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Assessing Secondary Control and its Association with Youth Depression Symptoms

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Abstract Extensive research has linked youth depression symptoms to low levels of perceived control, using measures that reflect *primary control* (i.e., influencing objective conditions to make them fit one's wishes). We hypothesized that depressive symptoms are also linked to low levels of *secondary control* (i.e., influencing the psychological impact of objective conditions by adjusting oneself to fit them). To test the hypothesis, we developed the *Secondary Control Scale for Children* (SCSC), examined its psychometrics, and used it to assess the secondary control-depression symptomatology association. In a large adolescent sample, the SCSC showed factorial integrity, internal consistency, test-retest stability, convergent and discriminant validity, and accounted for more than 40% of the variance in depression symptoms. Consistent with evidence on risk and gender, depression symptoms were more strongly associated with secondary control in girls and primary control in boys. Assessing secondary control may help us understand youth depression vulnerability in girls and boys.

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Theories spanning more than five decades have linked depression to low levels of perceived control (see e.g., Abramson and Sackheim 1977; Bibring 1953; Seligman 1975; Weisz et al. 2001). Numerous investigators have applied this notion to children and adolescents, with findings supporting the connection between youth depression and low perceived control, operationally defined in several ways. Research has linked youth depression to external locus of control and control beliefs (e.g., Herman-Stahl and Peterson 1999; McCauley et al. 1988), low perceived competence (e.g., Cole et al. 1999; Weisz et al. 1987), low perceived contingency between actions and outcomes (e.g., Weisz et al. 1993), perceived helplessness (e.g., Kazdin et al. 1985), attributions of failure to internal, stable, and global causes (Cole et al. 2008; Gladstone and Kaslow 1995), and low levels of perceived competence, contingency of outcomes, and ability to achieve desired outcomes (e.g., Muris et al. 2003; Weisz et al. 2001).

A common denominator of these models and findings is that they reflect one particular way of construing control, a construct labeled *primary control* in the two-process model of control (Morling and Evered 2006; Rothbaum et al. 1982; Weisz et al. 1984a,b). In that model, primary control entails influencing objective conditions to make them fit one's wishes. All the constructs noted above—external locus of control, low contingency, low personal competence, helplessness, and attributing failure to internal, stable, and global causes—are conceptually linked to a failure to achieve the objective outcomes and conditions individuals wish to achieve. The many research findings in these areas certainly indicate that a perceived inability to exert primary control is associated with depressive symptoms.

In theory and research thus far, less attention has been paid to the other form of control described in the two-process model: *secondary control* (Morling and Evered 2006; Rothbaum et al. 1982; Weisz et al. 1984a,b). Secondary control entails influencing the personal psychological impact of objective conditions, by adjusting oneself to fit those conditions rather than trying to alter them. This can take such forms as changing one's interpretation of an event or its subjective meaning, finding a "silver lining" in an otherwise unhappy situation, and finding distracting activities or other ways to stop thinking about upsetting events—that is, an array of approaches to reducing distress. It seems plausible that depressive symptoms might be associated not only with low levels of primary control (as noted above) but also with low levels of secondary control. Support for this notion can be found in the literature on coping and in an examination of treatment models commonly employed with youth depression.

Studies of youth coping have found that coping approaches involving secondary control are negatively associated with distress and negative affect and positively associated with adjustment in stressful situations ranging from painful medical procedures to separation from family in a summer camp (e.g., Connor-Smith and Compas 2004; Jaser et al. 2005; Thurber and Weisz 1997; Weisz et al. 1994). Moreover, a number of the methods the two-process model identifies for achieving secondary control (e.g., changing one's cognitions about events, finding silver linings, disrupting unproductive rumination) actually resemble methods used in cognitive behavioral therapy (CBT), the most prominent form of psychotherapy for youth depression. Indeed, a core tenet of CBT is that one's emotional state is less affected by objective conditions than by how one responds to the conditions cognitively and behaviorally (see e.g., Clarke and DeBar 2010). So, both the youth coping literature and similarities between secondary control and CBT methods suggest that secondary control may be inversely associated with depressive symptoms.

