

AFTER THE DINOSAURS: CHILDREN'S CHRONOLOGICAL THINKING

Matthew T. Downey
University of California, Berkeley

The recent movement for curriculum reform in the United States has helped focus attention on historical learning in the elementary grades. Several state history-social science frameworks and national commission reports have called for more history instruction in the elementary grades and for introducing history materials in lower grades than before. The state of Florida now recommends the teaching of Medieval history in Grade 3, which is three or four years earlier than this historical period has traditionally been introduced. The reform proposals raise questions about the ability of children in the elementary grades to benefit from history instruction. Are the new frameworks introducing history at an appropriate age? More critically, do developmental factors, such as children's understanding of historical time, place age constraints on historical learning?

There is a small, but important, body of literature about the development of children's understanding of historical time. Most of the early work was done by British and American psychologists who were only incidentally concerned about historical time. They were primarily interested in the development of children's notions of psychological and conventional or clock time, although some of their tests

This paper was presented at the annual meeting of the American Educational Research Association, New Orleans, April 7, 1994.

included items or subsets related to historical time (Oakden and Sturt, 1922; Ames, 1946; Bradley, 1947; Springer, 1952; Jahoda, 1962). Only in recent years have researchers focused their attention primarily on the development of children's sense of historical time. This research, for the most part, is the work of educators rather than psychologists (Poster, 1973; Levstik and Pappas, 1987; Thornton and Vukelich, 1988).

The early research by psychologists tended to emphasize the developmental constraints on children's understanding of historical time. It indicated that children do not begin to understand historical time until about age five. Before then, time and space are said to be confounded in a child's mind, with the past being a mixture of isolated fact and fancy grouped under the single category of "yesterday." After that age, Jahoda (1962) notes in his review of this literature, children gradually begin to order historical time into earlier and later events and acquire the ability to use dates. By age 9, British children could understand that Robin Hood lived before their grandmother's time and by age 10-11 could arrange a series of dates in correct order. However, only after age 11 could children differentiate between various historical periods. Some researchers placed the full understanding of chronology even later, with at least one study that suggests "that full understanding of time words and dates is not reached until sixteen" (p. 97).

The difficulty that young children had understanding historical time may have reflected in part the criteria the psychologists used to measure it. Much of this early research focused on children's ability to use dates and time terminology correctly. Oakden and Sturt (1922) set out to trace, among other abilities, "the

growth of that sense of time which gives us the power to think in dates” (p. 3100. Was the year 58 B.C. three years after or before the year 55 B.C.? Was Robin Hood, “who lived in 1187,” alive when the child’s mother or grandmother was alive or before then? The researchers designed the question so that the most important clue was the date assigned to Robin Hood. Bradley (1947), as well as Oakden and Sturt, used tests in which children had to arrange a series of three dates in chronological order. Young children found questions involving dates difficult.

Some of the early research also confounded historical time with other kinds of understandings. Both Oakden and Sturt (1922) and Bradley (1947) based their conclusions partly on children’s ability to detect historical absurdities. Oakden and Sturt’s test included the following passages, in which the italicized words represented absurdities that the children were supposed to identify.

In 55 B.C. Julius Caesar arrived with his troops at Dover.... The next day, Wednesday, the *30th February*, the Romans caught a British prisoner.... At dawn [Caesar] offered a sacrifice. Taking off his *top-hat* he stood before the Altar and prayed ‘*O, Lord Jesus*, may this day, *Friday*, by others regarded as unlucky, prove fortunate to us.’ The Romans won a great victory due to their superiority in *gun fire*. The British chieftain was taken prisoner and shown in Caesar’s triumphal procession three years later, in *58 B. C.*. *His grandson is still living in a remote corner of Scotland (p. 319).*

To respond correctly, students needed historical knowledge, including knowledge about the history of Christianity, an understanding of the B.C.-A.D. dating system,

and calendar knowledge, as well as an understanding of historical time. Young children were less likely to have acquired the necessary understandings than their older counterparts.

