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Self-Regulation and Its Relations to Adaptive Functioning in Low Income Youths

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Most studies of self-regulation involving children have linked it to specific outcomes within a single domain of adaptive functioning. The authors examined the association of self-regulation with a range of indices of adaptive functioning among 155 youth ages 8–18 years from families with very low income. Controlling for other explanatory variables, self-regulation was strongly associated with various outcome measures in the areas of mental health, behavior, academic achievement, and social competence. The authors also contrasted youths relatively high and low in self-regulation (the top and bottom quartiles). Youths with good self-regulation had much better indices of adaptive functioning across measures of social competence, academic achievement, grades, problem behaviors, and depression and anxiety than their counterparts with more diminished self-regulatory capacities. In addition, youths with better self-regulation skills stated more adaptive responses both in terms of how they coped with past stressful live events and how they would deal with hypothetical stressors. This study indicates that self-regulation is robustly associated with a range of important indices of adaptive functioning across many domains. Findings are discussed in light of their implications for theory and intervention for children of diverse economic backgrounds.

Keywords: children, coping, executive function, low-income, poverty, self-regulation

In an earlier report (Buckner, Mezzacappa, & Beardslee, 2003), we identified self-regulation as a key factor in distinguishing resilient from nonresilient youths belonging to families with very limited income. Among a number of internal and external factors that we considered could play a role in facilitating positive adaptation to the challenging circumstances of poverty, the self-regulation capacities of the youths we studied were clearly paramount and distinct from their intelligence. On a continuous-scale measure of resilience that we formed, self-regulation could account for 46% of the variance and remained highly associated in a positive direction with being resilient when controlling for other positively associated predictors of resilience including intelligence and self-esteem, as well as negative predictors, such as life events and chronic strains. We characterized resilience (i.e., doing well despite adversity) in this prior study in terms of mental health variables, including child self-reported symptoms of depression and anxiety and parent ratings of problem behaviors. Yet, theory and research on self-regulation suggests that it is also associated with good adaptive functioning in other realms besides mental health, including academic performance, social competence, and coping with life stress (Aspinwall & Taylor, 1997; Carver & Scheier, 1998; Karoly, 1993; Pennington & Ozonoff, 1996; Vohs & Ciarocco, 2004; Zimmerman, 2001).

In this paper (using data collected from the same study as Buckner et al., 2003) we use regression analyses to examine relationships between self-regulation and adaptive functioning in youths across multiple domains, including behavior and academic achievement, as well as further examine its relations to mental health indices. In a complimentary set of analyses, we also compare youths with contrasting self-regulation capacities in order to better understand the role that self-regulation may play in their adaptive functioning including how they cope with life stressors, both real and hypothetical.

As evidenced by a rapidly growing body of literature, the concept of self-regulation has become of increasing interest to researchers in psychology, education, and other disciplines (Baumeister & Vohs, 2004; Bronson, 2000; Carver & Scheier, 1998). Self-regulation refers to an integrated set of abilities or skills that draw from both executive function and emotion regulation capacities, which are invoked in the service of accomplishing both proximal and distal goals. The cognitive and emotion regulation "skills" encompassed by self-regulation are interrelated and act in a collaborative manner when an individual engages in goal-directed behavior (Karoly, 1993).

Executive function(s) refer to cognitive metaskills that stand apart from basic brain processes. Like the chief executive in an organization, executive functions marshal lower order brain processes to enable complex goal-directed behavior. The various

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executive functions include working memory, executive attention, inhibitory control, detecting novel stimuli, planning, set shifting, and decision making (Banfield, Wyland, Macrae, Munte & Heatherton, 2004; Goldberg, 2001; Pennington, 1997; Posner & Rothbart, 2000). When faced with complex tasks, individuals draw upon their executive function capacities to focus and sustain attention, consider options, formulate a plan, monitor progress, modify behavior in order to achieve a desired goal, and shift attention as needed to accommodate other demands or desired end states.

Researchers have argued that the emergence of self-regulation skills is an essential and central component of development (National Research Council/Institute of Medicine, 2000; Posner & Rothbart, 2000). The progression from infancy to childhood to adulthood is marked by an increasing capacity to self-regulate. For preschool age children, adequate self-regulation capabilities are critical to school readiness and are of much greater concern to teachers than students' initial proficiencies in the mechanics of reading, writing, and arithmetic (Blair, 2002). For older children and adults, self-regulation may also be at the heart of skills that are necessary to cope with stress in an adaptive manner. Aspinwall and Taylor (1997) argue that self-regulation is behind *proactive* means of coping with stress. Through proactive coping, which entails anticipating potential stressors, analyzing how to prevent them or mute their impact, and planning a course of action, individuals can reduce the number of stressors they experience thereby leading to better psychosocial adjustment (Aspinwall & Taylor, 1997).

Self-regulation skills may also be critical in effectively coping with stressors after they have occurred. Eisenberg, Fabes, and Guthrie (1997) propose that adaptively coping with stressful circumstances in a *reactive* manner can be framed in terms of self-regulatory processes which an individual implements when experiencing stress. Emotion-focused coping primarily entails the regulation or management of negative emotions, while problem-focused coping involves goal-directed efforts that include behavioral and attention-regulation strategies to resolve the stressful circumstance (Eisenberg et al., 1997). Supporting this argument, Lengua and Long (2002) found that self-regulation predicted more active (adaptive) ways of coping with stress and lower adjustment problems in a community sample of older children.

