Relating Resilience Factors and Decision Making in Two Groups of Underserved Adolescents: Implications for Intervention

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Keywords: youth, adolescent development, peer effects, family effects, delinquency prevention, resilience, decision making

Abstract

There is scant evidence regarding the relationship between cognitive variables and social factors influencing the success of community-based programs intended to foster positive youth development. This preliminary study examines the relationship among individual, community/contextual, and parenting factors, all of which have been associated with positive outcomes, and decision making in two groups of underprivileged youth. Participants for this preliminary study were drawn from two locations: the Juvenile Justice Diversion program (JJ) in Harris County, Texas, and Youth Advocates (YA), a community-based, peer-to-peer youth-mentoring organization. Participants were at-risk youth between the ages of 13 and 19 who were living in their communities. These youth were evaluated using the Child and Youth Resilience Measure (CYRM-28), a questionnaire that indexes developmental assets associated with resilience, and the Columbia Card Task
(CCT), a task that measures affective and deliberative decision making. We found group differences in the relation between decision-making skills and developmental assets. For those in the YA group, higher scores on the CYRM-28 were related to superior decision making; for youth in the JJ group, lower scores on the CYRM-28 were related to better decision making. Our results seem to indicate differences in the psychosocial environments of the two groups, such as the greater influence of anti-social peers among youth in the JJ group. These findings provide a potential direction for future research and may have implications for evaluating the effectiveness of adolescent intervention programs.

Introduction

Not all children exposed to significant environmental or social stress have negative outcomes. In fact, many children growing up under circumstances of poverty and trauma mature to become healthy, stable, and productive individuals (Masten, 2001). Resilience refers to the concept that some individuals have positive outcomes despite significant adversity. Research demonstrates that various psychosocial factors (e.g., the presence of at least one positive, stable adult influence in a child’s life) are crucial for promoting resilience (Hawkins, Graham, Williams, & Zahn, 2009).

A major gap in the research literature is the paucity of investigations examining how individuals’ cognitive skills contribute to positive outcomes, which could inform the development of intervention programs (Greenberg, 2006). In addition, research linking resilience factors to intervention strategies is significantly lacking (Hawkins et al., 2009).

A few studies have examined cognitive variables (i.e., variables beyond an average IQ) that may promote positive adjustment within high-risk circumstances. Buckner and colleagues showed that youth judged to be resilient exhibited better self-regulatory skills than youth judged to be non-resilient (Buckner, Mezzacappa, & Beardslee, 2003). In another investigation, Martel and colleagues found evidence that a suite of executive function tasks (e.g., measures of inhibition, working memory, and cognitive shifting) were moderately, but very consistently, related to resilience and social competence (Martel et al., 2007).

Adolescence is marked by an increase in risky behaviors despite decision making based on a seemingly intact understanding of various risks (Steinberg, 2010). Decision making has been characterized as a dual system that operates on controlled, logical, deliberative processes, as well as on automatic or impulsive-affective processes (Weber, Shafir, & Blais, 2004). In an attempt to explain how adolescents use both intellectual and emotional information when making decisions, researchers have postulated that adolescents are disproportionately influenced by affective information. This theory has been supported by research suggesting that, compared to young adults, adolescents engage in a greater number of risky decisions in the context of affective information than they do in the context of situations requiring deliberative thought (Figner, Mackinlay, Wilkening, & Weber, 2009). In one recent investigation, Johnson and colleagues (2012) demonstrated that adolescents made a greater number of risky decisions after they were exposed to an acute psychosocial stressor designed to simulate a real-world stressful experience (Johnson, Dariotis, & Wang, 2012). These investigators determined that an adolescent’s initial risk preference under non-stressed conditions appeared exaggerated in the stressful condition, especially when the adolescent tended toward an impulsive response style.