The more recent research by educators tends to be less concerned about dates and time systems and more interested in how children think historically. It focuses on children's understanding of broad time categories, an avenue of inquiry first explored by Friedman (1943-1944). He devised a test that asked children to place a set of events in one of the following categories: "a long time ago" "a short time ago," "a short time to come," and "a long time to come." Children in grades 4 to 6 (about ages 9 to 11) consistently placed George Washington, the Pilgrims, and Bible times in the category "a long time ago." Levstik and Pappas (1987) found that students in grade 2 were able to use such broad time categories as "long ago" and "before a long time ago," with students in grades 4 and 6 able to make still finer distinctions. "Sixth graders used 'the past' and 'long ago' as categorical headings and then provided specific instances such as 'the time of empires like the Incas or the American Revolution' (p. 8). Vukelich and Thornton (1990) suggest that there is a developmental progression in which children 6-to-8-years old commonly use general time references ("long ago" and "way back when"), 9-to-11 year olds identify time periods ("the era of the industrial revolution") and 12-to-14-year olds more precise terms ("decade, century") (p. 23).

The constraints placed on historical learning by developmental factors vary depending upon how one defines and measures children's understanding of historical time. Psychologists have tended to define it in terms of an understanding

of dates and formal time systems. Educational researchers have focused on children's understanding of concepts of historical time. Not surprisingly, they have reached quite different conclusions about developmental constraints. The implications for history instruction of the psychologists' research were summed up in Bradley's conclusion that "the capacity to understand the conventional time-scheme and to use particular time-words correctly is later in developing than is usually believed, and this is of major significance, particularly in relation to the teaching of history" (p. 77). The more recent findings that children can understand general time concepts at an early age obviously have more optimistic implications for historical learning in the lower grades. Are there still other dimensions of children's understanding of historical time that have not yet been considered that also have developmental implications? What about children's understanding of chronology?

Children's grasp of chronology is surely one aspect of their understanding of historical time that deserves consideration. When we think about history, Jahoda (1962) noted, "we associate it with dates and chronological sequence." But, he hastened to add, the two are not synonymous. Past events can be organized subjectively "without reference to the conventional time scale, but merely by the feeling that one particular event seems longer ago than another" (p. 93). Similarly, Oakden and Sturt (1922) concluded that children may have responded correctly to their Robin Hood question because his name "suggested a period remote from ordinary experience" and not because they "had any real understanding of a chronological [i.e., date-oriented] system" (p. 316). Our modern-day concern about

the precise dating of events was not shared by the historians of ancient Greece. Neither Herodotus nor Thucydides, although fond of quoting facts and figures, made practically no references to dates" (Jahoda, p. 95). That is, events can be organized chronologically without reference to dates.

An understanding of chronology may be more basic to historical thinking than knowledge of dates and historical time concepts. Both Godin (1959) and Jahoda (1962) assumed that knowledge of appropriate time terminology "precedes the child's grasp of time relationships" (Jahoda, p. 100). The reverse is more likely true. Historical understanding, as Giles and Neal have written, begins with "a sense of period and a grasp of chronological sequence, however imperfect and limited. Knowledge and a grasp of chronology are by no means synonymous with historical sense.... However, it has yet to be demonstrated that a historical sense can be acquired without them" (quoted in Lello, 1980, p. 347). It is arguable that time concepts only make sense within the context of chronological thinking.

Considering the importance of chronology to a sense of historical time, it is surprising that so little research has been done on children's chronological thinking. One such study was conducted by McAulay (1961), who interviewed 165 second-grade students to see if they could understand time relationships involving themselves, their family, their school and community, George Washington, Abraham Lincoln, pioneers, and Indians. The children had a better understanding of historical chronology than they did of more immediate temporal relationships. McAulay concluded that 'the social studies curriculum for the second grade underestimates the child's understanding of time. Perhaps the seven year old is able to comprehend

large events of the past as they relate to the present; he is capable of associating historical persons one to the other, and retain some information concerning each event and person. The child would seem to have little comprehension of time as it relates to the immediate family and community.” He thought it ironic that “it is about the family and community the second grade social studies curriculum revolves” (p. 312).

Using a different approach, West (1978) investigated children’s ideas of chronological sequence with picture cards. Children were asked to arrange 10 picture cards in chronological order. Among the items were pictures of dinosaurs, cavemen, Tutankhamen, Roman Legionnaires, a medieval castle, Guy Fawkes, and a stage coach. An average of 30 percent of the 7-year olds were able to do this correctly. At age 8, after a year of history instruction, 50 percent of the students could make the correct arrangement. In both studies, the children demonstrated a grasp of chronological relationships without reference to dates and without using time concepts.