The various facets of self-regulation are likely to promote good adaptive functioning for children (and adults) in areas of life that involve social relations, task demands (e.g., schoolwork, peer relations, coping with the stressors of daily living), and self-reflection. There is evidence for this in prior, mostly cross-sectional, research involving children (and adults) in which emotion regulation and self-regulation more broadly have been found to be associated in expected directions with numerous important outcomes in the realms of *mental health* (Barkley, 1997, 2004; Bradley & Corwyn, 2005, 2007; Gross, 1998; Moffitt, 1993), *social competence* (Carver & Scheier, 1998; Eisenberg et al., 1995; Shields, Cicchetti, & Ryan, 1994; Vohs & Ciarocco, 2004), and *academic achievement* (Blair, 2002; Zimmerman, 2001). Several longitudinal studies have also linked self-regulation in children to later mental health outcomes in predicted manners (Brody, McBride-Murry, Kim, & Brown, 2002; Eisenberg et al., 2001; Eisenberg, Liew, & Pidada, 2004; Kim & Brody, 2005; Kochanska & Knack, 2003; Lengua, 2003; Lengua & Kovacs, 2005; Murray & Kochanska, 2002; Shaw, Keenan, & Vondra, 1994).

Most prior studies that have demonstrated relations between self-regulation and specific indices of adaptive functioning have enrolled study participants from general population samples, although in recent years there have been an increasing number of studies focused on low-income children, which have also found self-regulation associated with various outcomes in expected directions (Blair & Razza, 2007; Brody et al., 2002; Fantuzzo & McWayne, 2002; Kim & Brody, 2005; Lengua, 2002; Lutz, Fantuzzo, & McDermott, 2002; Shaw et al., 1994). It should be noted that children living in poverty face a range of acute and chronic stressors that are quantitatively and qualitatively different than what children from more privileged backgrounds experience and they often do not fare as well as a result (Buckner, Bassuk, Weinreb, & Brooks, 1999; Buckner, Beardslee, & Bassuk, 2004; Duncan, Brooks-Gunn, & Klebanov, 1994; Huston, McLoyd, & Garcia-Coll, 1994; Luthar, 1999; McLoyd, 1998). Examples of acute stressors that, for the most part, children living in poverty exclusively encounter include exposure to community violence and homelessness. Chronic strains include hunger, insufficient household heat, decrepit living conditions, and worries about the safety of loved ones.

The present study involved an especially high risk group of children and adolescents from formerly homeless, as well as housed low-income, families in a midsized city in the United States, many of whom had experienced some or all of the negative events and chronic strains listed above (Buckner et al., 1999, 2003; Buckner et al., 2004). First and foremost, this study affords an opportunity to examine whether self-regulation skills are associated with various indices of adaptive functioning in the context of extreme poverty. Second, the high risk nature of the study participants allows us to see whether children with contrasting self-regulation skills deal in different manners with the very serious life events they have experienced. Although we have already demonstrated a strong link between self-regulation and mental health (Buckner et al., 2003), we expect to find self-regulation associated with other dimensions of adaptive functioning. Similarly, we hypothesize that children high in self-regulation will evidence better adaptive functioning in other spheres not examined in our prior study, including academics, social relations, and responding to life stress, than children comparatively low in self-regulation.

Method

Participants

A total of 155 youths participated in this cross-sectional study, which was part of a larger investigation of low-income families (i.e., single mothers and their children living with them whose ages spanned 0–18 years) in Worcester, MA. The average age of these 155 youths was 12 years 0 months (range 8–18 years) and 47% were boys. The race/ethnic status of these youths was 35% non-Latino White, 36% Puerto Rican Latino, 8% other Latino, and 21% African American.

The methodology for this and the parent study have been previously described in detail (Buckner et al., 1999, 2003; Bassuk et al., 1996, 1997). Briefly, families were enrolled into a case-control study of homeless and never homeless, low-income housed families in order to examine risk factors for family homelessness and the consequences of homelessness on mothers and children. These

families were then followed for 2 years and completed a total of three interviews (baseline, and 12-month and 24-month follow-ups). At enrollment into the baseline study phase, all families comprised single-parent, female-headed households. Homeless families were enrolled from family shelters in Worcester, while the comparison group of low-income housed (never homeless) families was recruited from the public welfare office when the head of the household came for a routine redetermination of her eligibility for cash assistance. Data reported in the present investigation were collected on school-age children during the longitudinal phase of the parent study (children in this report were interviewed once at either of the follow-up time points) when virtually all families were living in permanent housing. Hence, although 40% of these 155 youths had experienced homelessness at some point in their past, these study participants are best characterized as a group of youths from extremely poor, but currently housed families, at the time when they were interviewed.

Procedures

We obtained written informed consent from all participating mothers and assent from youths. All interviewers for this study had bachelors or masters level training in the social sciences and also received extensive additional training in administering (and scoring aspects of) the study protocol. When data for this study were collected, the interviewers had seen the youths and their mothers on multiple occasions spanning several years and were typically on familiar terms with them. Mothers were interviewed both about themselves and their children; in addition, children were interviewed directly over two to three 1–2-hour sessions. For 15 youths in this study (9.7%), interviews were conducted in Spanish. When available, existing Spanish versions of standardized instruments were used while other questions were translated into Spanish by bilingual and bicultural translators as previously described in Buckner et al. (2003).

Measures

Self-regulation skills. We measured self-regulation in children using items tapping the different facets of self-regulation that were taken from two separate Q-Sort instruments, the *California Child Q-Sort* (CCQ; Block, 1978; Block & Block, 1980) and the *Haan Q-Sort* (Haan, 1977, 1982). These two Q-sorts were completed by the interviewer after the study participant had completed all assessments. Each interviewer who did the two Q-sorts for a youth had known the child quite well by virtue of having conducted in-depth interviews with the child and with the mother over multiple time points spanning 2–3 years. Because a child was interviewed over time by the same person, it was not feasible to ascertain interrater reliability with these Q-sorts. The interviewers completed the Q-sorts without knowledge of the constructs being assessed.

