children and adolescents. For the purpose of the present study, we used the total score (Cronbach's $\alpha = .87$ in this sample).
- *Metacognitions Questionnaire for Children* (MCQ-C; Bacow *et al.*, 2009). The self-report questionnaire for children and adolescents includes 24 items and four subscales: *Cognitive Monitoring* as cognitive self-consciousness (i.e., "I pay a lot of attention to the way that I think"); *Positive Meta-worry* (i.e., "If I worry about things now, I will have fewer problems in the future"); uncontrollability and danger of worry, named as *Negative Meta-worry* (i.e., "If I worry a

lot, I could make myself sick”); *Superstition, Punishment and Responsibility*, shortened as *SPR* (i.e., “If I can’t stop my thoughts, bad things will happen”). Higher scores indicate greater negative metacognitive activity. The Italian version of the MCQ-C was already tested on a community sample of preadolescents (Benedetto *et al.*, 2013). This study extends the application of the Italian questionnaire to adolescents for the first time. The internal consistency (Cronbach’s alphas) resulted adequate for all scales in this sample (from .83 for Negative Meta-worry to .73 for Cognitive Monitoring) with the exception of *SPR* scale (.46). The low internal consistency of this scale was probably due to the heterogeneous contents of its items (Smith & Hudson, 2013).

- *Lum Emotional Availability of Parents* (LEAP; Lum & Phares, 2005; Italian adaptation by Babore, Candelori, & Picconi, 2012). Adolescents judged responsiveness separately for mother (LEAP-M, 15 item) and father (LEAP-F, 15 item) through statements such as “he/she consoles me when I am upset”. Higher scores indicate higher parental emotional availability. Internal consistency resulted strong for both mothers (Cronbach’s alpha = .94) and fathers (.95) in this sample.
- *Psychological Control Scale - Youth Self-Report* (Barber, 1996). A list of items, 8 referred to father (PCS-F) and 8 to mother (PCS-M), assesses adolescents’ perception of parental psychological control (i.e., “My mother/my father always tries to change my way of thinking”). Higher scores indicate more parental psychological control. Reliability in this sample resulted adequate for mother’s (Cronbach’s alpha = .74) and father’s form (.79).
- *Perceptions of Parent Scale* (Robbins, 1994). This questionnaire consists of 12 items (6 for each parent) assessing adolescent’s perceived support in choices/decisions (i.e., “My mother/my father hear my opinion and my point of view when I talk about a problem”). Higher score amounts to a good support to autonomy from parents. In this study, the Cronbach’s alpha was .87 for maternal (POPS-M) and .86 for paternal autonomy support scale (POPS-F).

2.2. Data analysis

The first step was to test gender differences using *t*-test for all measures with the exception of MCQ-C scales, which were tested by MANOVA.

Second, Pearson product-moment correlations were calculated in order to test the hypothesis that poses significant associations between adolescent's anxiety (RCMAS) and meta-cognitive beliefs (MCQ-C), and between anxiety levels (RCMAS) and parenting measures (LEAP, PCS and POPS). Finally, the stepwise linear regression analysis was conducted to test the power of meta-cognitive beliefs or parenting variables to predict anxiety symptoms. A .05 significance level was allocated in all tests. Data were analyzed using SPSS package 15.0 for Windows.

2.3. Results

2.3.1. Gender differences

Table 1 displays means and *SDs*, gender comparisons and effect size indexes for all measures. Girls reported higher anxiety scores (RCMAS) than boys and maternal control (PCS-M). For boys, higher scores resulted in both maternal emotional availability (LEAP-M) and support (POPS-M). In MCQ-C gender differences emerged for positive meta-worry subscale, were boys reported higher scores than girls.

