Playing in the Zone of Proximal Development: Qualities of Self-Directed Age Mixing between Adolescents and Young Children at a Democratic School

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At an ungraded, democratically structured school, we documented 196 naturally occurring interaction sequences between adolescents (ages 12–19) and children (ages 4–11) who were at least four years younger than the adolescent. Children and adolescents appeared to be drawn together by common interests and play styles, personal attraction, and complementary desires to nurture and be nurtured. Further analyses identified apparent contributions of such interactions to both parties' physical, intellectual, and social/moral education. Adolescents led children to act within the latter's zones of proximal development (Vygotsky's term), and children stimulated adolescents to make implicit knowledge explicit, be creative, and practice nurturance and leadership.

The potential educational value of free age mixing between adolescents and younger children has been largely neglected because of the widespread acceptance of the conventional scheme of age-graded schooling. To address this neglect, we analyzed qualitatively a set of field notes that describe nearly two hundred separate vignettes involving interactions between adolescents and younger children at a radically alternative school, the Sudbury Valley School. Our analysis identified seven qualities that were prominent in these interactions—Helping, Approving, Giving, Prosocial Intervention, Conflict, Game Variation, and Comedy. Our report here focuses on the particular ways in which these qualities were manifested, the contexts in which the interactions occurred, and the value that such interactions would appear to have for the

physical, intellectual, and social/moral education of the children and adolescents involved. Although our observations were made at a particular, unusual school, we believe that the kinds of interactions we observed could occur in any setting where children and adolescents have the opportunity to get to know one another well and engage one another freely. Before considering further the goals and methods of our study, it would be useful to know a bit about the school that served as the setting for our observations.

The Sudbury Valley School (SVS) is a nonselective, inexpensive day school, located in Framingham, Massachusetts. It enrolls students ages 4 through high school age and has operated continuously since 1968. The school is fundamentally a democratic community designed to allow students to pursue their own interests in their own chosen ways. All school rules and policy decisions are made by the School Meeting, at which each student and staff member, regardless of age, has one vote. The rules—which are designed to protect the school and to prevent people from interfering with each other's activities—are enforced by the Judicial Committee, which is selected monthly by lot to include representation from across the whole age range of school members.

The school's educational philosophy centers on the idea that, in an environment with ample opportunities, children will educate themselves through their own self-directed play and exploration. Classes are offered in response to students' requests, but no students are required or particularly encouraged to join a class. Books, equipment, and staff expertise are available to aid education in a wide variety of subjects and skills, but students are always free to use or not use such resources as they choose. A basic premise of the school's philosophy is that each person is responsible for his or her own education. Staff members do not coerce or coax children to learn.

The school gives no tests and does not evaluate students in any formal way.[1] Of greatest relevance for our present study is the fact that students are not assigned to grades, classes, or separate spaces, but can move throughout the school buildings (a large Victorian farmhouse and a renovated barn) and 10-acre campus as they please and associate with whom they please. The school's philosophy and details of its practice have been described in

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a number of books (e.g., Greenberg 1991, 1992, 2000; Holzman 1997) and in countless articles in the popular press. The school currently enrolls approximately two hundred students, and in recent years roughly twenty other schools that are explicitly modeled after SVS have been founded in various parts of the world.

The school operates in a manner that is almost the opposite of conventional schooling. Visitors, arriving at any given time of the school day and knowing only that SVS is a school, would assume that they must have arrived at recess time. They would observe students playing, talking, hanging out, and enjoying a wide variety of self-directed activities. Yet, follow-up studies of the graduates indicate that the school has succeeded admirably as an educational institution (Gray and Chanoff 1986; Greenberg and Sadoffsky, 1992). The school's graduates have, as a group, been highly successful in higher education and careers, and most of them attribute much of their success to lessons they learned at SVS—lessons about their own interests, abilities, and responsibilities.

When asked to explain the school's educational success, staff members and other long-time observers of the school commonly talk about the school's democratic ethos and the sense of personal responsibility that is part and parcel of that ethos. Most especially, however, they talk about the educational value of the free age mixing that occurs at the school. In an essay first published in 1974 and republished in 1992, Daniel Greenberg—one of the school's founders and the leading exponent of the school's philosophy—argued that free age mixing is Sudbury Valley's "secret weapon."

In Greenberg's (1992, pp. 131–32) words: "[Free age mixing] is the key to everything else. [It] provides a free flow of interaction among people at different points along the maturation process. It enables you, as you are growing toward adulthood, always to find somebody in *both* directions. You can find somebody who is just a few steps *ahead* in learning how to deal with the environment (just a *few* steps ahead, and therefore not so far ahead that the person is no longer encountering a lot of the same problems). Somebody who still speaks the same language, who still makes a lot of the same mistakes. But at the same time, someone who has achieved a few of the same things that you want to achieve, and since you can talk about 80% of it rather easily (because you are in the same boat for 80% of it), the other 20% becomes a lot easier to understand. On the other hand, it is equally important to be able to turn around and find somebody a little behind you, because you get a handle on your accomplishments and on your maturation by refining them through explaining and re-explaining and making it clear to somebody who is asking you. This is the real meaning of the commonplace saying that teaching and learning are two sides of the same coin."

From the perspective of modern educational practice, the idea that free age

mixing can serve as the foundation for education is radical indeed, but from a broader historical perspective, it is not. Throughout most of human history, self-directed age mixing has apparently been the primary vehicle of education. Children and adolescents in hunter-gatherer and other preindustrial societies spent (and spend) most of their time playing, working, and socializing in multiage groups (Draper 1976; Gray and Ogas 1999; Konner 1972; Whiting and Whiting 1975). Rogoff (1990) and Lave and Wenger (1991) have characterized the traditional educational process as a natural form of apprenticeship in which children, largely through their own initiative, participate with older children and adults in the culture's valued activities. Children are naturally social and curious about the activities of others around them and eager to take part. With practice and maturation they play increasingly sophisticated roles in such activities until they become experts. In Rogoff's (1990, p. 16) words: "Children seek, structure, and even demand the assistance of those around them in learning how to solve problems of all kinds. They actively observe social activities, participating as they can."

The apprenticeship concept was implicit in the educational writings of Lev Vygotsky, who claimed that children acquire knowledge and develop skills through interactions with others who are more competent than themselves. Vygotsky pointed out that children regularly perform new tasks in collaboration with others before they are able to perform them alone. He coined the term *zone of proximal development* (ZPD) to refer to the difference between what a child can do alone and what the same child can do in collaboration with more competent others (Vygotsky [1935] 1978). According to Vygotsky, development occurs most rapidly when the child collaborates with others within his or her zone of proximal development.

Closely related to the concept of the ZPD is that of *scaffolding*. Wood et al. (1976) introduced this term as a metaphor for the processes by which a more competent partner enables a less competent partner to carry out a task or solve a problem that the latter would be unable to complete alone. They described scaffolding as consisting essentially of the more competent partner's "controlling those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence." As the learner becomes increasingly skilled, the contribution of the more competent partner is reduced—the scaffold is removed, bit by bit—until the learner's performance can stand alone.

Although Vygotsky was most interested in applying the ZPD concept to school settings, such application has in fact received little more than lip service in conventional schools. Blank and White (1999) have summarized the obstacles to activity within the ZPD in conventional schools. One major obstacle is the group structure, in which a single teacher must interact with

many students at once, not all of whom are likely to share the same interest at the same time. Another is the mandatory curriculum, which, along with the group structure, greatly restricts students' abilities to initiate topics and thereby reduces students' motivation. The situations in which the ZPD and scaffolding concepts most clearly apply are those in which a learner and teacher (more competent other) are intensely involved together in an activity that is at least as interesting to the former as to the latter. In fact, most research studies of the ZPD and of scaffolding have involved observations of mothers interacting with their preschool children on tasks designed to mimic natural learning situations at home (Kermani and Brenner 2000; Lloyd and Fernyhough 1999).

For our present study, we have taken advantage of an opportunity to observe naturally occurring age mixing at the Sudbury Valley School. We chose to focus specifically on interactions between adolescents (ages 12–19) and children (ages 4–11) who were at least four years younger than the adolescent. Throughout most of the non-Western world, and through most of past history in the West, adolescents have regularly interacted with younger children as playmates, workmates, and caregivers (Nasaw 1985; Pratt 1986; Whiting and Whiting 1975). In contrast, in much of contemporary Western society—a society with relatively small nuclear families, relatively weak extended family ties, age-segregated schooling, relative paucity of unsupervised neighborhood play, and fears about the kinds of models that adolescents would provide—children and adolescents have much less opportunity to interact with each other than has been true at other times and places. By segregating children and adolescents to the extent that we do, we may, as a culture, be depriving both parties of a valuable resource for development and education.

Our systematic survey of the psychological and educational literature revealed that researchers have paid almost no attention to interactions between children and adolescents. Psychologists and educators regularly observe children interacting with others near their own age or with adults, but not with adolescents.[2] We suspect that this oversight derives largely from researchers' heavy reliance on traditional schools—both as sources of research questions and as convenient settings in which to make observations. In such settings, children and adolescents are segregated not only into separate classrooms but most often into completely separate buildings and campuses. Despite the paucity of direct empirical study of interactions between children and adolescents, there are reasons to believe that such interactions might provide unique benefits for both parties.