If this is true, then building an evidence base on the relation between depressive symptoms and secondary control may help enrich our picture of the psychology of youth depression, perhaps in ways that could have intervention implications. The prospects for building such an evidence base could be improved by the development of a secondary control measure that can fit smoothly into various forms of depression research. To date, secondary control has been studied mainly in research on stress and coping; in structured interviews (Weisz et al. 1994) or questionnaires (Connor-Smith et al. 2000), respondents are asked to identify one or more specific stressors and note how they cope, and the coping methods used with these person-specific stressors are classified by investigators into coping categories. A useful complement to this approach, particularly for clinical research, may be a questionnaire approach in which respondents are not asked about their own distinctive stressors, and do not just report which coping methods they use, but instead rate the extent to which they are able to achieve secondary control, in the context of an identical set of questionnaire items. This would be similar to questionnaires that are used to assess depressive symptoms (e.g., Kovacs 1992), perceived primary control (e.g., Weisz et al. 2001), self perceptions (e.g., Harter 1985), and a variety of other constructs studied in relation to youth depression. In the present study we followed this approach. We developed a questionnaire to assess perceived secondary control, and we gathered data to assess the psychometric properties of the measure, including its internal consistency, test-retest reliability, convergent validity, and discriminant validity. Using this new measure and a previously-established measure of primary control, we investigated the potential usefulness of the new measure for research on youth depression; in the process, we tested whether secondary control was associated with depressive symptoms over and above the association between primary control and depressive symptoms that has been documented in research to date.

Finally, we investigated whether use of the new questionnaire might help clarify processes that differentiate depressive symptoms in boys vs. girls. Secondary control generally involves responding to adverse, unwanted events with adaptive strategies—cognitive and behavioral—and selectively avoiding response patterns that could make those events more distressing. There is some evidence that dysfunctional forms of cognition increase depression vulnerability in girls more than boys, beginning in early adolescence (see Hankin and Abramson 2001; Hyde et al. 2008; Nolen-Hoeksema and Girgus 1994), and that this may help account for the fact that depression rates are higher in adolescent girls and women than in males of similar age.

Examples of the maladaptive cognitive patterns highlighted in reviews of gender differences include (a) rumination—thinking repeatedly, passively, and unproductively about the negative emotions brought on by unwanted events (see e.g., Nolen-Hoeksema and Girgus 1994; Nolen-Hoeksema et al. 2008); (b) negative attributional style—attributing adverse events to internal, stable, and global causes (e.g., an enduring flaw in oneself that shows up in many situations; see e.g., Hyde et al. 2008); and (c) generic cognitive vulnerability (Hankin and Abramson 2001), including a negative inferential style that encompasses causal attributions and inferences about consequences and the self, and/or dysfunctional attitudes as proposed in Beck's (1987) depression model. Taken together, these models and findings all suggest that responding to adverse,

stressful events with maladaptive cognition may be a particularly pernicious risk factor for girls and women. Because these cognitions are so inconsistent with secondary control, it seemed useful to investigate whether low levels of secondary and primary control might differ in their relative association with depressive symptoms in girls versus boys; we addressed this question through a series of regression analyses.

For the study, we obtained a large sample of youths in an age range of special interest in depression research—that is, the period of transition to early adolescence, in grades 6 and 7, just before rates of depression in girls begin to markedly exceed rates in boys (Bearman and Stice 2008). Using this sample, we added to the existing literature on youth depression in several respects. A primary purpose was to assess the psychometrics of a new measure of secondary control; however, we also used this measure to (a) test for an association between secondary control and depressive symptoms, (b) assess whether secondary control accounted for variance in depressive symptoms beyond that accounted for by primary control, and (d) investigate whether the relation between depressive symptoms and primary vs. secondary control differed for girls versus boys. We used a cross-sectional design to provide basic psychometric data on the new scale and to identify patterns in relation to depressive symptoms and gender that might be investigated longitudinally in future research (see Kazdin 1998).

Method

Participants

Participants were 6th and 7th grade students (N=2333) at 11 public middle schools in two large metropolitan areas (Boston and Los Angeles). Participant age ranged from 11 through 14 (M=11.79 years), and 53% were girls. The sample was 20% Caucasian (non-Hispanic), 26% Black/African-American (non-Hispanic), 40% Hispanic, 2% Asian, and 12% who reported "other," representative of the ethnic composition of the schools from which we sampled.

Procedures

Parents of all 6th and 7th graders were sent a description of the study, and active parental consent and youth assent were obtained; the participation rate was 37% of eligible students across all schools. Questionnaires were group-administered in non-academic classes during regular school hours by trained assessors with bachelors, masters, or doctoral degrees in psychology. Participants were entered into a raffle for gift certificates and movie tickets to compensate them for their time. The study was approved by the Institutional Review Boards for the protection of human subjects in each of the research institutions involved.

Measures

Perceived Control Scale for Children (PCSC; Weisz et al. 2001) This 24-item scale assesses perceived ability to exert primary control—that is, to influence or alter objective events or conditions through one's own effort. Respondents rate agreement with statements about their ability to exert primary control, with half the items worded in a positive direction (e.g., "I can do well on tests if I study hard.") and half in a negative direction (e.g., "I cannot get other kids to like me no matter how hard I try."). Responses can range from "very true" to "very false." This scale has shown acceptable internal consistency (α=0.88) and six-month test-retest reliability (r=0.57) as well as a strong inverse relation to depressive symptoms (r=0.58 with Children's Depression Inventory scores) (Weisz et al. 2001). Alpha was .89 in the present study.

