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AUTHOR   Carter, Carolyn S.
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ABSTRACT
                Based on an ongoing study of rural and urban Appalachian
adolescent girls, this paper examines ways in which culture, class,
ethnicity, and place influence girls' developing sense of self and beliefs
about their lives, schooling, and futures. The 65 girls in the study are
participants in "Rural and Urban Images: Voices of Girls in Science,
Mathematics, and Technology (SMT)," a 3-year program grounded in a social
constructivist view of both knowledge and identity, which seeks to support
the development of girls in grades 6-8 with regard to SMT learning, beliefs,
and career aspirations. The girls attend schools in McDowell County, West
Virginia--an isolated, economically depressed region--and in Charleston, West
Virginia. By far the greatest differences among the girls are directly
attributable to rural or urban place. Social class also shapes roles and
expectations for adolescents in both rural and urban communities. Ethnicity
is a less powerful influence but figures strongly in the self-image of some
urban African American girls. While many urban and middle-class rural girls
can talk about themselves and their futures, lower-class rural girls
generally cannot. But, these "have-nots" are rich in family and social
support; express the strongest ties to family, community, and environment;
have a strong sense of family and community norms; and have difficulty
thinking of themselves outside this context. The urban girls do not express
ties to a particular place but have a much stronger sense of identity and
control over their destiny. An appendix describes the "Voices" program.
Contains 23 references. (SV)

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Carolyn S. Carter

Appalachia Educational Laboratory Inc.
Post Office Box 1348
Charleston, West Virginia 25325-1348
(E-mail address: carterc@ael.org)

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The Stuff That Dreams Are Made Of: Culture, Ethnicity, Class, Place, and Adolescent Appalachian Girls' Sense of Self

Introduction

This paper, based upon two years of an ongoing study of adolescent girls in two settings—one rural, the other urban—provides an examination of issues related to girls' constructions of their identities and relationships to science, mathematics, and technology (SMT). In particular we examine: 1) ways in which multiple cultures in the two communities influence the girls' self-images, and their beliefs about their lives, schooling, and SMT; and 2) the impacts of place and culture on the girls' dreams for the future and life possibilities. Our collaboration with girls, their parents, communities, and schools in these two Appalachian communities—one, remote and rural, the other, urban—allows us to explore the complexity of relationships among multiple cultures, ethnicities, and classes. In making sense of these multiple contexts, we call into question models of adolescent development that do not include ethnicity, class, and place as critical factors in girls development and voice.

The National Science Foundation-funded *Rural and Urban Images: Voices of Girls in Science, Mathematics, and Technology (Voices)* program which forms the backdrop of this paper is grounded in a social constructivist view of both knowledge and identity. This perspective forms the basis for program research and activities. To address issues faced by adolescent girls in SMT we must examine the contexts in which adolescent girls, teachers, parents, and others construct beliefs not only about the nature of SMT, but also about themselves. Who does SMT? How does one learn SMT? What counts as SMT knowledge? What roles do girls and women play in SMT? Most particularly, who am "I" and what roles can I play in schooling and SMT? Based on data collected from girls, parents, and others, we have developed profiles of the girls, their hopes, dreams, views of themselves, support networks, and social contexts. Using these profiles, we address what we see as a limitation in current perspectives on the development of adolescent girls.

Perspectives and frameworks

We view culture as dynamic and continually reconstructed. We assume that the girls and parents in our study are part of multiple cultures and that how they interpret experience is shaped by factors including ethnicity, social class, place, and gender. We draw upon studies from sociology, anthropology, and feminist theories to explore these cultures. Our work is also grounded in studies of Appalachian sociology such as Maggard (1990, 1993), DeYoung (1993, 1994) and Duncan & Lamborghini (1994) and in educational studies such as those by Weis (1992, 1993) and Borman, Mueninghoff, & Piazza (1988).

Adolescent development, including cognitive, ethical, physical, and conceptual development, has been an area of intense focus in educational and psychological research. Traditional stage models of development have been recognized for their androcentric biases. These models have been challenged by research focusing on the development of women and girls, such as that by Gilligan and colleagues, and work based on the notions of "womens ways of knowing" (Belenky, Clinchy, Goldberger, and Tarule, 1986). Our perspectives on adolescent psychology are particularly informed by Gilligan's work (1988, 1990, 1995) and that of colleagues such as Brown (1992) and their critics (Stacey, 1990). We have also been influenced by postmodern notions of identity and "saturation" such as that explicated by Gergen (1991). While these researchers have not proposed to speak for the development of all women, their work is often used by others in such a way as to "essentialize" or to support notions that vital sex-linked differences exist in intellectual and ethical development. While we find much of great value in the work of Gilligan, Brown, Belenky and their colleagues and have been guided by their work, we argue that examining the influences of race, social class, ethnicity, and place on adolescent girls contributes vitally to our understanding of their development. Attention to multiple ways in which individuals construct their identity may help shift the dialog away from notions of essentiality and gender as destiny.

