Exploring the Roles of Extracurricular Activity Quantity and Quality in the Educational Resilience of Vulnerable Adolescents: Variable- and Pattern-Centered Approaches

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Abstract

This longitudinal study examines how extracurricular activity involvement contributes to "educational resilience"—the unexpected educational attainments of adolescents who are otherwise vulnerable to curtailed school success due to personal- and social-level risks. Educationally vulnerable youth characterized by significant risks and an absence of assets were identified during early adolescence (approximately age 14) using measures of academic motivation, achievement, and mental health as well as family, school, and peer contexts. Using a mixture of variable- and pattern-centered analytic techniques, we investigate how both the total amount time that vulnerable youth spent in positive extracurricular activities and the specific pattern of their extracurricular activity involvement during late adolescence (approximately age 17) predict their subsequent enrollment in college during early adulthood (up through approximately age 21). Educational resilience was predicted uniquely by some, but not all, activity patterns. These results suggest that positive extracurricular activity settings afford vulnerable youth developmentally appropriate experiences that promote educational persistence and healthy development.

Involvement in positive (e.g., structured or supervised) extracurricular activities, both within and outside of the school context, has been identified as an important factor in the promotion of positive youth development (e.g., Carnegie Corporation, 1992; Durlak & Weissberg, 2007; Eccles & Gootman, 2002; Eccles & Templeton, 2002; Granger & Kane, 2004; Kane, 2004; Larson et al., 2004; Lauer et al., 2006). Previous studies have highlighted the important role that such involvement can play in the educational pathways of youth growing up in situations of considerable developmental risk (e.g., Lauer et al., 2006; Mahoney & Cairns, 1997; McLaughlin, Irby, & Langman, 1994). Given the significant personal and societal costs of educational failure during an age of global capitalism (Friedman, 2005), redressing barriers to educational success among vulnerable adolescents continues to be a critical social issue and policy focus for governments across the world (UNESCO, 2003).

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In this article, we extend previous research by exploring the extent to which patterns (quality) of extracurricular activity involvement, independent of the amount (quantity) of activity involvement, contribute to the unexpectedly positive educational attainments of adolescents who are otherwise at risk for dropping completely out of formal educational systems. To do so, we adopt a multilevel, holistic interactionistic systems perspective on human development (Magnusson, 1999, 2003; Peck, 2007; Trost & El-Khouri, 2008) coupled with a blend of variable- and pattern-centered data analytic techniques. The coupling of systems perspectives with pattern-centered analytic techniques provides a powerful means of modeling the multiple and interacting processes, within and across the levels of adolescents and their social worlds, that co-contribute to the formation of educational pathways from childhood to early adulthood (Roeser & Peck, 2003).

Previously, in order to examine the role of extracurricular activity involvement in adolescents' educational lifepaths, we used a mixture of variable- and pattern-centered analyses to identify subgroups of adolescents who, based on their portrait of personal- and social-level risks and assets at the end of middle school, were more or less likely to succeed in high school and to enroll in postsecondary education (e.g., Roeser & Peck, 2003; Roeser, Peck, Eccles, & Sameroff, 2001). At the personal level, such risks include a history of educational failure and conduct problems, poor school motivation, and frequent and significant feelings of emotional distress. At the social level, such risks include living in poverty, low levels of parental education, harsh parenting, school environments stratified by ability and race, and school-alienated peers. These risks are known to affect academic achievement during adolescence (Becker & Luthar, 2002; Carnegie Corporation, 1992; Eccles & Gootman, 2002; Eccles & Roeser, 2005; Evans, 2004; Pagani et al., 2008; Roeser, Eccles, & Sameroff, 2000).

We termed adolescents' cumulative portrait of personal and social risks and assets their *lifespace configurations*[1] and examined how their educational attainments after high school were forecast by these early adolescent lifespace configurations. In most cases, adolescents followed the type of educational lifepath that was predicted by their lifespace configuration. For example, we found that vulnerable youth were significantly less likely to graduate from high school and go to college compared to adolescents characterized by fewer risks and greater assets at the end of middle school (Roeser & Peck, 2003). However, some of the early adolescents whose lifespace configurations were characterized primarily by personal and social risks went unexpectedly on to college after high school. We referred to such unexpected educational pathways as *educational resilience*, defined as the unexpectedly positive academic achievement and educational attainments among youth whose lives were characterized by multiple personal and social risks (Roeser & Peck, 2003; Roeser, Peck, & Nasir, 2006).