Secondary Control Scale for Children (SCSC) This 20-item scale[1] was designed to assess perceived ability to exert secondary control—that is, to influence the personal psychological impact of objective conditions on oneself, by adjusting oneself to fit those conditions. The item content reflects response patterns associated with secondary control in the two-process model (Rothbaum et al. 1982; Weisz et al. 1984a,b)—for example, finding a silver lining ("I can usually find something good to like, even in a bad situation."), adjusting cognition ("When something bad happens, I can find a way to think about it that makes me feel better."), avoiding rumination ("When I have a problem that I can't change, I can do something to take my mind off it."), and generic secondary control ("When bad things happen to me that I can't control, there are lots of things I can do to feel better."). To discourage response sets, half the items are worded in a positive direction (see examples above) and half in a negative direction (e.g., "When I have a problem that I can't change, I can't stop thinking about it."). Respondents rate their agreement with each item (on a 4-point scale, from "very false" to "very true"). Psychometrics for this scale with the current sample are reported in the Results section.

Youth Self Report[2] *(YSR, Achenbach and Rescorla 2001)* The YSR is a 118-item child-report checklist that yields T-

[1] Interested readers may obtain the full SCSC and scoring key from the first author by email (jweisz@jbcc.harvard.edu).

[2] In response to the concerns of some school officials, we followed a procedure used in numerous studies of depression in school-aged youth, excluding items from the YSR and CDI that asked about suicide and self-harm.

scores for eight narrow-band syndrome scales (e.g., Anxious-Depressed, Social Problems), two broad-band second-order syndrome scales (Internalizing and Externalizing), a Total Problems scale, and a set of DSM-oriented scales based on expert assignment of selected items to DSM-IV diagnostic groupings (see Achenbach et al. 2001, 2003). The DSM scales include: Anxiety Problems, Affective Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional Defiant Problems, and Conduct Problems. Extensive normative and psychometric data are available for the YSR and its scales (see Achenbach and Rescorla 2001).

Children's Depression Inventory[2] *(CDI; Kovacs 1992)* The CDI is a widely-used and researched measure of depressive symptoms backed by extensive reliability and validity data (e.g., Kovacs 1992). The 27 items each pose three graded alternatives, from which the child chooses one (e.g., "I am sad once in a while." "I am sad many times," "I am sad all the time."). Cronbach's alpha has ranged from 0.80 to 0.94 (Saylor et al. 1984; α=0.88 in the present study) and test-retest reliability has ranged from 0.38 to 0.87 (Saylor et al. 1984).

The Center for Epidemiologic Studies Depression Scale for Children (CES-DC; Weissman et al. 1980) Another measure of depressive symptoms was the CES-DC, a 20-item self- report inventory that is based on the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977), with slight modifications to some items to ensure understanding by children. On a 4-point scale (0 = not at all, 3 = a lot), children rate the frequency of symptoms over the past week—for example: "I did not feel like eating, I wasn't very hungry." The CES-DC has shown acceptable internal consistency (α=0.90–0.93; Hilsman and Garber 1995) and test re-test reliability (r=0.69; Faulstich et al. 1986); it has been shown to discriminate between depressed and non-depressed children (Fendrich et al. 1990) and to converge with other measures of depressive symptoms in children (LaGrange et al. 2008). Internal consistency was 0.89 in the present study.

Children's Negative Cognitive Errors Questionnaire-Revised (CNCEQ-R) Because secondary control involves adjusting one's cognitions in a positive direction, convergent validity would be indicated by an inverse association with negative cognition. To assess negative cognition we used a revised version of the Children's Negative Cognitive Errors Questionnaire (CNCEQ; Leitenberg et al. 1986), a 24-item self-report measure. Each question poses an adverse situation children encounter (e.g., doing poorly on a test, missing basketball shots), each followed by a negative thought, and children are asked to rate the likelihood that they would think that thought. We simplified the wording and revised or dropped content that seemed foreign to our culturally diverse, largely inner-city sample (e.g., we dropped a question about taking skiing lessons); this shortened the questionnaire to 16 items [sample CNCEQ-R item: "You play basketball and score 5 baskets, but you miss two really easy shots. After the game you think, 'I was awful today in basketball.'"]. The CNCEQ has shown acceptable internal consistency (α=0.89) and test-retest stability (r=0.65) (Leitenberg et al. 1986). Internal consistency of the CNCEQ-R was 0.82 in the present study. Two-week test-retest stability, assessed for a subset (n=198) of our sample, was 0.70 (p<0.01).