Psychologists have regularly observed and described qualitative differences between children's interactions with adults and with peers (Hartup 1982; Piaget [1932] 1965). Those with adults are typically asymmetrical and com-

plementary: adults teach, lead, and control while children learn, follow, and are controlled. Those with peers are more often symmetrical and reciprocal: lacking a clear authority figure, peers learn to negotiate with one another on an equal footing. Moreover, children's relationships with peers are generally rooted in play, while their relationships with adults are more often rooted in serious tasks and discipline. Children's relationships with adolescents might be expected to lie on a middle ground between those with peers and those with adults. An adolescent may have more authority and power than a child, but not as much as an adult. An adolescent may be more closely matched to the child in interests, playfulness, and energy level than is a typical adult, but not as closely matched as a typical peer. From this middle ground might emerge some qualities of interaction that are different from those commonly seen with either peers or adults and that are uniquely suited for engaging children within their zones of proximal development. The playful nature of adolescent-child interactions may make such interactions particularly valuable for development. Vygotsky (1978, p. 102) wrote: "Play creates a zone of proximal development of the child. In play a child always behaves beyond his average age, above his daily behavior; in play it is as though he were a head taller than himself." We might expect that children's play with older children and adolescents would be especially likely to stretch them in this way.

For adolescents, interactions with younger children might provide opportunities to practice nurturance and leadership and to consolidate and explicate (to themselves) some of their own knowledge through teaching. In a review of cross-cultural observations of social interactions among children in the 2–12-year-old range, Whiting (1983) reported that both boys and girls demonstrated much more nurturance and other prosocial behavior toward children who were three years or more younger than themselves than toward age-mates. From this and other observations she suggested that interaction with younger children allows young people to develop prosocial skills that may then generalize to their interactions with peers. Consistent with this hypothesis, Ember (1973) found, in a subsistence farming community in Kenya, that 8–16-year-old boys who were assigned by parents to perform traditionally "feminine" tasks, including child care (because of lack of an appropriately aged daughter to perform those tasks), manifested less aggression and more prosocial behavior in their interactions with peers than did boys who were not assigned to such tasks.

Many experiments or quasi experiments have been conducted on the effects of multiage grouping in schools that are much more conventional than SVS. Typically in such studies, children in two or sometimes three adjacent elementary grades are placed in the same classroom or are brought together for lessons in a specific subject and are compared on various tests

and measures with otherwise comparable children who spend the school day in same-age classes. Over all, such studies have revealed either no effects or small beneficial effects of multiage grouping on academic achievement and small-to-moderate beneficial effects on social-emotional measures, such as indices of self-esteem and attitude toward school (for meta-analyses and reviews, see Gutiérrez and Slavin 1992; Lloyd 1999; Pratt 1986; and Veenman 1995). Such studies are difficult to interpret because of the confounds that are inevitably present (such as the nonrandom assignment of teachers and the use of different teaching methods in the different conditions), yet they do suggest that at least in some cases age mixing can produce beneficial effects even in otherwise conventional schools. Larger, more consistent effects have been found in experimental studies of peer tutoring in schools, where the tutors are typically 1–3 years older than those being tutored. The usual finding is that tutors and those being tutored show greater increases in understanding of the subject matter than do appropriate control groups, and tutors also show greater gains in prosocial attitudes and empathy than do controls (Cohen et al.1982; Topping and Ehly 1998; Yogev and Ronen 1982). None of these studies of age mixing in schools have looked at mixing over as broad an age range as occurs at SVS.

The present study was not focused on outcome but, rather, was designed to learn about the qualities of natural, unforced interactions between children and adolescents at the Sudbury Valley School. The data were drawn from an extensive set of field notes made by one of us (JF) in a long-term ethnographic study. Our goal was not to test any specific a priori hypotheses but to describe, as objectively as we could, many adolescent-child interactions and to analyze those descriptions qualitatively to see what sorts of learning opportunities might lie within them for the adolescents and for the children. We were particularly interested in addressing four questions relevant to the role of age mixing in education at this setting: (1) What drew adolescents and children together? (2) How might adolescent-child interactions contribute to physical education? (3) How might such interactions contribute to intellectual education? (4) How might such interactions contribute to social and moral education? We assumed from the outset that interactions between adolescents and younger children would not always be beneficent, so one of our concerns was to document all conflictual interactions that we observed and to try to understand how they were resolved.

The study was facilitated by the fact that one of us (PG) had already been a long-time observer of the school and had conducted several studies of its students and former students. Through its democratic School Meeting, the school granted us conditional permission to conduct the study. The conditions depended on our continually demonstrating that our study would not interfere with students' ongoing activities. In seeking permission, we

TABLE 1

Number of Male and Female Students, at Each of Four Age Ranges, Enrolled at the School during Each Year of the Study

AGE RANGE	SEX	YEAR		
		1992–93	1993–94	1994–95
4–7	Males	12	11	17
	Females	9	5	9
8–11	Males	9	15	24
	Females	16	16	20
12–15	Males	25	22	30
	Females	17	18	23
16–19	Males	28	29	35
	Females	16	16	22
All ages	Males	74	77	106
	Females	58	55	74

NOTE.—Data are based on the students' ages at the midpoints of each year's observations.

described the methods of our proposed study and our general objective of "learning about what students do at SVS," but we did not specifically refer to an interest in age mixing.

Observational Methods

The Population Studied

All of the students enrolled at the Sudbury Valley School during the three years of the study were potential subjects of our observations. The numbers enrolled during each year, broken down by age category and sex, are shown in table 1.

The school has a nonselective admissions policy. Essentially everyone, four years or older, who applies and whose family agrees to pay the modest tuition is accepted. As a matter of policy, the school keeps no records on the backgrounds of students or their families and does not permit testing, so we cannot describe the population statistically. However, based on the previously cited surveys of former students and our own informal knowledge of past and present students and their families, we can report the following: the majority of students are white, middle-class suburbanites. Most attended a public school for some period of time before enrolling at SVS; very few attended another private school. Some report that they were performing poorly academically in their

former school, but at least an equal number report that they were performing well. The students appear to us to occupy roughly the same range and distribution of personality and intelligence that we observe in other children in the communities that feed into the school. Their most distinguishing characteristics, in our experience, are an orientation toward self-determination, a shared distaste for conventional primary and secondary schooling, and a family that supported or at least tolerated their decision to enroll in a highly unconventional school. Despite their distaste for conventional primary and secondary schooling, approximately 75% of the graduates surveyed in the follow-up studies went on to formal higher education. The great majority, whether or not they pursued higher education, are involved in careers that require high skill and/or intellectual ability (Gray and Chanoff 1986; Greenberg and Sadofsky 1992).

In a quantitative study that preceded the qualitative study, we verified that much age mixing in fact does occur at the school (Gray and Feldman 1997). For that study, a researcher toured the school buildings and grounds 14 times over a 52-day period and recorded the membership of all observable groups of two to seven students who were interacting with each other. Among the findings were that (*a*) the average group size was 3.7 students; (*b*) 57% of the groups encompassed an age span (oldest person's age minus youngest) of 24 months or more, and 25% encompassed an age span of 48 months or more; (*c*) 30% of the groups were gender mixed (contained at least one male and one female), while 28% were all female and 42% were all male; (*d*) age mixing occurred more frequently in groups who were actively playing together than in purely conversational groups; and (*e*) gender mixing occurred less frequently in groups who were actively playing together than in purely conversational groups.

Data Collection and Selection

The data for the present study were taken from field notes collected by one of us (JF) as part of a larger ethnographic study of age-mixed social interactions at the school (Feldman 1997). The observations were made over blocks of weeks during which the observer was present at the school 6–8 hours per day on a total of 102 days over three years (26 days in 1992–93, 33 days in 1993–94, and 43 days in 1994–95). The students were aware that JF was visiting the school "in order to learn about what students do at SVS" but were not informed of our specific interest in age mixing.

Over the course of the study, JF was 25–27 years old and sufficiently youthful in appearance to be judged by an outsider as a student. His observational method was one of reactive participation similar to that described by Corsaro

(1991). He did not initiate conversations except as needed to avoid appearing aloof or unfriendly but did respond honestly to students' questions directed to him and took part in conversations initiated by students. Typically, he would watch and listen to students' interactions while superficially engaged in an activity of his own, such as reading a magazine or drawing a picture. To avoid continually reminding students of his role as observer and to avoid drawing attention to himself, JF did not take notes while observing. Instead, immediately after observing an episode (which might last from 1 to 30 minutes), he would inconspicuously jot down brief notes about it, including the participants' names, the activity they were involved in, and key words to remind him of the salient features of the interaction. At the end of the day's observations (or sometimes earlier), while the memory was still fresh, he would expand on the notes to write a more extensive vignette for each episode.

This unobtrusive method of observing and note taking was necessary not only to meet the school's requirements that we not interfere with students' activities but also to meet our own desire to observe students' natural activities, influenced as little as possible by the observer. We did not want to study age mixing that occurred because of JF's becoming a magnet for students of various ages, who interacted with each other as they congregated around him. We also, obviously, did not want students to put on any sort of show for the sake of the study. Our own assessment, and that of staff members at the school, was that the attempts to observe unobtrusively worked well. Students were friendly to JF, as he was to them, but for the most part seemed to act as if he was not present.

