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Gender Differences in Cognitive Vulnerability to Depression and Behavior Problems in Adolescents

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This study assessed gender differences in cognitive variables as an explanation for gender differences in depression and behavior problems; 856 adolescents (491 females and 365 males), aged 14–17, completed the Irrational Beliefs Scale for Adolescents, the Social Problem Solving Inventory—Revised Short Form, the adolescent version of the Burnett Self-Talk Inventory, and the Youth Self Report. Female adolescents' lower levels of positive thinking and higher scores on negative problem orientation, need for approval and success, and self-focused negative cognitions partially mediated gender differences in depressive symptoms. Males' higher scores on justification of violence beliefs and the impulsivity/carelessness style of problem solving partially accounted for differences in delinquent behavior. The influence of need for approval and success on depressive symptoms was higher among adolescents at ages 14–15 than among older adolescents. Justification of violence did not influence delinquent behavior among girls at age 14–15.

KEY WORDS: gender; automatic thoughts; problem-solving; irrational beliefs; depression; behavior problems.

Epidemiological research has consistently demonstrated that whereas women present a higher prevalence of internalizing problems, such as affective and anxiety disorders, men have higher rates of some personality disorders, such as antisocial personality disorder and substance abuse (Simon, 2002). Most theories of gender differences in psychological disorders have focused on depression. Early research emphasized macrosocial risk factors for depression, such as poverty, low educational status, poorer employment opportunities, and lack of control over decision making, and suggested that they are unequally distributed between sexes in several cultures (Nolen-Hoeksema, Larson, & Grayson, 1999). In addition, role–gender interaction theory proposes that the lower social status of women negatively influences the quality of their social roles (Gove, 1972). The unrewarding and stressful nature of these roles may account for the higher rate of depression in women.

Nonetheless, recent research suggests that gender differences in psychological problems are evident during childhood and adolescence, prior to the acquisition of adult social roles. Therefore, role–gender interaction theory alone cannot account for the differences. For instance, gender differences in depression begin to emerge at age 14 (Wade, Cairney, & Pevalin, 2002), and during the period from ages 15 to 18 the female rate of depression rises to double the prevalence rate for males (Hankin et al., 1998). In addition, gender differences in behavior problems, such as aggressive behavior and antisocial behavior, are also evident during childhood and adolescence, with boys showing higher rates of these problems than girls (e.g., Keiley, Bates, Dodge, & Pettit, 2000; Lahey et al., 2000).

As an alternative explanation, a number of recent theoretical models have hypothesized that cognitive style may account for gender differences in depression (Cyranowski, Frank, Young, & Shear, 2000; Hankin & Abramson, 2001). For instance, Hankin and Abramson (2001) proposed a cognitive vulnerability-transactional stress theory of depression, in which girls' responses to negative events would be characterized by rumination and a negative inferential style. Although a few studies have failed to support this hypothesis (Hankin, Abramson, &

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Siler, 2001; Lewinsohn, Joiner, & Rohde, 2001), Hankin and Abramson (2002) found that cognitive characteristics, such as negative inferences about the self, mediated gender differences in depressive symptoms. These authors suggested that lack of prior support for the model could be due to problems with the reliability of measures of cognitive vulnerability.

As an extension of the above model, we examined whether male and female adolescents differ in a wide range of cognitive variables, which in turn may be associated with differential development of depression and behavior problems. One of the difficulties in addressing gender differences in cognitive variables is the complexity of both the content of cognitions and their hierarchical arrangement. Beck's (1976) cognitive content-specificity model stated that each emotional disorder is characterized by a cognitive content that is specific to that disorder. Applying this idea to gender differences in psychological disorders, it could be argued that females present a higher prevalence of cognitions that may be associated with the development and/or maintenance of depression, whereas males present more cognitions related to behavior problems. In other words, men and women may develop different profiles of psychological disorders because they think and interpret events in different ways. For instance, according to the cognitive content-specificity model, depression, which is more prevalent among women, is characterized by a predominance of negative cognitions related to themes of loss, deprivation, failure, and personal inadequacy (Clark, Beck, & Brown, 1989), whereas behavior problems, which are more prevalent among men, have been associated with perceptions of negative intentions in other people, underestimation of one's own responsibility for conflicts (e.g., Dodge & Crick, 1990; Lochman, White, & Wayland, 1991), and perceptions of frustration and discomfort (Berkowitz, 1989).

Cognitive contents can also be expressed at different levels. Beck proposed a hierarchical model that includes surface cognitions and underlying cognitive structures to explain the cognitive influence on affective disorders (Beck, 1976). Later, a number of authors (e.g., Ingram & Kendall, 1986) subdivided cognitive variables into cognitive structures, cognitive processes, and cognitive products. At the deepest level, cognitive structures consist of schemas or core beliefs about the self, the world, and the relations with other persons. Ellis (1962) identified a number of irrational beliefs considered to be critical determinants of psychopathology, such as the need for approval, low frustration tolerance, and perfectionism. Several studies have obtained evidence for the link between irrational beliefs and depression (e.g., Chang & D'Zurilla, 1996; Marcotte, 1996). In addition, some studies suggest that externalizing problems, such as aggressive behavior, are associated with specific beliefs concerning the justification for the use of aggression (Feindler, 1991; Slaby & Guerra, 1988).

In general, the relatively few studies that have explored gender differences in core beliefs have been based on adult samples. For instance, some studies suggest that women endorse more beliefs involving dependency and need for approval (Coleman & Ganong, 1987; Koopmans, Sanderman, Timmerman, & Emmelkamp, 1994). Welburn, Coristine, Dagg, Pontefract, and Jordan (2002) found that women scored higher on various cognitive schemas, such as self-sacrifice, failure, enmeshment, abandonment, and defectiveness/shame, which are associated with depression (Calvete, Estévez, López de Arroyabe, & Ruiz, 2005). In addition, various studies with children and adolescents indicate that boys endorse beliefs that involve acceptance of aggression to a greater extent than girls (Huesmann & Guerra, 1997; Slaby & Guerra, 1988).