METHOD OF THIS STUDY

The research reported in this paper represents a further exploration of children’s understanding of chronology. The research was conducted in a third-grade classroom and a fourth-grade classroom as part of the Writing to Learn History Project at the University of California, Berkeley. The schools were located in two large cities in the San Francisco Bay area. The third-grade classroom was in a school in a working-class neighborhood, with a racially and ethnically heterogeneous student population. The fourth-grade school was located in a

middle-class neighborhood with a predominantly white population. In each classroom, a representative cross-section of the students was selected as the research subjects. Each classroom had approximately thirty students. Thirteen students were selected in the third-grade classroom; sixteen in the fourth-grade class.

The data reported in this paper was collected in a series of student interviews. The initial interviews in the third-grade classroom were conducted early in October for the purpose of collecting baseline data. These were followed later that month by interviews that focused specifically on the students' historical knowledge. A final interview was conducted in April. The data for the fourth-grade students was collected during interviews conducted the following September. During this time, the project also collected data in the form of student writings, although that data is not relevant to this report.

An investigation of the students' grasp of chronology was not part of the original research design. The project was primarily concerned about how writing activities might be used to foster historical thinking and understanding. The initial findings about the students' sense of chronological order came almost by accident during interviews early in the fall that were designed to establish baseline data for the larger project. Data about chronological thinking was not collected systematically until the second year of the project, with fourth-grade students as the research subjects.

THIRD-GRADE STUDENT INTERVIEWS

The baseline interviews for the third-grade students included questions designed to assess their historical understanding and knowledge of California Indians, which was the project's content focus that year. The concluding question was "what other things do you know about that happened in the past?" As the students had not yet received any formal instruction in history, this researcher assumed that they knew very little about the past. Surprised by their responses, he allocated additional time during these and subsequent interviews to map the third-grade students' landscape of historical knowledge. For fear of imposing upon them knowledge not of their own creation, he did not initially ask questions that included names or events. However, midway through the baseline interviews, a checklist had taken shape based on the student-generated words. Subsequently, the first students were re-interviewed to make sure that all had been asked about all the items on the list. Still other items were added to the checklist for the final interview the following spring to probe for knowledge of topics that had not emerged spontaneously.

By the time they had reached the third grade, the students had accumulated a small but worthwhile stock of historical knowledge. All thirteen students knew about Columbus, George Washington, and Abraham Lincoln. Nearly all could identify Pilgrims and cowboys, and knew that white Americans had enslaved African Americans. Several could identify Davy Crocket. Two or more students could identify the Vikings, the Gold Rush, the American Revolution, and the United States Constitution. When questioned about how they had acquired this information, the

students mentioned several sources. They know about Columbus, the Pilgrims, and the two Presidents through exposure to “holiday history” during holiday observances during their -3 school years. Their knowledge of Indians came from being exposed to American popular culture. For example, several of the students had recently watched *Dancing With Wolves*, a movie about Plains Indians that had just been released as a home video. Others had been introduced to various historical topics by stories read to them by their parents and grandparents or through family outings to museums and historical sites.

During the course of the interviews, some of the students were asked questions about chronological sequence. These questions emerged spontaneously, as it was not assumed in the beginning that third-grade students had a grasp of chronology. However, during a discussion about Indians and dinosaurs, James had explained that Indians were not alive during dinosaur times because the cave men came between the two.

“I think they [the dinosaurs] died, and then the cave men came, because they were not like the Indians because they did not know how to make boats....”

“Do you think the cavemen lived around dinosaur times?” I asked.

“Uhh...no because...dinosaurs ain’t like humans because they have teeth, but not that sharp of teeth....”

“How about after the cave men?”

“I think after the cave men came Indians....”

“After the cavemen came the Indians. What happened next? Anybody come after the Indians?” I asked.

“Probably we did. Because if they were so smart, we came and...until things get smarter and smarter until we have computers to help us these days, and jobs, ah, wood cabinets, and stuff.”

“Tell me about the people who came after the Indians.”

“The dinosaurs came and then the Indians [forgetting about the cavemen]... After the Indians had died, God made more of us, just put 1,000 on the earth...”