This paper describes how we have used the lenses of culture, class, ethnicity, and place to make sense of Appalachian girls developing sense of self, particularly with respect to participation in science, mathematics, and technology. In exploring the girls' perceptions of themselves, their dreams, their hopes, and their behavior, we offer suggestions toward a broader

conceptualization of adolescent development for both research and practice. This study is unique in several ways. Most research on adolescent girls and their relationships to science, mathematics, and technology has focused on suburban and, to a lesser degree, urban girls. Rural girls have generally been unrepresented. In fact, much of the research on education in Appalachia has 1) assumed a univocal Appalachian culture without examining the ways in which race, class, place, and gender influence identity and development; and 2) used a deficit model, without considering the strengths with which cultures can support girls. We do not assume that girls raised in Appalachian cultures, whether rural or urban, are deficient either developmentally or with respect to SMT learning. Instead, we look to what these girls, their families, and communities can teach us about girls' development and possibilities.

Methods and data sources

In this two-year study, we have used a variety of methods to develop and test our understandings of the 65 *Voices* participants and their development. Our approach is primarily qualitative, drawing upon sources including Guba and Lincoln (1989), Bogdan and Biklen (1992) and Patton (1990). Data sources include: 1) multiple structured and unstructured interviews of parents, girls, and school personnel; 2) field notes on project sessions, parent meetings, meetings of project staff and others; 3) notes, photographs and video of project sessions, advocate meetings, and other interactions, 4) researcher reflections and logs; 5) parent and teacher comments and teacher logs; 6) survey and demographic information; 7) analysis of school and district documents, newspaper reports, and other documents; 8) grades, test scores, and school discipline and attendance reports; 9) project SMART evaluation activities; and 10) girls writings, drawings, poetry, speeches, journals, and other artifacts. We also used photography and video to document the material cultures of the communities and schools that are part of the project in order to aid analysis and to convey the impact of geography and place on development of girls' identities.

Initial interviews, repeated at the beginning of year two, focused on the girls' beliefs about SMT, about themselves and their futures, and about themselves as people who do SMT, both now and in the future. Interviews also addressed the roles that science, mathematics, and

technology play in the girls schooling and daily lives. Further interviews and debriefings have taken place during program activities or other interactions with the girls, teachers, parents, and others. These sessions have dealt with specific issues, events, and concerns both related and unrelated to the *Voices* program.

From these multiple data sources, we have developed profiles of each of the girls and themes across the profiles. In this paper we will use information from selected profiles to illustrate contextual and cultural influences on identity and development as *Voices* girls from both rural and urban sites have moved from upper-elementary to middle-school aged adolescents.

Contexts of the study

The *Voices* program

Voices, funded by NSF, is both a three-year science, mathematics, and technology program for Appalachian girls, their parents, teachers and community, and a research and development effort. Our rural site, in McDowell County, West Virginia draws from an area served by three elementary schools in an isolated, economically-depressed region whose economy was once based on coal. The urban site draws from three elementary schools in Charleston, West Virginia. These three schools have urban demographic characteristics and also have all the problems endemic to inner-city schools.

Voices began with 6th grade girls in both sites. These girls are now in the 7th grade and will participate in the program through their 8th grade year. The girls take part in monthly Saturday workshops, take field trips, communicate via electronic mail, and use the Internet. A school-based coordinator meets with the girls in her school on a regular (at least once weekly) basis. An advocate network of adults (generally parents or other family members) meets together with the girls regularly to provide support. In the second year of the program, girls have been paired with mentors—women whose work in some way utilizes science, mathematics, or technology. The girls meet monthly with their mentors and communicate with them via e-mail.

The program contains girls of all interest and ability levels. In the urban site, all 6th grade girls in the three schools were invited to participate in the program. In the rural site, girls were selected by random drawing, stratified by ethnicity in order to insure that the percent of

African-American students whose names were drawn was proportionate to their presence in the school. (Only one girl from the rural site invited to participate did not do so; her grandmother would not allow her participation.) There are a number of girls in special education programs; other girls would qualify for gifted programs.

Program activities in the first year of *Voices* were designed to honor the science, mathematics, and technology used in the daily lives of women in Appalachia, while simultaneously building bridges to science, mathematics, and technology as taught in schools. Activities in *Voices* were centered on SMT knowledge as situated and embodied in Appalachian womens' lives and reflect the perspective that all women, whether they realize it or not, practice SMT, although their practice has often been devalued by professional SMT communities.[1] We want the girls to understand that they should develop SMT knowledge and skills, regardless of their occupational goals. In practice, educators often use real-world science, mathematics, and technology as examples of more theoretical concepts. We have worked instead to make explicit the SMT knowledge that is necessary to carry out activities into which girls have already had some apprenticeship and then building bridges between this situated knowledge and school knowledge.

For more information on the *Voices* program, see Appendix A or http:\\www.ael.org\voices.htm

West Virginia is a particularly interesting location for programs focusing on gender issues or science, mathematics, and technology programs. Pay differentials between men and women are higher than in any other state. Nationally, women working full time earn approximately 70 cents for every dollar made by men working full time. In West Virginia, women working full time make only 58 cents for every dollar made by men. On the average in the state, working women receive 45 cents for every dollar men make. (Associated Press story reported in the Charleston Gazette, December 10, 1996). The Appalachian region faces chronic economic

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[1]It is interesting to note that we have been less than successful in convincing girls in the program that they are learning real science, mathematics, and technology. For example, after ably designing and doing the html coding for WWW pages for their schools many girls responded on evaluations that they had only learned 'a little' about technology. Similarly, after a workshop using tools including pH meters, microscopes, computers and other almost stereotypic trappings of professional science, many responded that they only learned 'a little' about science.

problems. Per capita incomes are some of the lowest in the nation and there is a severe lack of employment opportunities.