At an intermediate level, social problem solving involves a process by which a person attempts to develop effective or adaptive coping responses to problematic situations. This process includes several cognitive components, such as problem evaluation, seeking response alternatives, and planning (D'Zurilla, Nezu, & Maydeu-Olivares, 1998). A number of studies indicate that not only are the specific problem-solving skills associated with psychological problems, but also the attitude toward the problems. In fact, a negative problem orientation, consisting of low perceived self-efficacy and a perception of the problems as threatening and unsolvable, may be a stronger predictor of depression (Kant, D'Zurilla, & Maydeu-Olivares, 1997; McCabe, Blankstein, & Mills, 1999; Spence, Sheffield, & Donovan, 2002). In addition, deficits in problem solving, often manifested as impulsive behavior, are associated with aggressive and delinquent behavior in children and adolescents (D'Zurilla, Chang, & Sanna, 2003; Feindler, 1991; Jaffe & D'Zurilla, 2003; Lochman & Dodge, 1994; Slaby & Guerra, 1988). Overall, studies support the existence of gender differences in social problem-solving processes, with women showing a more negative orientation to problems (Maydeu-Olivares, Rodríguez-Fornells, Gómez-Benito, & D'Zurilla, 2000; Robichaud, Dugas, & Conway, 2003) and men scoring higher on impulsivity (D'Zurilla, Maydeu-Olivares, & Kant, 1998).

Finally, at the most superficial level, cognitive products are expressed in automatic thoughts. Several studies have supported the impact of negative automatic thoughts on affective disorders (e.g., Kendall, 1984; Treadwell & Kendall, 1996), although a recent interest

has emerged in relation to the role of the balance between positive and negative thoughts. This idea has been proposed in Schwartz and Garamoni's (1989) states-of-mind (SOM) model of cognitive balance, which establishes that a specific proportion of negative-to-positive self-statements accounts for optimal emotional adjustment, and that dysfunction occurs when this ratio shifts. Gender differences in automatic thoughts constitute a relatively unexplored issue. A few studies have found that females score higher than men on cognitions related to anxiety and depression (e.g., Jolly, Dyck, Kramer, & Wherry, 1994), whereas other studies have not found gender differences (Fichten, Amsel, Robillard, & Tagalakis, 1991; Prins & Hanewald, 1997).

The first purpose of this study was to test whether cognitive variables mediate gender differences in depressive symptoms and behavior problems in adolescents. In the mediational models tested in this study, gender was hypothesized to be linked with a number of cognitive variables, which would in turn be associated with psychological symptoms. The variables of interest were irrational beliefs, problem-solving components, and automatic thoughts. These variables were chosen because they represent the aforementioned levels of the hierarchical cognitive model. It was expected that female adolescents would score higher on cognitive variables that are associated with depressive symptoms, whereas male adolescents would score higher on cognitive variables associated with behavior problems.

On the other hand, there is wide agreement that psychological problems in adolescents should be studied from a developmental perspective (Lahey et al., 2000). For instance, gender differences in depression and aggressive behavior increase from early adolescence to late adolescence (Hankin et al., 1998; Keltikangas-Järvinen, 2002), and various studies suggest that older teenagers report engaging in more delinquent behaviors that younger teenagers (Lahey et al., 2000). Moreover, the relation between cognitive variables and psychological symptoms could be moderated by age. For instance, cognitions related to acceptance by peers may be more influential at early stages of adolescence. Thus, a second aim was to examine whether the influence of gender on psychological problems via cognitive variables was moderated by age.

METHOD

Participants

The research was conducted in Bizkaia, a province in northern Spain. A total of 856 Caucasian adolescents from 13 schools participated in the study. From these schools, 38 groups were randomly selected, using a cluster sampling procedure and balancing variables such as educational model (compulsory secondary education, advanced secondary education, and intermediate vocational training), educational level, and district. Seventy percent of the adolescents lived in or around the area of the city of Bilbao, and the rest in rural areas. There were 491 (57.2%) females and 365 (42.8%) males, aged 14–17 ($M = 15.92$, $SD = 1.39$). There were 24 missing values for age. According to the information provided by the school staff about parental education, socioeconomic levels were represented with the following distribution: 9% low, 28% low-medium, 60% medium, and 3% high-medium levels.

Measures

Automatic thoughts were assessed by the Spanish version of the *Burnett Self-Talk Inventory* (BSTI, Burnett, 1996) for adolescents. Participants were asked whether they would say to themselves each of the 32 statements in response to 10 imaginary situations, using a *Yes* (3), *Sometimes* (2) and *No* (1) response format. The BSTI includes two scales: The Positive Self-Talk Scale and the Negative Self-Talk Scale, both with adequate reliability coefficients. The items in the positive self-talk category (16 items) reflect the use of cognitions aimed at directing thought or behavior and controlling emotions. In the Spanish version of the BSTI (Calvete & Cardeñoso, 2002), by means of rational analysis of item content, the items of the Negative Self-talk Scale were grouped into two subsets: Self-focused negative cognitions (9 items), and other-focused negative cognitions (7 items). The *other-focused negative* category refers to feeling embarrassed and the belief that the others will assess one's performance negatively; and items in the s*elf-focused negative* category reflect negative self-evaluation and self-blame. Alpha coefficients in the present study for positive self-talk, self-focused cognitions, and other-focused cognitions were .89, .69 and .72, respectively.

The SOM ratio was computed with the 16 positive and the 16 negative self-statements from the BSTI by dividing positive self-statement scores by the sum of positive-plus-negative self-statement scores. To compute SOM ratios, scores were transformed to anchor them at zero ($1 = 0, 2 = 1, 3 = 2$), following the recommendations from Amsel and Fichten (1998).