His choices of what to observe were influenced in part by ease of observation without disruption. He did not attempt to follow groups who were moving from room to room or over large spaces outdoors, and he refrained from observing in the school's less public, smaller, "quiet rooms," where it would be difficult to be inconspicuous and where students would often prefer not to be disturbed. Although JF was interested in age mixing across the whole spectrum of age differences, he was particularly drawn to cases where the age gap was large, and his observations included many cases of interactions between adolescents and much younger children. Our plan was to use the vignettes to identify learning opportunities that lay in mixed age interactions, but we deliberately avoided preconceptions of what those "learning opportunities" would look like. We assumed that such opportunities could occur in activities that superficially looked nothing like "education" or "teaching," so JF strove to include as many different kinds of activities in his observations as possible, given the above constraints. He also strove to include as many different students as possible, not just those who were most conspicuous.

The vignettes that JF wrote into his field notes focused on objective features of the interaction, presenting with minimal interpretation the activities seen

and the comments heard. By the end of the observation phase, JF had prepared 375 such vignettes. For the present study, we selected from the whole set of vignettes all that described at least one interaction between an adolescent and a child who was at least 48 months younger than that adolescent and who was not a sibling of that adolescent. Somewhat arbitrarily, we classed all students aged 12 and older as adolescents and all students under age 12 as children. (Students who had their twelfth birthday within the 3-year observation period were classed as "children" in observations that occurred before that birthday and as "adolescents" in observations that occurred after that birthday.) We found 196 vignettes that met these criteria, and these provided the data for all of the analyses to follow. These vignettes included observations (often multiple observations) of 159 different students (101 males and 58 females) distributed roughly equally between adolescents and children. During the 3-year observation period, 246 students (147 males and 99 females) were enrolled (some for less than the whole three years) and were potential participants.

Methods of Coding and Quantitative Results of Coding

We analyzed the vignettes by methods consistent with the grounded theory approach to qualitative analysis (Glaser and Strauss 1967; Pidgeon and Henwood 1997). Rather than impose on the data a set of codes derived from a priori hypotheses, we derived and refined the codes from a preliminary analysis of the data. This analysis included the writing for each vignette of an abstract that summarized the information directly related to the child-adolescent interaction. We then developed ways (described below) to code each vignette for (*a*) the *domain* of activity in which the adolescent(s) and child(ren) interacted, (*b*) the *qualities* that characterized each adolescent-child interaction, and (*c*) the *initiator* (adolescent or child) of the interaction.[3]

The Domains of the Interactions

To categorize the vignettes by domain, we first labeled each vignette in accordance with its main specific activity, such as playing chess, talking and joking together, or selling cookies. We then sorted these labels in ways designed to place similar types of activities together. After several trial sortings, we decided upon five domain categories, which could be defined rather objectively and which collectively encompassed all of the vignettes reasonably well. The five are listed below along with a definition of each, the number of vignettes in each, and the most frequent specific activities observed in each.

Formal Physical Games. A *formal* game is one played according to a pre-prescribed set of rules, typically a set that has been handed down from one generation of players to another or that was developed and clearly specified by the game's inventor. A *physical* game is one in which the main actions entail skillful physical movements. At SVS such games are almost always played outdoors. In our coding, the "formal" aspect was interpreted loosely. Students at SVS regularly vary the rules and make up new rules for all of the physical games they play. Of the 24 vignettes in this domain, 10 involved the game of four square (a ball-bouncing game described later), 7 involved various versions of basketball, and the rest were comprised of one each of seven different games.

Formal Nonphysical Games. A formal nonphysical game is any formal game that is based on strategy, knowledge, and/or chance rather than physical skill. Such games are usually played indoors. We included in this domain all cases where adolescents and children were interacting with one another about the game, whether or not they were actually playing the game together.[4] Of the 35 vignettes in this domain, 12 involved Magic (a fantasy game played with special cards, which was a fad at the time of our study), 7 involved card games played with standard playing cards, 5 involved chess, 3 involved other board games, and the rest involved computer games and fantasy games other than Magic.

Informal Play. This domain included all forms of play that did not fit the definitions of either formal games or constructive play. Of the 30 vignettes in this category, 16 involved playful fighting and chasing, 5 involved other forms of make-believe play, 5 involved play on playground equipment, and 4 involved miscellaneous other activities.

Constructive Play and Projects. This domain encompassed activities that focused on creating a product, working on a project other than a formal or informal game, or solving a practical problem. Of the 64 vignettes in this domain, 13 involved constructive play with toys (including 8 cases of building with Legos); 13 involved art or craft constructions (including photography, drawing, sculpting, and ceramics); 13 involved efforts toward solving some practical problem (in most cases the adolescent was helping the child to find someone or something or to perform some chore, such as cleaning up spilled juice); 9 involved selling and buying (in 7 of these a child was selling cookies or brownies and an adolescent was buying or interacting with the child in some other way about the sales process); 6 involved singing or playing a musical instrument; and 5 fell into a miscellaneous category.[5]

Conversations and Brief Encounters. This domain encompassed verbal and (in a few cases) nonverbal interactions that did not occur in a context of ongoing play or projects that would lead to classification into any of the other four domains. Of the 43 vignettes in this domain, 14 involved good-natured teasing

or other verbal forms of fooling around; 13 involved serious, extended, back-and-forth discussions, of such varied issues as boyfriends and girlfriends, favorite movies, and appropriate uses of the school's judicial system; and most of the rest consisted of a rather brief, one-way imparting of information or advice, usually in response to a question.

The Qualities of the Interactions

To develop a coding system for the psychological qualities of the interactions, one of us (PG) wrote down, for each of the 196 vignettes, terms that seemed to describe the most salient qualities of the adolescent-child interaction(s) in that vignette. He grouped the terms that appeared frequently into categories based on similarity in meaning, developed a preliminary definition of each category, experimented with coding the vignettes using those definitions, and then, based on those trials, redefined the categories. The final result was a set of seven quality categories: Helping, Approving, Giving, Prosocial Intervention, Conflict, Game Variation, and Comedy. We then each independently coded each vignette for these categories, compared our results, and calculated Cohen's kappa to assess reliability of coding. The resulting reliability coefficients ranged from .804 to .952 over the seven quality categories. Finally, we discussed each mismatch until we reached agreement.

Each vignette could be coded as having any number of the qualities, from none up to all seven. The codes were generally applied only to the child-adolescent interactions. The only exceptions to this rule occurred in the coding of Prosocial Intervention. We applied that code not just to cases involving direct adolescent-child interactions but also to cases of adolescent-adolescent interactions where one was attempting to alter the way that the other was behaving toward a child. In the final coding, 16 vignettes had none of the seven qualities, 103 had one, 63 had two, 11 had three, 2 had four, and 1 had five. Table 2 shows the number of vignettes in each activity domain that received each quality code. As can be seen in the table, most interaction qualities occurred at a significantly higher rate (as assessed by chi-square tests) in some domains than in others. The seven qualities are briefly described below.

Helping. Helping was defined as actions or statements that were intended to enable or make it easier for another person to participate in or complete some activity or task or to solve a problem. It was by far the most prevalent of the seven qualities. As shown in table 2, Helping occurred frequently in all activity domains except Conversations and Brief Encounters and was most frequent in Constructive Play and Projects. In all but sevenof the 86 vignettes that received the Helping code, the direction of help was from adolescent to

TABLE 2

Number and Percentage of Vignettes, in Each Activity Domain, That Received Each Quality Code

QUALITY OF INTERACTION	DOMAIN OF ACTIVITY (%)						
	Formal Physical Games ($n = 24$)	Formal Nonphysical Games ($n = 35$)	Informal Play ($n = 30$)	Constructive Play and Projects ($n = 64$)	Conversations and Brief Encounters ($n = 43$)	Total, All Domains ($n = 196$)*	χ^2 and p-Value[†]
Helping	9	17	13	40	7	86	23.0
	37.5%	48.6%	43.3%	62.5%	16.3%	43.9%	$p < .0001$
Approving	2	1	2	18	14	37	19.4
	8.3%	2.9%	6.7%	28.1%	32.6%	18.9%	$p < .001$
Giving	0	1	1	10	5	17	9.2
	0%	2.9%	3.3%	15.6%	11.6%	8.7%	$p = .056$
Prosocial Intervention	2	3	3	7	4	19	.2
	8.3%	8.6%	10.0%	10.9%	9.3%	9.7%	$p = .994$
Conflict	8	15	0	11	7	41	21.5
	33.3%	42.9%	0%	17.2%	16.3%	20.9%	$p < .0005$
Game Variation	15	2	6	1	0	24	72.3
	62.5%	5.7%	20.0%	1.6%	0%	12.2%	$p < .0001$
Comedy	5	3	15	14	14	51	16.4
	20.8%	8.6%	50.0%	21.9%	32.6%	26.0%	$p < .005$

NOTE.—The percentages in each column (each activity domain) add up to more than 100 because any given vignette could be coded as having more than one quality. The n shown for each activity domain is the total number of vignettes, out of 196 total, that were coded as within that domain.