The Affiliative Obedience Scale (Diaz-Guerrero 1991) This scale, thought to be relatively unrelated to secondary control, was included because it provided a means of assessing discriminant validity of the SCSC. This scale consists of 17 items rated by youth from 0 (strongly agree) to 4 (strongly disagree), with each item designed to assess an inclination toward obedience. Sample items include "All adults should be respected" and "A person must always obey his/her parents." Internal consistency of this scale has been found to be acceptable, with α= 0.83 reported by Polo and Lopez (2009) and 0.90 in the present study.

Results

Table 1 shows intercorrelations among the measures plus means, SDs, and Cronbach's alphas. We also calculated the percent of the sample with elevated depressive symptoms on both primary depression measures, the CDI (cutoff of 13, see Kovacs 1992) and CES-DC (cutoff of 15, see Weissman et al. 1980), for the full sample, and by age group (<12 vs. 12 and up). For the full sample, 18% showed elevated symptoms on the CDI, 15% for younger, 19% for older youths, χ^2 for age (1, N=2329)=7.27, p=0.007. For the full sample, 30% showed elevated symptoms on the CES-DC, 25% for younger, 33% for older, χ^2(1, N=2329)=15.26, p=0.000. Gender differences were not significant on the CDI but girls showed significantly higher depressive symptom counts than boys on the CES-DC (means 13.11 and 11.81), F(1,2331)=7.90, p=0.005.

Psychometrics of the SCSC

SCSC Factor Analysis To examine the factor structure of the SCSC and to help us determine appropriate scoring, we conducted an exploratory factor analysis using maximum likelihood extraction. The scree plot indicated two factors. The first factor represented a general secondary control factor; all items of the SCSC loaded>0.35 on this general factor. As is sometimes seen in measures that counter-

Table 1 Intercorrelations, Means, SDs, and Internal Consistency for All Study Measures (n=2333)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Depression Factor	–											
2. YSR Affective Scale	0.85	–										
3. CDI	0.90	0.73	–									
4. CESD-C	0.83	0.63	0.65	–								
5. PCSC	−0.62	−0.51	−0.64	−0.51	–							
6. SCSC	−0.64	−0.53	−0.58	−0.60	0.56	–						
7. CNCEQ-R	0.56	0.46	0.50	0.52	−0.47	−0.55	–					
8. Affiliative Obedience[a]	−0.12	−0.08	−0.11	−0.10	0.02	0.11	0.07	–				
9. CDI Neg Affect	0.84	0.72	0.88	0.61	−0.48	−0.52	0.43	−0.11	–			
10. CDI Neg Self-Image	0.80	0.63	0.89	0.56	−0.58	−0.52	0.45	−0.11	0.66	–		
11. CDI Anhe- donic, Isolated	0.67	0.54	0.78	0.50	−0.55	−0.46	0.41	−0.06	0.57	0.65	–	
12. CDI School Problems	0.58	0.45	0.71	0.42	−0.54	−0.39	0.37	−0.03	0.46	0.57	0.59	–
M	−0.02	3.55	7.11	12.51	59.78	40.32	14.62	51.91	2.61	2.16	1.26	1.26
SD	23.54	3.40	6.60	11.07	9.90	10.26	8.03	14.65	2.81	2.32	1.50	1.38
Cronbach's α	0.94	0.76	0.88	0.89	0.89	0.89	0.82	0.90	0.75	0.73	0.61	0.55

[a] Statistics for the Affiliative Obedience Scale are based on an N of 2,331

balance positively and negatively worded items, there was a second factor on which all positively worded items loaded positively and all negatively worded items loaded negatively. When we rotated these two factors using a non-orthogonal oblimin rotation, the rotation produced two factors. The second factor, unrelated to the conceptual content of the scale, reflected the tendency of children to respond similarly to items that are worded positively, and similarly to items that are worded negatively. Because rotated and unrotated factor solutions are algebraically equivalent, the sole purpose of rotation is to improve interpretability (Gorsuch 1983), and the positive/negative factor reflected item valence rather than content, we excluded the positive/negative factor from scoring. The SCSC was thus scored using the general secondary control factor, which accounted for more than 75% of the common variance; since all SCSC items loaded on this factor, we calculated the SCSC score using all the SCSC items.

SCSC Internal Consistency and Test-Retest Reliability Internal consistency of the SCSC indexed by Cronbach's alpha was 0.89. We calculated 20 separate alphas, one with each of the 20 items deleted; these 20 alphas fell within a highly homogeneous range: 0.876–0.883, further supporting internal consistency. The observed moderate *average interitem correlation* of 0.28 provided additional evidence of internal consistency using a metric not influenced by number of items on the scale. This observed average interitem correlation fell within the range recommended (i.e., 0.15 to 0.50) as evidence that the items assess a relatively narrow construct (see Clark & Watson, 1995). Two-week test-retest stability was examined using a subset (n=198) of the total sample for whom school schedules permitted a second testing and for whom consent and assent were obtained; the test-retest correlation was 0.74 (p<0.01).