Table 1 - *Descriptive statistics and gender comparisons for anxiety scores, parenting measures and metacognitive beliefs*

Measures	Mean (<i>SD</i>)		Comparison <i>t</i> (189)	Effect size Cohen's <i>d</i>
	Boys (<i>n</i> = 98)	Girls (<i>n</i> = 93)		
<i>Anxiety</i> (RCMAS; T-points)	45.52 (8.08)	52.87 (9.72)	-5.70***	-.82
<i>Emotional Availability</i> Mother (LEAP-M)	4.76 (0.85)	4.45 (1.23)	2.02*	.29
Father (LEAP-F)	4.17 (1.27)	3.98 (1.34)	.96	.14
<i>Parental Control</i> Mother (PCS-M)	1.62 (0.37)	1.74 (0.46)	-1.99*	-.29
Father (PCS-F)	1.53 (0.39)	1.58 (0.47)	-.71	-.11
<i>Parental autonomy-granting</i> Mother (POPS-M)	5.41 (1.15)	4.91 (1.44)	2.60**	.38
Father (POPS-F)	5.04 (1.40)	4.69 (1.24)	1.73	.26
<i>Meta-cognitions</i> MCQ-C Total score	55.92 (11.02)	56.02 (11.17)	-.06	-.01
			<i>F</i> (1, 195)	
Positive Meta-worry	11.00 (3.24)	9.75 (2.86)	7.91**	.41
Negative Meta-worry	17.67 (5.57)	19.18 (6.89)	2.79	-.24
Cognitive Monitoring	14.41 (3.30)	13.84 (3.09)	1.51	.18
SPR	12.84 (2.80)	13.25 (2.86)	1.01	-.14

* $p < .05$; ** $p < .01$; *** $p < .001$

2.3.2. Relationships between meta-cognition, parenting and anxiety measures

Pearson's coefficients were calculated separately according to gender (Tab. 2). Positive correlations emerged between RCMAS scores and MCQ-C (both total scores and subscales). For boys, the positive meta-worry subscale only does not reach the statistical significance.

Table 2 - Pearson's coefficients for girls ($n = 87^a$; below the diagonal) and boys ($n = 91^a$; above the diagonal)

Study Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Anxiety RCMAS	—	.01	.48**	.26**	.27**	.39**	-.21*	-.30**	.25**	.31**	-.13	-.31**
2. Positive Meta-worry	.20*	—	.31**	.42**	.31**	.66**	.08	.24**	.13	.02	.10	.17
3. Negative Meta-worry	.56**	.17	—	.36**	.39**	.81**	.07	.07	.06	.11	.01	-.01
4. Cognitive Monitoring	.38**	.36**	.35**	—	.45**	.73**	.08	.16	.14	.07	.09	.12
5. SPR	.29*	.39**	.34**	.52**	—	.68**	-.004	-.08	.20*	.10	-.04	-.09
6. MCQ-C Total	.56**	.55**	.83**	.70**	.70**	—	.08	.13	.16	.11	.05	.06
7. LEAP-M	-.35**	-.16	-.14	-.06	-.22*	-.20*	—	.49**	-.29**	.10	.53**	.17
8. LEAP - F	-.06	.01	-.02	.21*	.01	.05	.30**	—	-.21*	-.21*	.21*	.65**
9. PCS - M	.45**	.30**	.33**	.25**	.27**	.41**	-.65**	-.14	—	.44**	-.36**	-.22*
10. PCS - F	.19*	.16	.24*	.06	.18	.25**	-.12	-.54**	.35**	—	-.08	-.44**
11. POPS-M	-.33**	-.12	-.06	-.11	-.15	-.13	.71**	.20*	-.63**	-.04	—	-.47**
12. POPS-F	-.04	.13	-.05	.18	.09	.07	.13	.73**	-.02	-.35**	.31**	—

Note: RCMAS = Revised Children's Manifest Anxiety Scale; SPR = Superstition, Punishment and Responsibility; MCQ-C = Metacognitions Questionnaire for Children; LEAP-M/F = Lum Emotional Availability of Parents, Mother/Father; PCS-M/F = Psychological Control Scale, Mother/Father; POPS-M/F = Perception of Parent Scale, Mother/Father.