* This column shows the total number of vignettes that received each quality code. The number of different adolescents, and of different children, seen as taking direct part in the quality-defining interaction of each quality category is presented in the following list (along with, in parentheses, the range of the number of different vignettes in which each of these adolescents and children was seen within that category): Helping, 49 adolescents (1–9) and 55 children (1–9); Approving, 29 adolescents (1–4) and 25 children (1–5); Giving, 12 adolescents (1–5) and 15 children (1–6); Prosocial Intervention, 16 adolescents (1–4) and 24 children (1–3); Conflict, 23 adolescents (1–6) and 31 children (1–6); Comedy, 44 adolescents (1–7) and 33 children (1–6). The median number of vignettes in which a given adolescent or child was seen within each quality category was one, with the exception of children in the Helping category, where the median was two. Numbers were not calculated for the Game Variation category because some of the games involved very many adolescents and children and their names were not all recorded in the field notes.

[†] The χ^2 statistic and p value at the end of each row tests the null hypothesis that the true rate (percentage) of occurrence of that row's quality is the same for each of the five activity domains. For each χ^2, $df = 4$.

child. Further qualitative analysis revealed four partially distinct varieties of Helping, which we labeled as *informing/teaching/advising*, *managing*, *scaffolding*, and *task performance*. The first two categories are self-explanatory. We used the term *scaffolding* more narrowly than it is often used, to refer to implicit forms of help in which the helper modified his or her behavior in relation to another person in a manner that enabled the latter to continue an activity or complete a task that would be difficult or impossible for that person to continue or complete otherwise. Giving boosts and hints are examples of scaffolding. In contrast, *task performance* refers to cases in which the helper took over the full performance of a task or some portion of a task for the benefit of the one being helped. For example, an adolescent might read an announcement to a child who cannot read or fix a toy for a child who cannot fix it.

Approving. Approving was defined as statements or actions that communicate a positive evaluation of the other person or of something that the other person had done. As shown in table 2, it was most frequent in Conversations and Brief Encounters and in Constructive Play and Projects. In 33 of the 37 vignettes that received this code, approval went in the direction of adolescent to child (this included nine vignettes in which it went in both directions). Further qualitative analysis revealed three relatively distinct varieties of Approving, which we labeled as *expressing affection*, *praising*, and *validating*. *Validating* refers to cases in which an adolescent paid special attention to a child in a manner that clearly reflected approval, even though the approval was not directly stated.

Giving. Giving was defined as the voluntary presenting or lending of some material object that one owns to another person. It was relatively infrequent overall but occurred most often in Constructive Play and Projects (see table 2). In 11 of the 17 vignettes that received this code, the direction of giving was from adolescent to child. Two of the cases of adolescents giving to children involved the giving of food, and the rest involved the giving or lending of toys or other objects.

Prosocial Intervention. Prosocial Intervention was defined as statements or actions intended to alter the behavior of one or more other persons for beneficial purposes, such as maintaining order, minimizing danger, or reducing conflict. It occurred in about 10% of all vignettes and did not vary significantly in frequency across domains (see table 2). In 18 of the 19 vignettes that received this code, the person intervening was an adolescent.

Conflict. Conflict was defined as a condition in which one person's statements or actions appeared to frustrate, annoy, or induce anger in another person. It was found much more often in Nonphysical and Physical Formal Games than in other domains, and it was not found at all in Informal Play (see table 2). Of the 41 vignettes that received the Conflict code, 13 were cases in which the conflict lay merely in one person's (usually the adolescent's)

rejection or ignoring of a request made by another person (usually the child). The remaining 28 cases involved clearer expressions of annoyance or antagonism. In 17 of those 28, the direction of annoying activity was primarily from child to adolescent, and in 11 cases it was primarily from adolescent to child.

Game Variation. Game Variation was defined as alteration in the style of play or in the explicit or implicit rules of play, by the older and more competent players, for the apparent purpose of making an age-mixed game more interesting, enjoyable, or challenging for themselves. It was found in over 60% of Formal Physical Games and much less frequently in other varieties of play (see table 2).

Comedy. Comedy was defined as statements or actions designed to elicit laughter. It includes good-natured teasing, banter, and clowning. Comedy was found in 50% of the vignettes in the domain of Informal Play and also quite frequently in Conversations and Brief Encounters, Constructive Play and Projects, and Formal Physical Games (see table 2).

To interpret our results, it is useful to know not just the number of vignettes that received each quality code but also the number of different adolescents and children who were observed within each quality category of vignettes. Those numbers are given in a footnote to table 2. As can be seen there, a relatively large sample of students was observed in each category. For example, the 86 vignettes in the Helping category included 49 different adolescents and 55 different children. These numbers include only those who gave or received help and do not include students who were named in the vignette but did not participate directly in the helping interaction. The footnote also presents the median and range of the number of different vignettes within each quality category in which any given adolescent or child was observed as a participant.

The Initiators of Interactions

Where possible, the vignettes were coded for initiator by determining who (adolescent or child) first approached whom, or spoke first, for the purpose of play, engagement in some project, or conversation. Vignettes that lacked such information (usually because the observation began after the interaction began) were coded as indeterminable. The reliability for this coding was comparable to that for interaction qualities (Cohen's kappa was .887), and mismatches were resolved through discussion. In the end, 67 vignettes were coded as indeterminable, 70 were coded as adolescent initiated, and 62 as child initiated. A chi-square test, conducted just on those vignettes with a known initiator, revealed that the proportion of adolescent-initiated to child-initiated vignettes varied significantly as a function of activity domain ($\chi^2 = 9.6$, $df = 4$, $p = .048$). As

TABLE 3

Initiator of Adolescent-Child Interactions as a Function of the Domain of Activity

	DOMAIN OF ACTIVITY					
INITIATOR	Formal Physical Games ($n = 25$)*	Formal Nonphysical Games ($n = 36$)*	Informal Play ($n = 30$)	Constructive Play and Projects ($n = 64$)	Conversations and Brief Encounters ($n = 43$)*	Total, All Domains ($n = 199$)*
Adolescent	6	8	13	25	18	70
Child	2	19	6	22	13	62
Indeterminable	17	9	11	17	13	67

* The *n*'s here are not identical to those shown in table 2 because three of the vignettes—one in each of three different domains—were scored doubly, once as adolescent initiated and once as child initiated. This was done whenever a vignette contained more than one distinct adolescent-child interaction, at least one of which was initiated by an adolescent and one of which was initiated by a child.

can be seen in table 3, child initiation predominated in Formal Nonphysical Games, and adolescent initiation predominated in Informal Play.

A chi-square test was also conducted on a 2 × 7 contingency table of the frequencies of adolescent and child initiation of vignettes across each of the seven different quality codes, and this failed to reach the conventional level of significance ($\chi^2 = 10.2$, $df, = 6$, $p = .117$). Nevertheless, it is noteworthy that adolescents initiated interactions coded as Comedy more than twice as often as did children (23 instances compared to 11), and adolescents initiated interactions coded as Conflict only half as often as did children (11 instances compared to 22).

Sample Vignettes and Their Coding

To illustrate the form in which the vignettes were written, we offer the following two examples along with the codes that were subsequently applied to them. These samples are taken verbatim from JF's field notes, except that names have been changed and ages have been added in parentheses.

> *Sample 1.*   Hank (age 18) was sitting at the social room table when Jeff (age 8), Clint (age 11), and Marc (age 9) came by, and Jeff said, "Can we do it now?" Hank looked at him and said "Sure" and got up and followed the three boys to the upstairs dance room. After placing floor mats around the room, the four began wrestling, with Clint, Jeff, and Marc trying to tackle Hank. Hank was very careful when throwing them around and threw them according to their ability and size. Clint, the oldest of the three, got tossed the farthest; Jeff, the youngest, was tossed

the smallest distance. The little kids pretended to be professional wrestlers going after Hank, and at one point Hank wrestled from his knees. The younger kids would often complain of injury and then when Hank would go over to them, they would renew their attack with a vengeance. In addition, one time Hank, while lying on his back, threw Clint quite some ways by launching him over his own head with his feet. Clint liked it so much, and the others were so interested, that they stopped the wrestling activity while Hank "launched" everyone quite a few times.

This vignette was coded as follows: *domain*, Informal Play (subcategory play-fighting); *initiator*, child (because the three children approached Hank to initiate the action); *qualities*, Helping (subcategory scaffolding, because Hank varied his actions toward each child in ways that were suited to that child's ability and enabled the child to participate at a higher level than would be possible without Hank's involvement) and Game Variation (because Hank varied his style of play in ways that permitted him, not just the children, to enjoy the game and to stretch his own abilities).

> *Sample 2.* In the art room, Max (age 15) was applying the finishing touches to his sculpture (a clay sculpture shaped like a hand). While he was working, Beth (age 8) came up to him and held in front of him a concoction made of yarn and other things. Beth held her creation by one string and was swinging it back and forth when she asked Max how he liked her puppy toy. He thought she meant that she had made a puppy out of the cloth and said it was interesting. She then asked if he thought it would fall apart when her puppy played with it and he said, "Oh, it's a toy for your puppy. I think it's good." She went back to her seat and Laura (age 10) entered the room and asked Max the same question about a toy she had made. He said it was good.

This vignette was coded as follows: *domain*, constructive play and projects; *initiator*, child (because the two children each approached the adolescent, seeking his evaluation); *quality*, approving (subcategory praising).

Qualitative Results

Our organizing and coding of the vignettes provided a foundation for further qualitative analysis aimed at addressing the four questions listed in the introduction to this article. To address each question, we studied further and reorganized in various ways the vignettes whose domain and quality codes were most relevant to that question. In what follows, we present, for each of the four questions, the main generalizations that emerged from our analysis.