Convergent and Discriminant Validity As noted earlier, we assessed convergent and discriminant validity of the SCSC by examining correlations with the CNCEQ-R and the Affiliative Obedience Scale, respectively. In support of convergent validity, the SCSC was strongly and negatively correlated (r=−0.55, p<0.01) with the CNCEQ-R. In support of discriminant validity, the SCSC showed a low (though significant) correlation (r=0.11, p<0.01) with Affiliative Obedience. The difference between the convergent and discriminant coefficients was highly significant (p<0.001).

Association Between Secondary Control and Depressive Symptoms We next examined associations between the SCSC and multiple measures of depressive symptoms. As expected, SCSC scores were negatively correlated with the YSR Affective Scale (r=−0.53, p<0.01), the CDI (r=−0.58, p<0.01), and the CESD-DC (r=−0.60, p<0.01). The SCSC was also negatively correlated with the four adolescent internalizing subscales of the CDI identified in a factor analysis by Weiss et al. (1991): Negative Affect with Somatic Concerns (r=−0.52, p<0.01), Negative Self-Image (r=−0.52, p<0.01), Anhedonia, Social Isolation (r=−0.46, p<0.01), and School Problems (r=−0.39, p<0.01).

Using Factor Analysis to Create a Depression Factor For regression analyses, we needed a single conceptually comprehensive index of depressive symptoms. So, we

subjected the 57 items collectively comprising the YSR Affective Scale, CDI, and CESD-C to an exploratory factor analysis using maximum likelihood extraction. The scree plot indicated strong support for a one-factor solution. Following extraction, this factor explained 23% of the variance in depression symptom scores. The 45 items loading .4 and above were retained to form a general depression factor; a factor score was computed by standardizing each of the 45 item scores comprising the factor and summing these standardized item scores for each participant.

Does Secondary Control Predict Depressive Symptoms Beyond the Predictive Power of Primary Control? We used the general depression factor to test whether secondary control contributed to the prediction of depressive symptoms over and above the predictive power of primary control. To increase confidence in the robustness of our answer to this question, we carried out regression analyses twice. The full sample of 2,333 was randomly split into Sample 1 (n=1167) and Sample 2 (n=1166). In Sample 1, regression analyses indicated that when used as the sole predictor of depression scores, primary control accounted for 36% (F (1, 1165)=650.63, p<0.01) of the variance, whereas secondary control as sole predictor accounted for 41% (F (1, 1165)=800.43, p<0.01). When primary control was forced to enter first, secondary control accounted for significant additional variance [F_{change} (1, 1164)=316.63, p<0.01; R^2_{change}=0.14]. These results were replicated in Sample 2. When primary control was entered as sole predictor, it accounted for 40% (F (1, 1164)=783.20, p< 0.01) of the variance in depression scores, whereas secondary control entered as sole predictor accounted for 41% (F (1, 1164)=818.52, p<0.01). In the hierarchical regression analysis, we found in Sample 2 (as in Sample 1) that when primary control was forced to enter first, secondary control accounted for significant additional variance in depression scores [F_{change} (1, 1163)=283.15, p<0.01; R^2_{change}=0.12].

Relative Contributions of Secondary Control and Primary Control Turning next to the relative contributions of secondary and primary control to depressive symptoms, we needed to determine the order in which primary control and secondary control should be entered as predictors. To make this determination and then carry out the analysis, we applied a two-step regression procedure to the split sample. First, a stepwise regression analysis was conducted using Sample 1, to determine the appropriate order of entry of primary and secondary control. Next we tested replicability of the Sample 1 findings with Sample 2, using hierarchical regression in which we entered the variables in the order observed in the stepwise regression with Sample 1. This two-step sequence provided a non-subjective approach to determining order of variable entry while addressing concerns that the use of stepwise regression alone capitalizes on chance associations.

In the stepwise analysis with Sample 1, SCSC, entered in the first step, accounted for 41% of the variance in depression scores [F (1, 1165)=800.43, p<0.01]. The PCSC, entered second, accounted for an additional 9% of variance in depression scores [F_{change} (1, 1164)=203.78, p<0.01]. Together, secondary control and primary control accounted for 50% of the variance in depression scores [F (2, 1164)=571.77, p<0.01; see Table 2]. Using hierarchical regression in Sample 2, the results observed in Sample 1 were replicated. Specifically, when secondary control was entered as the first step it accounted for 42% of the variance in depression scores [F (1, 1164)=818.52, p< 0.01], and primary control, entered second, accounted for an additional 11% [F_{change} (1, 1163)=257.39, p<0.01]. Together, secondary control and primary control accounted for 52% (F (2, 1163)=628.10, p<0.01) of the variance in depression scores (see Table 2).

