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The Relationship Between Developmental Assets and Food Security In Adolescents From A Low-Income Community

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Abstract

Purpose—To explore the association between developmental assets (characteristics, experiences, and relationships that shape healthy development) and food insecurity among adolescents from a low-income, urban community.

Methods—This mixed methods study occurred in two phases. In Phase 1, using a census approach, 2350 6-12th graders from the public school district completed an anonymous survey that included the Development Assets Profile (DAP), youth self-report form of the Core Food Security Module, and demographic questions. Logistic and multinomial regression analyses determined independent associations between developmental assets and food security adjusting for demographics. In Phase 2, 20 adult key informant interviews and four semi-structured student focus groups were performed to explain findings from Phase 1.

Results—On average, DAP scores were consistent with national norms. Food insecurity was prevalent; 14.9% reported low food security and 8.6% very low food security (VLFS). Logistic regression revealed that higher DAP was associated with lower odds of food insecurity (OR=.96, 95% CI=.95-.97); family assets drove this association (OR=.93, 95% CI=.91-.95). In multinomial regression modeling, these associations persisted and, paradoxically, higher community assets

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Implications and Contribution:

In this study, food insecurity, a pervasive social problem, was associated with fewer developmental assets, key building blocks for positive youth development. Our findings emphasize the importance of family and community-level resources for vulnerable youth and highlight the need for vigilance amongst adolescent health care providers regarding food insecurity.

were also associated with VLFS ($OR_{VLFS}=1.08$, 95% CI=1.04-1.13). Qualitative analyses suggested that greater need among VLFS youth led to increased connections to community resources despite barriers to access such as stigma, home instability, and cultural differences.

Conclusion—Food insecurity is a pervasive problem among adolescents from low-income communities and is associated with lower developmental assets, particularly family assets. That community assets were higher among VLFS youth underscores the importance of community-level resources in struggling areas.

Keywords

food insecurity; developmental assets; adolescents; poverty

Introduction

Growing up in a low-income community presents many challenges. Food insecurity, with its well-documented detrimental effects on physical, psychological, and social wellbeing, is one of the most serious obstacles for youth in these communities (1-11). Food insecurity is defined as “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways”(12). In 2012, 20% of households with children were affected by food insecurity and in 50% or 3.9 million households, a child experienced food insecurity that year(13). Children and/or adults in 463,000 of these households experienced ‘very low food security,’ formerly referred to as ‘food insecurity with hunger’(13). Poor families are at greatest risk for food insecurity: among households with children, 20.7% with incomes below 1.85 times the income-to-poverty ratio experienced food insecurity, compared to only 3.6% of those with higher incomes (13). Given recent economic and political trends in the US -- rising inequality, slow growth after the Great Recession of 2008, and reduction of both unemployment benefits and federal food and nutrition assistance programs-- it is likely food insecurity will remain a serious threat to healthy development for many families across the nation.

In addition to economic concerns and the erosion of social safety net programs, age appears to be an important risk factor for food insecurity. Adolescents are disproportionately affected by food insecurity in contrast with younger children (14). For example, in 2007, low food security and very low food security were 2.4 and 5.7 times as prevalent, respectively, in households with adolescents compared to those in which the oldest child was eight years or younger (14). Whether this is because parents protect younger children from the effects of food insecurity (15), or because adolescents develop greater awareness of familial challenges is unknown. Additionally, it remains unclear why some youth from low-income families are food secure while others are not. Understanding such resiliency is important in developing interventions to alleviate food insecurity and its sequelae.

Positive Youth Development (PYD) is a developmental systems science theory that can provide a useful framework for such studies. PYD is centered on the notion that youth have internal and external “*developmental assets*” that help them to develop into healthy, successful and socially engaged adults (16). Developmental assets include characteristics and behaviors that reflect positive personal and psychological development, as well as the

experiences, relationships, support, and encouragement youth receive from peers, parents, teachers, neighbors, and other adults (16, 17). PYD posits that youth develop optimally and are most resilient when their developmental assets are aligned with their environments (18). PYD has been successfully applied in the development of interventions to decrease alcohol and substance abuse among adolescents and to address sexual and reproductive behaviors within this age group (19, 20). Furthermore, Healthy People 2020 specifically highlighted PYD as a promising approach to adolescent health risks (21).