The Short Form of the Social Problem-Solving Inventory Revised (SPSI-R Short Form; D'Zurilla, Nezu, et al., 1998) was used to assess problem-solving dimensions. The SPSI-R Short Form is a 25-item self-report

instrument that measures two adaptive problem-solving dimensions (positive problem orientation and rational problem solving) and three dysfunctional dimensions (negative problem orientation, impulsivity/carelessness style, and avoidance style). Each item is rated on a 5-point scale ranging from *not at all true of me* (0) to *extremely true of me* (4). The *Positive Problem Orientation* dimension can be described as a problem-solving cognitive set that involves both the belief that problems are solvable (optimism) and the self-confidence to solve problems successfully (high self-efficacy). In contrast, *Negative Problem Orientation* consists of the general tendency to expect problems to be unsolvable (pessimism) and to lack self-efficacy in one's ability to solve problems successfully. The *Rational Problem Solving* factor may be defined as the rational, deliberate, and systematic application of adequate problem-solving principles and techniques. The *Impulsivity/Carelessness Style* is a problem-problem solving pattern characterized by active, impulsive, careless, and incomplete attempts to solve problems. Finally, the *Avoidance Style* is characterized by procrastination, passivity, and dependency (Maydeu-Olivares & D'Zurilla, 1996). Alpha coefficients for the subscales range from .72 to .85 (D'Zurilla, Nezu, et al., 1998). A recent study with the Spanish version of the SPSI-R Short Form confirmed its factor structure and obtained adequate alpha coefficients for the five subscales (Calvete & Cardeñoso, 2001). In this study, alpha coefficients were .55, .73, .66, .70, and .69 for positive orientation, negative orientation, rational solving, impulsivity, and avoidance, respectively.

The Irrational Beliefs Scale for Adolescents (IBSA; Cardeñoso & Calvete, 2004) consists of 37 Spanish items that adolescents score using a scale from 1 (*not at all*) to 4 (*completely true*). In this study the IBSA was used to assess the following categories of irrational beliefs: (1) Need for Approval and Success, which involves an over concern about the approval of others and the belief that one should be successful and thoroughly competent in all possible respects (e.g., When people reject me, I think I am not worth it), (2) Low Tolerance to Frustration, which consists of the idea that it is awful when things are not the way they should be and, hence it is appropriate to get upset when events are negative (e.g., I think I can't stand it when things are not going as I would like), (3) Justification of Violence, which involves the idea that aggression is adequate in a variety of situations (e.g., Sometimes you have to hit others because they deserve it) and that aggression enhances self-esteem and helps to maintain status among peers (e.g., It is better to have a row than let them think I am a coward). The IBSA has shown adequate reliability and factor structure (Cardeñoso & Calvete, 2004). In this study alpha coefficients for the three subscales were .71, .50, and .72, respectively.

The *Youth Self-Report* (YSR, Achenbach, 1991) measures an array of behavior problems. Broadband internalizing and externalizing factors can be scored, as well as specific subscales. The instrument has shown excellent reliability and validity, and discriminates between adolescent referred and not referred for mental health services. The Spanish version of the YSR has been studied in a large sample of Spanish adolescents ($n = 2833$) with good psychometric properties (Lemos, Vallejo, & Sandoval, 2002). In this study, the Spanish version was used, but only the items that were common for both sexes were selected. Behavior problems were assessed by the Aggressive Behavior and Delinquent Behavior subscales of the YSR. The Aggressive Behavior subscale includes symptoms such as temper, arguing a lot, demanding attention, and screaming. The Delinquent Behavior subscale includes symptoms such as drinking alcohol, using drugs, stealing, and vandalism. Depressive symptoms were assessed by the Affective Problems subscale from the YSR. This DSM-oriented subscale was constructed based on items selected to be consistent with the diagnostic categories of Major Depression and Dysthymic Disorder by experts around the world (Achenbach, Dumenci, & Rescorla, 2000). The Affective Problems subscale includes symptoms such as crying, worthless, sadness, and self-harm. The alpha coefficients for Aggressive Behavior, Delinquent Behavior, and Affective Problems were .72, .66 and .82, respectively. Each subscale has borderline and clinical cutoff scores based on the likelihood of referral for clinical services (Achenbach & Rescorla, 2001).

Procedure

The adolescents completed the questionnaires and demographic data in their classrooms. The study was presented as a research about the way young people think and behave in several areas of their lives. Responses were anonymous in order to guarantee honesty and participation was voluntary. Because there were no student names included on the surveys, the school staff chose to collect passive consent from parents. Parents were notified and given the option of refusing to allow their son/daughter's participation.[4] The participation rate was of 99%.

[4]Because the questionnaires were anonymous it was not possible to follow-up students whose responses suggested clinical need. Nonetheless, after the data collection, we provided the school staff with a report about overall findings of the study. This served to raise awareness of the possible presence of adolescents with high scores on depressive and behavior problems.

Participants were encouraged to ask questions if they had any trouble answering the instruments. The questionnaires took between 30 and 45 min to complete.

RESULTS

The Results section is divided into the following subsections: (a) analyses of gender and age differences in psychological problems and cognitive variables, (b) test of cognitive mediation, and (c) age as moderator of cognitive mediation.

Gender and Age Differences in Psychological Symptoms and Cognitive Variables

Differences in Psychological Symptoms

The adolescents were grouped into two groups (ages 14–15 and ages 16–17) and several Gender × Age ANOVAS were conducted. Girls obtained higher scores on depressive symptoms, whereas boys scored higher on delinquent behavior. There were no differences for aggressive behavior. The age and Gender × Age interactions were not significant. Because statistically significant effects may not be particularly meaningful in large samples, the interpretation of differences focused on effect sizes (see Table I). Cohen (1988) proposed small, medium, and large effect sizes (.2, .5, and .8) as a guide to interpret results. Using this guideline, a medium effect was found for depressive symptoms.