We were interested in understanding why some vulnerable youth showed educational resilience whereas some of their equally vulnerable peers did not. This type of question can be addressed using "prodigal analyses" (Cairns & Rodkin, 1998) that involve both (a) the identification of homogeneous subgroups of individuals whose developmental pathways are nonnormative for that subgroup, and (b) an investigation of the moderating personal and social factors that help explain such "unexpected" developmental pathways. Consequently, after identifying the homogeneous subgroup of educationally resilient youth, we considered the personal and social factors that might characterize these educationally resilient youth. One moderating factor that

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[1]Consistent with a multilevel systems theory perspective on persons in contexts that highlights the extent to which "intracomponent linkages are generally stronger than intercomponent linkages" (Simon, 1996, p. 204), we use the term "profile" where referring to patterns of parts and processes that exist within a given level of the system and the term configuration where referring to patterns of parts and processes that exist across two or more levels of a system (Peck, 2007). In these terms, and given that persons and contexts exist at different levels of organization, individuals "lifespace configuration" is defined by the pattern of variable values formed by crossing their person-level profile (e.g., intraindividual patterns of values on self-theory variables) with their context-level profile (e.g., intraindividual patterns of values on world-theory variables).

helps explain such educational resilience is the availability of, and engagement in, positive extracurricular activities (Bartko & Eccles, 2003; Eccles, Barber, Stone, & Hunt, 2003; Peck, Eccles, & Zarrett, 2005; Roeser & Peck, 2003; Zarrett, Peck, & Eccles, 2005a, 2005b, 2006; Zarrett, 2007).

Prodigal analyses revealed that vulnerable early adolescents who subsequently participated more than once a week in positive activities during their 11th-grade year in high school were approximately twice as likely to graduate from high school and enroll in college than their vulnerable peers who participated less frequently in positive activities (Roeser & Peck, 2003). However, in this earlier work, we used only a single summary score to indicate the amount of time youth spent engaged in six different positive activities (i.e., school sports, after-school or summer sports or recreational programs, school clubs or other extracurricular school activities, community groups or clubs, volunteer services, or religious activities; Roeser & Peck, 2003). Such measures of activity quantity may mask important difference in activity quality.

Recent research has increasingly focused on both the characteristics of specific activities and activity settings (e.g., Fletcher, Nickerson, & Wright, 2003; Hansen, Larson, & Dworkin, 2003) and how long-term engagement with particular activities and settings is associated with subsequent positive developmental outcomes among youth (e.g., Bartko & Eccles, 2003; Larson & Verma, 1999; Mahoney, 2000; Mahoney, Cairns, & Farmer, 2003; Raymore, Barber, Eccles, & Godbey, 1999; Shanahan & Flaherty, 2001; Zaff et al., 2003). Consequently, rather than examining educational resilience in relation only to the quantity (frequency, amount of time) of vulnerable adolescents' positive extracurricular activity involvement, here we extend this work by examining both (a) a wider range of extracurricular activities and (b) how qualitatively distinct patterns of activity involvement relate to the educational resilience of vulnerable youth.

Importantly, we do not replace the focus on quantity with a focus on only quality; rather, we consider simultaneously how both (a) the amount of time vulnerable youth spend engaged in positive activities and (b) the pattern of time use across these activities relate to educational pathways into adulthood. Specifically, we investigate whether vulnerable adolescents' participation more than once a week in any type of "positive activity" is sufficient to explain their educational resilience or whether some types or patterns of relatively frequent positive activity involvement are more beneficial than others. The primary hypothesis is that educational resilience (i.e., the probability of vulnerable youth following the unexpected educational pathway by enrolling in college) will be uniquely predicted by 11th-grade activity quality, after controlling statistically for the effects of activity quantity and other background factors.

Method

The data come from the Maryland Adolescent Development in Context Study (MADICS). MADICS is a longitudinal study of youth development in multiple contexts (e.g., family, school, peer group, and neighborhood) that began in 1991 in Prince George's County, Maryland, which is adjacent to, and east of, Washington, DC, USA. The participants in this study were 49% female and 60% African American. Data used in this report were gathered from the target adolescents, their parents, and school records at the end of eighth or beginning of ninth grade ($N = 1,060$; Wave 3; Age ~ 14), at the end of the 11th-grade ($N = 1,057$; Wave 4; Age ~ 17), and approximately 1 year ($N = 912$; Wave 5; Age ~ 19) and 3 years ($N = 887$; Wave 6; Age ~ 21) after the cohort's expected (normative) graduation date from high school in the Spring of 1997.

Procedures

Youth and their primary caregivers (typically their mother) were individually and separately interviewed for approximately 1 hour at Waves 3 and 4. They also filled out a 45-minute self-administered questionnaire. As often as possible, race of interviewer was matched to race of primary caregiver. Waves 5 and 6 consisted of questionnaires that were mailed only to the youth.

Attrition and Missing Data

The longitudinal data used in MADICS can be described as a complex pattern of complete and missing data. Importantly, 1,356 participants (92% of both Blacks and Whites) responded to at least two waves of data collection through Wave 6. Although the participants who dropped completely out of the study ($n = 211$ through Wave 6) tended to be the least well-functioning people in our initial sample, we have nevertheless retained a sufficient number of "high-risk" youth to adequately address questions about the effects of activity involvement on educational pathways (see Sameroff, Peck, & Eccles, 2004, for more details). In addition, we created an attrition probability indicator variable based on variables that predicted missing data in Waves 4, 5, and 6 relative to Wave 3 (cf. Berk, 1983; Berk & Ray, 1982; Sampson & Laub, 1993). We used this as a "control" variable in the regression analyses reported below to account for variation in adolescents' rates of college attendance attributable to variables associated with participant nonresponses.