The goal of this study was to apply the PYD framework to the problem of food insecurity in adolescence. A relationship between PYD and food insecurity is plausible given that structural and economic disadvantage, particularly the stressors of poverty and economic insecurity, are fundamental causes of both. Figure 1 describes our conceptual model for this cross sectional study. We hypothesized that having fewer developmental assets would be associated with greater food insecurity, and that this relationship would remain consistent across the different domains of developmental assets.

Methods

Study design

Because social disadvantage is a shared root cause of both developmental assets and food insecurity, the study was based in a low-income, predominantly minority urban community of approximately 47,000 located five miles outside of a major northeastern city. Although a historically white, working-class population, this community has recently undergone rapid demographic changes: its Hispanic population has more than tripled in the last decade. Amongst middle and high school students in 2009-2010, 45% were white, 40% were Hispanic, and 7% were Asian (22). Between 2000 and 2009, the percentage of residents with a first language other than English increased from 28% to 45%, while the percentage of low-income residents increased from 42% to 71%. Despite these vulnerabilities, the community has an active coalition working to address youth health risks, particularly obesity and substance use. Thus, we felt this community would have enough variation in youth development and socio-environmental risks to enable us to explore the association between PYD and food insecurity.

There were two phases to this study, both of which were approved by the Institutional Review Board of the participating hospital. In Phase 1, anonymous paper and pencil surveys were administered to students in the community's four middle schools (grades 6-8) and single high school (grades 9-12) during the school day between Jan-Mar 2012. Completed surveys were scanned into a database using SNAP V10 software (SNAP Surveys, LTD, Portsmouth, NH). In Phase 2, using an explanatory follow up mixed methods approach, we explored Phase 1 results through 20 key informant interviews with adult community members (23, 24) and four student focus groups(25), one at each school.

Study participants

Per the school district's request, a census approach with a parental opt-out option was used for Phase 1. All enrolled students were invited to participate. Only 3% (N=78) were opted

out by a parent. Overall, 2,516 students returned a survey, 2,442 (97%) of which were sufficiently complete to be usable. Of the 2,442 usable surveys, 2,350 (93%) provided adequate information to score both the food insecurity and developmental assets measures. Youth who completed these 2,350 surveys comprise the Phase 1 study sample. For Phase 2, students who had participated in Phase 1 were recruited for focus groups by study staff during school lunch periods. Twelve students from each school (total N=48) were then randomly selected from the pool of interested students. Parental consent was obtained for 32 of these students. These 32 students participated in the school-specific focus groups. Potential key informants were identified by study personnel who had worked closely with the community. During recruitment for interviews, snowballing was used to increase the pool of potential key informants. The final 20 key informants included members of school staff, parents, government officials, church officials, community organizers, and local health providers.

Measures

Demographics—Students self-reported gender, grade, race and Hispanic ethnicity. Response categories used in analyses were White, Black, Hispanic, Asian, or Other due to small sample sizes for some racial/ethnic groups.

Developmental Assets—Developmental assets were assessed using the Developmental Assets Profile (DAP) (23). This widely used, reliable, and validated 58-item Likert-type scale was developed for use in 11-18 year olds and has a possible range of 0-60, with higher scores representing more assets (26). In addition to total score, the context scoring method was used to derive asset subscale scores (26). This method creates five subscales, each reflecting assets of a unique context within the adolescent's life: personal, social, family, school, and community (see Figure 2 for examples of subscale items). Context subscale scores range from 0-30. The DAP and its subscales have excellent internal consistency (Cronbach's alphas all >0.8) and test-retest reliability (26).