^a The N s for girls and boys are that of participants' measures entered in stepwise regressions (see Tab. 3).

* $p \leq .05$; ** $p \leq .01$

For parenting dimensions, in female subsample negative correlations ($p < .01$) emerged between RCMAS scores and both emotional availability and autonomy-granting from mother; parental control perceived from mother (p

< .01) and father ($p < .05$) resulted positively correlated with anxiety levels. For boys, negative correlations emerged between RCMAS scores and emotional availability, larger for fathers ($p < .01$) than mothers ($p < .05$) and between RCMAS scores and paternal autonomy granting ($p < .01$). Finally, positive associations emerged between RCMAS scores and perceived paternal ($p < .01$) and maternal control ($p < .05$).

2.3.3. Predictors of anxiety levels

Finally, as gender differences emerged from correlations between variables, two separate stepwise linear regressions were calculated to test the predictors of anxiety levels for male and female participants (Tab. 3). For boys, a model with three factors explained the largest variance proportion ($R_c^2 = .35$): negative meta-worry was the most robust predictor of anxiety ($R_c^2 = .22$), followed by low paternal emotional availability (LEAP-F, R_c^2 change = .10) and paternal psychological control (PCS-F, R_c^2 change = .03) in the second and third step. For girls, the regression procedure produced a model with three factors (MCQ-C negative meta-worry, poor maternal support and cognitive monitoring) as explaining the largest variance proportion ($R_c^2 = .41$). In the first step, negative meta-worry resulted the most robust predictor of anxiety ($R_c^2 = .30$), followed by low maternal autonomy granting (POPS-M, R_c^2 change = .09) and cognitive monitoring (R_c^2 change = .02) as significant variables contributing to anxiety RCMAS scores.

Table 3 - Stepwise linear regression analyses predicting anxiety (RCMAS) for boys and girls separately

Group	Model	Predictor variables	B	SE B	β	t	R_c^2	F for ΔR^2
Boys	Step 1	Negative Meta-worry	.59	.12	.48	5.10***	.22	25.97***
	Step 2	Negative Meta-worry	.62	.11	.50	5.71***	.32	14.47***
		LEAP-F	-1.89	.50	-.33	-3.80***		
	Step 3	Negative Meta-worry	.59	.11	.47	5.49***	.35	5.16*
		LEAP-F	5.13	1.53	.29	-3.29**		
			PCS-F	-2.22	0.67	-.28	2.27*	

	Step 1	Negative Meta-worry	.78	.13	.56	6.17 ^{***}	.30	38.07 ^{***}
Girls	Step 2	Negative Meta-worry	.76	.12	.54	6.35 ^{***}	.39	12.50 ^{**}
		POPS-M	-1.98	.56	-.30	-3.54 ^{***}		
	Step 3	Negative Meta-worry	.67	.13	.47	5.36 ^{***}	.41	4.38 [*]
POPS-M		-1.87	.55	-.28	-3.38 ^{**}			
		Cognitive Monitoring	.59	.28	.19	2.09 [*]		

Note: LEAP-F = paternal emotional availability; PCS-F = paternal psychological control; POPS-M = mother support.

^{**} $p < .01$. ^{***} $p < .001$

3. Study 2

In Study 2 metacognitive beliefs about worry and perceived parenting were compared between non clinical and anxiety-referred adolescents. The scope is to explore which metacognitive beliefs about worry differentiate adolescents suffering of anxiety to non-clinical control, so offering a contribute to better comprehend the nature of “pathological” worry in childhood. We hypothesized that higher negative beliefs about worry, that resulted the most robust predictor of anxiety levels in Study 1, could differentiate non clinical adolescents from anxiety-referred adolescents. In addition, higher perceived parental control, together with lower emotional availability and autonomy-granting is expected to be reported by adolescents suffering of diagnosed anxiety.