Consisting of 100 items (cards), the CCQ covers a broad range of personality and behavioral descriptors of a child which the rater places into 9 piles according to how characteristic each is of the child; the piles range from extremely characteristic (value = 9) to neither characteristic/nor uncharacteristic (5) to extremely uncharacteristic (1). The Haan Q-Sort has 60 items which are also sorted into 9 piles. The items describe various adaptive and maladaptive personality processes relevant to stress and coping. Both instruments, particularly the CCQ, have been used in previous child research (Block & Block, 1980; Fantuzzo & McWayne, 2002; Morrissey, 1977; Shields & Cicchetti, 1997).

As described in further detail in Buckner et al. (2003), we created a scale measuring self-regulation that was comprised of 11 items from the CCQ and 21 items from the Haan Q-Sort. These were all items that tapped the executive function (e.g., motivational, executive attention, inhibitory control) and emotion regulation capacities that underlie the self-regulation construct. From the CCQ, 3 items assessed emotion regulation/emotional reactivity (e.g., "Overreacts to minor frustrations; is easily irritated and/or angered"—reverse coded) and 8 items measured executive functions (e.g., "Is attentive and able to concentrate," "Is planful; thinks ahead"). Likewise, from the Haan Q-sort we selected 5 items measuring emotion regulation (e.g., "Regulates expression of feelings proportionate to the situation") and16 items that assessed executive function capacities (e.g., "Inhibits his or her reactions for the time being when appropriate," "Focuses attention and effort on most relevant problems or situations"). We computed scale scores for each measure by averaging the items. Coefficient alpha for the 11-item CCQ measure of self-regulation was equal to .86 and for the 21-item Haan Q-Sort measure, .88. Due to high correlations with one another, the four underlying subscales (two measuring executive functions and two emotion regulation) were combined by computing the average (the scales have the same metric). The internal consistency of this combined measure of self-regulation was .84.

Mental health measures. We assessed mental health from the perspective of both the mother's and the child's own self-report. The mother of each study participant was administered the *Child Behavior Check List* 4–18 Version (CBCL; Achenbach, 1991) to assess her child's emotional and behavioral problems. The CBCL is scored by forming specific syndrome scales as well as composite "internalizing" and "externalizing" global scale scores. In scoring the CBCL, raw scores on the syndrome and global scales are adjusted for the child's gender and age and converted into *T* scores with the mean set to 50. The CBCL is a widely used instrument which has been shown to have criterion-related validity and high reliability (Achenbach, 1991). To assess self-reported symptoms of depression and anxiety children were given the *Children's Depression Inventory* (CDI; Kovacs, 1985) and the *Revised Children's Manifest Anxiety Scale* (RCMAS; Reynolds & Richmond, 1985). Among the youths in this study, coefficient alpha for the CDI total scale was .88 and for the RCMAS total anxiety score, .89. Both instruments have good psychometric properties and have been widely used in both clinical practice and research (Reynolds & Richmond, 1985; Saylor, Finch, Spirito, & Bennett, 1984).

Global adaptive functioning. At the completion of the assessment of each youth, the interviewer rated the study participant in terms of adaptive functioning in the realms of mental health and social relations using the *Child Global Assessment Scale* (CGAS; Shaffer et al., 1983). A commonly used measure of global functioning, the CGAS is a single number rating of the child's *lowest* level of functioning over the past 6 months, with scores ranging from 100–1 (higher scores indicate better functioning). The scale employs 10 different descriptions of adaptive functioning, each linked to a decile.

Social relations. We assessed social competence (positive adaptive functioning in the social realm) by administering a 6-item scale to mothers which included items that asked how well liked is the child, whether s/he makes friends easily, can keep friends for 6 months, enjoys being with others, and so forth). This scale was developed for and used in a multisite psychiatric epidemiology study of children (Lahey, Flagg, Bird et al., 1996). Among study participants in the current investigation, coefficient alpha was .88. We also looked at a youth's involvement with peers who engage in antisocial or otherwise deviant acts, which can be considered a negative measure of adaptive functioning in the area of social relations. For this, we used a 6-item scale developed by Patterson, Dishion, and Yoerger (2000), which assessed the extent to which friends of the study participant engaged in unethical or illegal acts within the past year (e.g., cheated on school tests, damaged property, stole property, threatened or hit someone). For each item, the child was asked to indicate whether none, very few, some, most, or all friends engaged in these activities. Higher scores indicate greater involvement with deviant peers. Alpha for this scale in the present study was .81.

Children's social support. To assess a child's social support, we used an abbreviated version (6 of 11 support -related vignettes) of *My Family and Friends* (Reid, Landesman, Treder, & Jaccard, 1989). In administering this measure, a youth is first asked to nominate up to eight persons with whom they routinely interact. Next, the child is asked to rank order which individuals they are most likely to seek out for the function of receiving emotional (3 vignettes), instrumental (1 vignette), informational (1 vignette), and companionship (1 vignette) support. As a last step, the child is asked to rate how satisfied he or she is with the support provided by the ranked person. The instrument can quantify both the quality and quantity of support as well as their combination. We captured both the quality and quantity of a child's social support in one variable by computing the average of the satisfaction ratings for the six support vignettes given to each network member (to measure quality) and then summed these scores across all network members (to measure quantity).

Academic achievement. We used the *Wechsler Individual Achievement Test Screener* (WIAT-S; Psychological Corporation, 1992) to measure academic achievement for English speaking study participants in the areas of basic reading (i.e., the ability to decode letters and words), spelling, and mathematical reasoning as well as a composite achievement score. The WIAT-S was standardized to have a mean score of 100 with a standard deviation of 15, taking into account a child's age. Because the WIAT-S is English-based, this instrument was not administered to 10 of the 15 study participants whose primary language was Spanish, as a valid score would not have been obtained. In addition to assessing academic achievement in a direct fashion, we also asked mothers to provide an estimate of their child's recent academic grades (e.g., mostly A's, mostly B's, etc.). From these responses, an informal grade point average ranging from 4.0 (highest) to 0.0 (lowest) was imputed.