Food Security—Most existing literature examines youth's food security from the perspective of parents (1, 4, 10, 11, 27-30). However, recent work suggests parents may overestimate their children's food security (28). We therefore relied on adolescent self-report of food security using the United States Department of Agriculture's Core Food Security Survey Module for Children Ages 12 Years and Older, hereafter referred to as A-CFSM (available at www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/survey-tools.aspx#youth) (31). The A-CFSM consists of nine dichotomous questions about access to food, modified eating behavior, concerns about food availability and hunger levels within the past year. Each positive response is given a score of 1; scores are then summed across the nine items to give a total score ranging from 0-9. Individuals with scores of 0-1 are considered food secure (FS); those with scores of 2-9 are food insecure. Among food insecure individuals, a score of 2-5 indicates low food security (LFS) and 6-9 indicates very low food security (VLFS).

Data Analysis

In Phase 1, data were analyzed using SPSS software v22. Bivariate analyses were performed to determine relationships between demographic characteristics, DAP scores and food security categories. Multivariable regression analyses determined independent associations between developmental assets and food security, adjusting for demographics. In regression models, 'food secure' was used as the reference category. Logistic regression was run first to assess the association of developmental assets with food security as a dichotomous variable. Multinomial regression was then run to explore potential differences between the LFS and VLFS groups compared to the FS group. For both logistic and multinomial regression, two sets of analyses were performed: the first used the total DAP score and the second used context subscales. Regression diagnostics were run for the subscale analyses to ensure that multicollinearity was not affecting the models.

For Phase 2, both focus groups and key informant interviews were transcribed. Twenty percent of transcriptions were checked for validity. Transcriptions were each reviewed by 2-3 investigators and analyzed for emerging themes. The investigative team met periodically to discuss and review themes. Through this iterative, reflective process, final themes were agreed upon and representative quotations pulled from the transcripts.

Results

Phase 1: Survey Findings

A description of the Phase 1 study population can be found in Table 1. Half were female and 41.9% identified as Hispanic. Scores for the total DAP and context subscales were consistent with national norms (26) and followed similar associations with demographic characteristics. Total DAP scores were lower in boys than girls ($\mu_{\text{boys}}=38.4$ vs. $\mu_{\text{girls}}=39.4$, $p=0.009$) and decreased as grade increased (Spearman's $\rho=-.23$, $p<.001$). Additionally, total DAP scores were significantly lower in minority students than in white students ($p<0.001$). This trend was particularly notable among Asian students, whose total DAP scores were significantly lower ($\mu_{\text{Asian}}=35.0$) than all other racial/ethnic groups ($\mu_{\text{white}}=40.2$, $\mu_{\text{black}}=38.7$, $\mu_{\text{Hispanic}}=38.0$, $\mu_{\text{Other}}=39.2$).

Food insecurity was common. Nearly one quarter (23.5%, $n=271$) were food insecure, with 8.6% reporting VLFS. Concerns regarding food availability were prevalent among both FS and food insecure students [Figure 3]. Most notably, students from all three categories reported that, at some point during the last 12 months, their family's limited budget caused worry that food would run out, and noted meals that included only cheap foods as well as lack of access to balanced meals. A small number of FS students reported instances of food actually running out. Questions reflecting greater food insecurity, such as whether a family's limited finances resulted in reduced meal size, having to eat less, skipping meals, or going hungry, were answered positively only by LFS and VLFS students. Only VLFS students reported instances of not eating for a full day. In bivariate analyses (Table 2), food insecurity differed by race/ethnicity and grade, but not gender. Food insecurity was more common among minority students, particularly Asian and black students.