Measures

We used a wide range of measures, most of which are described elsewhere in greater detail (see Roeser & Peck, 2003; Sameroff et al., 2004). These measures include indicators of the personal (i.e., intraindividual) and social (i.e., extraindividual) factors hypothesized to either support or undermine adolescents' school learning and motivation, a comprehensive set of demographic characteristics (e.g., sex, race, family income, parental education, achievement test scores), a wide range of extracurricular activities, and educational attainment defined in terms of college enrollment.

We use the term *self-theory* where referring to self-report measures of individuals' psychological characteristics and *world theory* where referring to self-report measures of social contexts (cf. Epstein, 1990). The self-theory measures focused on school motivation and mental health. These scales assessed adolescents' perceived academic ability (e.g., "How good are you in math?"; Cronbach's alpha [α] = .83), valuing of education (α = .81; e.g., "Compared to other kids your age, how important [is math] to you?"), and mental health (α = .75; e.g., "How often have you had thoughts of ending your life?"). The following world-theory measures focused on adolescents' perceptions of their family, school, and peer contexts: (a) positive family climate (α = .86; "How often can your family members talk to each other about the sadness they feel?") and discipline harshness (α = .88; "During the last month, how often did your parents] hit, push, grab, or shove you?"), (b) mastery-oriented (α = .86; e.g., "Teachers think how much you learn is more important than test scores or grades") and relative ability or status-oriented (α = .88; e.g., "Teachers only care about the smart kids") school culture, and (c) positive (α = .74; e.g., "How many of the friends you spend most of your time with like to discuss schoolwork/intellectual things with you?") and negative (α = .82; e.g., "How many of the friends you spend most of your time with put pressure on you to use drugs?") peer characteristics.

The measures of activity involvement used here were developed by Eccles and Barber for the Michigan Study of Adolescent Life Transitions (cf. Eccles & Barber, 1999). These measures included a broad range of 11th-grade extracurricular activities such as school sports, other sports or recreational programs, pleasure reading, academic homework, household chores,

friends, television, school clubs, community clubs, volunteer services, religious activities, paid work, and playing music. Activities were measured in terms of frequency (e.g., "During the last year how often did you spend time on school athletic teams?" [1 = *less than once a month*, 2 = *at least once a month*, 3 = *once a week*, 4 = *more than once a week*, 5 = *everyday while the program lasted*, 6 = *usually every day*], and "Think about the last two weeks, about how often did you [do homework] outside of school time?" [1 = *never*, 2 = *once or twice*, 3 = *at least once a week*, 4 = *several times per week*, 5 = *daily, usually less than an hour*, and 6 = *daily more than an hour*]). Following Bergman and colleagues (e.g., Bergman, Magnusson, & El-Khouri, 2003), items with different anchor values were converted to a common "quasi-absolute" scale where 1 = *little-to-no participation*, 2 = *less than once a month*, 3 = *at least once a week*, 4 = *more than once a week*, and 5 = *usually every day* (Zarrett, 2007). Subsets of these activity indicators were used to create a summary score of the total quantity of 11th-grade positive extracurricular activity involvement as well as cluster analyzed to create two different activity-profile variables (all described below).

Educational attainment was assessed with the question, "What is the highest grade of school you have completed?" administered at both Wave 5 and Wave 6. Responses at each wave were first collapsed into dichotomous variables where 0 = *no college* and 1 = *at least some college*. The "college" variable used for the analyses reported here was created by combining the Wave 5 and Wave 6 dichotomous variables such that missing Wave 6 values were replaced with valid Wave 5 values. This variable reflects all the information we have about whether or not participants had gone on to college by Wave 6 (e.g., 1 to 3 years post–high school).

Results

Lifespace Configurations

We began by using the Impute, Residue, Cluster, and Relocate modules of the SLEIPNER 2.1 statistical package for pattern-oriented analyses (Bergman & El Khouri, 2002) to separately cluster analyze (a) the three 8th-grade self/identity indicators, (b) the six 8th-grade social world indicators, (c) the six 11th-grade positive activity indicators used by Roeser and Peck (2003) to create their summary measure of positive activity involvement, and (d) the full set of 11th-grade activity involvement indicators (Zarrett, 2007). Each of these cluster analyses involved using Ward's method on squared Euclidean distances and then *k*-means relocation on the Ward's solutions. The final cluster solutions were selected on the basis of both the theoretical meaningfulness of the profile patterns and the size of the change in the error sum of squares (ESS[2]) values (sometimes called "fusion coefficients") between adjacent cluster solutions. In addition, because we are interested in taking into account as much of the complexity in individuals' lives as possible, we generally select the most complex solution that is justified by both theory and ESS values. Although we have no direct estimate of classification errors, this set of analytic procedures and the validation techniques used to corroborate the substantive interpretation of the cluster profiles suggests that these errors are relatively small in comparison to the observed systematic between-cluster variances; these validation analyses and other analytic details associated with the cluster solutions can be found in Bartko and Eccles (2003), Peck, Eccles, Malanchuk and Funk (2004), Peck and Eccles (2005), Roeser and Peck (1999, 2000, 2003), Roeser et al. (2001), Zarrett (2007), and Zarrett, Peck, and Eccles (2005a, b, 2006).