The rural site

McDowell County once had a thriving, coal-based economy. With increased automation and mine closings, the area is now severely economically depressed. During the past ten years, the county has lost 30% of its population. The unemployment rate is 21%, the highest in the state. The median family income is $15,756 and over 50% of the county's children live in poverty. Among the schools participating in the *Voices* program, from 60% to 93% of students qualify for free or reduced lunches. Student populations in the rural schools participating in *Voices* range from 20% to 50% students of African descent. One school is located in the county seat. This school, whose students are from working- and lower-middle to middle-class families, serves the community elite. Its student body is predominantly white.

The urban site

Kanawha County is home to the capital city, Charleston, which has a relatively diverse population of more than 200,000. The median family income is $30,030. The county's unemployment rate is 7.7% and 22% of children in the county live in poverty. While the county's "minority" population is 7.5% of the total, 24%-50% of children in the elementary schools that feed into the *Voices* program are of African descent. The percentages of students in these schools qualifying for free or reduced lunches vary from 45% to 94%.

Some commonalities

The girls in the *Voices* program expressed some common themes across sites, income levels and ethnicity. While in all sites the girls often were in conflict with parents or other significant adults, they also frequently listed their parents or other relatives as their heroes and talked about the importance of family members. In both counties being nice, and doing good are important terms in the girls' rhetoric. Income levels, standardized test scores, and the numbers of girls living in non-traditional families are roughly similar in both the rural and urban sites. In both project sites, education plays an ambiguous role in community culture, and educational opportunities were occasionally removed from students as a form of punishment or of controlling

behavior. None of the schools has a strong history of parent involvement. According to DeYoung (1993), there are many similarities between the problems faced by at-risk rural students and low-income urban students. He notes that both groups face poverty, unemployment, substance abuse, low self-esteem, child abuse and early sexual activity.

While access to other activities and forms of entertainment were closely related to place and social class, most girls in both sites watched television programs (particularly *Martin* and *Saved by the Bell*). Favorite books in both sites were Babysitters Club and GooseBumps series. Girls in both sites react very positively to *Voices* activities, particularly field trips, although they complain about getting up on Saturday morning[2]. In general, the girls expressed much more favorable opinions about science than about mathematics; primarily because of the hands-on activities they do in science classes. In spite of their experiences in the *Voices* program, when the girls describe their stereotypes of scientists and mathematicians, many still describe nerdy males.

The Power of Place

By far the most powerful influences we observe in the adolescent girls in *Voices* are related to place—both the presence and absence of ties to a particular place. Ties to a particular place are extremely strong in the rural site, and geography is closely allied with a sense of destiny. During the first year interviews, few of the girls from lower-economic status homes could imagine futures for themselves outside the coal camp communities where they live. Most planned on living and working in these communities throughout their lives, and did not consider the possibility of life even elsewhere in the county. Several girls already had spots picked out for their future houses. A comment made by a parent (not in the *Voices* program) to a *Voices* staff member is illustrative. The parent said she was not sure she wanted her daughter to go to high school "because it's so far away," referring to a school approximately 7 miles down the road. During the second year interviews, more of the rural girls from the two schools with high

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[2]Due to rugged terrain, winding roads in hollows, and frequent stops by coal trains, some of the rural girls have to leave home as early as 6 a.m. to arrive at the *Voices* workshop by 9 a.m. They complain no more than do the urban girls, all of whom live within a five minute drive of their workshop.

percentages of students on free or reduced lunches mentioned that they might like to live elsewhere—almost exclusively North Carolina, where many girls have relatives working in textile mills (and where they would also have networks of support in place).

Networks of support are incredibly strong in the rural site. The girls are continually supported by extended kinship ties and inter-family relationships that have continued through generations. While some of the rural girls in the *Voices* program do not live with their parents, they do live with other relatives and are surrounded by family. If a parent or a grandparent cannot fill a particular role, another family member is there to fill in. These ties that provide such powerful support can also strangle, however, as connection to place and family often take precedence over economic and social well-being, and children may not prepare for or enter careers that might take them away from their homes and families.

By contrast, girls in the urban site do not express deep ties to their home or to a particular geographic location. When asked where they would like to live, the girls often mentioned distant cities such as Detroit or Chicago. They have not necessarily been to these distant cities, but the girls think they might be an interesting place to live. Many have already lived in several communities, and some in other states. While family is important to the urban girls, ties to a geographic location are not necessarily critical to those bonds and urban place is significant by the absence of these ties.

The middle-class rural girls from the elite school expressed a mixture of these two perspectives. Many have traveled throughout West Virginia and nearby states, or even more widely. While ties to home and family are important to these girls, many do not indicate that their destiny is tied to their locale. They plan on going to high school, attending college, and pursuing careers that may or may not keep them near McDowell County. In general, they do not, however, express the desire to get away from West Virginia that many of the urban girls do.