Using the clinical cutoff scores obtained in the Spanish national sample for the YSR subscales (Lemos et al., 2002), adolescents with scores within the borderline (percentile between 90 and 97) and clinical ranges (percentile $\geq$98) were identified. For depressive symptoms, 32 adolescents (5.30% of girls and 1.64% of boys) scored in the clinical range and 72 (14.66% of girls and 3.8% of boys) in the borderline range; for aggressive behavior, 28 (2.85% of girls and 3.84% of boys) in the clinical range and 75 (9.37% of girls and 7.95% of boys) in the borderline range; and for delinquent behavior, 36 (3.05% of girls and 5.75% of boys) in the clinical range and 119 (9.78% of girls and 19.45% of boys) in the borderline range.

Differences in Cognitive Variables

A series of Gender × Age Anovas was conducted to assess differences in cognitive variables. Significant main effects for gender were found for all cognitive variables (see Table I). Girls reported significantly more negative automatic thoughts, both self and other-focused cognitions, whereas boys scored higher on positive self-talk and SOM ratios. Differences were also evident in social problem-solving dimensions, with girls scoring higher on negative orientation, and boys scoring higher on positive orientation, rational solving, avoidance, and impulsivity. Finally, boys showed higher scores on justification of violence and low tolerance to frustration, whereas the girls scored higher on need for acceptance and success. Using the Cohen's guideline, a large effect was found for the gender difference in other-focused cognitions, and medium effects were found for gender differences in self-focused cognitions, SOM ratio, and justification of violence.

The effect of age was significant for self-focused cognitions, $F(1, 827) = 10.12$, $p < .05$, and need for acceptance, $F(1, 828) = 5.14$, $p < .05$. Younger adolescents scored higher on both variables ($M = 16.51$ and $SD = 4.04$ at ages 14–15 vs. $M = 15.69$ and $SD = 3.49$ at ages 16–17 for self-focused cognitions, *effect size* = .22; $M = 18.65$ and $SD = 4.22$ at ages 14–15 vs. $M = 17.87$ and $SD = 4.35$ at ages 16–17 for need for acceptance, *effect size* = .17). A significant interaction of gender and age was found for justification of violence, $F(1, 828) = 4.20$, $p < .05$, and low tolerance to frustration, $F(1, 828) = 4.58$, $p < .05$. Post hoc analyses indicated that these beliefs increased with age only among the boys ($M = 17.73$ and $SD = 4.29$ at ages 14–15 vs. $M = 18.20$ and $SD = 4.51$ at ages 16–17 for justification of violence; $M = 8.07$ and $SD = 2.07$ at ages 14–15 vs. $M = 8.48$ and $SD = 2.00$ at ages 16–17 for low tolerance to frustration), whereas they were similar at all ages among the girls.

To address whether gender differences in cognitive variables could be accounted for by differences in the rates of elevated scores within the clinical ranges for females and males, the analyses were repeated without these subgroups and all gender differences remained statistically significant.

Association Between Cognitive Variables and Symptoms of Depression and Delinquent Behavior

Cognitive mediation was studied for depressive symptoms and delinquent behavior, because male and female adolescents scored similarly on aggressive behavior.

Selection of Potential Cognitive Mediators

We conducted a series of stepwise multiple regression analyses to determine which cognitive variables were the best predictors of depressive symptoms and delinquent

Table I. Descriptive Statistics, and Effect Sizes for Differences in Psychological Symptoms and Cognitive Variables Between Female and Male Adolescents

	Females ($n = 491$)		Males ($n = 365$)				
	Mean	*SD*	Mean	*SD*	*df*	*F*	*Effect size*
Affective problems	5.02	3.73	3.04	3.00	1,853	67.75	.58**
Aggressive behavior	7.39	3.39	7.44	3.69	1,853	0.49	−.01
Delinquent behavior	2.44	2.03	3.36	2.36	1,853	37.10	−.42**
Positive self-talk	37.45	5.09	38.74	4.99	1,827	11.72	−.26**
Other-focused negative cognitions	13.56	2.98	11.20	2.91	1,827	130.42	.80**
Self-focused negative cognitions	16.77	3.84	14.92	3.43	1,827	48.67	.50**
SOM ratio	.61	.14	.70	.14	1,827	90.57	−.64**
Positive problem orientation	10.42	3.47	11.90	3.24	1,813	37.91	−.43**
Negative problem orientation	10.00	3.79	8.38	3.71	1,813	35.33	.44**
Rational problem solving	10.71	3.37	11.31	3.57	1,813	7.34	−.17*
Impulsivity/carelessness style	5.28	3.83	6.63	3.64	1,813	22.74	−.36**
Avoidance style	5.26	3.80	6.44	3.84	1,813	18.63	−.31**
Justification of violence	15.53	3.78	18.02	4.42	1,828	67.95	−.61**
Low tolerance to frustration	7.95	1.99	8.31	2.04	1,828	4.45	−.18*
Need for approval and success	18.90	4.47	17.22	3.98	1,828	33.32	.39**

Note. A positive effect size indicates a higher score for the females sample.
* $p < .05$. ** $p < .001$.

behavior. In the first regression analysis, affective problems were used as the criterion variable and all cognitive variables were entered into the equation so that the predictor variable that contributed the most toward the prediction of R^2 was entered first. Additional predictors were added in the same way until no more variance could be accounted for. The following five variables were included as predictors in the equation: Negative orientation, $\beta = .30$, $t(826) = 8.55$, $p < .001$; need for acceptance, $\beta = .23$, $t(826) = 6.67$, $p < .001$; self-focused cognitions, $\beta = .10$, $t(826) = 2.48$, $p < .05$; positive self-talk, $\beta = -.09$, $t(826) = -3.04$, $p < .01$; and other-focused cognitions, $\beta = .10$, $t(826) = 2.58$, $p < .01$. This model accounted for 39% of the variance of affective problems.