Other studies demonstrate that deliberative decision-making processes are related to emotion-regulation strategies (Panno, Lauriola, & Figner, 2012), and evidence indicates that both decision-making and emotion-regulation processes may be compromised by various risky behaviors (Arnsten & Rubia, 2012; Crowley et al., 2010; Hobson, Scott, & Rubia, 2011; Matthys, Vanderschuren, Schutter,
& Lochman, 2012; Pang & Beauchaine, 2012). For example, a recent investigation indicated that adolescent binge drinkers exhibited abnormal affective decision making (as indexed by their performance on a cognitive decision-making task, as well as on their pattern of brain activity) compared to adolescents who had never consumed alcohol (Xiao et al., 2012). The authors emphasized that these differences were apparent despite a relatively brief history of binge drinking in their sample.

Another line of research has clearly demonstrated an association between the numbers of family and community-based developmental assets and reductions in various risk behaviors, including risky sexual behavior (Vesely et al., 2004), participation in violence (Aspy et al., 2004), and drug and alcohol use (Oman et al., 2004). Given these relationships—and because of the linkages between decision making, risky behaviors, and the overall trajectory of psychosocial, occupational, and educational outcomes (Steinberg, 2010)—it is important to examine how affective and deliberative decision-making processes are related to resilience variables and how these relationships may be modified or supported by intervention efforts. To our knowledge, no studies have examined the relationship between resilience and higher-order executive skills, such as decision making among adolescents. Major predictors of positive outcomes for children are positive psychosocial and community environments. Pernicious environmental influences constitute a major challenge for underprivileged youth. The families of underprivileged youth are often unstable, have few financial resources, experience a lack of educational opportunities, reside in high-crime areas with a large concentration of gang-involved peers, and struggle with communication barriers (Overstreet & Mathews, 2011; Stanton-Salazar & Spina, 2003). The situation deteriorates further when youth become involved in the criminal justice system.

The high rate of juvenile re-offending underscores the importance of developing new models of rehabilitation (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). Interest in one such rehabilitative approach, peer-based youth mentoring, has grown steadily over the past few decades (Schwartz, Rhodes, Chan, & Herrera, 2011; Smith, 2011). Although research tying peer-based mentoring to decreases in risky behaviors and better outcomes for underprivileged youth is lacking in rigor and has resulted in inconsistent findings, this strategy appears to hold promise for improving outcomes for these vulnerable youth (DuBois, et al., 2011).

Despite the correspondence between the family/community environment and participation in risky behaviors, little research has addressed the specifics of an individual’s resilience factors and their effect on targeted interventions (Overstreet & Mathews, 2011). Furthermore, few, if any, studies have examined an individual’s cognitive factors and their contribution to the success of community-based intervention strategies. Cognitive variables, such as decision making, are important to consider when evaluating the effectiveness of intervention strategies because they are significant drivers of behavior, especially social behavior. Developing interventions that can work on a cognitive as well as a social level may significantly increase the potency of some intervention approaches.

In this preliminary study we explore the relationships between cognition and factors associated with resilience (e.g., individual assets, community/contextual variables, and parenting relationships) in two groups of youth who are at high risk of poor social outcomes, such as early gang involvement, dropping out of school, substance abuse, and early pregnancy. This preliminary study examined the relationship between individual, community/contextual, and parenting assets (as measured by the Child and Youth Resilience Measure, CYRM-28) and performance on a decision-making task (the Columbia Card Task, CCT) in two groups of underprivileged adolescents. The first group comprised participants in a diversion program of the Harris County, Texas,
Juvenile Probation Department (JJ); the second was a demographically similar group of adolescents participating in Youth Advocates, Inc. (YA), a community-based, peer-to-peer youth service organization. The CCT (Figner et al., 2009) is a novel decision-making tool that evaluates an individual's ability to make decisions in two contexts: one driven primarily by emotion, the other driven primarily by information on risk and probability; that is, by cognition. The CCT allowed us to investigate the influences of affective and deliberative factors in these adolescents’ decision-making processes. We anticipated that higher resilience factors would correspond to less risky decision making as demonstrated by adolescents’ performance on the CCT.