Place was important not only in terms of the girls' ties (or lack thereof) and their dreams, but also with respect to how teachers and administrators view their students. In the urban schools, we encountered many stereotypes of students. Those from large housing projects, were often written off by the schools or viewed as hopeless. We were accused by one urban principal of "setting girls up for failure" because the girls in our program could never achieve careers in

science, math, or technology. Teachers were not part of the communities where the girls lived,
and often cast themselves as adversaries of their students' families and communities. Teachers
and administrators saw their job as trying to ameliorate negative community influences. We
repeatedly heard that "parents don't care" about their children—even as the schools structured
mechanisms for parent conferences that discouraged, or even prevented parent involvement. In
the rural schools, relationships between schools and family take on a patriarchal tone. We rarely
heard anyone say that parents don't care. Even when the girls' home situations are very
negative, teachers usually know someone who cares for the children. Although parent
participation in school events may be no greater than that in the urban site, school personnel
ascribe different motivations for the lack of participation. Lack of parent conferencing was often
viewed as evidence of trust in the schools. In the rural schools, teachers know parents and
relatives of the students in other contexts and are often part of the same community, so they have
a vested interest in providing students with the best possible education. Thus, students are far
less likely to be thrown away by the schools.

Place and constructions of SMT

The urban girls and the girls from the two rural elementary schools with high percentages
of students on free or reduced lunches expressed striking differences in their beliefs about who
does SMT. Even after a year of the _Voices_ program, some of these rural girls repeatedly stated
that boys are smarter, generally like science better and are better at science, mathematics, and
technology than are girls. Urban girls and the girls in the elite rural school were much more
likely to explain the low numbers of women in SMT fields by referring to the impacts of gender
expectations and discrimination on limiting options for women. There was no implicit belief that
men were inherently smarter or better at SMT. In addition to having an impact on the ways girls
may view their prospects, such differences may have implications for the amount and types of
efforts necessary to challenge gender-differentiation in schools' efforts to prepare students for
work.

Place, class and languages of the self

Research by Gilligan and others describe girls' loss of voice during the adolescent years. The notion of "loss of voice" assumes that one has a voice to lose. Our research indicates that few of the rural girls participating in the *Voices* program have developed a vocabulary for talking about themselves. When asked how they viewed themselves or what they liked about themselves, these rural girls often answered with shrugs or shakes of the head. One girl asked the interviewer to see a snapshot of herself that we had taken earlier in the day. She looked at the photograph for several moments, then shook her head. She had nothing to say. This does not mean that they have particularly low self-esteem. In fact, the girls have a tremendous amount of family and community social support. Many of these girls did not have a way of thinking about themselves outside of relationships to family and community. As in societies where the individual is less important than family and community or the common good, these girls had difficulty talking about themselves outside referents of family and community. The questions did not make sense from their frame of reference. These experiences call into question the issue of what "self-esteem" means in the context of girls who may generally think about themselves as parts of intricate, long-standing social webs.

In contrast to the difficulties many of the rural girls had in discussing themselves, many of the urban girls were able to express a quite healthy acceptance of themselves as individuals, particularly in the second year of the study. Two girls referred to themselves as "the bomb" (the ultimate, the best). While the girls are conscious of their appearance, in general they appear to accept that appearance and their self-esteem does not seem to be based on particular social standards of physical beauty. Many of the African-American urban girls expressed pride in their heritage, and mentioned reading and being quite knowledgeable about African-American history. The African-American rural girls did not express this pride or such interests.

The rural girls in general are less assertive than the urban girls. Early in the *Voices* program, the rural girls tended to hang back and wait to be shown exactly what to do. They wanted more direct guidance and were less willing than the urban girls to try things on their

own.[3] The urban girls tended to charge ahead, not wait for direction, start on their own. These differences in the girls' autonomy played out in other contexts as well. For example, several rural girls talked about early pregnancy as destiny. These girls describe early motherhood as almost foreordained. In the urban site although many girls also talked about having a baby at an early age, pregnancy was much more likely to be referred to as a choice. While the results may be similar, the motivations may vary.

Being nice only goes so far: Cultural constructions of appropriate behavior

The language of 'niceness' was part of the rhetoric of *Voices* girls in both counties. The girls frequently talked of the importance of being good and of a desire to be known for their good deeds. In general, they are well-behaved, working well with one another and with the adults in the program. However, while relationships are important to the girls, the critical relationships are those within their particular subcultures. Repeatedly the language of niceness was at odds with the girls perceptions of one another. What counts as niceness is based on norms of behavior within their particular subcultures. When other girls do not meet those norms, dislike, often quite intense can develop. A number of girls in the *Voices* program do not yet seem to have the social skills to maintain relationships outside their particular subcultures. The arena in which being nice was important seemed to be narrowly drawn, and girls from one school often expressed active dislike of girls from another school. For example, girls from the two rural schools serving the lower-income communities habitually expressed their dislike of the girls from the elite school, describing them as "pushy", as "always taking over", and "stuck-up". This animosity came through so persistently, that "Nobody likes the Welch girls." became a catch phrase among adults conducting interviews with the girls during the second year of the program. Similarly, many girls from the elite school were initially reluctant to work with girls from the other schools. Project staff have teamed girls from different schools together on a

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[3]Over the year and a half, to date, of *Voices*, there have major changes in the rural girls willingness to speak out, be in the limelight, take credit for their efforts, and appear "smart". They no longer hang back. While they may wait for or demand assistance on particular aspects of tasks, there is no general hesitancy to start and do. The girls are now likely to turn to their peers, rather than adults, for assistance.

regular basis, however and the girls have worked well together when so teamed. Yet, they still tend to regroup by school during breaks and before and after activities.