To further explore whether these cognitive variables were associated with depressive symptoms at the clinical level, the borderline group and the clinical group were compared with the normal group (percentile $\leq$90, $n = 714$). Table II presents the means and standard deviations of the cognitive variables in the three groups. The analysis of variance revealed significant differences in the five cognitive variables across the three groups, $p < .001$. Adolescents in the clinical group scored significantly higher on all variables. All post hoc comparisons (Tukey method) were statistically significant at $p < .05$ for negative orientation, need for acceptance, other-focused cognitions, and self-focused cognitions. In addition, adolescents in the normal range scored higher on positive thoughts than adolescents in the borderline and clinical range.

In a second stepwise regression, delinquent behavior scores were used as the criterion variable and the cognitive variables served as predictors. Four subscales were entered into the equation: Justification of violence, $\beta = .24$, $t(823) = 7.24$, $p < .001$; impulsivity, $\beta = .22$, $t(823) = 6.68$, $p < .001$; low tolerance to frustration, $\beta = .10$, $t(823) = 3.05$, $p < .05$; and other-focused cognitions, $\beta = -.08$, $t(823) = -2.46$, $p < .05$. This model accounted for 18% of the variance in delinquent behavior scores.

Adolescents within the normal, borderline, and clinical range in delinquent behavior were compared on the four cognitive variables. The analysis of variance showed significant differences in impulsivity, justification of violence, and low tolerance to frustration. All post hoc group comparisons were statistically significant for justification of violence, and the adolescents in the clinical and borderline range of delinquent behavior scored significantly higher on impulsivity and low tolerance to frustration than the adolescents in the normal group.

Test of Mediation for Affective Problems

To test the hypothesis that cognitive variables would mediate the effect of gender differences on depressive symptoms, we followed the criteria and recommendations established by several authors (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004; Holmbeck, 1997). According to these criteria, in the first step, gender must be significantly associated with affective problems. In the second step, gender must be significantly associated with the

Table II. Differences in Cognitive Variables Between Normal, Borderline, and Clinical Subgroups

	Normal range, $n = 714$		Borderline range, $n = 70$		Clinical range, $n = 31$		
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*(2, 826)
Subgroups for affective problems							
Negative orientation	8.78	3,66	12.46	3.18	14.42	3.44	67.03**
Need for approval	17.65	4.04	21.04	4.13	24.45	4.46	60.29**
Other-focused cognitions	12.25	3.04	14.19	2.80	16.03	3.16	34.36**
Self-focused cognitions	15.62	3.56	18.30	3.52	20.35	4.07	41.62**
Positive self-talk	38.32	4.95	36.36	5.13	34.28	5.73	14.37**
	Normal range, $n = 662$		Borderline range, $n = 119$		Clinical range, $n = 34$		
Subgroups for delinquent behavior							
Impulsivity/carelessness style	5.39	3.61	7.77	3.88	7.79	4.66	26.00**
Justification of violence	16.06	3.84	18.11	4.64	21.35	5.08	28.11**
Low tolerance to frustration	7.95	1.96	8.69	2.08	8.91	2.23	9.88**
Other-focused cognitions	12.63	3.11	12.30	3.13	12.00	3.81	1.12 ns

$^{*}p < .05$. $^{**}p < .001$. *ns* = nonsignificant.

potential mediating variables. In the third step, the mediating variables must be associated with affective problems, when the effects of gender are controlled. In this study the third step was based on multiple-mediator analyses, rather than single-mediator analyses, because significant effects in single-mediator analyses for a particular mediator may be accounted for by the other mediators in the model (Mackinnon et al., 2001). The final step is to show that the strength of the association between gender and affective problems is significantly reduced when the mediators are added to the model. If perfect mediation is obtained, the gender effect will become zero, showing that cognitive variables fully mediate the relation. If the path between gender and affective problems remains significant, it suggests that cognitive variables are partial mediators.

Table III shows the results of these analyses. In the first step, gender significantly predicted affective problems. In the second step, each of the five potential cognitive mediators (negative orientation, need for acceptance, other-focused cognitions, positive self-talk, and self-focused cognitions) was regressed on gender to estimate paths between gender and cognitive variables. In the third stage, gender and the five cognitive variables were entered simultaneously in the equation as predictor variables. At this point, the regression coefficient of affective problems on other-focused cognitions was nonsignificant.[5] The other regression coefficients were significant, showing that negative orientation, need for acceptance, positive self-talk, and self-focused cognitions could act as mediators between gender and affective problems.

In this study, Sobel's equation was used to clarify the significance of individual mediating pathways (Sobel, 1982). The results of these tests were significant at $p < .001$ for negative orientation and need for acceptance (zs $= -5.16$ and -4.25, respectively), and at $p < .05$ for self-focused cognitions and positive self-talk (zs $= -2.24$ and -2.31, respectively). The unstandardized regression coefficient for gender on affective problems decreased from -1.97 to -0.79 in the third step, showing that 59.9% of the variability in the relationship between gender and psychological symptoms was explained as a function of the cognitive mediators (1.97–0.79/1.97). The proportions of the mediated effect attributable to each of the four mediators were 38.28, 28.26, 14, and 12.79% for negative orientation, need for acceptance, self-focused cognitions, and positive self-talk, respectively.

Test of Mediation for Delinquent Behavior

A similar procedure was used to test whether cognitive variables accounted for gender differences in delinquent behavior. As shown in Table IV, all conditions were met except for other-focused cognitions, because the path from these cognitions to delinquent behavior was not significant in the third step. The unstandardized regression coefficient for gender decreased from 0.96 to 0.36 in the third step, showing that 62.5% of the variability in the relationship between gender and psychological symptoms was explained as a function of the cognitive variables. Tests of significance of the mediating pathways showed that only justification of violence and impulsivity ac-

[5] At this step, the regression coefficient of affective problems on other-focused cognitions was significant using single-mediator analysis. Nonetheless, we preferred to base our results on a multiple-regression approach, which accounted better for the overlapping between cognitive variables.