Was Gender a Moderator? Next we examined whether gender moderated the relation between primary and secondary control, on the one hand, and depression scores, on the other. Following Aiken and West's (1991) guidelines for moderation tests, we conducted two separate but parallel regression analyses with the full sample evaluating the dichotomous variable of gender as a moderator of the relationship between the continuous independent variables

Table 2 Stepwise Regression Analysis Predicting Depression Symptoms from Primary and Secondary Control in Sample 1 (n=1167) and Hierarchical Regression Analysis Predicting Depressive Symptoms from Primary Control and Secondary Control in Sample 2 (n=1166)

Sample	Predictor		*B*	*β*	*t*	R^2	R^2_{change}	F_{change}	*p*
Sample 1	SCSC					0.41	0.41	800.43	0.00
	PCSC					0.50	0.09	203.78	0.00
		SCSC	−1.01	−0.44	−17.79				0.00
		PCSC	−0.84	−0.36	−14.28				0.00
Sample 2	SCSC					0.41	0.41	818.52	0.00
	PCSC					0.52	0.11	257.39	0.00
		SCSC	−0.97	−0.42	−16.83				0.00
		PCSC	−0.95	−0.40	−16.04				0.00

of primary and secondary control, respectively, and the continuous dependent variable of depression scores. Values for the two independent variables were centered. The variables entered for each analysis included the independent variables of primary or secondary control, the proposed moderator of gender, and the relevant two-way interaction term (i.e., PC x gender or SC x gender).

Primary control was significantly related to depression (β=−0.62, t(2329)=−38.45, p<0.01), as was gender (β=−0.10, t(2329)=−6.07, p<0.01). A significant interaction between primary control and gender was also observed (β=−0.04, t(2329)=−2.52, p<0.05). To probe this significant interaction, two regressions were conducted separately for boys and girls in which the simple slope of the regression line was tested for each gender. Primary control was significantly related to depression for both girls (β=−0.66, t(2329)=−29.31, p<0.01) and boys (β=−0.58, t(2329)=−5.12, p<0.01), with the magnitude of the relationship slightly stronger for girls.

Similarly, we found a significant association between secondary control and depression (β=−0.63, t(2329)=−39.66, p<0.01), a significant main effect of gender (β=−0.04, t(2329)=−2.57, p<0.05), and a significant interaction of secondary control and gender (β=−0.06, t(2329)=3.56, p<0.01). To probe the interaction, we conducted two regressions separately for boys and girls, testing the simple slope of the regression line for each gender. Secondary control was significantly related to depression for both girls (β=−0.69, t(2329)=−32.51, p<0.01) and boys (β=−0.58, t(2329)=−24.16, p<0.01); the magnitude of this relationship was slightly stronger for girls.

The previous analyses showed that gender significantly moderated the relation between primary control and depression scores, as well as secondary control and depression scores. As a follow up, we conducted separate regression analyses for girls and boys in Samples 1 and 2 to evaluate the relative contributions of primary and secondary control to depression scores among boys and girls separately. As in the procedures described earlier, we used stepwise regression in Sample 1, for both boys and girls, to determine the order in which the two predictors (primary and secondary control) should be entered into the regression equation. In Sample 2 for both boys and girls, the order of entry of primary and secondary control observed in Sample 1 was applied, to assess the robustness and replicability of the results yielded in Sample 1. Simple effects regression results for boys and girls in both samples are reported in Table 3.

For boys in Sample 1 (n=557), the stepwise analysis indicated that primary control was entered first, followed by secondary control. As the sole predictor, primary control

Table 3 Stepwise Regression Analyses Predicting Depressive Symptoms from Primary Control and Secondary Control for Boys (n=557) and Girls (n=610) in Sample 1; Hierarchical Regression Analyses Predicting Depressive Symptoms from Primary Control and Secondary Control for Boys (n=518) and Girls (n=648) in Sample 2

Sample	Group	Predictor		*B*	β	*t*	R^2	R^2_{change}	F_{change}	*p*
1	Boys									
		PCSC					0.39	0.39	355.00	
		PCSC & SCSC					0.49	0.10	104.34	
			PCSC	−0.89	−0.41	−11.20				0.00
			SCSC	−0.81	−0.38	−10.22				0.00
1	Girls									
		SCSC					0.44	0.44	475.05	
		SCSC & PCSC					0.52	0.08	95.92	
			SCSC	−1.14	−0.48	−14.40				0.00
			PCSC	−0.84	−0.33	−9.79				0.00
2	Boys									
		PCSC					0.45	0.45	428.23	
		PCSC & SCSC					0.53	0.07	77.89	
			PCSC	−1.01	−0.48	−12.64				0.00
			SCSC	−0.72	−0.33	−8.83				0.00
2	Girls									
		SCSC					0.44	0.44	505.00	
		SCSC & PCSC					0.53	0.09	129.81	
			SCSC	−1.11	−0.46	−14.05				0.00
			PCSC	−0.98	−0.37	−11.39				0.00