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[2]ESS can be more formally defined as the sum of squared differences between individual values on the cluster variables and the means of these variables within each cluster (i.e., the centroid), summed across all clusters (Bergman et al., 2003). The change in ESS values can be represented in scree-type plots that reveal the upper and lower bounds of cluster solution complexity (i.e., the number of cluster groups per solution) that can be statistically justified (e.g., on the basis of providing more or less unique information where going from lower to higher numbers of cluster groups). Details of the self-and world-theory cluster analyses can be obtained from the first author and are summarized in Roeser and Peck (2003); details of the activity involvement cluster analyses can be obtained from the first author and are summarized in Zarrett (2007).

Following the stages of analysis set out by Roeser and Peck (2003), we first created separate self- and world-theory profiles. These analyses yielded a 7-cluster self-theory solution and a 12-cluster world-theory solution. Next, we crossed the self- and world-theory profiles to derive 84 *lifespace configurations* (LC), each of which constitutes a relatively homogeneous subgroup of eighth graders characterized by a particular profile of self-reported personal and social risks and assets (see Figure 1). Educationally vulnerable adolescents were characterized by a combination of relatively negative self- and world-theory profiles (i.e., negative lifespace configurations). Specifically, 50% of the youth ($n = 520$) were characterized by "educationally vulnerable" lifespace configurations (or "negative lifespaces"; cf. Dryfoos, 1990); 28% ($n = 293$) were characterized by a profile of cumulative assets or "positive lifespaces"; and 22% ($n = 230$) were characterized by a pattern of mixed risks and assets in their lifespaces, some of which reflect extreme contrasts between positive and negative self and world profiles.[3]

Educational Attainment

Considering the full sample, 65% of MADICS eighth graders had gone on to at least some college by approximately 3 years post–high school (i.e., Wave 6). However, these rates differed for adolescents' characterized by the three primary eighth-grade lifespace configurations: College attendance rates were 77% for those with a positive lifespace, 72% for those with mixed lifespaces, and 56% for those with a negative lifespace. These results indicate that risks and assets at the beginning of high school are clearly linked to adolescents' subsequent educational attainments.

In this article, we focus on individual differences in educational outcomes within the subgroup of educationally vulnerable adolescents—those with negative lifespaces at the beginning of high school. The parents of these youth reported slightly lower levels of educational attainment than the parents of youth characterized by mixed or positive lifespace configurations, and these youth were also lower in 8th-grade academic achievement and reported less time engaged in 11th-grade positive activities than the mixed or positive lifespace youth. In addition, Black males (57%) tend to be overrepresented, and White females (39%) underrepresented, in the negative lifespace configuration.

Our prodigal analyses examine the extent to which activity involvement promotes educational resilience by increasing the probability that vulnerable youth would go on to college. We consider any activity pattern or amount of activity involvement that increases such a probability above the subgroup base rate of 56% as reflecting a potential "health promotion factor" in which youth are "deflected" onto a pathway characterized by a greater-than-average chance of attending college. In this way, we estimate how involvement in both the overall amount of positive activity involvement (i.e., the quantity of activity involvement) and different patterns of activities (i.e., the quality of activity involvement) are associated with educational resilience among vulnerable youth from adolescence into early adulthood.

Extracurricular Activity Patterns

We began by using simple bivariate cross-tabulations to examine the extent to which different patterns of involvement in positive activities in 11th-grade were related to different rates of college attendance among the subgroup of vulnerable youth. We first considered how different patterns of involvement among the six activities examined in Roeser and Peck (2003) might be associated with differential rates of educational attainment. Cluster analysis of the six

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[3]Bergman et al. (2003) referred to such extreme cases as white spots; that is, profiles that are relatively unlikely to occur. Consistent with this view, each of the 14 eighth-grade lifespace configurations that appear as "white spots" occur at rates that are significantly less likely than expected on the basis of chance alone (i.e., they are significant antitypes) and, together, constitute only 4% of the sample (see Figure 1).

positive activity variables yielded six distinct profile patterns of positive activity involvement. One particular pattern of involvement emerged as a significant precursor to elevated rates of college attendance among the vulnerable youth: Seventy percent of vulnerable youth whose 11th-grade positive activity profile was marked by high levels of both school and community sports activity went on to college (ASR^4 = 2.4). This "school and community sports activity" profile reflects an average activity frequency of "more than once a week" and therefore enriches our understanding of why youth with such frequent activity involvement were found to go on to college at twice the rate of other vulnerable youth (Roeser & Peck, 2003).