Table III. Regression Analyses Testing Mediation of the Gender Difference in Affective Problems by Cognitive Variables

Predictor variable	*B*	*SE*	β	*t*	Step R^2	Criterion variable
Step 1					$R^2 = .074$, $F(1, 828) = 65^{**}$	
Gender	−1.97	.25	−.27	−8.23**		Affective problems
Step 2						
Gender	−1.64	.26	−.21	−6.28**		Negative orientation
Gender	−1.72	.30	−.19	−5.79**		Need for approval
Gender	−1.62	.32	−.17	−5.03**		Self-focused cognitions
Gender	−2.11	.29	−.24	−7.27**		Other-focused cognitions
Gender	1.28	.35	.13	3.54**		Positive self-talk
Step 3					$R^2 = .39$, $F(6, 822) = 87^{**}$	
Gender	−0.79	.21	−.11	−3.68*		Affective problems
Negative orientation	0.28	.03	.30	8.62**		Affective problems
Need for approval	0.19	.03	.23	6.84**		Affective problems
Self-focused cognitions	0.11	.04	.12	2.88*		Affective problems
Other-focused cognitions	0.07	.04	.06	1.50 *ns*		Affective problems
Positive self-talk	−0.06	.02	−.09	−3.67**		Affective problems

Note. Gender (0 = *female*; 1 = *male*).
* $p < .05$. ** $p < .001$. *ns* = nonsignificant.

counted for gender influence on delinquent behavior (zs = 4.91 and 3.84, respectively, $p < .001$). The proportion of the mediated effect attributable to justification of violence and impulsivity was 53.50% and 28%, respectively.

Age Moderation of Cognitive Mediation

A series of additional hierarchical multiple regression analyses was conducted to test the hypothesis that age could moderate cognitive mediation. A regression model was estimated for each outcome variable (affective problems vs. delinquent behavior) and each cognitive variable that satisfied criteria for mediation in the above section. Following standard procedure, predictors were centered to maximize interpretability and minimize potential problems with multicollinearity (Aiken & West, 1991). Age was coded using effects coding (code −1 for ages 14–15 and code 1 for ages 16–17; see Frazier et al., 2004).

Age Moderation of Cognitive Mediation for Depressive Symptoms

The first regression was conducted to test whether age moderated the mediation through need for acceptance.

Table IV. Regression Analyses to Test Cognitive Mediation of Gender Prediction of Delinquent Behavior

Predictor variable	*B*	*SE*	β	*t*	Step R^2	Criterion variable
Step 1					$R^2 = .05$; $F(1, 28) = 38.81$	
Gender	0.96	.15	.21	6.23**		Delinquent behavior
Step 2						
Gender	2.48	.29	.29	8.71**		Justification of violence
Gender	1.30	.26	.17	4.93**		Impulsivity/carelessness style
Gender	0.36	.14	.09	2.53*		Low tolerance to frustration
Gender	−2.11	.29	−.24	−7.27**		Other-focused cognitions
Step 3					$R^2 = .17$; $F(5, 818) = 32.77$	
Gender	0.36	.16	.08	2.19*		Delinquent behavior
Justification of violence	0.12	.02	.22	6.47**		Delinquent behavior
Impulsivity/carelessness style	0.12	.02	.21	6.32**		Delinquent behavior
Low tolerance to frustration	0.11	.04	.10	3.01*		Delinquent behavior
Other-focused cognitions	−0.03	.02	−.05	−1.46 *ns*		Delinquent behavior

Note. Gender (0 = *female*; 1 = *male*).
* $p < .05$. ** $p < .001$. *ns* = nonsignificant.

Table V. Summary of Hierarchical Regression Analysis for Age, Gender, and Cognitive Variables Predicting Psychological Problems

Outcome	*B*	*SE*	β	*t*	Step R^2 change
Affective problems					
Step 1					$R^2 = .28$, $F(3, 826) = 105^{**}$
Age	−0.14	.11	−.04	−1,26	
Gender	−0.64	.11	−.18	−5.68**	
Need for approval	0.40	.03	.48	14.64**	
Step 2					$\Delta R^2 = .008$, $\Delta F(3, 823) = 3.18^{*}$
Gender × Need for approval	−0.01	.03	−01	−0.29	
Age × Need for approval	−0.09	.03	−.11	−3.26**	
Gender × Age	−0.10	.11	−.03	−0.90	
Step 3					$\Delta R^2 = .002$, $\Delta F(1, 822) = 2.68^{*}$
Gender × Age × Need for approval	−0.04	.03	−0.05	−1.64	
Delinquent behavior					
Step 1					$R^2 = .12$, $F(3, 826) = 36.6^{**}$
Age	0.09	.08	.04	1.15	
Gender	0.29	.08	.13	3.74**	
Justification of violence	0.15	.02	.29	8.51**	
Step 2					$\Delta R^2 = .02$, $\Delta F(3, 823) = 5.61^{**}$
Gender × Justification of violence	0.02	.02	.04	1.16	
Age × Justification of violence	−0.07	.02	−.13	−3.68**	
Gender × Age	0.14	.08	.06	1.77	
Step 3					$\Delta R^2 = .007$, $\Delta F(1, 822) = 6.42^{*}$
Gender × Age × Justification of violence	0.05	.02	.09	2.53*	

Note. Age (−1 = *ages 14–15*; 1 = *ages 16–17*).
$^{*}p < .05$. $^{**}p < .001$.