Among a small number of girls in the urban site, dislikes took on a somewhat different form. Again, most of the girls in the program were well-behaved and worked well with others during program activities. While they also tended to cluster in school-based groups to socialize, when teamed with girls from other schools they worked well. Thus, project staff were surprised to discover during the second year that there had been some animosity among students from the three urban schools in the first year of the program. Behavioral issues did not go unnoticed by the girls themselves. For example, one urban girl expressed her dislike of girls who were not "serious about *Voices*" and girls often expressed irritation at other girls when they were disrupted while working on an activity.

Perhaps the most striking examples of dislike of the 'other', however, came about when we tried to bring girls from our rural and urban sites together. Early in the program in a situation that was, in hindsight, poorly planned, we invited girls from both sites to meet with their penpals from the other site during lunch in a college cafeteria. Only a few girls were able to connect long enough to talk with one another. Instead, some of the urban girls laughed at their rural penpals and called them names. Some rural girls made excuses to leave their urban counterparts for a moment and then did not return. Girls, and the rural chaperones, left the meeting with an impression that the urban girls were rude and mean. The urban girls called the rural girls prissy and dorky, although some also admitted being hurt by the rural girls' avoidance of them. E-mail communication between the girls in the rural and urban sites was hit and miss. Some girls were able to make connections in spite of the cultural differences. Others refused to write because of real or perceived slights from their penpals.

At the beginning of the second year of the program we brought the girls together again in a sleep-in at a hands-on science center—after discussions of appropriate conduct with both groups. While there were many positive contacts, project staff had to work to forestall a threatened fight between a group of four urban girls and a group of rural girls. The confrontation arose over cheering (a favorite activity of the rural girls) vs. rapping (a favorite activity of the urban girls).

Within our group of girls who want to be nice, the limits of niceness are often drawn at the lines of our group—whatever that group may be. Their likes and dislikes, as well as preferred groupings in activities were often founded upon class- or place-based norms of behavior and discourse. The rural girls from the schools that served lower-income areas of the county reacted to the pushiness and take-charge attitudes of girls from the more elite school. Yet, the girls from the more elite school did not see themselves as being pushy. In completing their tasks, they naturally took charge. Similarly, the conflict over cheering and rapping between the rural and urban girls is closely tied to standing up for ones norms. These class-based behaviors reflect adult norms in the area. Parents from the elite school are accustomed to speaking up and being involved in the education of their children. Other parents in the community frequently comment that some people's opinions and voice counts more than others in school and community affairs, yet these parents may not choose or feel free to speak up in public. *Voices* staff have taken care to invite parents and advocates of girls from school other than the elite school to make their voices and opinions heard in meetings.

Several African-American urban girls reported conflicts between their attitudes and their desires to be nice. They talked about the need to improve their "attitudes", and saw them as barriers between themselves and their goals. These attitudes may reflect survival strategies that Ogbu (1990) refers to as part of the cultural learning that many low-income African-American children develop during preschool—learning which is not completely compatible with white, middle-class teaching and learning behavior. Indeed, many teachers and administrators have commented negatively on these girls' attitudes. While the girls talk about changing their attitudes, recognizing this disjunction, school personnel seem to be less likely to believe attitude is mutable. Instead, particularly at the urban junior high school, we have been encouraged to drop girls with attitudes from the *Voices* program. It is interesting to note that when girls from the rural site mentioned their attitudes, they are much more likely than the urban girls to talk about them as positive, rather than negative.

Activities reflecting and reifying identity

As noted earlier, most girls in both sites report watching television. There were three major differences in viewing habits between the rural and urban sites, however, that crossed boundaries of economic class and ethnicity. (1) When asked to list their favorite programs, urban girls listed more shows than did the rural girls. (2) Girls in both sites mentioned Martin and Saved by the Bell as favorites, but the urban girls also frequently named programs such as Living Single; Sister, Sister; and New York Undercover. The rural girls frequently named cartoons. The Cartoon Network and other cartoon sites on the Internet were favorite sites for the rural girls. Printouts of pictures and schedules for these sites were in evidence everywhere near the computers in the rural schools, and girls often showed staff pictures, schedules, and other artifacts they had printed from cartoon sites. Not once have we seen the urban girls search for or mention a cartoon site. There are no cartoon-related print-outs in evidence. Instead, their searches tended to center on popular music figures (particularly rappers) and commercial products (Pepsi, snack foods). (3) Urban girls were much more likely to mention relating to or having as heroes people they had seen on television. Other than one mention of a professional basketball player, rural girls did not allude to TV characters or media figures as heroes.

While variations of media habits may seem mere curiosities, they are illustrative of striking cultural differences in the ways the girls construct their identities at this particular point in their development. In general the urban girls see themselves as much more independent and adult than do the rural girls. Their television viewing habits reflect this more adult-like image, and their interactions with adults tend to reflect this greater sense of what Clark (1983) has termed "unsponsored independence." The rural girls can still have child-like interests and comics are an important part of school culture.