While it was not surprising that James knew about dinosaurs, cavemen and Indians, his arranging them in chronological order had not been anticipated.

Before the interviews were completed in the spring, three other students had touched upon chronology. Alan had replied to one of my questions that Indians had lived a thousand years ago or more, “because they’re related to the cavemen and stone age stuff.”

“Which came first?” he was asked.

“Stone age, and then Indians.”

“Where were the knights and castles, then?” He had mentioned earlier in the interview that he had read a book about Medieval times.

“They were after the Indians.”

This line of questioning was resumed later in the interview.

“You mentioned that Stone Age people lived before the Indians.”

“Yeah.”

“And knights and castles came after them. Can you think of any other people who lived in the past?”

“Uh...sure, Abraham Lincoln, George Washington, Hawaiians. I forget what they called the kind of Indians they had.”

“Where do Lincoln and Washington fit into all this, before the Indians or after the Indians?”

“After, after the cave men, after the knights and stuff, way after that....”

Alan’s chronology was not entirely accurate. The Indians, of course, spanned all of these time periods, living in North America before, during, and after the heyday of European knights and castles. Nevertheless, Alan’s scheme was plausible, as the Indians he had in mind were the California Indians of the pre-Spanish-contact period that he was then learning about. He did place Washington and Lincoln in a more recent period than knights and the pre-contact California Indians, and placed the latter after the time of the cavemen.

It also became apparent from these initial interviews that chronological placement can be problematic for third graders. Greta had difficulty trying to decide whether Columbus or the Pilgrims came first. We had talked about the Pilgrims earlier in the interview, and about their sailing to North America in a boat. Then she told me that Columbus had also sailed in a boat and had discovered the Indians.

“Did Columbus come before the Pilgrims or after the Pilgrims? I had asked.

“He came after,” he replied.

“He came after the Indians?” I asked, uncertain that she had understood the question, as we had just been talking about Columbus discovering the Indians.

“Yeah.”

Having reintroduced the Pilgrims, I was afraid that I had confused her.

“Let’s see,” said. “Let’s try to get things set up here.” I marked off spaces on the tabletop with my fingers, making a kind of timeline.

“There were the Indians, right?” I said, pointing to one end of the imaginary timeline.

“And then there were the Pilgrims?” I pointed to a second place along the line.

“Yeah.

“Now where would you put Columbus?”

“Right there.” She pointed to a place beyond where I had located the Pilgrims, indicating that she really had thought that Columbus came after the Pilgrims.

“So, Columbus is sometime after the Pilgrims?”

“Yeah.”

“Well, did Columbus discover the Pilgrims?”

“Make that backwards.”

“Make what backwards?”

“That Columbus came and then the Pilgrims came.”

“The Pilgrims came after Columbus?”

“Yeah.”

“Oh, I see.... Who did Columbus see when he arrived?”

“He saw the Indians.”

“Did he see the Pilgrims?”

“No.”

Placing Columbus and the Pilgrims in chronological order had posed a problem for Greta. However, with some assistance, she was able to work her way through it. She finally concluded that Columbus had to have preceded the Pilgrims. Otherwise he would have discovered the Pilgrims as well as the Indians, and that seemed illogical to her.

Christine, another third-grade student, shared Greta’s problem with the Columbus-Pilgrim relationship. During the course of the interview, she mentioned the Pilgrims.

“Who were the Pilgrims?” I asked.

“Pilgrims were things that Christopher Columbus found when he was, he found out that, he made them out to be Pilgrims. He came on this boat, and he came to their land.

“They were having a party, and, uhh, then they had, uhh, and he decided to name them Pilgrims....”

I asked her to tell me more about Columbus and she replied that he had sailed from his country and had discovered the Indians.

“He found the Indians, did he? Did he call them the Indians?”

“Native Americans.

“He also called the Pilgrims the Pilgrims?”

“No, naw, I don’t know. I don’t know.”

“All right, but you are pretty sure he found the Indians?”

“Yeah....”

“Who came first and who came next?”

“The Indians were first, then came the Pilgrims.”

“And where does Columbus fit in?”

“Oh, first.”

“You just said the Indians were first.”

“No, Christopher Columbus, then the Indians, then the Pilgrims.”