In the first step, age, gender, and need for acceptance were regressed on depressive symptoms. In the second step we entered the two-way interactions (Age × Gender, and Age × Need for acceptance), and in the third step we entered the three-way interaction (Age × Gender × Need for acceptance). The Age × Need for acceptance interaction served as a significant predictor of affective symptoms ($\beta = -.11$, $\Delta R^2 = .01$, $p < .05$). According to the framework proposed by Baron and Kenny (1986), the presence of this interaction is indicative of moderated mediation. The triple interaction was not significant (see results in Table V). To illustrate the Age × Need for acceptance interaction, we plotted the regression of affective problems on need for acceptance and age. Consistent with the procedures outlined by Aiken and West (1991), we used the low (one standard deviation below the mean) and high (one standard deviation above the mean) values for need for acceptance and the effects coding for age. As Fig. 1 shows, the influence of need for acceptance on depressive symptoms was higher among adolescents at ages 14–15, $\beta = .55$, $t(342) = 12.17$, $p < .001$, than at ages 16–17, $\beta = 0.51$, $t(522) = 12.17$, $p < .001$.

Next, we estimated three similar hierarchical regression models using negative orientation, self-focused cognitions, and positive self-talk as the cognitive variables. None of the interaction terms in these regression models were statistically significant.[6]

Age Moderation of Cognitive Mediation for Delinquent Behavior

Finally, we tested whether age moderated the influence of cognitive variables on delinquent behavior. Results were significant only for justification of violence. The hierarchical regression model of age, gender, justification of violence, Age × Gender, Age × Justification of violence, and Age × Gender × Justification of violence showed that both the Age × Justification of violence interaction and the three-way Age × Gender × Justification of violence interaction were significantly associated with delinquent behavior (see Table V). Post hoc equations predicted delinquent behavior from justification of violence at two levels of justification of violence (at 1 standard deviation below the mean and 1 standard deviation above), and at ages 14–15 and ages 16–17. The justification of violence was a stronger predictor of delinquent behavior among younger than older adolescents ($\beta = .23$ and .12, respectively, $p < .001$). In the three-way interaction, as depicted in Fig. 2, justification of

[6]To ease presentation, regression models for the other cognitive variables are not included. These results are available by contacting the authors.

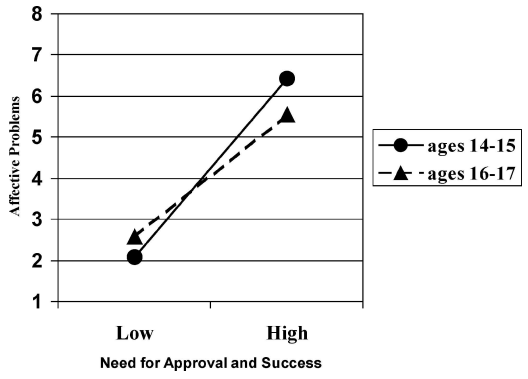

Fig. 1. Interaction between age and need for approval and success in the prediction of affective problems.

violence did not predict delinquent behavior among female adolescents at ages 16–17 [$\beta = .04$, $t(279) = 0.68$, *ns*], whereas it was a predictor among younger girls, [$\beta = .43$, $t(200) = 6.64$, $p < .001$], and among male adolescents at all ages [$\beta = .36$, $t(140) = 4.47$, $p < .001$ and $\beta = .30$, $t(207) = 4.43$, $p < .001$, respectively, for ages 14–15 and ages 16–17].

DISCUSSION

Results from this study suggest that male and female adolescents present a different cognitive profile, which in turn could account for gender differences in depressive symptoms and delinquent behavior. Negative orientation towards social problems was the cognitive variable that best explained gender differences in depressive symptoms. Consistent with previous studies (Marcotte, Alain, & Gosselin, 1999; Maydeu-Olivares et al., 2000; Robichaud et al., 2003), girls showed a greater tendency to expect problems to be unsolvable and to doubt their own abilities to solve conflicts. Adolescents with this pessimistic attitude toward problems tend to feel discouraged when they have to cope with life difficulties (Marcotte et al., 1999). Thus, this result provides additional evidence for the influence of a negative problem orientation on psychological maladjustment (Kant et al., 1997; McCabe et al., 1999; Spence et al., 2002).

Fig. 2. Interaction between age, gender, and justification of violence in the prediction of delinquent behavior.

The second variable that met criteria for mediation between gender and depressive symptoms was self-focused negative cognitions. The content of this type of automatic thoughts reflects negative self-evaluation, failure, and self-blame, which, according to the cognitive content-specificity model, are characteristics of depression (Beck, 1976; Clark et al., 1989). Findings concerning negative orientation and self-focused cognitions can also be analyzed within the context of the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989), which conceptualizes cognitive vulnerability to depression as a characteristic negative cognitive style. Adolescents with this style tend to make negative inferences about the cause and consequences of the problems (i.e., low self-confidence expectations), and the implications for one's self (i.e., low self-efficacy). Therefore, our findings are particularly consistent with the results obtained by Hankin and Abramson (2002). In their study, the general cognitive style, attributional style, and negative inferences for self-mediated gender differences in depression.

Female adolescents' lower levels of positive automatic thoughts also accounted for gender differences in depressive symptoms. The association between depression and lack of positive self-statements has been hypothesized in the tripartite model of depression and anxiety (Clark & Watson, 1991) and has obtained support in several studies (e.g., Burgess & Haaga, 1994; Calvete & Connor-Smith, in press; Jolly et al., 1994).

The fourth variable that mediated the relationship between gender and depressive symptoms was the need for approval and success. Female adolescents showed a high degree of concern about the way in which they are perceived or evaluated by other people, as expressed both in the need for acceptance beliefs and others-focused negative cognitions. These results agree with the proposals of a number of authors. For instance, Cyranowski et al. (2000) hypothesized that girls experience a greater need for affiliation that could place adolescent girls at particular risk for specific interpersonal negative events. Other authors have suggested that women could be more dependent on others in terms of self-esteem than men, and that they would be characterized by a greater concern about abandonment and rejection by others (e.g., Cross & Madson, 1997; Marcotte et al., 1999; Nolen-Hoeksema & Girgus, 1994; Prinstein & Aikins, 2004). The findings are also

consistent with the higher importance assigned by women to social support (Ystgaard, Tambs, & Dalgard, 1999) and to interpersonal harmony and sensitivity (Rosenberg, 1989).