Cognitive abilities. To gauge a child's cognitive abilities, we used the *Kaufman Brief Intelligence Test* (KBIT; Kaufman & Kaufman, 1990). The K-BIT is comprised of verbal (Vocabulary subtest) and nonverbal (Matrices subtest) measures of intelligence, as well as composite IQ score derived from the two K-BIT subtests. Similar to the WIAT-S, raw scores for each KBIT subtest and an overall KBIT IQ composite score were computed into standard scores in accordance with the examinee's age (mean of 100 and standard deviation of 15 in the standardization sample). Children whose preferred or sole language was Spanish were only administered the K-BIT Matrices subtest because the Vocabulary subtest would not be a valid measure of their verbal intelligence; hence we focus on this nonverbal measure of IQ as it was administered to *all* study participants. The test-retest stability of the K-BIT is very good and evidences criterion-related validity with full battery measures of intelligence (Kaufman & Kaufman, 1990).

Children's negative life events and chronic strains. Children were asked to report on 50 different life events that they had experienced in the past year using the *Life Events Questionnaire* (LEQ; Masten, Neemann, & Andenas, 1994), which we modified to include additional stressors experienced by low-income children. These items include both severe (e.g., death of a friend, parents separated or divorced, mother arrested/jailed, mother had problems with alcohol/drugs) and moderate (e.g., family moved, family financial situation worsened) events. In order to quantify these events we created a summary count (1 = reported; 0 = not reported) across 40 of these 50 items, excluding several which were within a child's ability to influence (e.g., suspension from school). Among children in the present study the range of events reported was as few as 0 and as many as 22. In prior reports, this scale has correlated appreciably with indices of mental health in expected manners lending support to its validity (Buckner et al., 1999, 2003). A measure of life strains that was specifically developed for this study was also administered to youths. This measure tapped 22 adversities (e.g., feelings of hunger due to lack of food, feeling unsafe, etc.) that are more chronic and enduring in nature than those assessed via the life events measure. A variable representing the sum of frequency scores across the 22 items was created (the theoretical range in scores was 0–88). Further details regarding this chronic strains measure are reported in Buckner et al. (2003).

Coping with real and hypothetical events. A series of questions were developed for the present study which asked youths how they responded (i.e., "coped") to up to three specific life events that they had experienced in past 12 months. This portion of the assessment was much more qualitative on account of its exploratory nature and the lack of established instruments that could be employed to assess children's coping with real events. Based on the child's answers to the list of 50 negative life events, the interviewer selected up to three, choosing the events most serious in nature to inquire about further. After being reminded of the event which they reported, the youth was asked ". . . tell me how you responded, what did you do to deal with the problem or your feelings." The child's verbal response was recorded by the interviewer, who subsequently coded the response for the type of coping strategy that was used. A coding schema, grounded in the literature on children's coping, was specifically crafted for this study. A child's response was first rated for whether it seemed adaptive or maladaptive in addressing the problem or event. "Adaptive" responses were those that helped make the youth feel better, or reduced the amount of stress being experienced, or made the situation better. "Maladaptive" responses were those that made the situation worse or led the child to feel more psychological stress and distress. Although the ratings sometimes involved a subjective judgment, in most cases the adaptive or maladaptive

nature of the coping response was easy to discern. Some negative events were of such an uncontrollable or final nature for youths (e.g., death of a relative or friend) that they would report their response was to accept or be resigned to the aftermath of what had been experienced. A coding option of "acceptance/resignation" was used in these instances and such a response was deemed to be neither adaptive nor maladaptive.

For each event, up to two coping responses were coded if this was needed to fully capture the child's description of how he or she responded to the event. In the majority of instances, the child's response could be classified with one rating, and in some cases two categorizations were required. To quantify these ratings of the adaptive or maladaptive quality of the coping response, we summed the number of adaptive responses the child listed and divided by the total number of coping responses rated as adaptive or maladaptive thereby creating a variable that reflected the probability that a child's response to an event was adaptive.

Children were also asked how they would respond to three separate hypothetical events. These vignettes were posed to children in order to compare children's responses to the same stressor, albeit a hypothetical one. The first vignette asked children what they would do if their mother did not like a close friend of theirs and didn't want the youth to see his or her friend anymore. The second vignette inquired as to how the youth would respond if a teacher assigned him or her the task of giving an oral report in front of his or her class in 2 weeks about the country of China. The final vignette posed the situation of the youth finding out that his or her family was told to move out of their apartment (or house) in a month's time. We employed the same coding scheme as was used with real events; and, likewise, computed a variable that indicated the child's propensity to respond adaptively to each vignette.

Statistical Analyses

Bivariate relationships among variables were examined using chi-square tests for categorical variables, Pearson Product Moment Correlation Coefficients (r) for variables measured on a continuous scale, and *t* tests when one variable was categorical and the other continuous. Using linear and logistic regression for the entire sample of 155 youths, we examined associations between self-regulation and adaptive functioning in both unadjusted and adjusted manners controlling for age, gender, nonverbal intelligence, negative life events, chronic strains, and social support, which past research, including our own (Buckner et al., 2003) suggest could explain variation in each of the predictor variables. Additionally, to more clearly examine self-regulation processes we selected youths in the highest and lowest quartile on our composite self-regulation variable and, using *t* test and chi-square statistics, compared these two groups to one another. Although this approach collapses self-regulation into a dichotomous variable, thereby reducing the statistical power of analyses provided in the regression analyses of the full sample, it offers a more tangible means of understanding how children high and low in self-regulation differ across a range of variables. To test for the possibility of effect modification involving self-regulation, two-way multiplicative interaction terms were created (e.g., gender × self-regulation; age × self-regulation). Before forming these interaction terms, the continuous-scaled variables were centered in keeping with the recommendation of Aiken and West (1991).