This line of questioning ended here with Christine hopelessly confused. Unlike Greta, she was not able to reason her way through the problem.

FOURTH GRADE STUDENT INTERVIEWS

In September, 1992, the research was resumed in a fourth-grade classroom in another school. This time, I took care to include questions about historical background knowledge and chronology in the baseline interview. The sixteen students on which I was gathering data were asked if they could identify the following names and terms: Abraham Lincoln, Christopher Columbus, Pilgrims, George Washington, Cavemen, Vikings, Knights and Castles, Gold Rush, and the Civil War. As I was also interested in their understanding of chronology, I only included names or terms that I assumed most fourth-grade students would know. To count as a correct identification, the students had to provide some correct historical

information about the item. Merely recognizing the name as one they had heard before did not count. Table A indicates the responses.

Next, the students were asked to place the items in eight pairs of words in the correct chronological order. An item was skipped if the students had failed to identify one or the other of the terms. The gold rush and Spanish explorers were included, as California history was the focus of instruction that year. See Table B for the students' responses.

RESULTS

Most of the fourth-grade students succeeded in placing most of the items within each pair in the correct chronological order. Placing Lincoln and Washington in order proved to be the most difficult task. Nearly three-quarters of the students solved the Columbus-Pilgrim problem, which had created difficulties for some of the third-grade students. Even some of the fourth-grade students had to struggle with the problem.

"It's a hard question," said Mark. "I'm not really sure about this one because if the Pilgrims came first, Columbus would have saw them. I don't know."

Nate narrowed the alternatives to either "at the same time" or "after" by logical deduction.

"Did the Pilgrims come before Columbus?"

"I don't think so," he said, after a long pause.

"Columbus came before the Pilgrims?"

"I think."

“What would make you think that’s the order?”

“Well, I think that the Pilgrims were Englishmen, but Europeans, so either they came over on Columbus’s boat or they came a bit later.”

Alan decided that they all came together, calling Columbus a Pilgrim. Danny, very articulate, found it confusing as well. Although he knew that “Columbus discovered America in 1492” he thought that the Pilgrims were “a little bit first.”

CHRONOLOGICAL REASONING

How the students determined chronological order became clearer as the interviews proceeded. In the first place, they seldom used dates. Danny and Shawn, who both knew that Columbus discovered America in 1492, were the exceptions. Shawn also added an approximate date for the Pilgrims. Columbus came before the Pilgrims, he said, because “I think the Pilgrims came in 1600 or something like that, and Columbus discovered America in 1492.” None of the other fourteen fourth-grade students mentioned or compared dates. During the interviews, students sometimes used such expressions as “long ago” or “a long time ago,” but not in their explanations of chronological order.

In sorting things out chronologically, the students relied heavily on visual cues. Their historical landscape is furnished with mental pictures of people and things. Children are visual learners, as all teachers know. They also retrieve historical information from memory visually. The extent to which the students relied upon visual imagery in their historical thinking was evident in the interviews with third-grade students. When I asked Katie if she knew about anyone who lived in the past besides Indians, she mentioned George Washington:

“What did he do?” I asked.

“He was a President, and he chopped down a cherry tree.”

“What did he look like?”

“Kind of funny,” she replied.

“Funny how?”

“He had a little braid in back of his hair with his hair all curled up like that in front,” she said, making a curling motion with her fingers in her hair.

“How about his clothes?”

“He wore a suit....”

“OK.”

“He wore pretty shoes.”

“How were the shoes pretty?”

“They looked like slippers....”

“Whom else do you know about who lived a long time ago?”

“Other Presidents.”

“Tell me about other Presidents.”

“I only know about the one with the big hat,” she replied.

“Who was he, the one with the big hat?”

“Abraham Lincoln.”

Clothing, headdress, and hair styles figured largely in the students’ historical images. They associated Indians with feathered headdresses, Vikings with horned helmets, and Abraham Lincoln with his stovepipe hat. The clothing styles of

historical periods had a dual function. In the first place, they were memorable. Washington's distinctive clothing helped Katie remember him. However, clothing styles also give the students important chronological cues. Dolores, a fourth-grade student, placed George Washington after the Pilgrims because his clothing looked less ancient.