Method

Participants. Twenty-three adolescents (19 male) between the ages of 13 and 19 years ($M = 16.62$, $SD = 1.53$) who live in poverty or with family dysfunction, and who had endured multiple traumas, participated in the study. Participants were recruited from two venues: YA, a peer-to-peer youth-mentoring organization that provides a positive peer culture for youth living in circumstances of acute risk ($n = 15$; age = 15-19 years), and a diversion program for first-time offenders in the Harris County, Texas, Juvenile Probation Department (JJ) ($n = 8$; age = 14-16 years).

YA is a service organization that has provided support for acute-risk youth in Houston for 30 years. YA utilizes peer Outreach Worker mentors to connect with youth from underserved urban areas of Houston. The main goal of YA is to facilitate the establishment of a positive peer culture for at-risk youth, thereby creating a direct alternative to gang involvement and criminal activity. This is done by providing a safe, positive environment in which youth from similar backgrounds can come together to build friendships, talk, and participate in various pro-social activities (e.g., break dancing, soccer, music). Community volunteers and staff connect YA participants with educational opportunities and jobs. Specific YA program components include: healthy alternative activities; life skills training; classes in refusal skills and gang avoidance; educational support, including class credit recovery and tutoring; assistance with employment (if eligible); parent training for families of youth; and opportunities for positive peer interactions in various social venues. Data demonstrate a negative correlation between risk-taking behaviors and the amount of time spent in the YA program (see Figure 1).

The JJ group included youth who had been detained for the first time for various non-violent offenses, but who have not been or will not be charged with a crime. These youth come from similar backgrounds (including high levels of

Figure 1. Correlation Between Risk-taking Behaviors and the Amount of Time Spent within the YA Program.
trauma) as the YA group. JJ participants were provided information about YA services following the completion of the study but were under no obligation to participate in YA-sponsored events.

Table 1 compares the two groups in terms of various demographic factors (including parent education, highest grade attained, and estimated IQ), as well as other experiential variables, such as the number of endorsed trauma symptoms and overall quality of life. These data indicate that participants were drawn from similar family environments and socioeconomic circumstances, were of similar race/ethnicity, had similar overall intellectual abilities, and shared a variety of life experiences. Thus, based on the data collected as part of this study, these factors appeared the most important to compare between these two groups.

Table 1. Demographic Information Comparing Two Groups

<table>
<thead>
<tr>
<th></th>
<th>YA</th>
<th>JJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent education (Years)</td>
<td>10.3</td>
<td>10</td>
</tr>
<tr>
<td>Last grade completed (Grade)</td>
<td>10.7</td>
<td>10</td>
</tr>
<tr>
<td>Overall Life Quality (30 point scale)</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>UCLA Trauma Scale (17 point scale)</td>
<td>5.3</td>
<td>6</td>
</tr>
<tr>
<td>WASI_IQ</td>
<td>105</td>
<td>100</td>
</tr>
<tr>
<td>Ethnicity (Total Number)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic—Non-White</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>African American</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Asian</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Ya: Youth Advocates group; JJ: Juvenile Justice group; WASI: The Wechsler Abbreviated Scale of Intelligence

Procedures

We obtained these data as part of a wider pilot investigation examining the relationships between cognitive and psychosocial factors important for positive adjustment among underprivileged adolescents.

All procedures were approved by the institutional review board at Baylor College of Medicine. All English-speaking, typically developing, healthy, males and females between the ages of 13 and 18 from YA and JJ were eligible to participate in this study. Those excluded from the study included non-English-speaking youth outside the age range; youth with a history of documented head injury or with a diagnosis of a severe psychiatric or developmental disorder (i.e., mental retardation, bipolar disorder, schizophrenia, or autism); an IQ below 70; or referral for drug abuse treatment.