3.1. Method

3.1.1. Participants and procedure

The clinical sample consists of 19 youths (9 males and 10 females) aged between 12 and 17 years ($M = 14.9$; $SD = 1.6$). Participants were recruited among teenagers who arrived for emotional or anxiety problems at the Division of Child Clinical Neurology and Psychiatric of the University Hospital. Diagnoses were made by a child psychiatrist according DSM-5 criteria after parents’ reports and a semi-structured clinical interview with the youth. Severity of anxiety symptoms was assessed by RCMAS-2 (Reynolds & Richmond, 2008; Italian adaptation by Sozzari, Sella, & Di Pietro, 2012) with the scope to obtain measures comparable with nonclinical sample. Five youth were excluded because their RCMAS-2 scores did not reach the clinical severity cut-off according to the age-related Italian norms.

The final clinical sample was then composed by 14 young people (6 males and 8 females) who meet the criteria for a principal anxiety disorder diagnosis (GAD, $n = 3$), anxiety disorder other than GAD ($n = 8$ including social phobia, panic disorder, obsessive-compulsive disorder and anxiety not otherwise specified) and anxiety with other comorbid disorders ($n = 3$, post-traumatic stress disorder, deflected mood and/or social inhibition). A post-graduated psychology student then administered to the youths the rating scales assessing parenting and metacognitive beliefs about worry (*see* section measures on Study 1).

The nonclinical sample was composed of an equal number ($n = 14$) of participants from Study 1 randomly selected and paired by age and gender to clinical youths.

3.1.2. Measures

The measures were the same *self-report* questionnaires (RCMAS-2, MCQ-C, LEAP, PCS and POPS) as described in Study 1.

3.2. Data analysis

A MANOVA was run to test the differences between clinical group (anxiety-referred adolescents) and non-clinical group (community control) in MCQ-C subscales scores. Second, a series of *t-test* were calculated for comparing the means of MCQ-C total score and parenting measures (LEAP, PCS and POPS) between the two groups (anxiety referred adolescents *vs.* non-clinical group). Finally, Pearson product-moment correlations between anxiety (RCMAS), metacognition (MCQ-C) and parenting measures (LEAP, PCS and POPS) were calculated separately for clinical *vs.* non-clinical adolescents.

3.3. Results

3.3.1. Group comparisons

Table 4 displays means and *SDs*, group comparisons and effect size indexes for all measures. The clinical group reported higher metacognitive scores (MCQ-C) than the non-clinical group and higher scores on negative meta-worry and cognitive monitoring subscales. No differences emerged for parenting measures, with the exception of maternal autonomy-granting (POPS-M) where non-clinical group reported significantly higher scores than anxiety-referred group.

Table 4 - *Descriptive statistics and group comparisons (anxiety-referred vs. not-clinical adolescents) for anxiety scores, parenting measures and metacognitive beliefs*

Measures	Mean (SD)		Comparison	Effect size
	Anxiety-referred (n = 14)	Non-clinical (n = 14)	t (26)	Cohen's d
<i>Anxiety</i>				
(RCMAS, T-points)	61.64 (10.35)	39.29 (3.73)	7.60***	2.87
<i>Emotional Availability</i>				
Mother (LEAP-M)	4.50 (.86)	5.04 (.77)	-1.74	-.66
Father (LEAP-F)	3.40 (1.59)	4.43 (1.33)	-1.83	-.70
<i>Parental Control</i>				
Mother (PCS-M)	1.68 (.26)	1.45 (.45)	1.60	.62
Father (PCS-F)	1.45 (.33)	1.36 (.38)	.68	.25
<i>Parental autonomy-granting</i>				
Mother (POPS-M)	4.47 (.93)	5.70 (1.02)	-3.26**	-1.26
Father (POPS-F)	4.53 (1.40)	5.20 (1.08)	-1.35	-.54
<i>Meta-cognitions</i>				
MCQ-C Total score	65.00 (8.45)	52.86 (11.54)	3.18 **	1.20
			<i>F</i> _(1, 26)	
Positive Meta-worry	10.50 (2.57)	12.07 (3.91)	1.58	-0.47
Negative Meta-worry	24.14 (6.14)	14.64 (4.40)	22.17***	1.78
Cognitive Monitoring	16.29 (3.43)	12.79 (2.72)	8.95**	1.13
SPR	14.07 (2.37)	13.36 (3.61)	.38	.23