accounted for 39% of the variance in depression scores (F (1, 555)=355.00, p<0.01). Secondary control, entered into the equation next, accounted for an additional 10% of the variance [F_{change} (1, 554)=104.34, p<0.01; R^2_{change}= 0.10]. By contrast, for girls in Sample 1 (n=610), results of the stepwise analysis indicated that secondary control was entered first, followed by primary control. Secondary control in the first step accounted for 44% of the variance in depression scores (F (1, 608)=475.05, p<0.01). Primary control, added in the second step, accounted for an additional 8% of the variance [F_{change} (1, 607)=95.92, p< 0.01; R^2_{change}=0.08].

For boys and girls in Sample 2, hierarchical regression analyses were conducted to assess the extent to which the results observed in Sample 1 were replicable. For boys (n= 518) primary control was entered in the first step, accounting for 45% of variance in depression scores (F (1, 516)=428.23, p<0.01); secondary control, entered in the second step, accounted for an additional 7% [F_{change} (1, 515)=77.89, p<0.01; R^2_{change}=0.07]. For girls in Sample 2, secondary control was entered first and accounted for 44% of the variance in depression scores (F (1, 646)=505.00, p<0.01); primary control, added in the second step, accounted for an additional 9% [F_{change} (1, 645)=129.81, p<0.01; R^2_{change}=0.09]. In sum, results of the hierarchical regression conducted with boys and girls in Sample 2 were consistent with the results in Sample 1. Both sets of regression analyses indicated that primary control was more strongly linked to depression symptoms than secondary control in boys, but that secondary control was more strongly linked to depression symptoms than primary control in girls.

Discussion

The findings suggest that our understanding of depression vulnerability may be enriched by the addition of secondary control to a literature that has largely focused on primary control to date. We developed the SCSC, a questionnaire measure of secondary control designed for use in clinical research on the topic, and we provided data demonstrating the psychometric soundness of the SCSC. Using this measure, we found a strong association between secondary control and depressive symptoms, and secondary control accounted for substantial variance in depressive symptomatology beyond that accounted for by primary control. When primary and secondary control were combined, they accounted for fully half the variance in depressive symptoms. We also found gender differences in associations among primary control, secondary control, and depressive symptoms that may shed light on gender differences in depression vulnerability.

Focusing first on development of the new measure, we found that the SCSC showed good internal consistency according to both Cronbach's alpha and average inter-item correlation, an index developed by Clark and Watson (1995) as an alternative to alpha that is not influenced (as alpha is) by number of items on a scale. In addition, the SCSC showed strong temporal stability. Convergent validity was supported by the SCSC's strong negative association with a measure of negative cognition. Discriminant validity was supported by the low correlation of the SCSC with Affiliative Obedience, a construct that is theoretically distinct from secondary control. Taken together, these findings suggest that the new questionnaire provides a psychometrically sound measure of secondary control that may be useful in youth depression research.

A second topic of interest was the association between secondary control and youth depressive symptoms. Simple correlational analysis showed that secondary control was very strongly associated with our three different standardized measures of depressive symptoms and with all four internalizing factors of the Children's Depression Inventory. In addition, secondary control accounted for significant and substantial variance in depressive symptoms over and above the association of depressive symptoms with primary control, with fully half of the depressive symptom variance accounted for by the combination of primary and secondary control (50% in sample 1, 52% in sample 2). In a two-stage regression analysis, used to ascertain the *relative* contributions of primary and secondary control, we found that secondary control was actually the more prominent predictor of depressive symptoms.

The associations between primary and secondary control and depressive symptoms, however, were moderated by gender. We investigated whether the interaction of gender with primary and secondary control, tested in separate regression analyses, predicted depression scores above and beyond the main effects of gender and primary or secondary control. The interaction was significant for both, indicating that gender did moderate the relation of primary and secondary control to depression symptoms. Subsequent analyses showed that among boys, depressive symptoms were more strongly related to primary than secondary control; among girls, by contrast, depressive symptoms were more strongly related to secondary than primary control.

This pattern is reminiscent of findings reviewed in the introduction, indicating that several kinds of cognitive and related dysfunction may pose more elevated risk of depressive symptoms in girls than boys, when combined with stressful events (see e.g., Hankin and Abramson 2001; Hyde et al. 2008; Nolen-Hoeksema and Girgus 1994). A particularly interesting respect in which our findings resembled those in other areas reviewed by these authors

—e.g., locus of control, attributional style (rumination is the exception)—is that we found a negligible association between gender and secondary control (r=0.02). That is, our findings suggest a gender difference not in *level* of secondary control but in the *strength of association between* secondary control and depressive symptoms. This suggests that a low level of secondary control, while not markedly more pronounced in girls than boys, may be a particularly potent risk factor for depressive symptoms in girls relative to boys. The overall picture suggested by our findings—considered in the light of SCSC item content—is that girls who are not able to control the psychological impact of adverse events and conditions by adjusting themselves to fit those events and conditions may be at particular risk of depressive symptomatology and, conversely, that the ability to achieve secondary control may be a particularly important asset for girls in warding off depressive symptoms, at least in early adolescence.