Participation for all youth was voluntary and we obtained youth assent prior to testing. We recruited YA youth passively via posters and brochures at the YA community center during group activities. During these activities, a research coordinator was on hand to answer questions interested youth had about the study. Youth who expressed an interest were given brochures that contained a detailed description of the study (available in Spanish and English) to take home to their parents or legal guardians. Although participants were required to be primarily English-speaking, brochures in Spanish were provided for Spanish-speaking parents to review prior to giving their informed consent for their children's participation. Interested parents contacted the research coordinator, who then explained the study, verified eligibility, and went over the consent form to answer questions. Upon receiving the signed consent form, the youth was scheduled for assessment.

We recruited JJ youth via the Harris County Juvenile Probation Department diversion program (HCJPD). After the youth had been accepted into the diversion program, the project investigators introduced the study to the youth and his or her parents. The investigators made it clear that participation was entirely voluntary and confidential, and had no bearing on the legal disposition of the youth. To minimize any possibility of coercion, parents received a form on which they could accept or decline to participate in the study (with contact information if they decided to accept). All parents turned in a form (either completed or not); and the project investigators contacted
those who expressed interest to verify interest
and eligibility, explain the study procedures, and
obtain informed consent. As with the other par-
ticipants, we did not conduct scheduling or test-
ing of any kind until we obtained signed informed
consent forms. Neither officers nor staff of HCJPD
were informed about who chose to participate
and who did not.

All testing took place in the Cognitive
Neuroscience Laboratory at Baylor College of
Medicine or in a quiet office at the YA facility,
whichever was most convenient for the family.
All assessments were administered by the same
psychometrician, who was experienced in using
all of the instruments and who was trained and
certified (at Baylor College of Medicine) in Human
Subjects Protection and data handling. All mate-
rials were kept strictly confidential. Specifically,
we coded all data with an identification number
and kept the information linking ID numbers to
participant information in a locked office. Only
participant ID numbers were stored in the elec-
tronic database, which were secured on Baylor
College of Medicine password-protected servers;
access to this information was restricted to study
personnel. Further, we obtained a Certificate of
Confidentiality from the National Institutes of
Health. Prior to beginning testing, we offered par-
ticipants a healthy snack and drink. Upon comple-
tion of the study, we offered participants a gift
card from one of several local vendors.

Measures

The CYRM-28 (Ungar & Liebenberg, 2011) is a
28-item, self-report questionnaire constructed
to assess developmental assets related to resil-
ient outcomes across a variety of cultural con-
texts (Ungar & Liebenberg, 2011). The CYRM-28
explores the developmental assets available to
youth between the ages of 12 and 23 to bolster
resilience across three domains: 1) Individual
Skills (e.g., attitudes and knowledge about self);
2) Relationship with Caregivers (e.g., perceived
support of family); and 3) Contextual Factors
(e.g., variables related to the community and
environment). Higher scores indicated the pres-
ence of a greater number of assets considered
important for resilience (Ungar, 2008, 2011).
Internal reliability of the three factors of the
CYRM-28 ranged from 0.65 to 0.91. The inter-
class correlation coefficients (validity coefficient)
ranged from 0.583 to 0.773 (Ungar & Liebenberg,
2011). The CYRM-28 has been demonstrated to be
reliable and to have face validity across cultures
and contexts (Ungar, 2008, 2011). It has a high
degree of overlap with other instruments assess-
ing developmental assets, and is freely avail-
able for research use with permission from the
authors.