“Well, I look at the clothes that George Washington wore and I look at the clothes the Pilgrims wore, and I see a big difference.”

“And which one looks like it's the older?” I asked.

“The Pilgrims. And then if you combine [compare] it with us and then the Pilgrims, they would look much older, and compare us with George Washington and he would look older.”

The technology of a period was another visual indicator of historical time. In placing people chronologically, the students frequently mentioned weapons and tools. The boys, especially, focused on weapons:

“The came men were after the dinosaurs, they used a lot of rocks, and they lived in these caves, and places that they lived, and they tried to find food like the Indians, and they made weapons,” Danny said.

They knew that the weapons of the cavemen were wooden clubs and rocks, which they considered a more primitive technology than the bows and arrows of the Indians. Their timeline for weapons technology extended from wooden clubs to bows and arrows to swords and shields to cannon and guns. Mark placed knights and castles before George Washington's time based on the weapons that he associated with each period:

“The knights and castles were probably before Washington because Washington was around when there were big wars with guns and big cannons but knights were working with swords and shields.”

Guns also figured prominently in the students’ images of the cowboy, with branding irons, lariats, and other tools of the trade being conspicuously missing.

The quantity of weapons, tools, and other material goods that people had was also important to the students in reckoning historical time. James placed the Indians after the cavemen “because they [cavemen] didn’t have much stuff. And now the Indians have a little bit more. They have knives, and they know how to make Indian dolls and stuff. [A doll was one of the artifacts we had used in the classroom.] And they know how to make arrows, spears, and weapons.” Mark noted that both the Pilgrims and the Americans of George Washington’s time had guns, but the Pilgrims had fewer of them:

“I think Washington came after [the Pilgrims] because...Washington was round the wars, you know the bigger, higher wars and back then [Pilgrim times] they didn’t have enough guns and things.’

The students’ heavy reliance on visual imagery may help to explain the difficulty they had in deciding whether the Pilgrims or Columbus came first. Although they had vivid images of the Pilgrims, Columbus is a comparatively shadowy figure. No one mentioned what he wore or what he looked like. When asked what he thought about when the thought about Columbus, Danny replied:

“Umm, I kind of think of his boats and all the workers that helped him, and that he was just trying to find spices and landed on a place that he had never seen.”

He did not mention clothing or the kind of weapons Columbus may have had. The students know that both Columbus and the Pilgrims came from Europe and both came on ships, but they have few visual cues that place them in different times and circumstances.

To say that the images are sharply etched does not necessarily mean that they have a high degree of historical accuracy. Some of the images were too stereotypical to provide an adequate foundation upon which to build future knowledge. To the third-grade students, all Indians were Plains Indians. In their minds, these mounted warriors of the Plains greeted Columbus, had turkey with the Pilgrims, and welcomed the Spanish to California. Their cowboys are perpetually chasing Indians, who, in real life, they seldom if ever saw. Cowboys spent most of their time looking for strayed cattle, fixing fences and cutting hay, activities never mentioned by the students. History instruction must include image deconstruction and stereotype analysis.

The students also identified people by what they did. Columbus discovered America, the Pilgrims had a feast with the Indians, and Washington served as the United States' first President. However this knowledge had very little depth and the students were tentative about it. They felt much more secure when describing what such people looked like and what they wore. Dolores' answers to my questions about Lincoln were typical of such responses:

“Who was Abraham Lincoln?”

“Abraham Lincoln was a President. He was very tall and he was known to believe to have people, I think either in the North or the South, I don’t remember, to not be slaves anymore.”

“Anything happen otherwise during the time he was President that is important?”

“Umm, not that I can remember now. I probably do know but I can’t remember.”

“You said that Lincoln was tall. What else comes to mind when you think about Lincoln? How do you see him?”

“In black. In all the shows in all the TV shows and all the pictures, he has on a black suit with a tall black hat. I suppose black was his favorite color.”

Dolores felt much more confident discussing the color of Lincoln’s clothes than his role in freeing the slaves.

The students also used commonsense reasoning to place items in chronological order. Simple logic helped the fourth-grade students consistently place Columbus after the Indians. If Columbus discovered America and encountered Indians, the Indians had to have been there first. As Mark put it:

“Because if he had thought it was India and there were Indians there, obviously they were there before him. Because if he had gotten there first then he wouldn’t have thought they were Indians, as there would have been no one there.”