These results suggest that the pattern of extracurricular activity involvement may be an important aspect of why higher levels of positive activity involvement promote educational resilience among vulnerable youth. However, because there was only one positive activity cluster group for which the average amount of time spent amounted to "more than once a week," these analyses provide no way of disentangling the relative importance of the amount (quantity) versus pattern (quality) of activity involvement for explaining the educational resilience of vulnerable youth. Consequently, in a second series of analyses, we examined the relation between the educational resilience of vulnerable youth and a more comprehensive, 9-cluster solution of 11th-grade activity patterns (Zarrett, 2007) that was based on a more extensive set of activity indicators (including activities such as watching TV and paid employment).

As shown in Figure 2, five of the nine 11th-grade activity patterns are characterized by high involvement in sports, and none of these patterns differs in terms of the large amounts of time youth spend watching television. The sport cluster (I) is marked by high involvement in sports and low involvement in all other positive activities, including notably less time doing homework. The sport-school cluster (II) is marked by high involvement in sports, school-based activities, reading for pleasure, and time doing homework. The sport-volunteer cluster (III) is marked by high involvement in sports, volunteer services, and doing homework. The sport-work (IV) cluster is marked by high involvement in sports, working for pay, and doing homework. The high engaged cluster (V) is marked by high involvement in most of the activities, particularly sports and community-based clubs, but also homework, reading, chores, school clubs, volunteer services, and hanging out with friends. The school cluster (VI) is marked by high involvement in school-based activities, reading, and religious activities. The volunteer cluster (VII) is marked by high involvement in volunteer services, and the work cluster (VIII) is marked by high involvement in paid employment and relatively low involvement in most of the other activities. Finally, the low engaged cluster (IX) is marked by low involvement in all activities except watching television.

Using this 9-cluster 11th-grade activity involvement solution, we found several different activity patterns associated with higher-than-average rates of college attendance among vulnerable youth. Specifically, vulnerable youth who were highly involved in both sports and school clubs (83%, ASR = 2.5), both sports and volunteering (79%, ASR = 2.2), school clubs only (78%, ASR = 2.4), and most positive activities (86%, ASR = 3.2) went on to college at rates that were not only significantly higher than the average 56% rate for all vulnerable youth but, notably, as high or higher than the average 77% rate for youth with positive lifes-pace configurations at the beginning of high school. By way of contrast, we also found that only 28% (ASR = −4.4) of vulnerable youth whose 11th-grade activity pattern was marked primarily by watching television (i.e., low engaged) went on to college. Vulnerable youth whose 11th-grade activity pattern was marked by paid work were also less likely than expected by chance to go on to college (45%, ASR = −2.0). These are one kind of prodigal analysis; they show

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[4]ASR's (i.e., adjusted standardized residuals) are interpreted as Z-scores (e.g., ASR values above 1.96, 2.58, and 3.29 are significant at the two-tailed .05, .01, & .001 levels, respectively).

that adolescents who were vulnerable to educational failure at the beginning of high school yet go on to college are distinguished by their pattern of activity involvement during high school.

After establishing that college attendance rates varied by activity patterns for vulnerable youth, we extended these analyses by conducting a second form of prodigal analysis. In these analyses, we focus on the relative contributions of activity quantity versus quality to the educational outcomes of vulnerable youth. Specifically, we used logistic regression models to examine the extent to which rates of going on to college among vulnerable youth varied as a function of (a) the total amount of time spent engaged in extracurricular activities during 11th-grade, (b) specific patterns of activity involvement during 11th-grade, and (c) factors such as race, sex, level of parent education and income, and level of academic achievement measured at the end of 8th-grade. The 9-cluster activity-profile variable was dummy coded into four separate dichotomous variables corresponding to each of the four positive activity patterns described above that were associated with higher than average rates of college attendance among vulnerable youth. Vulnerable youth from the low engagement (Cluster IX) group were used as the reference category for each of these dichotomous "positive activity pattern" variables.

Preliminary, bivariate analyses showed that vulnerable youth following the unexpected educational pathway (i.e., going on to college) tended to score higher on eighth-grade academic achievement than vulnerable youth following the expected pathway. Similarly, parents of vulnerable youth following the unexpected pathway tended (at the end of the youth's eighth grade) to be college graduates or in the highest income brackets (i.e., above $95,000). There were no significant sex or race differences between vulnerable youth following the two pathways.

The results of the first hierarchical logistic regression analysis, using sport-school as the activity pattern contrast category, showed that college attendance was predicted significantly by youth academic achievement (B = .97, p = .035, Odds Ratio [OR] = 4.9) and the sport-school activity pattern (B = 3.06, p = .046 [one-tailed], OR = 21.4) but not by the total amount of time in positive extracurricular activities (B = −1.35, p = .357, OR = .26) or any of the other variables included in the analysis. This model correctly classified 82% of the participants with a .50 "pseudo" (i.e., Nagelkerke) R-squared (nR^2).

The results of the second hierarchical logistic regression analysis, using school as the activity pattern contrast category, showed that college attendance was predicted significantly by academic achievement (B = 1.36, p = .004, OR = 3.9) and the Race by Sex interaction term (B = −4.87, p = .008, OR = .01) but not by either the school activity profile (B = 1.04, p = .197 [one-tailed], OR = 2.8) or by the total amount of time that the youth engaged in positive extracurricular activities (B = 1.19, p = .375, OR = 3.3). This model correctly classified 82% of the participants with a .63 nR^2.