Results

Table 1 presents the demographic characteristics of the entire sample along with the two different groupings of youths: those relatively "high" ($n = 39$) and those relatively "low" ($n = 39$) in self-regulation. Youths who were included in these subgroup analyses (i.e., those in the 1st and 4th quartiles in self-regulation) were comparable to those who were dropped (i.e., 2nd and 3rd quartiles) in terms of race/ethnic status, gender, and age. As Table 1 illustrates, youths high and low in self-regulation were equivalent in their race/ethnic composition and age. Girls were somewhat more likely to be in the group high in self-regulation than were boys. Both groups were comparable in terms of the type of family they lived in (whether a father-figure was present or not) and household income.

Self-Regulation and Its Associations With Various Indices of Adaptive Functioning

Table 2 presents associations of self-regulation with various indices of adaptive functioning. For continuous-scale variables, both the unadjusted (equivalent to a Pearson correlation coefficient) and adjusted standardized regression coefficients are presented. For dichotomous variables, the unadjusted and adjusted odds ratios are listed. The adjusted results control for any effects of age, gender, nonverbal intelligence, negative life events, chronic strains, and social support. For each association, the adjusted β or odds ratio was comparable to the unadjusted value and retained its statistical significance. For each odds ratio or standardized regression coefficient reported in Table 2, the direction of association was such that the more adaptive score for that particular index was associated with higher self-regulation (Note: an odds ratio below 1.0 indicates a negative association).

Table 1
Demographic Characteristics: Full Sample and Subgroup of Youths High Versus Low in Self-Regulation

Variable	Full sample ($N = 155$)	High self-regulation ($n = 39$)	Low self-regulation ($n = 39$)	*p*
Average age (years)	12 years, 0 months	12 years, 4 months	12 years, 4 months	.95
Gender (% boys)	46.5%	33.3%	53.9%	.07
Race/ethnic status				
Latino White	35.5%	38.4%	35.9%	.94
African American	21.3%	17.9%	23.1%	
Puerto Rican Latino	35.5%	30.8%	30.8%	
Other Latino	7.7%	12.8%	10.3%	
Family composition				
Two-parent	31.0%	30.8%	25.6%	.35
Single-parent	69.0%	69.2%	74.4%	
Family annual income (median)	$12,500	$12,500	$12,500	.98
Ever homeless	31.0%	20.5%	33.3%	.20

Note. *p* values pertain to tests of group differences between youths high versus low in self-regulation.

Table 2
*Associations of Self-Regulation With Dimensions of Adaptive Functioning (*N = *155)*

Variable	Unadjusted β or odds ratio	Unadjusted *p*	Adjusted[c] β or odds ratio	Adjusted[c] *p*
Behavior problems in the home environment				
CBCL Externalizing Global *T*-score[a]	−.55*	<.0001	−.51*	<.0001
Behavior in the community				
Ever had a police contact? (Yes/No)	.60**	<.01	.62**	<.01
Ever arrested? (Yes/No)	.60**	<.05	.58**	<.05
Social relations				
Social competence[b]	.32*	<.0001	.29*	<.001
Involvement with deviant peers[a]	−.34*	<.0001	−.19*	<.05
Academic/school performance				
Wechsler Achievement Test-Screener[b]	.29*	<.0001	.17*	<.05
Grade point average	.36	<.0001	.39*	<.0001
Ever suspended from school? (Yes/No)	.39**	<.0001	.33**	<.0001
Global adaptive functioning				
Children's Global Assessment Scale[b]	.73*	<.0001	.63*	<.0001
Psychological well-being				
Children's Depression Inventory[a]	−.43*	<.0001	−.25*	<.001
Revised Children's Manifest Anxiety Scale[a]	−.33*	<.0001	−.21*	<.01

Note. CBCL = Child Behavior Check List.
[a] Higher score indicates lower adaptive functioning. [b] Higher score indicates higher adaptive functioning. [c] Adjusted for gender, age, nonverbal intelligence, negative life events, chronic strains, and social support.
* Standardized regression coefficient. ** Odds Ratio.

For each of the indices of adaptive functioning reported in Table 2, we examined whether age or gender modified the relationship between self-regulation and that particular variable. In most instances, no evidence of interaction was detected, which means that the strength of association between self-regulation and each outcome variable was similar for boys and for girls as well as for youths older and younger. However, there was some suggestion of effect modification with regard to the anxiety measure such that the negative association between self-regulation and anxiety was greater for girls than for boys and for older youths more than for younger children. Also, for externalizing problems (as measured by the CBCL), the negative association between self-regulation and these problem behaviors was stronger for girls than for boys. Put another way, in general, boys and girls high in self-regulation were less likely to have externalizing problems than children low in self-regulation, whereas this was especially the case for girls.

Comparing Youths High and Low in Self-Regulation on Indices of Adaptive Functioning

In a complimentary set of analyses, we then compared youths deemed high versus low in self-regulation (i.e., the top and bottom quartiles) on a wide array of indices of adaptive functioning. For the full sample, the mean (with the standard deviation in parentheses) for the self-regulation variable was 5.82 (1.31). For the top and bottom quartile these were 7.25 (.27) and 3.91 (.65) respectively, $t(76) = -29.7$, $p < .0001$. Table 3 shows the means and standard deviations for the two contrasting groups of youths (as well as for the entire sample) on these measures. Across the range of measures we assessed, youths high in self-regulation had scores on these different indices that consistently indicated more adaptive functioning than children low in self-regulation. This included fewer problem behaviors in the home as evidenced by lower scores on the CBCL Global *T* score for externalizing behavior problems, as well as fewer problems in the community, with much fewer police contacts. On two separate measures that assess social relations, children high in self-regulation were rated by their mothers as more socially competent and self-reported less involvement with peers who engage in deviant behaviors than did youths who scored low in self-regulation. As for academic performance, youths high in self-regulation had, on average, better academic achievement scores, higher GPAs, and were much less likely to have been suspended from school in the past, as compared with those low in self-regulation. However, youths in these two groups had more modest differences in nonverbal intelligence (mean for youths high in self-regulation = 98.7; mean for youths low in self-regulation = 94.4), which did not reach statistical significance, $t(76) = -1.66$, $p = .10$.