* $p < .05$; ** $p < .01$; *** $p < .001$

3.3.2. Relationships between meta-cognition, parenting and anxiety measures

Pearson's coefficients were calculated separately for anxiety-referred and non-clinical adolescents (Tab. 5). Consistently with the hypothesis, in the clinical group a positive correlation resulted between anxiety levels (RCMAS) and negative meta-worry beliefs ($p < .05$); a strong negative correlation ($p < .01$) emerged also between anxiety levels and positive meta-worry beliefs. Among parenting measures, negative correlations emerged between anxiety levels and paternal emotional availability ($p < .05$) and autonomy-granting ($p < .01$).

No significant correlations were found between anxiety levels, metacognitive beliefs and perceived parenting behaviors in non-clinical group.

Table 5 - Pearson's coefficients for anxiety referred group ($n = 14$; below the diagonal) and non-clinical group ($n = 14$; above the diagonal)

Study Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Anxiety RCMAS	—	.38	.42	.34	.38	.49	-.11	.19	-.08	-.11	.35	.51
2. Positive Meta-worry	-.68**	—	.69**	.38	.47	.84**	-.43	.28	.65*	.54*	-.12	.52
3. Negative Meta-worry	.56**	-.41	—	.48	.47	.88**	-.15	.12	.40	.45	-.01	.36
4. Cognitive Monitoring	.08	-.15	.42	—	.33	.65*	.23	.13	.25	.37	-.02	-.05
5. SPR	-.06	-.29	.18	.36	—	.73**	-.04	.60*	.22	.10	-.09	.50
6. MCQ-C Total	.22	-.14	.82**	.77**	.47	—	-.16	.36	.50	.47	-.10	.46
7. LEAP-M	-.37	.44	.17	-.002	.51	.40	—	.35	-.57*	-.28	.55*	.07
8. LEAP - F	-.58*	.63*	-.06	.20	.21	.27	.65*	—	-.21	-.32	.26	.76**
9. PCS - M	-.10	-.01	.17	.34	-.04	.24	-.23	-.15	—	.82**	.55*	-.06
10. PCS - F	.23	-.13	.22	.04	-.45	.01	-.26	-.49	.40	—	-.34	-.14
11. POPS-M	-.38	.47	-.64*	-.48	.10	-.49	.32	.28	-.39	-.42	—	.49
12. POPS-F	-.78**	.80**	-.39	.03	.15	.01	.54	.74**	-.18	-.50	.66*	—

Note: RCMAS = Revised Children's Manifest Anxiety Scale; SPR = Superstition, Punishment and Responsibility; MCQ-C = Metacognitions Questionnaire for Children; LEAP-M/F = Lum Emotional Availability of Parents, Mother/Father; PCS-M/F = Psychological Control Scale, Mother/Father; POPS-M/F = Perception of Parent Scale, Mother/Father.

* $p \leq .05$; ** $p \leq .01$

4. Discussion

This study aimed to explore metacognitive beliefs in predicting adolescents' anxiety, following suggestions from Wells (2000) on the role played by positive and negative meta-worry in adults' anxiety disorders. The developmental perspective suggested also to assess how parenting factors may contribute to anxiety, since child-perceived behaviors (particularly, low supporting and high controlling parenting) increase children's vulnerability to develop internalizing disorders (McLeod *et al.*, 2007).