The results of the third hierarchical logistic regression analysis, using sport-volunteer as the activity pattern contrast category, showed that college attendance was predicted significantly by academic achievement (B = 1.47, p = .012, OR = 4.4), marginally by the sport-volunteer activity pattern (B = 2.53, p = .079 [one-tailed], OR = 12.6), but not significantly by the amount of time engaged in positive extracurricular activities (B = .51, p = .732, OR = 1.7). This model correctly classified 80% of the participants with a .69 nR^2.

The results of the fourth hierarchical logistic regression analysis, using high engaged as the activity pattern contrast category, showed that college attendance was predicted significantly by academic achievement (B = 1.30, p = .008, OR = 1.4) and the Race by Sex interaction term (B = −3.94, p = .03, OR = .02), marginally by the high engaged activity profile (B = 3.24, p = .074 [one-tailed], OR = 25.4), but not significantly by the total amount of time engaged in

positive extracurricular activities (B = −.14, p = .911, OR = .87). This model correctly classified 81% of the participants with a .61 nR^2.

The results of these prodigal analyses using logistic regression provide some limited evidence that it is the pattern of extracurricular activity involvement, not the total amount of time engaged in such activities, that is significantly predictive of subsequent educational attainments for vulnerable youth. However, the relatively small number of cases included in these analyses (mean = 67) provided minimal power to detect the potentially simultaneous effects of activity quantity and quality in explaining some vulnerable youths' educational resilience. Consequently, we conducted one final analysis designed to increase the chances of detecting significant effects of activity quantity and quality on vulnerable youths' educational attainments.

We began by combining the four key positive activity clusters into one group and using as the reference group the combination of the five activity patterns that the bivariate analyses revealed were negatively or unrelated to rates of college attendance among vulnerable youth. The results of this analysis showed that college attendance was predicted significantly by academic achievement (B = .85, p < .001, OR = 2.4), parental income (B = .54, p = .002, OR = 1.7), the total amount of time spent in positive extracurricular activities (B = .69, p = .037, OR = 2.0), and membership in one of the four positive activity-profile groups (B = 1.13, p = .003, OR = 3.1). This model correctly classified 74% of the participants with a .36 nR^2 Despite the fact that the nR^2 value and percentage of correctly classified cases were substantially lower than the more focused models reported above (likely due to the increase in heterogeneity associated with combining the relatively distinct homogenous subgroups), the key result of including all these cases in a single analysis was obtaining some relatively precise effect size estimates for the predictor variables. Most important, these results show that youth who were identified as vulnerable to curtailed educational attainments at the beginning of high school and who were subsequently engaged in one of four positive extracurricular activity patterns during 11th-grade (high engaged, sport-school, sport-volunteer, and school) were 3.1 times more likely to go on to college (95% Confidence Interval [CI] = 1.5–6.6) than vulnerable youth characterized by one of the other five activity patterns. These associations between activity quality and educational pathways were significant, independent of the effects of both the overall quantity of time youth were engaged in positive extracurricular activities and the other background factors.

Discussion

This longitudinal study investigated the role that patterns of extracurricular activity involvement in high school may play in explaining the "educational resilience" of vulnerable youth. Educationally vulnerable youth were identified at the beginning of high school (approximately age 14) and included those who reported poor school motivation and mental health as well as family, school, and peer worlds characterized by significant developmental risks coupled with an absence of developmental assets. Different patterns of extracurricular activity involvement were identified using self-reported activities during adolescents' 11th-grade school year (Zarrett, 2007). Using longitudinal data and a mixture of variable- and pattern-centered analytic techniques, we investigated how the relation between adolescents' educational risk status at the beginning of high school (end of eighth grade) and their educational attainments 1 to 3 years post–high school was conditioned on their background characteristics as well as both the quantity and quality of their extracurricular activity involvement during 11th-grade.

Previously, we found that adolescents who begin high school significantly at risk for curtailed educational attainments are twice as likely to graduate high school and enroll in college if they

engage in positive extracurricular activities more than once a week during 11th-grade (Roeser & Peck, 2003). In this study, we extended our understanding of this finding beyond that of activity quantity (i.e., time spent in activities) to show how activity quality (i.e., specific patterns of extracurricular activities) is associated with subsequent educational attainments among educationally vulnerable youth. Based on a subgroup base rate of college enrollment that was 56%, we found that college enrollment rates increased dramatically for vulnerable youth whose activity patterns were marked by involvement in both school clubs and organized sports, both organized sports and volunteering, multiple positive activities, and (to a lesser degree) school clubs only. On the other hand, we also found that when vulnerable youth were engaged primarily in paid work or were relatively unengaged in positive extracurricular activities (e.g., they spent more time watching television and hanging out with friends than engaging in positive activities) they were significantly less likely to show educational resilience by going on to postsecondary education.