Adult support and unsponsored independence or **Running the streets and walking up and down the hollers**

Many of the girls in the _Voices_ program must cope with stressful home lives. Many live in poverty. Some must deal with chronic substance abuse in their families. Some do not have two parents and a stable home situation to provide support. The ways in which the girls cope

with their living circumstances has implications for their development as adolescents and their interactions with adults, schooling, and science, math and technology.

Many of the urban girls in *Voices* tend to take on adult behaviors and ways of interacting at an early age. Some have essentially raised themselves, and may be raising siblings or other relatives as well. They are accustomed to interacting with adults as peers, to being in charge, and to determining their own comings and goings. Some speak enthusiastically of "running the streets". If no one watches out for them, they watch out for themselves. Although many of the urban girls do come from stable, supportive family structures, they interact daily with girls who are essentially on their own at least for a large part of the day. As a result, they experience peer pressure toward independence and are influenced by social norms of autonomy. The unsponsored independence of some of the girls affects how they interact with adults. Thus, these girls may be seen as insubordinant or behaviorally impaired instead of as acting normally, given their social and cultural circumstances. When the girls participate in *Voices* activities, the more independent girls tend to forge ahead with tasks, without waiting for adult direction. Their independence has both positive and negative ramifications as the girls negotiate schooling. The norms of schooling generally include obeying commands and complying with directions—norms which are often incompatible with the girls' real-world learning which requires independent thought and action.

In the rural site, many girls, particularly from the schools in the lower-income areas of the county, have to deal with the same types of stresses in their immediate families. However, the deep, intricate networks of connection in the rural areas encourage very different coping strategies, with different implication for the girls development. For instance, while a number of girls in the *Voices* program do not live with their mother and/or father, they are surrounded by other relatives and family friends. Changing living circumstances is likely to mean moving from an aunt's house to a grandmother's house. In general, they remain part of the same family and community networks. (When urban girls go from one parent or relative to another, they are less likely to bring such support with them.) We see evidence of the networks of support in *Voices* advocate meetings. While the girls are not always represented by the same parent or family member, generally they are represented by someone in the family. Aunts, grandmothers, fathers,

sisters, uncles, cousins, and others attend meetings with the girls. Often <u>many</u> family members take part. Increasingly, we find that adults are coming to the advocate meetings to support not just a particular girl, but to support _Voices_ girls in general. Rural sociologists would point to this phenomenon as an example of the long history of schools playing a major role as the center of rural communities and as nuclei for community revitalization and development. Sociobiologists might argue that extended kinship networks in the rural area foster a greater sense of communal responsibility. Others might argue that this support is a reflection of the lack of opportunities for socializing in rural communities, or of the success of program activities. Regardless of the forces at play, the implications of this support network on the lives of the girls are profound.

In addition to the greater degree of hanging back and waiting for adult guidance that we observe in the rural girls, they generally do not attempt to relate to adults as equals. They are much less likely to act independently of adult supervision. While the rural girls might go out and "walk up and down the hollers" for entertainment, they are always in relatively close proximity to someone who knows them, knows their family, and can take some sort of responsibility for them. Even though the girls have responsibilities for caring for siblings and babysitting the children of relatives and others, these activities are carried out in the context of a community that also shares their responsibility. Again, they do not have to assume the unsupported, unsponsored independence that many of the urban girls have taken on.

We see somewhat different coping strategies from rural girls who must deal with parents who cannot provide support. Usually the girls rely on their network of relatives and friends. Less frequently, we see the rural girls taking over the role of parent to their parents—sometimes displaying a greater sense of responsibility and adherence to social norms than do their parents. Three girls in the rural site have taken on parental roles with their parents. These girls are the <u>adults</u> when they interact with their parents, and exhibit a greater sense of maturity. For example, when one of these girls brought her mother to a _Voices_ workshop, she repeatedly had to mediate between her mother and other girls when her mother tried to take materials away from the girls in order to do her own project. Another of the girls, from a family where alcohol/substance abuse is the norm, repeatedly calls home during project activities to check on her parents. She has missed several project events in order to care for her parents when they are

inebriated.

This phenomenon of parenting your parents is not visible in the urban site, although it may occur. In the rural areas, everyone knows everyone else's affairs, so there is no attempt by the girls to hide what is happening in their families. It would be futile for them to do so. In the urban site, girls may hide any parental roles they assume, if they do assume such roles. What is visible in the urban site is a heightened degree of girls struggling with parents for independence—a struggle we see little of in the rural site.

In the urban site, relationships between _Voices_ staff and the girls has a flavor quite different from those in the rural site. For example, one of the urban girls calls a project staff member daily—just to talk. When the staff member told the girl not to call until the girl had called her mentor, the girl punished the staff member by not attending the next workshop. In the rural site, while we have developed close relationships with the girls, staff are not part of the girls' regular network of support. They may occasionally e-mail staff, hang around and help out before and after workshops, and vie for attention during meetings, but they do not look to us as a regular form of support.