Likewise, on a global measure of adaptive functioning (CGAS), the group high in self-regulation had a much superior level of functioning. The average score of 78 for the high self-regulation group translates to a rating on the Children's Global Assessment Scale of *"Doing all right at home, at school, and with friends. Any problem with functioning is temporary and mild."* In contrast, the average score of 53 for the low self-regulation group relates to the following CGAS description: *"Some noticeable problems at home, at school, or with friends. In the situation where she/he has problems, the problems would be noticeable to anyone."* Lastly, on two indices of psychological well-being, one a measure of depressive symptoms the other of anxiety, youths high in self-regulation had much fewer symptoms on average.

Youths low in self-regulation had experienced, on average, more negative events in the past year than the high self-regulation group, 7.4 vs. 5.5, $t(77) = 2.1$, $p < .05$. In addition, the quality and

Table 3
*Mean (*SD*) of Different Dimensions of Adaptive Functioning for Full Sample and Youths High Versus Low in Self-Regulation*

Variable	Full sample ($N = 155$)	High self-regulation ($n = 39$)	Low self-regulation ($n = 39$)	p
Behavior problems in the home Environment				
CBCL Externalizing Global *T*-score[a]	52.5 (12.9)	45.6 (10.7)	62.9 (11.3)	<.0001
Behavior in the community				
Ever had a police contact? (%)	16.8%	5.1%	28.2%	<.01
Ever arrested? (%)	7.7%	2.6%	15.4%	<.05
Social relations				
Social competence[b]	3.50 (.59)	3.61 (.40)	3.20 (.66)	<.001
Involvement with deviant peers[a]	1.89 (.84)	1.44 (.44)	2.21 (.96)	<.0001
Academic/school performance				
Wechsler Achievement Test-Screener[b]	91.0 (14.2)	97.3 (13.7)	85.6 (11.7)	<.001
Grade point average	2.85 (.77)	3.09 (.65)	2.41 (.85)	<.001
Ever suspended from school? (%)	38.3%	10.3%	71.1%	<.0001
Global adaptive functioning				
Children's Global Assessment Scale[b]	67.2 (14.1)	78.2 (9.8)	53.0 (10.7)	<.0001
Psychological well-being				
Children's Depression Inventory[a]	7.6 (6.9)	3.7 (3.4)	11.6 (9.5)	<.0001
Revised Children's Manifest Anxiety Scale[a]	8.3 (6.2)	4.7 (3.8)	10.9 (6.9)	<.0001

Note. p values pertain to tests of group differences between youths high versus low in self-regulation.
[a] Higher score indicates lower adaptive functioning. [b] Higher score indicates higher adaptive functioning.
CBCL = Child Behavior Check List.

quantity of social support from their social network were somewhat lower than that of youths high in self-regulation, $t(74) = -2.3$, $p < .05$. When adjusting for the same set of control variables as used in the full sample analyses described above, the strength of association between self-regulation and each index of adaptive functioning (as measured by the adjusted standardized regression coefficient or odd ratio) was slightly attenuated (as compared to the unadjusted measure of association) but retained its statistical significance (at least $p < .05$) for each variable reported in Table 3.

Comparing and Contrasting Youths on Adaptive and Maladaptive Responses to Real Events

In addition to comparing these youths on established measures of adaptive functioning, we examined how they responded to up to three separate negative real life events which had been experienced in the recent past. Among all 78 youths overall, 72.6% of coping responses were judged to be adaptive, 14.2% maladaptive, and 13.2% were in the acceptance/resignation category which was deemed to be neither adaptive nor maladaptive. Among responses that could be rated as either adaptive or maladaptive (i.e., excluding those responses by youths in which they were resigning themselves to a difficult or impossible to control event), youths in the high self-regulation group had a 91% probability or responding in an adaptive manner compared to 76% for youths low in self-regulation (odds ratio = 3.59, $p < .01$). Although the type of events that children dealt with were quite varied as were their coping responses, some generalities could be gleaned as to types of responses that were judged to be maladaptive. Most commonly, such responses had: a) an impulsive quality to them which was likely to make the situation worse; or b) involved an unconstructive display of negative emotion. Lapses in self-regulation were by no means the only factor contributing to a maladaptive response; but they were a common qualitative theme, nonetheless.

Self-regulation was correlated with a variable representing the probability of adaptive coping ($r = .27$, $p < .05$). Controlling for life events and social support, self-regulation remained associated with adaptive coping after adjusting for these potential confounding variables ($\beta = .28$, $p < .05$).

Comparing Youths on Adaptive and Maladaptive Responses to Hypothetical Vignettes

We also examined how youths stated they would respond to several hypothetical (although realistic) vignettes. An advantage to vignettes is that they facilitate comparison of coping responses by making the stressor equivalent for all youths. Two vignettes posited a negative event or situation while the third posed a situation which was a challenge in nature and had the potential to be a growth experience. In the vast majority of instances, youths rated these hypothetical situations as being likely to cause them considerable stress. Some examples of youths' actual responses to the vignettes which received either "adaptive" or "maladaptive" ratings are displayed in Table 4. Among all study participants ($n = 155$), the tendency to respond adaptively to real events was associated with responding adaptively to hypothetical vignettes ($r = .26$, $p < .01$).