CCT (Figner et al., 2009) measures decision-
making capacity under two conditions: Affective
and Deliberative (Figner et al., 2009). The Affective
condition measures decision making based on
emotional information, whereas the Deliberative
condition measures decision making based on
cognitive risk and reward estimations. In both
conditions, participants viewed a computer
screen and were presented with an 8 x 4 grid of
squares representing cards that were placed face
down. In each trial, we informed participants of
the maximum number of points to be gained
from each card (10, 20, or 30); the maximum
number of points to be lost from each card (250,
500, or 750); and the number of risk cards (1, 2, or
3) present in the grid for that trial. We informed
participants that they would earn 1 cent for every
20 points accrued by the end of the task. In the
Affective condition, we asked participants to click
on the cards one at a time, with each click “turn-
ing over” a card to reveal a cartoon of either a
smiling face (gain card) or a frowning face (loss
card); participants accrued points each time they
turned over a smiling face, but the trial ended
when a frowning face appeared. A participant
could end the trial at any time prior to turning
over a loss card. When the participant ended the
trial either voluntarily or by turning over a loss
card, the participant turned over the remain-
ing cards, revealing whether they were gain or
loss cards. In the Deliberative condition, the
participants did not turn over cards, but made decisions about how many cards theoretically should be turned over based solely on the knowledge of the maximum number of points and the number of risk cards in each trial.

We assessed performance in terms of the number of cards turned over in each condition, with higher numbers associated with poorer (riskier) decision making. We also noted the amount of money each participant earned. We balanced the order in which we presented the Affective and Deliberative blocks. Each block consisted of a total of 54 trials, for a total of 108 individual trials for the entire task.

Other Measures

*The Wechsler Abbreviated Scale of Intelligence (WASI)* (The Psychological Corporation, 1999) is a widely used, nationally standardized test of intelligence yielding estimates of verbal IQ, performance IQ, and full-scale IQ (The Psychological Corporation, 1999). The average stability coefficients for the adult sample ranged from 0.87 to 0.92 for the IQ scores. WASI subtests are shown to have good convergent validity with their counterparts on other standard measures, ranging from 0.76 to 0.88 (The Psychological Corporation, 1999).

*The University of California–Los Angeles Posttraumatic Stress Disorder (UCLA PTSD) Reaction Index Trauma Exposure Screen* comprises questions regarding types of trauma a person has experienced (e.g., assault, arrest, war, family death, hospitalization, etc.). We modified this measure slightly to capture more accurately the experiences of these youth, although we preserved all original content. Modifications included: 1) adding an age option for each traumatic event; 2) combining items of earthquake and disaster into one question; and 3) adding four new items: *being a refugee, being forced to do something bad, seeing a family member/friend arrested, and being arrested*. The original measure has good convergent validity with other measures ranging from 0.70 to 0.82, good sensitivity (0.93) and specificity (0.87), good internal consistency (0.90), and good test re-test reliability (0.84).

*Family Environment Questionnaire* is a measure we constructed to index overall family environment, including receiving government aid, use of drugs or alcohol by family members, judicial system involvement, and family physical and mental health. This questionnaire is available upon request from the corresponding author.

Statistics and Preliminary Analyses

Youth recruited from YA and JJ were drawn from the same general population and were similar in terms of IQ, rates of trauma experienced, and overall family environment (Table 1). We analyzed three types of developmental assets scores based on CYRM-28 subscales: Individual Skills, Relationship with Caregivers, and Contextual Factors. These three subscales define the factors promoting resilience (personal skills, family support, and social environment). To examine the relationships between the subscales of CYRM-28 and decision-making performance on the CCT, we calculated Spearman correlation coefficients. Due to the limited sample size and the preliminary nature of the study, we made no corrections for multiple comparisons. Observed effect sizes ranged from small (0.1) to moderate (0.3) to large (0.5 and larger).

Results

Groups were similar in terms of their CYRM-28 subscale scores (Figure 2a) and their performance on both conditions of the CCT (Figure 2b). Consistent with their similar performance in the number of cards selected, both groups earned approximately the same amount of money (mean YA = $4.01, JJ = $4.17). However, the relation between the CYRM-28 and CCT differed based on group, with the findings for only the YA group following the anticipated direction; that is, we found a significant negative relation between CYRM-28 and CCT scores. Essentially, the higher the
CYRM-28 score for participants in the YA group (suggesting the presence of more resilience-promoting factors), the fewer cards they turned over and thus the less risk they took on the CCT. This relation was observed only in the Deliberative condition of the CCT and only between the individual and context subscales of the CYRM-28 (Table 2).