Consistently with Wells' metacognitive model and our hypotheses, youth high worriers reported more anxiety levels, and the negative beliefs about worry (i.e., danger and uncontrollability) resulted the most robust predictor of anxiety symptoms (study 1). In addition, anxious-referred adolescents reported higher levels of negative metacognitive beliefs about worry than non clinical control (study 2). These dysfunctional worry-specific beliefs appear a key component of anxiety symptoms both in adults as well in children, since they are activate by children as young 13 years old and they did not increase with age (Cartwright-Hatton *et al.*, 2004). These findings are quite similar to studies involving adults with emotional disturbances. Davis and Valentiner (2000), among others, found that negative meta-worry beliefs differentiate adults with GAD from individuals without clinical symptoms. According to Wells (1995), positive worry beliefs motivate individuals to engage worry (for example, like as coping strategy), but when worry becomes uncontrollable the negative beliefs are activated, so the person focuses on monitoring these cognitions (e.g., worry damages memory or thinking) maintaining emotional distress.

In present study an association between anxiety levels and positive thoughts (i.e., worrying is useful in problem-solving) emerged for girls only, but positive meta-worry did not differ between non-clinical controls and clinically-anxious adolescents. In addition, an unexpected result is the negative correlation between positive meta-worry and anxiety levels in anxiety-referred adolescents. Wells (1995) believes that it is relatively "normal" for individuals to active positive meta-worry, since worry as coping strategy is advantageous and prepares to avoid negative future outcomes. Data from anxious-referred group in the present study suggest that focusing on the "benefits" of worry may contain adolescent's anxiety. However, findings about the role of positive meta-worry in childhood anxiety disorders remain mixed in literature. Ellis and Hudson (2011) found that anxiety-disordered adolescents reported more positive beliefs about their worry than non-anxious control. Esbjörn and colleagues (2015) suggest that an increased attention to positive meta-beliefs may be indicative of children at risk for developing anxiety disorders, and GAD specifically. In fact the levels of positive meta-worry resulted higher *only* for adolescents suffering of GAD (not other emotional disorders), so putting these findings in line with Wells' model of GAD in adults. The question that remains open is how these positive meta-worry beliefs become "pathological" for children. Esbjörn and collaborators (2015) propose that the duration of the anxiety disorder and the severity of the emotional suffering experienced

could be linked to increased levels of positive meta-worry. In other words, when anxiety becomes pervasive and pathological, children revalue the usefulness of worrying and begin to focus on dangers it causes or to the efforts to stop worrisome thoughts (that is, *worry about worry*). Unfortunately in present study the adolescents with diagnosed GAD were very few, so collecting new data with a larger clinical sample is necessary for comprehending the development and the pathological nature of worry in adolescents suffering of severe anxiety disorders.

This study also found higher cognitive monitoring levels in anxiety-referred group than in non-clinical group. This metacognitive beliefs refer to the ability to assess one's own thoughts and to the awareness of the cognitive processes. Cognitive development makes adolescents aware of their thinking processes (Bacow *et al.*, 2009), but it is not clear to what extent this awareness about thinking is a "normative" or dysfunctional process. In addition, the adaptive or dysfunctional nature of cognitive monitoring seems linked to specific anxiety disorders, not only to age differences. In a clinical sample of preadolescents (mean ages 11 y.o.) with anxiety disorders, Bacow and colleagues (2010) found opposite findings, that is a greater degree of cognitive monitoring in healthy controls than in children suffering of separation anxiety disorder. All these studies lead us to think that distinct metacognitive processes could be *specific* to particular anxiety disorders and their influence could be age-related. Following Vasey (1993), we can suppose that youth with anxiety disorders lack to recognize when they are involved in anxious self-talk, but in different ways: in some cases the level of cognitive monitoring could be excessive (e.g., rumination about their own thoughts), in other cases it could be too poor (e.g., cognitive avoidance) with different influences in affective arousal and distress experienced by children.