In their analysis of the gender differences in depression that begin in adolescence, Hankin and Abramson (2001) suggest that negative events and conditions tend to prompt initial elevations in negative affect, that "generic cognitive vulnerability factors" (p. 773) moderate the likelihood that the negative affect will escalate to depression, and that the negative affect → cognitive vulnerability → depression connection is more likely to emerge in girls than boys, beginning in early to mid-adolescence. This is interesting in light of gender-linked evidence collected by neuroscientists in their search for endophenotypes of depression (see Hasler et al. 2004)—that is, intermediate phenotypes that lie between genetic vulnerability and expressed depressive disorder. While nearly all of the candidate endophenotypes identified by Hasler et al. are relevant across gender, the "Stress Sensitivity" endophenotype is identified as gender-specific, reflecting growing evidence of elevated vulnerability of females to the development of anxiety and depression symptoms following stress, driven in part—according to increasing evidence—by excessive activation of the HPA axis in females relative to males following stressful events (see Stroud et al. 2002). A question raised by our findings is whether such elevated risk might be mitigated by the use of secondary control skills, and whether variations in such skills may be particularly important for adolescent girls and women, given their elevated risk. These possibilities warrant attention in future research.

Hankin and Abramson (2001) also suggest that "interventions such as cognitive behavioral treatment …can address the more proximal risk factors to prevent the formation and consolidation of cognitive vulnerability to depression" (p. 789). In keeping with this idea, one team of investigators has developed—and demonstrated the effectiveness of—a CBT program specifically for girls who are moving into adolescence (ages 9–13); Stark et al. (2010) note that this program was designed for girls based on growing evidence (from Hankin and Abramson 2001, and others) that depression in girls is more likely than depression in boys to be associated with dysfunctional responses to distressing events and conditions. Assessment of secondary control may be one approach to identifying those youngsters for whom skill in adapting to distressing events is not well-developed and may profit from intervention.

One possible advantage of the SCSC in assessing this dimension of functioning is that the content is somewhat broader and more 'outcome-focused' than questionnaires that assess youth reports of specific cognitions or styles (e.g., questionnaires assessing locus of control, automatic thoughts, or attributional style). Unlike those questionnaires, which are very useful for the purposes for which they were designed, the SCSC involves reports of how *successful* youngsters are in using strategies to control the psychological impact of negative events and conditions. In these respects the SCSC may provide a useful summary index of the broad vulnerability to which so many gender researchers have pointed in their research on depression, and it may thus serve as a useful complement to the multiple questionnaires that have been designed to tap specific cognitions and styles. Given the summary nature of the secondary control construct, the fact that there is now a measure of the construct that meets accepted psychometric standards, and the fact that the measure focuses on youth-reported *effectiveness* of strategies, it may now be useful for researchers to consider secondary control as a candidate in their search for mechanisms of change in depression treatment.

Certain limitations of the study warrant attention, and these suggest directions for future research. For example, the SCSC focuses on youngsters' perceived success in achieving secondary control, but it does not delve deeply into the strategies they use; in future research, learning which strategies are associated with success and which with failure could enrich our understanding of secondary control and inform clinical intervention. The age range of our sample focused appropriately on the very beginning of adolescence, a period when research suggests that cognitive vulnerability and depressive symptoms begin to converge in distinctive ways for girls and boys; but the age range is also a limitation in that our findings provide no information about secondary control or its relation to depression at older or younger age levels. In the future it will be important to take a broader developmental look at secondary control, particularly in relation to the emergence of depression in boys and girls. The cross-sectional nature of our design is another limitation, at least in relation to our findings that extended beyond the psychometrics of the SCSC to associations with depressive symptoms. Our cross-

sectional findings can suggest associations, but future research with longitudinal designs will be needed to clarify the extent to which early levels of secondary control, and primary control for that matter, can predict the emergence of depression in girls and boys over time. Longitudinal research will also be needed to probe for stress x control interactions in relation to vulnerability to depressive symptoms over time and to test whether such vulnerability is more closely related to deficits in primary control for boys and secondary control for girls. Our findings suggest potentially intriguing patterns of interplay among primary and secondary control in relation to gender and depression risk, but considerable research and enriched research designs will be needed to test these possibilities and fill in the temporal and causal picture.

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