Association of Developmental Assets with Food Security—As hypothesized, bivariate analyses showed that DAP scores were highest among FS students and lowest among VLFS students (Table 2). Multivariable analyses to adjust for demographic factors are presented in Table 3. In logistic regression modeling, the association between total DAP score and food insecurity persisted (OR=0.96, 95% CIs= 0.95-0.97). This suggests that, for each point increase in the DAP score, there was a corresponding 4% decrease in the odds of being food insecure. Modeling of the context subscales revealed that the family subscale drove this association (OR=0.93, 95% CIs= 0.91-0.95). No other context subscale was significantly related to food insecurity in logistic regression modeling. These relationships were also demonstrated in multinomial regression modeling. Furthermore, multinomial regression modeling revealed that, in addition to the family subscale, the community subscale was also a significant correlate of VLFS. In contrast to our hypothesis, *higher* community assets were associated with increased odds of VLFS (OR=1.08, 95% CIs 1.04,1.13). This may be interpreted to suggest, for example, that a three point difference in the community assets subscale would mean that youth with the higher score would have an increase in the multinomial odds of 1.24 compared to the youth with the lower score.

Phase 2: Explanatory Follow up Key Informant Interviews and Focus Groups

—We conducted key informant interviews and focus groups to help us better understand the Phase 1 findings, particularly the paradoxical association between higher community assets and VLFS. Key informant interviews and focus group discussions were semi-structured and guided by four open ended questions addressing: 1) where youth get most of their meals; 2) where parents get food for their families; 3) how youth deal with food insecurity; and 4) the role of school food assistance programs. The key informant interviews included two additional questions in which the findings regarding the respective relationships between family and community assets and food insecurity were explored. Three themes emerged from these discussions: 1) food insecurity is a recognized community concern, primarily among adults; 2) community-level resources are crucial for food insecure youth; 3) barriers prevent families from accessing community resources.

Food insecurity is a recognized community concern, primarily among adults

—Most adult respondents were not surprised by the prevalence of food insecurity in the community (“I would think it would be higher”), and many noted the lengths that some families must go to in order keep food on the table (“families [aren’t] really focusing on [whether] the foods...[are] healthy. They’re just trying to get food for their children so they can at least have something to eat.”). Alternatively, while some students acknowledged problems with food access among their peers, most were unaware that food insecurity was prevalent in their community.

Community-level resources are crucial for food insecure youth

—Many participants attributed our finding of higher community assets among VLFS youth to a heightened knowledge of and reliance on available community resources. Specifically, they suggested that the absence of a supportive home environment, reflected in lower family asset scores, motivated youth to reach out to the community (“Because they don’t have their parents [to support them] maybe they turn to their community and each other more”).

Respondents also emphasized the support and empathy young people offered to each other and suggested that accessing community resources enhanced food insecure youths' connection to other community members ("[Youth] are seeking other ways ...to get food through community places [where] they're meeting people from different cultures and hence being open to others... which [gives] them...a sense of connection and tie to the community").

Adult respondents felt that diverse community level resources, such as local food pantries, school breakfast and lunch programs, and summer nutritional programs were helping to address the needs of food insecure youth. In particular, they emphasized the importance of school meal programs ("school programs for some families are the foundation of their food [and] their capacity to provide food"), without which they believed many children would face even greater food insecurity. In contrast, many students believed that school meal sizes were insufficient given scarcity at home ("[Portions of school meals] are very important...sometimes that's the only meal for some kids ...and some of the lunches here [are] under 1000 calories...some kids just don't have enough food and it really hurts them").

Barriers prevent families from accessing community resources—Despite the availability of community resources, barriers to access create considerable challenges. Pride emerged as one such barrier ("For some families it might be a pride issue for them not to go. I think people feel like they're failing their families if they can't provide them the basic needs"). Similarly, students noted that the stigma and embarrassment surrounding hunger might prevent them from reaching out to peers ("That's where embarrassment comes in...If I didn't have enough food and I had [to ask my friend], I would feel extremely embarrassed"). In this vein, some participants emphasized the need for more open dialogue about food insecurity ("People could start talking to each other and ... to people who are too scared to even say that they don't have food"). Another emergent theme was instability at home ("domestic violence, drug and alcohol abuse, [or] absentee parents"), which may have contributed to the correlation between low family assets and food insecurity. Respondents also suggested that parents might have difficulty navigating resources, particularly due to language barriers and cultural differences ("There are a ton of resources out there but they aren't in one central place"; "there are a lot of immigrant families and [certain ethnic groups] are really isolated a lot of times too").