Regarding gender differences, girls obtain higher anxiety levels than boys, confirming their greater vulnerability to internalizing disorders (Rapee *et al.*, 2009), but boys and girls report similar levels of metacognition (MCQ-C total), as already observed by Cartwright-Hatton and colleagues (2004) and Ellis and Hudson (2011). In present study some gender differences emerged analyzing specific metacognitive beliefs about worry (as measured by MCQ-C subscales). First, higher positive meta-cognitive beliefs emerged for boys, which is a result we did not anticipated, but there is no relationship between positive beliefs and reported anxiety levels. For girls instead positive metacognitions are associated to increased anxiety. Second, higher anxiety levels resulted linked with a greater amount of SPR

beliefs. Previous studies employing MCQ-C questionnaire report positive associations between SPR scale and anxiety levels in community (Benedetto *et al.*, 2013) and clinical samples (Ellis & Hudson, 2011). The SPR scale assesses negative beliefs about thinking in general (e.g., “if a person can’t stop her/his thoughts, bad things will happen”), whereas negative beliefs enclose “worrying about worry”, that is, worrying as a harmful mechanism of thought (e.g., it can affect concentration or make people mad). According to Wells (2005), SPR beliefs maintain anxiety because worrying leads the individual to negative appraisal of the worrying process itself and are associated with obsessive compulsive disorders in adults (Wells, 1995). The relative role of SPR beliefs is less explored in developmental literature, but some studies suggest age-related differences: associations with anxiety symptoms were found in adolescents (Ellis & Hudson, 2011), not in children (Smith & Hudson, 2013). SPR beliefs are abstract and involve processing future possibilities, so it is plausible that they become more influential in adolescence (Vasey & Dalaiden, 1994). Therefore, from a developmental perspective more research is needed to clarify the potential influence of these meta-worry beliefs on specific childhood anxiety disorders, as observed with adults. Third, although no gender differences emerged for cognitive monitoring subscale, for girls only cognitive monitoring is a predictor that contributes even if to minimum to anxiety levels. Taken together these finding suggest that girls who have a greater awareness of their internal states or feel responsible for their thinking tend to be more anxious and vulnerable to worry (Muris *et al.*, 1998). The existence of gender differences in metacognition remains a research area to be explored, even because other individual variables as coping, intolerance of uncertainty, or mental health (Barahmand, 2008; Thielsch *et al.*, 2015) can intervene influencing worry-related beliefs and the adolescents’ anxiety.

Among parenting factors, high perceived control, low emotional availability and autonomy-granting resulted linked to anxiety symptoms, but some gender differences emerged into parent-adolescent pairs. Generally, parenting influences resulted paired according to gender, that is, perceived maternal behaviors predicted anxiety in girls, and paternal behaviors in boys. First, as expected (Ballash *et al.*, 2006) both mothering and fathering control are positively associated with anxiety, with girls reporting higher levels of maternal control than boys. Secondly, adolescents who perceive their mothers as “emotionally responsive” display lower levels of anxiety. These data confirm the protective role of maternal warmth for children exposed to stressful situations (Bosco, Renk, Dinger, Epstein, & Phares,

2003). In addition, high levels of warmth displayed by mothers appear to neutralize the negative impact of maternal intrusiveness and poor autonomy-granting on children anxiety (Raudino, Murray, Turner, & Cooper, 2013). Third, the support of the autonomy changes according to adolescent's gender into the pair mother/father-child. In males, anxiety levels correlate negatively with low paternal and maternal autonomy-granting, in females with maternal autonomy-granting. Girls perceive less maternal support for their autonomy than boys, in line with other developmental studies (Cicognani, 2002), and this low support from their mothers predicted higher anxiety levels.