Girls in the middle-class school in the rural county are involved in activities such as scouting, dance, and competitive swimming; urban girls have many possible diversions. Opportunities are limited for the rural girls from the lower-income schools. For many of these girls, church is their primary non-school activity. For most, but not all, girls in _Voices_, church activities play an important part in their daily lives. Heavy involvement in church and community activities has given many of the girls opportunities to interact informally with adults in a variety of settings and to develop social skills in an arena outside of school. It is interesting that, in general, the urban girls not involved in church-related activities are also the girls that have the most difficulty working with adults. The positive impact of church activities, and the difficulties experienced when girls do not have such a source of support is consistent with Haynes & Comer's discussion (1990) of the impact of social systems such as the church on the on psychoeducational, socioeconomic, and emotional needs of low income children. Our observations are also consistent with Sanders (1996) report of the positive impacts of church participation on African-American urban adolescents self-concept, achievement ideology and

school behavior.

There are many more distractions on the streets than in the hollers, and activities, such as *Voices*, take on different meanings in the two contexts. In the rural site, the *Voices* program has high visibility, high status, and retention in the program has been excellent. Adults in the area vie for opportunities to serve as coordinators, mentors, or workshop presenters in the program (These positions all carry a small financial incentive). Only two rural girls have dropped out of the program. *Voices* is considered a special opportunity, and girls are proud of their participation. In the urban site, *Voices* is one of many programs, and does not have this special status or visibility. There are many more things available for girls to do on Saturday morning, and only about 45% of the girls who initially enrolled in the program remain. Participation in *Voices* is not a point of pride in the urban school. In fact, school personnel have told us that perceptions that the program is for the "wrong" girls has lowered the program's status, and it has been quite difficult to recruit adults to serve as coordinators and mentors.

Social Class, Community and Dreams

> *It is easy to document the many sociological and economic distinctions between the poor and the rich--describe the world of a ghetto, the world of a well-to-do suburb. It isn't so hard to compare the schools in a ghetto as against those in a suburb. ... It is not all that hard to hear the children in each school talk--and thereby hear two altogether different languages, sets of assumptions, hopes, expectations. But inside the mind of every child is an ultimate truth of sorts--what a particular boy or girl thinks about, dreams about, in the course of a day, a night.*

Coles, 1991

As Coles so eloquently notes, languages, living conditions, clothing, transportation, and experiences are somewhat tangible indicators of the social contexts that influence an adolescent's development. Dreams, however, reflect the child's visions of what is possible. One of the most striking things we found in our interviews with the *Voices* girls is the difficulty that all the girls had in giving voice to their dreams. For a number of girls in our program, expressing their dreams, particularly during their 6th grade year was simply not possible. (During their

interviews at the beginning of the 7th grade almost double the number of girls—16 out of approximately 60—told us about their dreams and visions of the future).

It is fascinating to note what the girls did tell us about their visions for the future. Several of the urban girls wanted to be professionals (doctor—2, lawyer—1, astronaut—1, paramedic or nurse—1; scientist—2). Two others aspired simply to good jobs with lots of money. One urban girl, when asked if there is a college she wants to attend, responded "One. I don't know where it is. Harvard." These dreams are consistent with research describing urban children who aspire to be professionals, yet often lack a knowledge of what it takes to become a one. One girl recognized her dream was somewhat unrealistic, stating that she wanted to teach math without having to go to college. Two other girls' dreams had little to do with careers: one wanted to meet movie stars; another dreamed of $1000 and a car.

The dreams expressed by the rural girls were very much tied to social class. Girls at the middle-class school talked about being a lawyer (1), marine biologist (2), archeologist (1) or mathematician (1). These girls not only know the specific names of professions, they realize that they must attend college to prepare for these professions. Those girls at the other two schools who named specific careers said they wanted to be a professional basketball player (1) or a doctor (1). Although during the first year of interviews these girls consistently expressed their intent to remain where they are, during the second year two mentioned dreams of living in another city (Washington D.C. or Chicago). One wanted to "make lots of money". Another girl's dream was to visit Camden Park (a small, somewhat shabby amusement park about three hours from where the girls live). These girls were much less specific in their dreams, and generally lacked the experience and role models that would help make their dreams concrete.

Ethnicity

By far the greatest differences we see in the girls in _Voices_ are directly attributable to their place as rural or urban. The worlds of the rural and urban girls in the program differ dramatically. Social class also shapes roles and expectations for adolescents in both urban and rural communities. At this time, ethnicity appears to have relatively little effect on girls participation in schooling and SMT in either site. Place and community are far more powerful

constructs influencing identity. Ethnicity does appear to be an important facet in the self-image of the girls in the urban site, although not in the rural site. Being a strong African-American woman and being highly knowledgeable of and interested in African-American history is important to many of urban African-American girls. The unsponsored independence of many of the urban girls is not necessarily linked to ethnicity and is not evident in the rural site. There is no evidence in the rural site of a focus on ethnic heritage.

Girls from the elite school in the rural site appear to have the most common ground with the urban girls in that they have had a wider range of experiences than the other rural girls and exhibit a greater independence. Yet, these girls rarely experience unsponsored independence, and rarely relate to adults as peers.

In the urban site a conflation of ethnicity and social class seems to be a marker of the presence or absence of potential by school staff. We cannot help but believe that the powerful stereotypes expressed about girls who are simultaneously from low-income and African-American backgrounds has an impact on the schooling opportunities they receive and thus on their development. In a school where faculty and administrators expend an incredible amount of time and energy enacting an elaborate sequence of punishments for even minor infractions such as chewing gum, there is little wonder that some girls see little connection between academic endeavors and their dreams.