Adolescent Child Age Mixing

The generalizations are illustrated with examples of specific adolescent-child interactions. The examples are not verbatim quotations from the vignettes but, rather, are summaries that focus on the particular aspect of the vignette that is relevant to the generalization being exemplified. The names of students used in these examples are pseudonyms in every case.

What Drew Adolescents and Children Together?

To address the first question, we studied the vignettes in each activity domain with the aim of understanding the attractions that brought adolescents and children together in that domain. In our earlier qualitative study, we found that age mixing at the school was more frequent in active play and projects than in purely conversational contexts (Gray and Feldman 1997). The results of our present qualitative analysis are quite consistent with that finding. Although the vignettes cannot reveal the participants' motives directly, the behaviors and contexts of the behaviors provide a foundation for reasonable inferences. The adolescents and children that we observed appeared to be drawn to each other by (*a*) their common interests and attraction to each other's activities, (*b*) their common enjoyment of laughter and high-spirited play, and (*c*) their personal attraction to each other and complementary interests in nurturing and being nurtured.

Common interests and attraction to each other's activities. In many cases, children and adolescents found themselves side by side, interacting with one another, because a common interest brought them together at the place where that interest could be pursued. One such place was the school's art room, which contained equipment for various arts and crafts. In one typical art-room vignette, three adolescents (ages 15–18) and six young children (ages 7–9) sat around a table glazing ceramic objects that they had made, talking with one another as they worked. Likewise, common interests brought adolescents and children together in the computer room, the kitchen (where students could pursue their interests in cooking), the playroom (where some adolescents enjoyed making elaborate constructions with Legos), and the outdoor playgrounds.

In many cases, children were drawn to adolescents' activities that were more sophisticated than the activities that children engaged in with age-mates. This was particularly true in the domain of Formal Nonphysical Games, where (as shown in table 3) children initiated most of the interactions. Young children often approached adolescents who were playing board games or card games and then watched, asked questions, sometimes sat on the laps of the adolescent players, and sometimes were invited to join the game. Once playing, the children often needed help in learning and following the rules. Other ado-

lescent activities that attracted young children included musical performances, complex artistic endeavors, and complex constructive play. In one typical example, Scott (age 13) was making up and singing funny rap songs, with a golf club as a pretend microphone, while Noah (age 7) looked on laughing and giggling. At one point, Scott said, "Give me a beat." When Noah responded that he did not know what that meant, Scott explained and demonstrated the process. Noah then copied Scott's "beat" noises while Scott made up another rap.

Conversely, adolescents were often drawn to the joyful, relatively simple activities that children engaged in. For example, in one vignette, a 17-year-old boy stopped his art project for awhile to join a group of 8–12-year-olds who were making and flying paper airplanes nearby. In other cases, adolescents passing through the playroom stopped to engage themselves with young children playing with blocks or other toys, and adolescents passing by the outdoor playground joined young children on the swings and slide.

Certain games seemed to be particularly conducive to age mixing. The supreme example of such a game is four square, which has been the most popular outdoor game at Sudbury Valley throughout the school's history. The game is played on pavement, on a square court (approximately six meters on a side) divided into four smaller squares. At any given time, one player occupies each of the smaller squares while others wait their turn to enter. The person who occupies the "king square" serves the ball (usually a basketball) by hitting it into any other square. The player in whose square the ball bounces must hit it (with hands or any part of the body) into another square before it bounces a second time. A player who fails to accomplish this is out and must go to the end of the wait line, while other players move up one square in the direction of the king square. This game seems to lend itself to adolescent-child interaction, partly because anyone can enter and leave the game at any time (no invitation or planning is necessary), partly because the rules are simple and easily understood by everyone, partly because the game can be played in an essentially infinite variety of ways to accord with the needs and whims of almost any mix of players, and partly because it is rarely played competitively. Players attempt to improve their skill—for example, by practicing new ways of hitting the ball—but are generally not strongly motivated to get less skilled players out or to remain for a long time in the king's square. In an ethnographic study of four square conducted at another school, Hughes (1988) likewise found that players added implicit rules that made the game quite different from that prescribed by the formal, explicit rules.

In the realm of Nonphysical Formal Games, the most frequently age-mixed game that we observed was Magic, which was popular at the school at the time of our study. Magic is a fantasy game played with special cards, each of which represents a fantasy character with unique abilities or powers.

The outcome of the game depends not just on skill in playing the cards but also on the cards one owns. Everyone who owned a deck of Magic cards—regardless of age—was united by their shared interest in learning about the game, in examining each other's cards, and in trying to improve their own deck by trading cards. Most of the adolescent-child Magic interactions that we observed involved trading or attempting to trade cards, or discussing the relative merits of particular cards and combinations of cards, not the actual playing of the game.

Common enjoyment of teasing, chasing, laughing, romping, and silliness. Overall, the interactions between adolescents and young children were highly "playful" in the sense of the word meaning lighthearted and high-spirited. The serious and competitive aspects of play were reduced, and the joyful, spontaneous, creative aspects were enhanced when adolescents and younger children played together. Consistent with this is the high percentage of adolescent-child interactions that received the Comedy code, especially in the domain of Informal Play (see table 2). The fact (noted earlier) that two-thirds of the Comedy vignettes for which an initiator could be determined were initiated by adolescents suggests that adolescents especially enjoyed such high-spirited interactions.

Informal Play between adolescents and children commonly consisted of teasing, chasing, or mock fighting, often accompanied by squeals of laughter. In one vignette, for example, Noam (age 5) and Beth (age 15) were playfully calling each other "poopyhead" and other such names. Noam then started chasing Beth. When he caught her, Beth held him off with one hand while they both laughed. Similarly, Physical Formal Games were generally played in a lighthearted, noncompetitive manner when young children and adolescents participated together. For example, in an age-mixed game of capture the flag, one team, the Big People, consisted of three adolescents and one 11-year-old, and the other team, the Hordes, consisted of 10 4–8-year-olds and one 12-year-old. Larry (age 4) would often run across the line and get captured by Sam (age 17) in an act that included lots of tickling and carrying of Larry in mock combat. After Larry was set down, he would prance merrily back to his own side, without going to jail. Often one or more of the Big People would cross into the Hordes' territory not to go for the flag but simply to run around with a gang of small children chasing them. Nobody seemed to be much focused on winning, but when the Hordes did finally capture the flag, they cheered loudly.

In some cases, adolescents teased and joked with younger children in ways that were intellectual rather than physical. In one vignette, for example, Jack (age 17) was overheard explaining to Don (age 8) that the school was just an experiment and the adults were pretty sure that it did not work. Jack's smile gave his joke away, and Don smiled with him. In another vignette, Drew (age

15) was looking at the "weird" pictures that Nat (age 5) had drawn—of white blood cells battling with bacteria—and asked Nat if he was going to show them to his psychiatrist. Nat's laughter showed that he understood the joke and enjoyed Drew's attention to his pictures.

Mutual affection and the giving and receiving of care. Adolescents and children were attracted not only to each other's activities and styles of play but also to each other as persons. Affection was expressed both physically and verbally. The most common form of such expression was that of a young child sitting cozily on the lap of or snuggling next to an adolescent, while the latter read to the child or was engaged in some other activity. Adolescents and younger children were also seen to pat each other's backs and rub each other's heads in gestures that were simultaneously affectionate and playful. In one instance, 14-year-old Kelly enthusiastically volunteered to help a 6-year-old boy whose turn it was to empty the school's trash cans. Twice, as she passed through the kitchen with trash cans, Kelly was overheard saying to a staff member, "He's so cute!"

Young children often approached adolescents for help, advice, or approval, and most often the adolescents responded in ways that satisfied the child's needs or wishes. Adolescents were repeatedly observed reading to young children, helping them find lost objects, mending their broken playthings, advising them about how to use the school's judicial system, resolving squabbles among them, teaching them a wide variety of skills, and complimenting them on their creations. In most cases such aid and praise was given readily and cheerfully. The adolescents seemed to enjoy such exercises in maturity and nurturing as much as the children enjoyed the help and attention they received.

Contributions of Adolescent-Child Interactions to Physical Education

We turn now from consideration of the forces that drew adolescents and children together to consideration of the potential benefits of such interactions, beginning with benefits in the realm of physical education.

As noted earlier, adolescents and children often came together because of their shared enjoyment of vigorous physical play. Our analysis of the vignettes in the domains of Formal Physical Games and Informal Play revealed that adolescents often interacted with young children in ways that allowed the latter to exercise physical skills that they would not have been able to exercise alone or just with age-mates. Two 4-year-olds cannot play a game of catch; neither one can catch or throw well enough to keep the game going. But a 4-year-old can play catch with an adolescent. The adolescent can throw the ball gently, right into the young child's hands, and can leap and catch the child's wild throws. In such a game, the young child and adolescent can both

have fun and stretch their skills. By far the most common variety of help shown by adolescents to children in physical play was scaffolding, in which adolescents modified their style of play in ways that allowed younger children to participate and enjoy the game. Here are two typical examples:

> In a game of four square, the older players allowed Ernie (age 4) to catch and throw the ball, rather than hit it. Shawn (age 17) was particularly good at hitting the ball softly into Ernie's square so he could catch it.
>
> In an exuberant bout of "boffing" (fencing with soft padded swords), Sam (age 17) adjusted his movements to accord with the skills and style of each of his 6–10-year-old attackers, thereby presenting each with a challenge without overpowering any.

