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WHY BLACK ENGLISH DOESN'T ADD UP

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TWICE AS LESS Black English and the Performance of Black Students in Mathematics and Science. By Eleanor Wilson Orr. 240 pp. New York: W. W. Norton & Company. \$15.95.

A change is coming to mathematics classrooms around the country. Inspired in part by the research of cognitive scientists on problem solving, some teachers have discovered that paying attention to words can help students learn to cope with numbers. At the Hawthorne School, an independent coeducational high school that was founded in Washington in 1956 and closed in 1982, first-year algebra students began with word problems before they learned anything about solving equations. The mathematics department wanted students "to experience words as tools with which they can think."

Founded by teachers who believed the purpose of private schools is to promote the experimentation and innovation their size and independence allow, Hawthorne in 1972 entered into an arrangement with the Board of Education of the District of Columbia, an agreement that brought students from public schools to Hawthorne for tuition-free schooling in grades nine through twelve. Over a nine-year period 320 students, 98 percent of them black, transferred to Hawthorne. Though the school had always been integrated, the transfer students made Hawthorne's student body more representative of the city's population, and the faculty looked forward to working with a more diverse student body. Teachers quickly discovered, however, that the support they were accustomed to providing for students with fewer skills was not adequate to the challenge posed by the transfer students. Within two years, these students had failed 87 percent of the math and science courses in which they were enrolled. Eleanor Wilson Orr, a founder of Hawthorne and a math and science teacher there, describes in her book, "Twice as Less," the work of those students and her attempt to trace how differences between black English vernacular (the first language of the transfer students) and standard English affect a student's concepts of quantitative relationships.

"In fact, I didn't even know there was something called Black English when I [first] began to realize that many of the difficulties my students were having were rooted in language," Mrs. Orr writes in the foreword to "Twice as Less." The book describes the approach that teachers at Hawthorne developed to correct the problem they had identified.

Math teachers know that students often garble the sense of quantitative expressions such as "less than" and "divided by" (40 divided by 5 is the same as 5 divided into 40, but different from 5 divided by 40). Linda, a Hawthorne student discussing a word problem in an algebra class, writes,

"The fathers present age divided into five equals the son present age in x years [because] the father is five times older than his son." Mrs. Orr suggests that much of what students are actually thinking can be masked by a teacher's assumption that one knows what a student means in spite of the way he or she says it:

"In a chemistry class a student stated that if the pressure was doubled with the temperature remaining constant, the volume of a gas would be half more than it was. When I asked her if she meant that the volume would get larger, she said, 'No, smaller.' When I then explained that half more than would mean larger, one and a half times larger, indicating the increase with my hands, she said she meant twice and with her hands indicated a decrease. When I then said, 'But twice means larger, two times larger,' again indicating the increase with my hands, she said, 'I guess I mean half less than. It always confuses me.'" The book traces the functions of prepositions, conjunctions and relative pronouns in expressing quantitative ideas, noting that often the use of these forms in black English vernacular is not the same as in standard English. Mrs. Orr argues that "the students' in-school nonstandard uses are not, as some would have it, simply 'bad English,' but rather are characteristic of their out-of-school language, which has a history and a grammar of its own." She shows that such usages are not isolated or idiosyncratic, that they appear in the work of numbers of students who attended Hawthorne in different years. "The car traveling twice as fast would take twice as less hours to cover each mile," more than one student asserted as Hawthorne teachers worked to help them acquire the verbal tools needed to make sense of quantitative relationships.

According to Mrs. Orr, the problem is correctable if schools are willing to amend certain course requirements without lowering standards and expectations. At Hawthorne, students with inadequate skills were required to take a course designed to develop the habit of thinking as a substitute for the habit of rote learning. Moreover, geometry and algebra courses emphasized explaining in words the concepts and relationships of mathematics rather than memorizing steps to solve specific examples. The emphasis on the use of language was then carried over into science courses that combined classroom observation with study of the writings of scientists who made significant discoveries, so that students could "experience both what it is to know exactly what someone else's works are saying and the power of language as an instrument with which one can reason beyond the observable." "Twice as Less" offers fine examples of the work of students who completed the new sequence of courses at Hawthorne. Particularly useful for teachers is the comparison of early and later writing of some of these college-bound students.

As Mrs. Orr admits, the work needed by such students is unconventional and therefore likely to incur objections from those who think only of test scores and college entrance requirements. Nor is the final verdict in on black English vernacular and the debate on the relationship between language and thought. Though Mrs. Orr refers to some of the controversy of the last 20 years over the matter of black English, she avoids entangling herself in those arguments and comes out squarely on the side of linguists who have identified features of black English that can interfere with a child's progress in school. This effort, which identifies specific features of the language that interfere with a student's learning mathematics and science, should prove useful to researchers and practitioners as well as to a general public that must face the continuing failure of schools to reach

and teach black students.

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