As shown in Table 5, for each of the three vignettes, despite differences between them as to the nature of the stressor, youths high in self-regulation reported that they would respond in manners that were judged to be more adaptive. For the first vignette (mother no longer wants child to play with/see a close friend), 84% of youths high in self-regulation said they would deal with the situation in a manner judged to be adaptive compared to 51% of youths low in self-regulation. Conversely, 49% of youths low in

Table 4
Examples of Coping Responses to Hypothetical Events

Vignette	Coping responses rated as adaptive	Coping responses rated as maladaptive
Mother no longer wants child to see close friend (negative event)	"Talk to mom about her, introduce my mom to my friend" (15 year old female); "Talk to mom, tell mom that she is my best friend and I want to see her again, that we have a lot in common and do same things together" (12 year old female); "Talk to mom, tell mom he's a really nice guy" (10 year old male); "Talk to mom about the problem, about being sad" (11 year old female); "Just play with him at school where the teachers watch, and not in the neighborhood" (9 year old male); "Maybe talk to guidance counselor in school about situation" (13 year old female);	"Run away to one of my friends house to tell them what happened" (9 year old female); "Yell at her why not, I'd still go to her house?" (12 year old female); "Play with him anyway" (9 year old male); "Tell her off, punch a hole through the door" (12 year old male); "I'd demand I should play with him, I would run away" (11 year old male); "Let her forget and don't say anything (see friend anyway)" (10 year old female);
Family told by landlord to vacate apartment (negative event)	"Look in newspaper for houses or apartments for new place to live, talk to people" (12 year old female); "Talk to owner about it, would go and ask for more time" (12 year old male); "Ask why?, would talk to the landlord to get the reason and try to convince him not to make us move" (12 year old female); "Help pack, say goodbye to my friends" (10 year old male); "Tell my friends about the situation, tell them how I feel" (12 year old male); "Help my mom pack everything up so we could move, try to look at the bright side - tell myself this could be for the better" (17 year old female); "Talk with my family to learn how to deal with it" (15 year old male); "Try to help pay the rent, because I'd rather stay here" (16 year old male);	"Tell mom I can't move, I'd lie to keep from moving" (10 year old female); "Give the landlord extra money to bribe him so we don't have to move" (12 year old male); "I'd go to his house and beat him up" (11 year old male); "Nothing, stay across the street, refuse to leave the neighborhood" (14 year old female); "I'd run away and tell my friends that someone was trying to make us move" (9 year old female); "Leave my stuff, say we're not going to move" (11 year old male);
Teacher assigns child task of presenting oral report on China to classroom (challenge)	"Say sure, tell myself that I can do it" (10 year old female); "Show mom and get her help, tell teacher the plan for the report to make sure there would be enough time" (14 year old female); "Prepare for report by studying everyday and give myself a pep talk" (12 year old male); "Go home and study, get it done" (11 year old male); "Get good information from library, practice speaking in front of others by imagining an audience" (15 year old female); "I would call my dad and have him look up on his computer about China and send it to me." (10 year old male); "Read books, go to the library and look at maps" (12 year old female)	"On that day, I'd say I was sick and pretend I had to throw up" (9 year old female); "Just not do it, tell teacher I forgot and haven't worked on it" (12 year old female); "Tell them I'm not going to do it" (17 year old female); "Stay at home so I wouldn't have to give report" (9 year old female); "Get a note from my mother saying I forgot the report" (13 year old female); "I'd do it, pass it in and be sick the day I had to give the report" (12 year old female); "Just tell the teacher I didn't want to do it" (10 year old male)

self-regulation said they would respond in a manner deemed to be maladaptive (usually a direct negative action or a negative expression of emotion) compared to just 16% of youths high in self-regulation. No youths in either group indicated they would resign themselves to this situation. Maladaptive responses to this vignette were primarily of two types: (1) defiant actions (e.g., continuing to see the friend without the mother's knowledge); or (2) expressions of negative emotion (e.g., yelling at the mother).

For the second adverse vignette (family told by landlord to vacate apartment), among youths high in self-regulation, 89% gave responses judged to be adaptive, 8% indicated maladaptive responses that would likely make the situation or the level of stress they would experience worse, and 3% responded in a manner reflecting resignation to the situation, which was not rated as adaptive or maladaptive. This compares to 63% of youths low in self-regulation who gave an adaptive response to this vignette, 20% who responded in a manner deemed to be maladaptive, and 17% who would accept or resign themselves to the event. The most common maladaptive response to this vignette involved taking a direct action that would likely make the situation worse (e.g., refuse to move; try to bribe the landlord).

Table 5
Responses to Hypothetical Events for Youths High (N = 39) and Low (N = 39) in Self-Regulation

Nature of coping response	High self-regulation	Low self-regulation	Combined ($N = 78$)
Vignette #1 (Mom dislikes friend):			
Adaptive type of response	83.8%	51.4%	68.1%
Maladaptive type of response	16.2%	48.6%	31.9%
Neither adaptive nor maladaptive	0.0%	0.0%	0.0%
			χ^2 (1, $N = 78$) = 8.66, $p < .01$.
Vignette #2 (Family told to vacate apartment):			
Adaptive type of response	89.5%	63.3%	77.9%
Maladaptive type of response	7.9%	20.0%	13.2%
Neither adaptive nor maladaptive	2.6%	16.7%	8.8%
			χ^2 (1, $N = 78$) = 7.07, $p < .05$.
Vignette #3 (Oral report on China):			
Adaptive type of response	92.3%	65.7%	79.7%
Maladaptive type of response	7.7%	34.3%	20.3%
Neither adaptive nor maladaptive	0.0%	0.0%	0.0%
			χ^2 (1, $N = 78$) = 8.07, $p < .01$.

Lastly, for the vignette that posed a challenge rather than an adverse situation to youths (preparing and then giving an oral report on China), 92% of the high self-regulation group stated an adaptive response (usually to go ahead and prepare the presentation) compared to 66% of youths low in self-regulation. Only 8% of youths high in self-regulation indicated a response judged to be maladaptive to the situation (e.g., avoiding preparation); whereas 34% of the low self-regulation group responded in such a manner, typically, by stating a direct negative action (e.g., refusing the teacher's request) or indicating they would avoid the challenge.