Only one fourth-grader placed Columbus before the Indians. This student used logical reasoning to reverse the correct order. Defining the term “discover” quite literally, Moses concluded that if Columbus discovered America, the Indians could not have been there first.

“I am pretty sure he did because, I mean, he discovered America.

[Otherwise], the Indians would have discovered it.... See, Columbus was the one who discovered America, then he went off to discover more, and the Indians think they got there first.”

On the other hand, Nate pointed out that Columbus did not deserve credit for discovering America, as the Vikings had discovered America first, “apart from the Indians.”

The historical associations that third- and fourth-grade students can make are narrowly circumscribed. They could have associated George Washington also with both Indians and kings had they know about his military career as an officer in the French and Indian War and the War for Independence. They failed to do so because their historical images are still thinly contextualized. They are also not yet connected together. The students did see historical time as continuous, but their timeline has many empty spaces. Their chronological thinking is similar to that of Herodotus or Thucydides, “in whose thought the successive acts of men formed, in Focke’s felicitous phrase, not a ‘red line but red patches’” (Jahoda, p. 95). History instruction in the elementary grades should concentrate on adding richness of context and on linking the children’s “red patches” together.

Finally, the students relied heavily upon historical associations to place things in time. Elise placed the Pilgrims before George Washington by associating them with Indians. When asked which came first, Elise replied:

“I think the Pilgrims date back farther than George Washington does because they were here at the time of the Indians.”

Dorothy used much the same reasoning, when asked why she thought the Pilgrims came first.

“I just think that since the Indians came first, and they [the Pilgrims] met with the Indians, I think [Washington] was a little bit later.”

Elise associated Washington with the presidency, which helped her place him after the knights and castles. The latter came before Washington “because the knights and castles didn’t have Presidents; they had kings.” Presidents, to her, were not only more modern than kings, but had replaced them. Donna had the same idea:

“And then Modern Day kicked in and Presidents came in, so knights were first.”

The students tended to associate prehistoric humans with caves; Pilgrims with Indians; knights and castles with kings and queens; and George Washington with the presidency. This helps them place these people in time, as the associated item or items can also serve as a time cue.

DISCUSSION

Research indicates that children’s understanding of historical time consists of at least three kinds or levels of understanding. These include the ability to use

dates and the terminology of historical time, the acquisition of general concepts of historical time, and a grasp of chronology. The ability to use dates and terms correctly seems to be acquired by about grade 5 or 6, when children are about age 10 or 11. The ability to use general time concepts comes somewhat earlier, at least by grade 4, possibly as early as grade 2. The date presented in this paper indicates that children have acquired a secure grasp of chronology by grade 4, and perhaps by grade 3. McAulay (1961) and West (1978) reported a similar grasp of chronology for students in grades 2 and 3.

The development of children's chronological thinking probably begins at a rather early age. It is a process of visual differentiation that does not require special skills. Children only need to notice that the people they see in historical pictures from different times did not dress the same and did not dress like people do today. Moreover, chronological relationships can be expressed in ordinary language, such as "before" and "after," terms that many 4-year olds can use correctly (Harner, 1982). This researcher asked his 4 ½ year old daughter, Sarah, what she knew about George Washington and Abraham Lincoln. She knew what Washington and Lincoln looked like because her preschool teacher had posted their pictures in the classroom in observance of President's Day. She explained that both were Presidents and that one had "white, curly hair" [Washington's wig] and the other had dark hair and a beard [Lincoln]. Although she reversed the names of the two Presidents, she knew that the dark-haired one wore a hat, while the curly-haired one did not. When asked if they lived at the same time or if one lived before the other was born, she replied that the curly-haired one came first. When asked shy

she thought this, she replied that the two men looked different. The fourth graders' grasp of chronology reported here represented a more sophisticated version of Sarah's perceptions, but the essential visual elements were present in her explanation.

The evidence suggests that fourth-grade students have a coherent sense of chronology that functions independently of dates and historical time concepts. Their grasp of chronology probably serves as a foundation upon which they construct other and more abstract ways to think about historical time. It is grounded in visual images, mental associations, and commonsense reasoning. The students' chronology also had a clearly marked beginning, as did the system that Poster (1973) encountered: "When a ten-year old boy was asked what he thought of when he heard the words time and past, he answered, "The clock or cave men." Poster concluded that cavemen served as "an achronic bottom rung for their time ladder" (p. 92). The bottom rung in the chronological system of the fourth graders interviewed for this project was occupied by the dinosaurs.