More focused pattern-centered analyses revealed that vulnerable adolescents whose activity patterns were marked by engagement in both sports and school clubs showed significantly higher rates of college enrollment compared to other vulnerable youth (after accounting for the total amount of time youth spent in positive extracurricular activities as well as their academic and demographic background characteristics). Activity patterns marked by engagement in many positive activities and engagement in both sports and volunteering activities also uniquely predicted educational resilience, but these effects were only marginally significant. Engagement in only school-based activities was not uniquely related to educational resilience. However, in a final analysis designed to increase predictive power, we found that vulnerable adolescents' engagement in any one of these four positive activity patterns resulted in a three-fold increase in the likelihood that they would subsequently go on to college compared to youth who were not engaged in these activity patterns and independent of the effects of background characteristics and the total amount of time spent engaged in positive activities.

These analyses revealed information about the difference between the *quantity* of extracurricular activity time use and the *quality* of this time use, as reflected in distinct patterns of activity engagement, by showing that vulnerable youth in activity patterns that required more time were not necessarily following the most advanced educational pathways. Rather, some activity patterns characterized by "more-than-once-a-week" participation rates (e.g., the one marked by high levels of sports and school clubs activity) appear to promote unexpectedly positive educational pathways for vulnerable youth better than other activity patterns (e.g., the one marked by high levels of engagement in sports and paid employment).

What is it about these particular activities, settings, and patterns of activity involvement that help vulnerable adolescents in aspiring toward and enrolling in college? Eccles and Gootman (2002) provided a review of the features of activity settings that may be particularly instrumental in enhancing positive youth development (e.g., appropriate structure, positive social norms, and opportunities for skill building). Our results suggest that when vulnerable youth are exposed to a broad distribution of extracurricular activity settings that afford them constructive, developmentally appropriate opportunities (e.g., to befriend healthy peers, develop competencies and skills, exercise some autonomy, develop long-term mentoring relationships, and explore their commitment to education more generally) then their chances of being educationally resilient are enhanced. What is lacking, at this point, is a more detailed analysis of the precise nature of the positive features of these activity settings and the mechanisms by which these features (a) are produced by the social agents responsible for managing these settings and (b) influence the education-related motives, skills, and knowledge that are central to keeping vulnerable youth on track educationally. Thus, a next step in this research is to incorporate information about the resilience-enhancing features of specific kinds

and patterns of extracurricular activities and settings among different subgroups of youth (e.g., Hansen et al., 2003; Larson, 2000).

In addition to beginning to examine the substantive and functional role of extracurricular activity involvement in the educational resilience of vulnerable youth, we also wanted to provide an illustration of the general utility of pattern-centered theoretical and analytic approaches to addressing issues of sample heterogeneity through focusing on individuals characterized by unexpected patterns of person and context variables as well as unexpected developmental pathways (cf. Feinstein & Peck, 2008). For example, viewed from the multilevel, holistic interactionistic systems perspective on human development that motivated this study (Magnusson, 1999, 2003; Peck, 2007), the analyses reported here are not intended to generate inferences that apply to either the average person in the population from which the sample was drawn nor to the average adolescent in the larger population of the United States. Rather, these analyses were designed to test specific hypotheses about the likely effects of configurations of educational risks and assets during early adolescence, specific patterns of activity involvement during late adolescence, and educational attainments during early adulthood for the most vulnerable members of our society. Consequently, these relations are presumed to generalize only to persons with similar intraindividual and contextual patterns of risks and assets and not to the average person from the population from which the study sample was drawn. This distinction between assuming homogeneity within study samples and populations (which is an assumption that is seldom met but that is integral to the proper application of statistics based on the general linear model; cf. Richters, 1997) and identifying and demonstrating subgroup homogeneity (which we do using a combination of variable- and pattern-centered approaches) is central to the analysis of complex person-in-context systems in human development. This distinction is also central to understanding the applied implications of this research.

One of the greatest strengths of adopting pattern-centered approaches to complex social problems is the generation of knowledge about precisely for whom empirical results are most likely to have applied relevance. For example, whereas it might be true that positive extracurricular activities are beneficial for any and all developing youth, our results indicate that some patterns of extracurricular activity involvement increase the probability that vulnerable youth will go on to college whereas other patterns of activity involvement decrease the probability that vulnerable youth will go on to college. This kind of knowledge about specific activities that have positive and negative effects on developmental pathways for specific kinds of people can, in turn, be used to inform policy decisions about how best to help those youth who are vulnerable to curtailed educational attainments and related life opportunities. Specifically, these kinds of pattern-centered results argue *against* the development and implementation of a "one-size-fits-all" intervention strategy and *for* the development and implementation of specific intervention strategies for specific kinds of youth who live in specific kinds of social contexts.