Discussion

Researchers have theorized that self-regulation capacities play a causal role in influencing adaptive functioning (Aspinwall & Taylor, 1997; Carver & Scheier, 1998; Eisenberg et al., 1997; Goldberg, 2001; Karoly, 1993), which makes good intuitive sense given the centrality of self-regulation to goal accomplishment. Results from the present investigation are quite consistent with existing theory and prior research findings and contribute to the small but growing literature in this area in several ways. First, we provide perhaps the most extensive examination to date of self-regulatory processes and their relations to adaptive functioning among youths living in poverty. Second, we demonstrate that children who are seen as proficient in self-regulation appear to be doing well on a variety of indicators of adjustment or adaptive functioning, not just one. Third, we have found preliminary evidence that self-regulation is associated with adaptive means of coping with stressors, both real and hypothetical, as theory would predict.

These findings, because of their cross-sectional nature, cannot disentangle cause from effect; nonetheless, they lend support to the argument that good self-regulation contributes to positive adaptation. Moreover, the link is quite robust as indicated by the consistent association we detected across separate (but somewhat) overlapping realms including behavior in the home and community, social relations, school performance, and psychological well-being. According to Cohen (1988), the strength of most of these associations between self-regulation and the various indices correspond to *large* effect sizes in unadjusted analyses and to mostly *moderate* effect sizes when controlling for other explanatory variables.

Although the results are tentative and the methods somewhat exploratory, the finding that youths high in self-regulation appear to respond in more adaptive manners to stress, whether it be recent actual events or hypothetical situations, may help to explain how self-regulation capacities could affect adaptive functioning. In essence, self-regulation skills may help children cope with adversity in manners that help to alleviate distress and resolve problems. This would be consistent with the arguments put forth by Aspinwall and Taylor (1997) as well as Eisenberg et al. (1997) concerning the importance of self-regulation to proactive and reactive manners of coping.

Overall, all of the youths in this study predominantly responded to stressors with direct problem-solving strategies, especially when the stressors were hypothetical. Due to their heterogeneous nature, real life events had been dealt with in more diverse manners. When we examined more closely, it appears that youths who responded to stressors in maladaptive ways tended to do so by reacting in manners that were impulsive or involved expressions of anger, with youths lower in self-regulation showing a greater proclivity in these regards.

Self-regulation skills were not associated with a child's age, race/ethnic status, or household composition. There was a tendency for girls to manifest higher self-regulation than boys, but statistically controlling for gender did not affect the association between self-regulation and various indices of adaptive functioning. Likewise, while nonverbal intelligence was slightly higher for youths with greater self-regulation, it too did not weaken the strong association between self-regulation and adaptive functioning, including academic achievement and grades.

Limitations

A limitation of the study is that it is based on a group of youths enrolled from one geographic locale, thereby potentially restricting the generalizability of results. Also, as this study is cross-sectional in nature, future research that employed a longitudinal design could better disentangle antecedents from consequences and shed greater light on the potential causal role of self-regulation in influencing adaptive outcomes in children and adults. Preventive interventions that were designed to improve self-regulation skills could provide even more definitive tests of such a causal link. Although the broad array of measures used in this study was a strength, there were a couple of weaknesses to note as well. First, the examination of coping responses to real and hypothetical stressors was exploratory in nature and the ratings open to some subjective interpretation. Also, it was not feasible for us to ascertain interrater reliability on our Q-sort measures that were used to construct a measure of self-regulation as well as the measure of global functioning. This was due to the fact that each study participant was assessed by only one interviewer; hence only this interviewer was in a position to complete informed ratings of a youth.

Directions for Future Research

Additional research on the role of self-regulation in adaptive functioning appears warranted. For instance, further research is needed to better examine whether self-regulation skills facilitate proactive means of responding to stress such as reducing the severity of modifiable stressors by addressing them sooner or "heading them off at the pass" entirely. Also, it would be useful to better tease apart the components of self-regulation in order to understand how, and under what circumstances, specific facets contribute to adaptive means of coping with stress. This study compared children in terms of relative degree of self-regulation; it would be helpful for future research in this area to better anchor self-regulation in more absolute or normative terms.

If a causal connection between self-regulation and various indices of adaptive functioning could be well established, it would hold great promise for preventive intervention, especially given that self-regulation comprises a set of capabilities that are modifiable. When viewed as skills which can be learned or improved upon, the construct of self-regulation lends itself to a strength-based approach to intervention with at-risk groups, as well as in a more universal manner (in this regard, as stated earlier, we found no evidence that self-regulation skills varied as a function of race/ethnic status). Our findings hold out the important possibility that targeting self-regulation to improve an outcome in one realm of functioning could lead to beneficial ("spillover") effects in other domains as well. As prevention science has advanced dramatically in recent years, both in terms of alternative designs and analytic strategies, it is becoming increasingly possible to meaningfully examine the possible effects of interventions that aim to improve one or more facets of self-regulation.

Having said this, it is important to remember, especially when drawing implications from a study involving low-income children, that self-regulation is very much an attribute of a person, and puts the onus for change at the individual level, when there are important parenting and family factors as well as macro or structural-level factors also at work in influencing adaptive functioning (as well as self-regulation itself). Many of the stressors experienced by children living in impoverished circumstances, such as exposure to violence and homelessness, come about because of community-level variables that are outside of a child's or family's ability to influence. Multiple approaches, that is interventions that aim to produce change in individuals as well programs and policy that attempt to alter macrolevel factors, are necessary and needed to improve the lives of children (and adults) living in poverty.

In conclusion, there is a growing body of literature on the construct of self-regulation which seeks to better clarify its nature and role in human functioning. Our results provide clear evidence that self-regulation skills are associated with a wide array of indices of outcomes among a sample of low-income children facing significant adversities. Theory suggests that self-regulation skills may contribute to adaptive functioning, but further research is needed to better clarify its role and to extend this line of investigation.

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