Discussion

The purpose of this study was to explore the relationship between developmental assets and food security in adolescents. In this sample of 6-12th graders from a Northeastern urban community with developmental assets mirroring national norms, we found a disturbingly high prevalence of food insecurity. Nearly one quarter of students were food insecure and nearly one in 10 had very low food security; these statistics are higher than those found in the Northeast in 2012, when 16.7% of households with children were found to be food insecure (13). Additionally, we demonstrated an association between developmental assets and food insecurity. We found that having fewer developmental assets correlated with higher food insecurity. Context analyses revealed that lower family assets, rather than

school, personal, or social assets, drove this association. We also found that higher community assets were associated with very low food security but not low food security.

The relationship observed between lower family assets and greater food insecurity was consistent with our hypothesis as well as the existing literature (3, 11, 30). However, the relationship between greater community assets and higher odds of very low food security was paradoxical. Follow up qualitative analyses in the explanatory phase of this study suggested that VLFS youth, who were more likely to have lower family assets, may be more resourceful and/or more dependent on community resources than their food secure peers. This is consistent with the buffering effect of high social cohesion against food insecurity that has been shown in other studies (32). Furthermore, that this association existed for very low food secure students but *not* for low food secure students—in other words, that the link to community assets manifested only at the highest levels of food insecurity—suggests a floor effect. This has important implications for development of PYD interventions to address food security. In this community, interventions addressing community assets would be most appropriately targeted toward VLFS youth.

Our qualitative findings also suggested that school breakfast and lunch programs were key protective community resources for students in this community. In the 2011-2012 academic year, breakfast was available to all students, 64.3% of students in this district received free lunch, and 10.7% received discounted lunch (22). Although many students considered the available meals to be insufficient, if these meals had not been available, it is likely that more students would have been food insecure. This buffering effect of school food assistance programs is important to consider in the context of widespread budget cuts within the public sector, especially in communities already facing economic hardship.

Despite its pervasiveness among adolescents in low-income communities, food insecurity often goes unrecognized, as it did among many students in this study. Adults, however, were better able to acknowledge the seriousness of the problem in this community. This finding highlights the importance of adult support networks in addressing the problem of food insecurity, particularly for adolescents who may be overlooked in favor of younger children in relation to nutritional assistance (14, 15). PYD programming, which is youth-specific and aims to build and sustain such networks, offers one avenue for addressing this major public health issue.

The adolescent healthcare system could also serve as a supportive adult network for food insecure youth. Just as shame may impede discussions of food insecurity with peers, teens may also hesitate to bring up issues related to food security at health care visits. Thus, providers should specifically ask adolescents if they are concerned about food availability or experiencing hunger, in addition to other social risks (33). Moreover, given that food insecurity may be associated with other pressing health issues for adolescents such as depression, anxiety and obesity (2, 3, 11, 34-36), its identification may offer providers an opportunity to address these health concerns from a different perspective. These types of discussions provide an opportunity to address patients' basic psychosocial needs through the primary care visit, which is consistent with the medical home model (37, 38).

This study has important limitations. Firstly, because of its cross sectional design, this study cannot determine whether food insecurity was the result or cause of differences in developmental assets. Whilst determining such causal effects are important objectives, such a determination was not our goal. Indeed, we specifically conceptualized the relationship between developmental assets and food insecurity as bi-directional not only because of our cross sectional design, but more importantly, because we believe the relationship between developmental assets and food security to be recursive (Figure 1). Determining the causal nature of this association will require further study. Additionally, our results are representative of only one community. It is unclear how generalizable these data are to other communities, particularly those with different socioeconomic and racial/ethnic composition. These limitations are countered by this study's strengths: use of measurement tools proven to be both valid and reliable and which allowed us to ask adolescents directly about their food security, rather than relying on parental report; a census-based survey sampling with very low parental opt-out, and our explanatory mixed methods approach.