Issues and implications

Class, place, and ethnicity have potent impacts on the development of the girls. Consistent with research by Duncan & Lamborghini (1994) we found the rural Appalachian site highly socially stratified. This stratification had a profound influence on the ways in which girls viewed themselves. For example, the languages girls had available for talking about themselves and their futures differed dramatically along class lines. While many of the urban girls and the "haves" (i.e. lower-middle to middle income groups) had access to ways of talking about themselves, their aspirations and possible futures, the "have-not" rural girls were generally not able to verbalize futures or images of themselves. Many rural girls had difficulty expressing things they liked about themselves. However, these economically and socially "have-not" girls

are rich with the support of family and community. These girls generally expressed the strongest ties to place and sense of their interwovenness with family and community of all the girls we interviewed. They have a strong sense of family and of community norms, and have difficulty thinking of themselves outside of this context. The urban girls did not express ties to a particular place or location.

The urban Appalachian girls express a much stronger sense of identity and control over their destiny than do the rural girls. In many cases, their identities appear to be influenced less by the social institutions of school and church than those of the rural girls. Ethnicity seemed to play a role in identity primarily in the way the urban girls constructed their self-image and in the ways in which schools and adult society interact with them.

Grounded in data such as these, our research points toward the need for a social constructivist notion of adolescent development. Such a perspective, based on a broader picture that includes place, class, gender, and ethnicity may provide educators insight into ways in which multiple discourse communities influence girls narratives of themselves and their journeys toward who they are becoming as relational and situational, but also as independent women.

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Appendix A

Rural and Urban Images

Voices
of girls
in science, math, and technology

AEL's mission is to link the knowledge from research with the wisdom from practice to improve teaching and learning. AEL serves as the Regional Educational Laboratory for Kentucky, Tennessee, Virginia, and West Virginia. For these same four states, it operates both a Regional Technology Consortium and the Eisenhower Regional Consortium for Mathematics and Science Education. In addition, it serves as the Region IV Comprehensive Technical Assistance Center and operates the ERIC Clearinghouse on Rural Education and Small Schools.

Information about AEL projects, programs, and services is available by writing or calling AEL. To learn more about the Voices project, contact Dr. Patricia Kusimo (kusimop@ael.org) or Dr. Carolyn Carter (carterc@ael.org).

Voices
of girls
in science, math, and technology

Voices is a three-year project to help girls do well and feel confident in science, math, and technology. Girls are as capable as boys, but do not participate as fully as boys in these subjects. As a result, girls are less often than boys prepared to enter technical careers.

- In its first year, Voices involved sixth-grade girls in activities that helped them become stronger students in science, mathematics, and technology.

- In the second year, women who work in science, mathematics, and technology fields are serving as mentors to the girls as they work together on projects.

- In the third year, girls in Voices will continue their exploration and teach younger students what they have learned.

nsors:

- Appalachia Educational Laboratory (AEL) in Charleston, WV
- Kanawha County (WV) School District
- McDowell County (WV) School District
- The National Science Foundation

Project Partners:

- American Association of University Women-WV
- Association for Women in Science-WV
- Challenger Learning Center
- Concord College
- Marshall University
- Union Carbide
- West Virginia Department of Education
- West Virginia State College
- West Virginia University
- WVU Extension Service
- WVU Health, Science and Technology Academy
- WVU Institute of Technology

Participating Schools

The project began in 1995-96 with sixth-grade girls in six elementary schools*. It has moved to their middle schools for the second and third years of the project. Participating schools are Stonewall Jackson Junior High in Kanawha County, and Northfork and Welch Middle Schools in McDowell County.

* Chandler, Glenwood, and Tiskelwah in Kanawha; Welch, Switchback, and Kimball in McDowell County.

Project Activities

First-year activities included science, math, and technology workshops in which the girls explored science, mathematics, and technology in the context of Appalachian culture. For example, they investigated the math in designing quilt patterns, the chemistry of folk medicine, and the microbiology of food preservation. The girls also designed World Wide Web pages for their schools, communicated through e-mail, explored the Internet, and flew a simulated space voyage at the Challenger Learning Center.

In their second year, the girls will continue workshops and field trips. They will also work together with mentors on investigative projects. Mentors are women scientists, engineers, and mathematicians from partner institutions.

In the third year, girls will participate in a "virtual scientist" experience. They and their mentors will also work with students in elementary school levels, where the *Voices* girls will be the experts and serve as role models.

Family Participation

To gain confidence and skills in science, mathematics, and technology, the girls need their families and friends to support them, advocate for them, and celebrate with them. *Voices* holds meetings for families to share information and support one another. Transportation, child care, and meals are provided.

Research

Part of the purpose of *Voices* is to learn how the girls experience science, mathematics, and technology in their communities. Are there differences in how these subjects should be taught in urban and rural places? *Voices* will add to what is known about rural and urban perspectives. Understandings gained over the three project years will be disseminated in a final report.

Instructional Materials

Activities and methods used with the project girls will be adapted for classroom use and made available to teachers in West Virginia and nationally.

Film

Throughout the project, two professional filmmakers are documenting the stories of these girls. The resulting film will allow their voices to help improve education in science, mathematics, and technology for other girls.