Therefore, this study contributed to explore perceived parenting desegregating results for fathers and mothers and for the adolescent's gender. Having considered paternal and maternal parenting separately is a strength of this study, since research on parenting and childhood anxiety generally focus on maternal behavior. The results from present study suggest possible pathways of relationship between perceived parenting, adolescent's gender and anxiety symptoms. A limitation in this sense may have been the sample size. Finding about the role of child's gender in mediating links between parenting and child anxiety are contradictory (Verhoeven, Bögels, & van der Bruggen, 2012). The patterns of results are complex because of children' ages, dimensions of parenting explored (i.e., autonomy-granting, overcontrol, etc.) and methods of parenting assessment (i.e., parent *vs.* child report) change across studies.

Regression analysis, however, indicated that negative meta-worry beliefs, rather than perceived parenting style, are the most robust predictors of anxiety symptoms, followed by cognitive monitoring for girls. Parenting dimensions accounting an additional variance of anxiety levels are low maternal autonomy-granting for girls, low paternal emotional availability and high control for boys. The modest contribution of parenting behaviors on adolescent's anxiety levels is not surprising, since several studies and meta-analysis report modest size effects (van der Bruggen, Stams, & Bögels, 2008). Recent studies also suggest both direct and indirect effects of parenting on children's anxiety. Lønfeldt and colleagues (2017), among others, found that low autonomy granting and high psychological control predicted worry-related beliefs in children, who in turn were associated to children's anxiety levels. Anyway, the differential role of maternal/paternal behaviors remains complex to explain (Bynion, Blumenthal, Bilsky, Cloutier, & Leen-Feldner, 2017) and some limitations of this research do not

allow to attribute any causal role to meta-worry beliefs or parenting as a factor explaining the genesis of adolescent's anxiety.

First, parent-child bidirectional influences must be remembered because parental behaviors may increase the risk of anxiety in the child, as well as child's anxious behavior could elicit in turn ineffective parenting. For example, behaviors limiting autonomy in anxious children could be an attempt by the parent to reduce his/her distress, but over the long-term parenting behaviors can reduce in children the opportunity to cope unusual situations and trigger a sensation of uncertain and worry. A second limit derives from adolescents' reports for assessing parenting variables and anxiety symptoms in Study 1. Despite the well-know weaknesses of self-report questionnaire and the risks for bias in children's responses (Taber, 2010), there are some reasons for this choice. Perceived parenting provides authentic information regarding subjective experience in parent-child relationship. Moreover, adolescents' measures on parenting practices are linked with a greater number of behavioral or emotional problems than were parent report (Barry, Frick, & Grafeman, 2008). For example, a source of bias could be adolescents' anxiety levels: in fact, it was observed that anxious adolescents, compared to non-clinical control, tend to report higher levels of maternal negativity or anxious parenting. Therefore their responses may be more a reflection of anxious cognitions than their parents' behaviors (Waite *et al.*, 2014). This explains why most authors prefer to include both parents' and adolescents' measures of parenting (e.g., Wilson, Budd, Chernin, King, Leddy, Maclennan *et al.*, 2011).

Regarding the assessment of anxiety symptoms, this study must be replicated with a larger sample of adolescents diagnosed for GAD or other types of anxiety disorders. The small group of anxiety-referred adolescent involved is a limitation of this study, particularly because it did not allow to differentiate young patients with GAD from other emotional symptoms (e.g., obsessive-compulsive, social phobia, etc.). Wilson (2010) states that the most stringent way for comprehending how meta-worry beliefs relate to anxiety is to study children with GAD. In fact, excessive and uncontrollable worry may be a significant component of other anxiety conditions, but not the *primary* symptom as in GAD. Future research comparing GAD with other internalizing disorders could offer further support to the meta-cognitive model with young populations, and clarify which patterns of meta-cognitive beliefs (i.e., meta-worry, cognitive monitoring or SPR thoughts) increase the individual vulnerability to specific anxiety disorders.

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