Acknowledgments

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Eighth-Grade Lifespace Configurations

			Eighth-Grade Self Profiles							Total
			S-I	S-II	S-III	S-IV	S-V	S-VI	S-VII	
	W-I	Count	50	12	4	10	0	0	1	77
		ASR	11.2	1.7	-2.9	-1.2	-4.2	-3.0	-2.5	
	W-II	Count	23	5	21	9	10	2	0	70
		ASR	3.4	-.8	2.9	-1.2	-.7	-2.0	-2.8	
	W-III	Count	32	6	24	37	6	0	0	105
		ASR	3.5	-1.5	1.6	4.8	-3.4	-3.6	-3.5	
	W-IV	Count	43	25	25	54	12	4	1	164
		ASR	3.0	2.5	-.7	5.4	-3.8	-3.5	-4.2	
	W-V	Count	13	4	29	25	24	5	2	102
		ASR	-1.4	-2.1	3.1	1.8	1.7	-1.8	-2.7	
Eighth-Grade World Profiles	W-VI	Count	4	2	15	10	20	3	6	60
		ASR	-2.3	-1.7	1.6	-.3	3.3	-1.3	.2	
	W-VII	Count	6	12	21	16	24	10	3	92
		ASR	-3.0	1.1	1.5	-.2	2.3	.3	-2.1	
	W-VIII	Count	6	11	12	10	24	16	12	91
		ASR	-3.0	.7	-1.1	-1.8	2.3	2.6	1.3	
	W-IX	Count	3	14	8	11	13	20	9	78
		ASR	-3.4	2.5	-1.7	-1.0	-.2	4.9	.7	
	W-X	Count	5	5	9	5	26	7	18	75
		ASR	-2.6	-1.0	-1.3	-2.7	4.0	-.2	4.5	
	W-XI	Count	1	4	6	0	18	25	34	88
		ASR	-4.3	-1.8	-2.7	-4.6	.7	6.1	9.8	
	W-XII	Count	1	3	6	2	6	11	12	41
		ASR	-2.6	-.6	-.5	-2.2	-.5	3.7	4.4	
Total		Count	187	103	180	189	183	103	98	1043

Fig. 1.
S-I to S-VII refer to self-theory profiles; W-I to W-XII refer to world-theory profiles. ASR = adjusted standardized residuals. The light-, medium-, and dark-shaded cells along the main diagonal highlight positive, a mix of positive and negative, and negative lifespace configurations, respectively. The light- and dark-shaded cells in the off-diagonal areas highlight lifespace configurations dominated by either positive or negative profiles, respectively (e.g., youth with an S-V/W-VII lifespace configuration are characterized by low academic self-concepts, negative perceptions of families and peers, yet positive perceptions of the school environment). The "vulnerable youth" in this study come from both the dark-shaded cells along the main diagonal (i.e., youth with completely negative lifespace configurations) and the dark-shaded cells in the off-diagonal areas (i.e., youth with lifespace configurations that are not "completely" negative but that are dominated by negative self- or world-theory profiles).
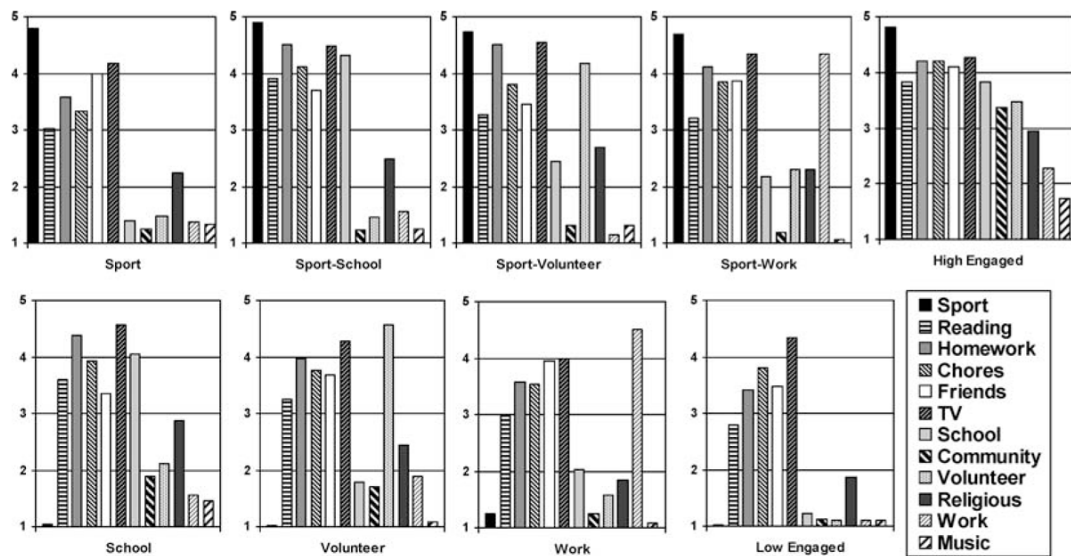
Fig. 2.
1 = *little-to-no participation*, 2 = *less than once a month*, 3 = *at least once a week*, 4 = *more than once a week*, and 5 = *usually every day*. Sport (*n* = 140), sport-school (*n* = 69), sport-volunteer (*n* = 73), sport-work (*n* = 107), high engaged (*n* = 83), school (*n* = 144), volunteer (*n* = 98), work (*n* = 150), low engaged (*n* = 147).