Although the strongest gender differences in cognitive variables were observed for other-focused negative cognitions, this variable did not satisfy criteria for mediation when multiple-mediator analyses were used, suggesting that its influence on depressive symptoms was accounted for by the other variables in the model. In any case, the higher scores among female adolescents on both self- and other-focused negative cognitions, together with the lower scores on positive cognitions led to a more negative cognitive balance, as expressed in the SOM ratio. The boys' SOM ratio mean fell into the positive dialogue SOM category (.67–.90), which according to Schwartz (1997) is characteristic of well-balanced and adaptive persons, whereas the girls' SOM ratio mean fell into the successful coping dialogue (.59–.66), which is associated with adaptive (but not optimal) coping under distressing conditions.

Regarding behavior problems, only two cognitive variables met criteria for mediation of the association between gender and delinquent behavior: Justification of violence and impulsivity/carelessness style. As expected, male adolescents scored higher than female adolescents on both variables, which have been previously associated with externalizing problems. Adolescents with an impulsive style consider few solution alternatives, often impulsively go with the first idea to come to mind, and evaluate alternatives and their consequences quickly and without careful information processing (D'Zurilla et al., 2003). Thus, a combination of this style with aggression-biased cognitions may partly explain the development of delinquent behavior.

It is important to note that the influence of aggression-biased cognitions on delinquent behavior was moderated by age, with younger adolescents showing a stronger association between these variables. Moreover, justification of violence was not a predictor of delinquent behavior among female adolescents at ages 16–17. The findings also revealed that age influenced cognitive mediation of depressive symptoms. A significant interaction between age and need for acceptance indicated that the need for acceptance was a stronger predictor of depressive symptoms among the younger adolescents. Furthermore, adolescents at ages 14–15 reported a greater concern about acceptance by others.

It is important to take a developmental perspective on relations between negative thinking and symptoms because the content of negative cognitions placing individuals at greatest risk may change over the life span (Hankin & Abramson, 2001). Adolescents' identity emerges from a match between how they view themselves and how others see them (Bernard & Joyce, 1984) and early adolescence is characterized by a strong dependence on the opinions of peers. Thus, beliefs about acceptance by others and success may have a stronger influence on the development of depression in early adolescence.

Unlike many prior studies, male adolescents did not report more aggressive behavior than females. This may be related to recent statistics suggesting an increase in aggression and violence among girls (Moretti, Holland, & McKay, 2001). Alternatively, the result could be due to use of the YSR Aggressive Behavior subscale, which assesses both overt aggression and oppositional behavior. Various studies have failed to find gender differences for oppositional behavior (Lahey et al., 2000). Moreover, girls may express aggressive behavior in forms that differ from commonly recognized overt or physical acts of aggression (Crick & Grotpeter, 1995). Future research on gender differences may benefit from the use of measures distinguishing oppositional behavior, delinquent behavior, overt aggression, and covert aggression.

Finally, an important question that future research should address concerns the origins of gender differences in cognitive vulnerability. Various cognitive theories have focused on early experiences and parent–child interactions as particularly relevant to the development of cognitive styles (Ingram, 2003). These experiences could be different due to the existence of gender-linked parenting and socialization (Simon, 2002). It is possible also that boys and girls are socialized to express their distress in a sex-stereotyped form (Keenan & Shaw, 1997). For instance, through the process of socialization, girls' distress would be channeled into predominantly internalizing problems or covert forms of aggressive behaviors, whereas boys would be encouraged to act out their distress.

In addition, socialization could be different across cultures. This study was based on a Spanish sample of adolescents and the majority of prior research on cognitive vulnerability to psychological problems has been based on North American samples. Although Spanish and American cultures are both rooted in Western philosophical traditions, Spanish culture is more collectivist and less individualistic than North American culture (Oyserman, Coon, & Kemmelmeier, 2002). This fact could influence the results obtained for variables such as need for acceptance and other-focused negative cognitions. Thus, cross-cultural studies could help to clarify the role of socialization on gender differences in psychopathology.

This study has a number of shortcomings. First, we did not examine the presence of negative life events, although they are considered an important etiological factor

in the development of psychological disorders. In fact, recent theoretical models hypothesize that cognitive vulnerability interacts with negative life events to contribute to symptoms (Hankin et al., 2001) and that greater exposure to stressful events can account for girl's higher levels of depressive symptoms (Davies & Windle, 1997). Second, this research was based on a community sample. Although, cognitive mediators significantly differentiated between adolescents in the normal, borderline, and clinical range for psychological symptoms, future research should replicate findings of this study in clinically referred samples. Third, some of the measures used in this research exhibited poor internal consistency (i.e., the low tolerance to frustration subscale) and, as Hankin and Abramson (2002) have suggested, this fact could prevent the emergence of significant results for cognitive mediation of psychological disorders. Fourth, this investigation used a cross-sectional design. In consequence, our findings do not allow us to conclude that the cognitive variables included in this study lead to symptoms of depression and delinquent behavior. The relations between cognitions and symptoms could be bidirectional, and, as a result, cross-sectional relations between these variables may reflect a confounding effect of reciprocally related processes. Last, the findings were based merely on self-reports and, although the adolescents themselves may be the best source of information about their thoughts and behaviors (Funder & Colvin, 1997), self-reports are also susceptible to biases.

In summary, the findings of this research supported the existence of gender differences in several cognitive variables, which in turn could influence, at least partially, the development of different psychological disorders in male and female adolescents. In brief, female adolescents scored lower on positive thoughts and higher on negative problem orientation, need for approval and success, and self-focused automatic thoughts, all of which are linked to internalizing problems. Male adolescents scored higher on justification of violence and impulsivity/carelessness style, which were associated with delinquent behavior. These findings, although limited, have clinical implications. The identification of domains of cognitive vulnerability from a developmental and gender perspective may help clinicians assess and target areas of focus for therapy.

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