Such adjustments are probably integral to essentially all vigorous but cooperative physical play among people who differ greatly in size and skill. Scaffolding was not recorded in all of the vignettes of such play, but that omission may have occurred because it was so common that it was unremarkable and sometimes so subtle that it was unnoticed when the observer was not specifically looking for it. The adolescents modified their play not just in ways that helped the younger players but also in ways that made the game more fun and challenging for themselves. These modifications were what we coded as Game Variation. Here are two typical examples:

> In a four-square game with players ranging in age from 8 to 15, Yvette (age 15) played with only her feet, kicking the ball into an opponent's square rather than hitting it. Scott (age 13) would serve by bouncing the ball very high and hitting it with his forehead.
>
> Ed (age 15) was playing basketball with a group of 8–10-year-olds. He rarely shot, but spent much time dribbling while the gang of small boys who made up the opposing team tried to steal the ball from him. Then he would pass to his single teammate, Daryl (age 8), and encourage him to shoot.

When players differ widely in age and ability there is little point in trying to see who is best. The point, instead, is to enjoy the game. To do that, the game must be modified in ways that allow all players to improve their skills without overwhelming or hurting anyone. Game variation and scaffolding were in many cases two sides of the same coin. By dribbling and passing rather than shooting, a tall, skilled adolescent made a game of basketball more fun and challenging for himself as well as for his much shorter teammate and opponents. One cannot improve one's shooting skill much when nobody is tall enough to block shots, but dribbling through a horde of short people who

are scrambling for the ball is a great, fun way to improve one's dribbling. It is doubtful that the adolescents were consciously thinking about improving young children's skills or even their own skills as they played. Their game variations and scaffolding occurred naturally to keep the game going, to keep all players interested, and to have fun.

Contributions of Adolescent-Child Interactions to Intellectual Education

To address the question of contributions to intellectual education, we studied vignettes in all domains but especially those in the realms of Nonphysical Formal Games and Constructive Play and Projects, with a focus on the kinds of mutual problem solving and transfer of information that was occurring between adolescents and children. That study revealed many ways by which adolescents at the school seemed to contribute to children's intellectual development. They read to young children, thereby helping to foster an interest in reading. They accepted children into their games, which were intellectually more advanced than the children's games, and they helped children learn to play those games. They talked with children and advised them in ways that appeared to foster higher, more systematic ways of thinking. Their vocabulary and the ideas they expressed were more advanced than the children's but not too advanced for the children to understand. Such interactions probably contributed also to adolescents' intellectual development, in part by making them more conscious of their knowledge and more able to articulate their thoughts and ideas.

Scaffolding of intellect. Scaffolding occurred not just in physical play but also in mental problem solving, both inside and outside of play. In such cases the adolescent helped not by solving the problem for the child, nor by explaining exactly how to solve it, but rather by providing a hint or by modeling thought processes that allowed the child to solve it. Here are two examples:

> Alan (age 18) helped Bridget (age 5) find her lost shoes by asking her where she might have left them and where she had already looked.
> While trying, in play, to write the letters of the alphabet in order, Nancy (age 5) accepted hints from Brittany (age 14), who would sing the alphabet song up to but not including the sought-after next letter.

Such scaffolding probably does much more for the child than merely help solve the immediate problem. By jogging Bridget's memory, Alan implicitly demonstrated to Bridget a way by which she might jog her own memory in future searches for lost objects. By singing the alphabet song, Brittany not only provided Nancy with a clue as to what letter came next but also modeled

a means by which she (Nancy) could remember the order of letters in the future—she could sing the song. Brittany did not explicitly suggest that Nancy should adopt this procedure; she merely employed it herself in a way that was obvious to Nancy. Scaffolding also occurred in board games and card games, when adolescents gave general strategy hints, such as "think about what will happen if you make that move," or "remember what cards were played." In their interactions with adolescents, children seemed to be acquiring strategies for organizing and governing their own mental activities, which, according to some theories, is the key to intelligence (Sternberg 1986).

In Informal Play and Constructive Play, adolescents often added a degree of complexity to children's play that was not present before the adolescent joined. The helping in these vignettes was categorized as scaffolding as well as managing, because the structure raised the intellectual level of the play to one that was higher than would have been achieved by the children playing without the adolescents. Here are two examples:

> Rebecca (age 14) and two of her somewhat younger friends joined a group of eleven 4–8-year-olds who were playing on the slide. Rebecca made suggestions that modified the children's previously informal slide play. First she introduced a game in which the object was to get everyone on the slide at once, and then to all release at once, creating a huge pile-up at the bottom. Then she modified that into a game in which all the players had to line up in order of height and slide down in that order, so the biggest person would be at the bottom and the shortest person at the top of the pile-up.
>
> Nine 5–10-year-old girls, a reluctant 8-year-old boy (the groom), and Stephanie (age 12) were involved in an elaborate pretend wedding. Stephanie had been chosen to perform the ceremony, and she organized and directed all aspects of the play as the children dressed for, prepared for, and carried out the wedding. Among other things, she used her authority and persuasive power, out of game, to get the groom to come out from under the table and go through with the ceremony.

In the slide example, the children eagerly went along with Rebecca's directions, perhaps because the activities she proposed were similar to those they were already engaged in, but more organized and grand. The youngest children in this vignette would not have thought of sliding down by order of height (and, according to Piaget, could not have thought of it, lacking the concept of seriation), but they eagerly did so under Rebecca's guidance. They stood next to each other to compare height and then formed a line from shortest to tallest. In both examples, because of the managerial skills of an adolescent, the children found themselves in a more ordered and intellectually driven form of play than they would have been involved in otherwise—a form

that required mental activity to follow the rules or format suggested by the adolescent.

Informing/teaching/advising. The most obvious and frequently observed contributions made by adolescents to children's mental development came in the form of informing, teaching, and advising. This category of help generally differed from scaffolding in that it consisted of explicit verbal statements of how to solve a problem rather than hints or examples. Such help most often occurred naturally in the context of some ongoing interaction between the adolescent and child, and in such cases was distinguished from scaffolding only by the more explicit nature of the help. Such help was especially frequent in Formal Nonphysical Games, where adolescents were often observed teaching rules and strategy to children. In fact, games of strategy between an adolescent and child who differed markedly in ability seemed to be understood by both parties as teaching/learning opportunities. They were played not so much to see who would win as to offer the child an opportunity to learn and the adolescent an opportunity to explain the game and to enjoy the position of instructor. Here are two typical examples:

> Ed (age 15), an experienced chess player, was playing chess with Karen (age 10), a novice. Ed explained the rationale of each of his moves and described the advantages and disadvantages of moves that Karen might make.
>
> Bridget (age 7) watched Maggy (age 12) play solitaire. When Maggy finished, Bridget asked her how to play. Maggy set out the cards, explaining the rules, and helped the younger girl play a full game, occasionally pointing out where a card went.

Such help was also quite common in Constructive Play and Projects, and in Conversations, as illustrated by the following two examples:

> Marianne (age 18) and Stephanie (age 11) were trying to figure out how to string a bead loom in the art room. Marianne was quickest at this, and as she figured out each step she explained and demonstrated it to Stephanie.
>
> Ed (age 8) was talking with Arthur (age 14) about how two other boys (age 9 and 10) had been calling him names. Arthur told Eric that he should bring a complaint to the school's Judicial Committee. Eric then said, "They have freedom of speech." Arthur replied that freedom of speech meant that they had the right to say those things, but that Eric also had the right not to hear them. Eric said, "Okay."

In the great majority of cases, the informing, teaching, and advising recorded in these vignettes was sought out and eagerly accepted by the child. In contrast

to the situation in peer tutoring of subject matter in conventional school settings (Cazden et al. 1977), keeping the learner's attention was almost never a problem. The advice and teaching that adolescents provided seemed to be effective in part because it was rarely too much. The adolescents were not in any formal sense responsible for the younger children's learning. Whatever help they provided was voluntary, and it occurred almost always in response to some immediate need or request of the child. The help rarely seemed to be oriented toward improving the child but was oriented toward enabling some game or other enjoyable activity to continue or enabling the child to solve some immediate problem. The help nearly always pertained to something to which the child was already attending. Because the help was generally no more than what the child wanted, it did not disrupt the child's ongoing activity or sense of autonomy. A previous analysis of interactions among students in general at the school (not just between adolescents and children) revealed that unsolicited advice and instruction were rare and were commonly ignored when offered (Feldman 1997). In the present study, we found two clear examples of unwanted instruction given by an adolescent to a child. They are the following:

> Adam (age 14) asked Tim (age 9) if he could look at Tim's new box of Magic cards, and Tim reluctantly agreed. Adam sorted Tim's cards into two piles, one that Tim "should trade" and one that he "should keep." Tim appeared annoyed by the advice, and he mixed the cards back together as soon as he got them. Tim also ignored the unsolicited trading advice of another adolescent, Ed (age 16), but later gladly accepted Ed's advice about how to play the cards during a game of Magic that they played together.
>
> James (age 7) and Bob (age 8) were playing Magic. James, who was a novice at the game, often asked Amy (age 12), who was sitting near him, for advice about how to play. At one point, Adam (age 14), claiming that it was unfair that James was being helped and Bob wasn't, began to explain to Bob a complex move that he could make, but Bob ignored him.