Conclusions and Implications

This study demonstrated an association between developmental assets and food security. In particular, we found that fewer family assets were associated with both low and very low food security, and that, paradoxically, greater community assets were also associated with very low food security among adolescents. Our findings, both quantitative and qualitative, highlight the importance of community resources and adult support networks for vulnerable youth. Moreover, they underscore the importance of integrating psychosocial factors such as food insecurity into adolescent primary care.

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Abbreviations

A-CFSM	youth report form of the Core Food Security Module
DAP	Developmental Assets Profile
FS	food secure
LFS	low food secure
VLFS	very low food secure

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Figure 1. Conceptual Model. In this model, economic insecurity and poverty are identified as shared, root causes of food insecurity and developmental assets. The current study's area of focus, the relationship of between food insecurity and developmental assets is highlighted. This relationship is conceptualized as bidirectional.

Figure 2. Context View of the Developmental Assets Profile. Each context includes descriptions of the items used in its assessment. .

Figure 3. Distribution of Students' Responses to Items on the Core Food Security Module by Food Security Category (N=2350). Responses reflect students' experiences at any point in the past 12 months.

Table 1

Description of Demographic Characteristics and Developmental Assets of the Study Population (N=2350)

	N	%
Gender		
Male	1133	48.2
Female	1187	50.5
Missing	30	1.3
Race/Ethnicity		
White	738	31.4
Black	86	3.7
Hispanic	984	41.9
Asian	119	5.1
Other	289	12.3
Missing	134	5.7

	Mean	SD
Grade *	8.7	2.0
DAP		
Total	38.9	10.2
Subscales		
Personal	19.4	5.2
Social	19.9	5.4
School	19.6	6.2
Family	21.8	6.6
Community	16.9	6.0

* N=48 were missing grade

Table 2

Association of Demographic Characteristics and Developmental Assets to Food Security Category

	Food secure (N=1797)		Low food security (N=350)		Very low food security (N=203)	
	N	%	N	%	N	%
Gender						
Male	857	75.6	173	15.3	103	9.1
Female	916	77.2	176	14.8	95	8.0
Race/Ethnicity						
White	610	82.7	82	11.1	46	6.2
Black	63	73.3	14	16.3	9	10.5
Hispanic	729	74.1	161	16.4	94	9.6
Asian	83	69.7	27	22.7	9	7.6
Other	211	73.0	48	16.6	30	10.4

	Mean	SD	Mean	SD	Mean	SD
Grade	8.7	2.0	8.4	2.1	9.1	2.1
DAP						
Total	39.9	10.0	37.3	10.0	32.8	11.0
Subscales						
Personal	19.8	5.1	18.6	5.1	16.8	5.6
Social	20.4	5.4	19.1	5.3	17.1	6.0
School	20.1	6.1	18.9	6.2	16.7	6.6
Family	22.6	6.2	20.8	6.6	16.7	8.0
Community	17.2	6.0	16.2	5.8	15.2	5.9

p .001

Table 3

Logistic and Multinomial Regression Analyses of the Relationship of Developmental Assets to Food Security

	Logistic Regression ^{#†}		Multinomial Regression [†]			
	Food Insecure		Low Food Secure		Very Low Food Secure	
	OR	95% CI	OR	95% CI	OR	95% CI
DAP						
Total	*** 0.96	0.95-0.97	*** 0.97	0.96-0.98	*** 0.94	0.93-0.96
Subscales						
Personal	0.98	0.95-1.02	0.99	0.95-1.03	0.97	0.92-1.03
Social	0.99	0.95-1.04	0.99	0.94-1.04	0.98	0.92-1.04
School	0.99	0.97-1.03	1.00	0.97-1.04	0.98	0.94-1.03
Family	*** 0.93	0.91-0.95	** 0.96	0.94-0.99	*** 0.89	0.86-0.91
Community	1.02	0.99-1.05	1.00	0.97-1.04	*** 1.08	1.04-1.13

[#] Models adjust for gender, race/ethnicity, and grade.

[†] Food Secure is the reference category for both logistic and multinomial regressions.

** 0.01 p > .001

*** p .001