Table 2. The Relationship between CCT Scores and Scores on the CYRM Subscales in YA Youth (n = 15)

<table>
<thead>
<tr>
<th>CCT scores</th>
<th>CYRM Subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual Skills</td>
</tr>
<tr>
<td>Affective condition</td>
<td>-0.05</td>
</tr>
<tr>
<td>Deliberative condition</td>
<td>-0.42†</td>
</tr>
<tr>
<td>Total</td>
<td>-0.31</td>
</tr>
</tbody>
</table>

Note: CYRM: Child and Youth Resilience Measure; CCT: Columbia Card Task; YA: Youth Advocates group; *: statistically significant at p = 0.05; †: marginally significant (p < .10)

Different from the YA group, the JJ group showed a positive correlation between performance on the CCT Affective condition and the caregiver subscale of the CYRM-28. Essentially, those participants within the JJ group who reported greater levels of caregiver-related factors also took more risks on the CCT by turning over a greater number of cards. Interestingly, for JJ participants in the Deliberative condition of the CCT, lower scores (i.e., less risk taking) were associated with higher scores on the CYRM-28 caregiver subscale. Conversely, higher Deliberative CCT scores (i.e., a greater number of risky choices) were associated with higher scores on the CYRM-28 individual and contextual factors subscales (i.e., a greater endorsement of these resilience-promoting factors) (Table 3). Of note, despite relatively large effect sizes, no correlations in the JJ group reached significance, possibly because of this group's small sample size.

Table 3. The Relationship between CCT Scores and Scores on the CYRM Subscales in JJ Youth (n = 8)

<table>
<thead>
<tr>
<th>CCT scores</th>
<th>CYRM Subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual Skills</td>
</tr>
<tr>
<td>Affective condition</td>
<td>0.18</td>
</tr>
<tr>
<td>Deliberative condition</td>
<td>0.57</td>
</tr>
<tr>
<td>Total</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Note: CYRM: Child and Youth Resilience Measure; CCT: Columbia Card Task; JJ: Juvenile Justice group. No correlation reached significance.

Discussion

This preliminary study was an initial step in investigating relations between resilience and decision-making skills in high-risk adolescents.
under two different decision-making conditions (Affective and Deliberative). Youth involved in the YA program exhibited the expected pattern of results: higher resilience was associated with better decision making, but only in the Deliberative CCT condition and only in association with individual and contextual factors (but not caregiver factors) endorsed on the CYRM-28. The resilience measures were related only to the condition in which youth made decisions in the absence of affective cues. This suggests that among adolescents from at-risk circumstances, protective factors may have a negligible impact on decisions made in the context of affective information potentially secondary to the strong emotional valence of this information.

Individual factors have been implicated in resilience (Cicchetti & Rogosch, 2009), whereas the role of the broader community environment (contextual factors) has been less well-defined (Rutter, 2007). It was somewhat surprising that the caregiver subscale yielded no significant findings in this population, as a positive family environment has been associated with resilience (Rutter, 2007). However, it is possible that the strong community organization in which these youth participated compensated for a weak family system, a finding supported by the relationship between contextual factors and CCT performance observed in the YA group.