"Help" that seemed to threaten the child's autonomy or undercut the child's initiative may have been perceived not as help but as an attempt to control.

Intellectual benefits to the adolescents. Just as the presence of adolescents seemed to broaden the range of activities that children engaged in, the presence of children seemed to broaden the range of activities that adolescents engaged in. Adolescents joined young children in high-spirited chase games and mock fights, in constructive play with blocks or crayons, and sometimes in elaborate games of make-believe. Such play seemed to foster adolescents' creativity. Even formal strategy games, such as cards or chess, seemed to be played in more

creative, lighthearted ways when adolescents played with young children than when they played only with other adolescents. In such age-mixed games, winning became relatively unimportant, and variations were invented to make the game more fun and challenging. In age-mixed chess, for example, the more skilled, older player might try out novel and risky plays, deliberately get into difficult situations, or play at lightning speed in order to make the game interesting and to stretch his or her own abilities (Feldman 1997).

The lighthearted, noncompetitive nature of adolescents' interactions with younger children would seem to provide ideal conditions for creativity, including creative problem solving. Researchers have found repeatedly that induction of a lighthearted mood tends to improve people's ability to think and act creatively (Ashby et al. 1999). Many of the school's graduates have gone on to careers in the arts and in other realms that require high creativity (Gray and Chanoff 1986; Greenberg and Sadofsky 1992), and we suspect that adolescents' involvement with children and with children's creative activities may help explain that fact.

In addition, the acts of teaching and advising children must have helped foster the adolescents' intellectual growth. Teaching is always an intellectual challenge. It requires that one put one's own sometimes implicit knowledge into words that another person can understand. It seems quite likely that the adolescents, in explaining games to children, in helping them solve problems, and in advising them in various ways, were at the same time developing further their own understanding.

Contributions of Adolescent-Child Interactions to Social and Moral Education

As illustrated in many of the examples already presented, play between adolescents and children commonly involved qualities of nurturance and leadership. Adolescents adjusted their physical play in ways that allowed their smaller, less skilled teammates and opponents to enjoy the game and play at peak ability. They taught rules and strategy in nonphysical formal games. They helped children find lost objects and solve other practical problems. They occasionally organized and managed the activities of children in complex sociodramatic play or in creating new playground games. They praised young children's accomplishments and expressed affection toward them. In these and other ways, adolescents, on their own initiative, seemed to be practicing behavioral styles that would make them good parents, caregivers, leaders, and managers. In a setting where everyone is the same age and at roughly the same level of development, they would have had much less opportunity for such practice.

To address further the question of contributions to social and moral education,

we focused particularly on those vignettes in each activity domain that were coded as containing qualities of Prosocial Intervention and/or Conflict.

Adolescents' interventions for prosocial ends. In addition to practicing skills that would be useful for their own social/moral development, the adolescents sometimes provided moral instruction to each other and to the younger children in the context of their age-mixed interactions. Of the 19 vignettes that were coded as Prosocial Intervention, 10 involved an adolescent defending or protecting a younger child (or set of younger children) from what were perceived as unfair or potentially hurtful actions stemming from another adolescent or child. Here are three typical examples:

> While Kelly (age 14) was reading to Robin (age 4), Amy (age 12) could be heard shouting an obscene word from across the room. Kelly responded, "Amy!" in an accusing tone. Amy then looked at Robin and said, "Oops, innocent ears," and changed her expletive to something much more innocuous.
>
> Randy (age 13) and Jerry (age 17) were playing Magic when Eric (age 9) came by and asked Randy if he wanted to trade Magic cards later. Randy responded gruffly, "Leave me alone." Jerry told Randy he was being a little touchy. Randy explained that Eric was always asking him to trade and had no cards that he (Randy) wanted. Jerry responded, "Deal with it." When Eric returned and again asked Randy to trade, Randy glanced at Jerry and said, almost politely, "I don't want to trade cards today."
>
> Sabrina (age 17) scolded Melinda (age 11) for failing to put away the dress-up clothes that had been left out by the group of younger children with whom Melinda had been playing. Melinda said that she wasn't responsible for the clothes because the other children, not she, had brought them out and worn them. Sabrina told her that it was still her responsibility because she (Melinda) knew the school rules and the younger children looked up to her as an example.

In general, such interventions appeared to be quite effective. Those who were rebuked typically responded positively, as if the rebukes were reminders of how they preferred to behave. The remaining nine vignettes in this category generally involved adolescents intervening in children's activities that seemed potentially dangerous or that violated a school rule. An example is the following:

> John (age 5) and Marshall (age 7) were rolling around on the floor in a serious fight. They didn't stop when Jeremy (age 14) told them they would be brought up if they kept fighting, so Jeremy physically broke up the fight by picking John up and holding him.

Although Prosocial Intervention was less frequent than Helping and Ap-

proving, the instances of it that we observed seemed to be quite important both to the school's operation and to children's development. Adolescents were clearly helping to maintain order in the school and good relationships among the younger students, and in doing so they were imparting moral lessons. The fact that the adolescents were not authority figures—at least not to the degree that adult staff members were—may have made their moral suasions all the more effective. Children at the school clearly looked up to the adolescents. They often watched adolescents' activities intensely, asked questions of adolescents about those activities, and sought praise and approval of adolescents concerning their own activities. It seems likely that through such attentiveness children were gaining ideas about the next stage in their own lives.

Conflicts between adolescents and children.   The interactions between adolescents and children were not always harmonious. In addition to intervening in conflicts among children, adolescents had to learn to cope with the often-annoying behaviors of children directed toward them. As noted earlier, 28 of our vignettes contained some clear expression of annoyance or antagonism between an adolescent and a child. They fell predominantly in the domains of Formal Physical Games and Formal Nonphysical Games (18 of the 28 occurred in these domains). In 17 of these vignettes the direction of annoying activity was primarily from child to adolescent. In most of these cases, the annoyance did not appear to be deliberate but, rather, seemed to lie in the child's thoughtlessness or lack of competence. A typical example is the following:

> Don (age 8) was disturbing Ed (age 15) by leaning against him as he (Ed) was immersed in a chess game. Ed asked Don to stop, but after a short break Don continued. Ed said he would bring Don up [to the school's Judicial Committee] if Don didn't stop. Don then moved away and stayed away.

In most such cases the annoyance was terminated just by asking the child to stop or by threatening some sanction, or it was simply tolerated. In a very few cases the annoyance appeared to be deliberate and repeated, and in some of these cases physical action was taken, such as elbowing the child out of the way or carrying the child out of the room—as in the following example:

> Andre (age 8) was one of several children watching a group of teenage boys playing a computer game. At one point he grabbed the ball from the computer's mouse and began to play with it. Mitch (age 15) made him put it back, but Andre grabbed it again. The third time Andre tried to grab it, Greg (age 13) pulled him out of the room.

In 11 vignettes the direction of annoying activity was primarily from adolescent to child. Five of these involved the game of four square, which is the

one setting in the school where overt bullying of younger children by adolescents was repeatedly observed and seemed, in some ways, to be socially sanctioned. In particular, a group of older boys, ages 15–18, would deliberately and ostentatiously dominate younger boys, mostly ages 8–11, who attempted to join their game. Their tactics included positioning their body between the ball and the younger child to prevent a return, hitting the ball hard right at the child, slamming the ball in such a way as to make the younger child run a long way to retrieve it, and cheating obviously on line calls. This deliberate picking on younger boys seemed to be a game in and of itself—apparently for both parties. The teenagers bragged of instilling "fear" in the younger boys, and the younger boys complained bitterly but kept returning for more and refused all suggestions that they might make their own court and play separately to avoid such torment. Others have reported on this sort of phenomenon in settings where it apparently occurs to greater extremes than at Sudbury Valley School. Based on their multinational study of children's behavior, Whiting and Edwards (1988, pp. 233–34) wrote: "Young boys seek interactions with older boys more frequently than young girls seek interactions with older girls. In interacting with older boys, the younger boys are usually dominated, told what to do, and sometimes physically teased."

The other six cases of adolescents annoying younger children were scattered across various activities and generally involved unwanted but relatively innocuous teasing or unkind criticisms. Some of these cases were resolved by another adolescent stepping in on behalf of the younger child, and these were coded as Prosocial Intervention as well as Conflict.

That adolescents were not always benign toward young children may have even added in some ways to the benefits the latter experienced. The adolescents were not in any official sense caregivers at the school. They spent their days in their own chosen way, with their own chosen self-interests and occasional mischief. Their unpredictability may well have contributed to the interest that children found in them and made all the more meaningful and believable the kind attention that the adolescents often paid to them.

Conclusions and Limitations

Our observations at a democratically organized alternative school revealed that adolescents and younger children interacted frequently with one another. Overall, such interactions were initiated as often by adolescents as by children. A number of forces seemed to bring adolescents and children together. Their shared interests brought them together in such settings as the art room, computer room, playroom, and kitchen, and in those settings their close proximity led them to interact with one another. In addition, children were often attracted

to the more sophisticated activities of adolescents, such as their formal games, and adolescents were often attracted to children's more informal activities, such as playing with blocks or on playground equipment. Their shared enjoyment of chase games, mock fighting, and other high-spirited and comedic play also brought them together. In addition, personal attractions to each other as individuals brought them together, as did the adolescents' needs and desires to nurture and the children's needs and desires to be nurtured.