The findings in the JJ group were striking in that we observed opposite patterns of relations (i.e., we found moderate-to-large effect sizes for higher individual and contextual resilience factors of the CYRM-28 being associated with poorer, or risky, decision making). One possible explanation has to do with the environmental influences operating on this group. That is, individuals from the JJ group may have been in environments (such as gangs) that promoted risky behaviors as an appropriate and potentially necessary aspect of adaptive or resilient functioning (Ungar, 2004). Although the YA group was also drawn from a high-risk sample and was exposed to many of the same risk factors as youth in the JJ group, those in the YA group were surrounded by a significant, positive peer and adult support network. Obviously, this explanation is speculative and should be further investigated with larger samples and longitudinal designs that incorporate measures of peer groups and peer influences. Another possibility is that the resilience factors assessed by the CYRM-28 may not actually be indicative of a resilient outcome in the JJ population. However, the large effect size found for the relationship between the caregiver subscale and the CCT within this group is consistent with our initial hypotheses and suggests that the CYRM-28 has validity for this population, at least with regard to caregiver-related variables.

Finally, it is possible that participants in the JJ group did not answer truthfully or respond consistently on either the CYRM-28 or CCT. Therefore, these patterns may reflect elusory correlations based on inaccurate or unrepresentative data. Given our small sample size in both groups, this possibility cannot completely be ruled out; however, performance on both procedures was fairly similar for both groups (including ranges and means) and correlations did not appear overly influenced by outliers in either group.

This study is a preliminary attempt to identify cognitive variables that may influence resilience. Obviously, decision making is not the only important cognitive skill to investigate in this regard. However, given its close relationship to emotion regulation (Panno et al., 2012), the connection between deficits in decision making/emotion regulation and various psychopathologies (Arnsten & Rubia, 2012; Matthys et al., 2012; Pang & Beauchaine, 2012), and the association between developmental assets and reductions in various risky behaviors (Aspy et al., 2004; Oman et al., 2004, Vesely et al., 2004), investigating the relationship between decision making and resilience appears to be a reasonable first step. The current findings underscore the importance of assessing the role of various contextual factors on the relationship between cognition and resilience (Greenberg, 2006). To this end, future studies
should employ additional measures of resilience or developmental assets in order to provide a more thorough understanding of important family and community factors that may affect a child’s trajectory within various domains (Scales and Roehlkepartain, 2003; Sesma & Roehlkepartain, 2003).

Specifically, future studies should 1) expand the scope of cognitive variables evaluated, 2) investigate the role of neurobiology and genetic factors in promoting resilient outcomes, specifically gene-environment interactions (Rutter, 2012), and 3) investigate the role that these variables play in previously established relationships between developmental assets and outcomes such as school achievement (Scales & Roehlkepartain, 2003).

In addition, early and late adolescence represent different developmental periods. Future studies should examine whether the relationship between developmental assets and cognitive factors changes as a consequence of maturation, and/or whether particular assets become more or less salient as adolescents grow older and the social, cognitive, and adaptive demands on them increase.

The current investigation lacked sufficient numbers of females for a separate analysis of this group; however, future studies should examine whether the relationship between developmental assets and cognition differs by sex, since other research suggests gender-based differences in protective factors (Hawkins et al., 2009). Although some initial data was suggestive of a reduction in risk behaviors the longer an individual participated in the YA program, the cross-sectional nature of our preliminary investigation prohibits an exploration of this variable. Other prospective studies should examine how the relationship between developmental assets and cognition changes as a factor of time in intervention.

These results suggest that the nature of contextual influences (e.g., whether prosocial or antisocial) are important to understand when assessing the interaction of these variables with behavioral/cognitive outcomes. Further, these results suggest that contextual factors that would usually be considered beneficial within most high-risk populations (e.g., a stable peer group or feeling part of a particular community) may actually potentiate risky behavior and be detrimental to outcomes if these influences are themselves aberrant. This is akin to research demonstrating that children have better behavioral outcomes when they have regular contact with both parents, except when the father engages in high levels of anti-social behavior—in which case a child’s outcome is likely to be significantly worse (Jaffee, Moffitt, Caspi, & Taylor, 2003). Our findings emphasize the need for positive community and peer supports and suggest these factors may influence cognitive variables related to risky decision making. They suggest that programs intervening on a community level may increase the effectiveness of interventions more traditionally focused on the individual.

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