With adolescents, children often behaved in ways that were more advanced than the ways in which they could have behaved by themselves or with same-age peers. In other words, to use Vygotsky's term, interactions with adolescents often led children to act within their zones of proximal development. Such interactions appeared to be educationally beneficial to the adolescents as well as to the children.

Contributions of Age Mixing to Physical, Intellectual, and Social/Moral Education

Adolescents contributed to children's physical education by playing formal and informal physical games with children that the latter would not have been able to play—or play as well—with age-mates alone. Adolescents adjusted their play toward children so as to challenge but not overwhelm each child's physical abilities. At the same time, adolescents modified the rules and their own goals within such games so as to make the games challenging and enjoyable for themselves. Adolescents defending themselves in mock fights from hordes of small attackers, or dribbling basketballs through gangs of small defenders, or playing four square with their feet rather than hands, were surely stretching their own physical abilities as well as those of the children with whom they were playing.

Adolescents contributed to children's intellectual education by modeling such activities as reading and relatively advanced ways of thinking and talking, by teaching children how to play games that require attention and planning, and by providing hints and strategies for solving problems that left children in control of the problem-solving process. In formal games, adolescents provided the structure and managerial skills that allowed children to play and to control their own thoughts to accord with the game's rules. Adolescents also sometimes added a degree of structure to children's informal play that made such play more exciting and intellectually challenging than it would have been had the children played just with age-mates. In advising and teaching children, adolescents were undoubtedly consolidating and explicating to themselves their own knowledge and understanding. In addition, the presence of children appeared to contribute to adolescents' development of creativity by stimulating them to engage in constructive and artistic forms of play, such as with blocks

or crayons, and to play games in lighthearted, creative, relatively noncompetitive ways.

Adolescents contributed to children's social and moral education by helping to enforce the school's rules, by suggesting ways of resolving conflicts, by intervening when children's activities became disruptive or dangerous, and sometimes by articulating moral reasons for behaving in one way versus another. Conversely, the presence of children contributed to adolescents' social and moral development by providing them with opportunities to nurture, lead, and think consciously about their responsibilities to other people. By taking leadership roles in play with children, adolescents were practicing the subtle art of management without undercutting the younger players' sense of autonomy. By enforcing school rules and helping to maintain order and safety, adolescents were developing a sense of responsibility toward the community at large. The age-mixed community of the school provided a setting, similar to that of the larger community, in which people with a wide range of interests, dispositions, and abilities must find ways to get along with one another.

Noddings (1992) has argued that caring is fundamental to education—that people learn most from one another when they are in caring, trusting relationships. According to her analysis, children learn to care and accept care through (*a*) modeling (witnessing and experiencing the care provided by others), (*b*) dialogue (discussions that truly connect the participants in personal ways), (*c*) practice (which requires the opportunity to care for others), and (*d*) confirmation (in which the child's attention is drawn to his or her better self). In our observations of adolescent-child interactions at the school, we witnessed many instances of such care-learning opportunities.

Although we did not attend to children's interactions with adults in this study, our observations are consistent with the idea that in certain respects, and under some conditions, adolescents may be even more effective than adults as models, teachers, and guides to young children. Adolescence, not adulthood, is the next stage of development for children, and for this reason children may be more interested in adolescents than in adults and more motivated to learn from them. Adolescents' interests, activities, and ways of thinking are closer to children's interests, activities, and ways of thinking than are those of adults, and so the potential for prolonged, natural, mutually enjoyable interaction between adolescents and children may be greater than that between adults and children. Play is a particularly potent force for learning, and adolescents have much more capacity for prolonged play with children than do adults. Adolescents are generally less inclined than adults to see themselves as responsible for the long-term development of children, and for this reason adolescents' teaching and help centers more on keeping enjoyable activities going and solving immediate problems than on "improving" the child for the long term. Because such teaching pertains to the child's im-

mediate, concrete interests and needs, keeping the child's attention and motivation is almost never a problem. In our observations, adolescents rarely attempted to teach or explain more than the child wanted to hear, and the help that was offered occurred almost always in ways that left the child in control of his or her own thought processes and actions. Because adolescents lacked any official authority over the children, the children could always walk away from interactions that failed to interest or please them.

Of course, none of this discussion is meant to deny the importance of adult care and guidance, which are generally associated with a heightened, long-term sense of responsibility and concern for the child's future. For the purposes of this study, we ignored interactions between students and staff at the school, but it is worth pointing out that the adult staff play many vital roles. Sudbury Valley provides no refutation of Golding's *Lord of the Flies* thesis. Adults founded the school, established its democratic ethos and structures, and work continuously to maintain all aspects of the school environment. In addition, the staff are in many ways like uncles and aunts to the students. They get to know the students well, take pride in their growth and development, provide comfort when it is needed, serve in many ways as models (perhaps especially for the adolescents), provide bridges between the school and potential careers and higher education, and continue to keep in touch with former students even after they graduate.

Limitations of the Study

Consistent with the grounded theory approach to qualitative analysis, the codes used to catalog the qualities of the adolescent-child interactions were developed after the data were collected, as part of the analysis. The field notes were taken without an a priori list of qualities in mind. The aim of the notes was to describe each interaction holistically—to portray it in its own right. In order for a particular vignette to be coded as having a particular quality, that quality had to be present not just in the original interaction but also in the notes concerning that interaction—notes that were made before the list of qualities was developed. It is highly likely, therefore, that our analysis underestimates the actual frequency of some if not all of the coded qualities. We suspect that this is particularly true for the variety of help that we labeled as scaffolding, which is often so much a part of the natural flow of activity that it does not draw attention unless one is specifically looking for it.

The quantitative aspect of the present study is also limited by the fact that the interactions observed were not a random selection of all that occurred at the school but, rather, were a selection based on such factors as ease of observation and the desire to include as many different students and different

activities as reasonably possible. In addition, because many students were seen in more than one vignette, the observations were not strictly independent of one another. The study was designed to identify and describe the commonly occurring qualities of interactions between adolescents and children, not to quantify precisely the frequency of each quality.

The qualities of the interactions that we observed are no doubt affected by unique characteristics of the Sudbury Valley School. Because of the school's democratic ethos and mode of operation, the students tend to place high value on such principles as free association, tolerance, respect for individual differences, rule of law, individual responsibility, and democratic decision making. The supportiveness of students for each other may be further enhanced by their shared identity as people who have chosen to attend such an unusual school. Moreover, the school's democratic judicial system certainly affects people's behavior. Students who feel harassed or in other ways put upon by the actions of others can bring their complaints to the Judicial Committee, where they will be heard by committee members who represent the entire age spectrum of school members. With this structure there is much peer pressure to get along with each other in peaceful ways.

Our study is not one of adolescent-child interactions in typical settings in our culture. Rather, it is a study of such interactions in a setting that seems almost ideally constructed to allow them to occur without interference. The study may tell us more about human potential than about typical behavior in Western culture. We suspect, however, that mutually beneficial interactions between adolescents and young children, like those described in this article, occur more frequently in the larger culture than is generally recognized, despite the obstacles imposed by age-graded schools and other institutionalized forms of age segregation. As far as we can tell, ours is the first research study to focus specifically on the qualities of self-chosen interactions between children and adolescents. We hope that the study will help stimulate further research on such interactions in a variety of settings and will help to prompt educators and other child care specialists to work to develop safe ways to bring adolescents and children together more frequently both inside and outside of school.

Notes

1. There is one exception to the statement that SVS students are not formally evaluated. Students who wish to obtain a high school diploma from the school must present in writing, and defend orally, the thesis that they have used the school to

prepare themselves for responsible adult life outside of the school. The thesis is then voted up or down by the school's Assembly, a body consisting of students, staff, and the parents of SVS students.

2. As part of our systematic survey of the literature, we examined every issue of the two leading journals of developmental psychology—*Child Development* and *Developmental Psychology*—published during the decade from 1990 to 2000. During that period these journals published 234 studies addressing young people's interactions with peers who differed in age by less than 24 months, but only four studies of young people's interactions with others (excluding adults) who were more than 24 months younger or older than themselves, and no studies at all of interactions across the gap between childhood and adolescence. Similarly, our search through journals of education, journals of adolescent psychology, and social science databases turned up almost no empirical research focusing on child-adolescent interactions. The only exceptions were an article that we ourselves had published and an article on the tutoring of first graders by eighth graders (Gorrell and Keel 1986).

3. A more detailed description of the coding and analytic methods used for this study can be found in an unpublished manuscript available from the authors.

4. Of the 35 vignettes in the domain of Formal Nonphysical Games, 17 involved adolescents and children playing the game with each other, 6 involved adolescents playing while interacting with a child who was watching or interrupting, 5 involved children playing while one or more adolescents watched and offered advice or instruction, and 7 involved interactions about the game in which neither party was actually playing it.

5. In 23 of the 64 vignettes in the domain of Constructive Play and Projects, adolescents and children worked together on a shared project. In 11 vignettes they worked in parallel on similar projects while talking with each other about their projects. In another 24 vignettes (including all but one of the practical problem vignettes), the projects were conducted primarily by children while adolescents commented, advised, or helped. In the remaining six vignettes, the projects were conducted primarily or solely by adolescents while children asked questions or were otherwise engaged in the project.

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