"How about the cavemen? Have you heard anything about cavemen?"

Albert was asked.

"Yeah, they were after the dinosaurs, a little after the dinosaurs."

His sense of duration was off, as the dinosaurs preceded the cavemen by millions of years. But his chronology was correct. Human prehistory and history did begin "after the dinosaurs."

Developmental factors related to children's understanding of historical time probably do place constraints on historical learning. However, the research strongly

suggests that the understanding of historical time has several dimensions and that the constraints operate upon each at different age levels. Are the new frameworks introducing history at an appropriate age? The best answer is probably a qualified yes. History instruction that helps children develop and refine their grasp of chronology can presumably be introduced early in the primary grades (K-3). Before the end of the primary years, many students will also be able to use general time concepts. Working with dates and more specific time terminology should wait until later. Needless to say, language proficiency and children's level of cultural background knowledge impose constraints no less important than developmental limitations. In any case, the critical factor is the design of the curriculum. To the extent that the new frameworks make appropriate curriculum choices possible in the primary and elementary grades, they will be a considerable asset to history education. To the extent that they license the teaching of curricula that is inappropriate, they will serve neither history nor the students well.

REFERENCES

- Ames, L. (1946). The development of the sense of time in the young child. *Journal of Genetic Psychology*, 67, 97-125.
- Bradley, N. C. (1947). The growth of the knowledge of time in children of school age. *British Journal of Psychology*, 28, 72, 77.
- Friedman, K. C. (1943-1944). Time concepts of elementary school children. *Elementary School Journal*, 44, 337-352.
- Godin A. S. J. (1959). The historical function. *Lumen Vitae*, 14, 245-265.
- Harner, L. (1982). Talking about the past and the future. In W. J. Friedman (ed.) *The developmental psychology of time* (141-169). New York: Academic Press.

- Jahoda, G. (1962). Children's concepts of time and history. *Educational Review*, 97, 87-104.
- Lello, J. (1980). The concept of time, the teaching of history, and school organization. *The History Teacher*, 13, 341-350.
- Levstik, L. and Pappas, C. (1987). Exploring the development of historical understanding. *Journal of Research and Development in Education*, 87, 1-15.
- McAulay, J. D. (1961). What understanding do second grade children have of time relationships? *Journal of Educational Research*, 54, 312-314.
- Oakden, E. C. and Sturt, M. (1922). The development of the knowledge of time in children. *British Journal of Psychology*, 12, 310-336.
- Poster, J. (1973). The birth of the past: Children's perspective of historical time. *The History Teacher*, 6, 592, 596.
- Springer, D. (1952). Development in young children of an understanding of time and the clock. *Journal of Genetic Psychology*, 70, 83-96.
- Thornton, S. and Vukelich, R. (1988). Effects of children's understanding of time concepts on historical understanding. *Theory and Research in Social Education*, 16, 69-82.
- Vukelich R. ;and Thornton, S. (1990). Children's understanding of historical time: Implications for instruction. *Childhood Education*, 67, 22-25.
- West, J. (1978). Young children's awareness of the past. *Trends in Education*, 8-15.
- Zaccaria, M. (1978). The development of historical thinking: Implications for the teaching of history. *The History Teacher*, 11, 323-339.

The work reported herein was supported under the Educational Research and Development Center Program, Cooperative Agreement between the U.S. Department of Education and the University of California at Berkeley, Agreement Number R117G10036-92 as administered by the Office of Educational Research and Improvement, U.S. Department of Education.

The findings and opinions expressed herein do not reflect the position or policies of the Office of Educational Research and Improvement or the U.S. Department of Education.

TABLE A: GRADE 4 LIST OF HISTORICAL NAMES AND TERMS

<u>NAMES/TERMS</u>	<u>NUMBER OF CORRECT IDENTIFICATIONS (N 16)</u>
Abraham Lincoln	16
Christopher Columbus	16
George Washington	15
Cavemen	13
Pilgrims	12
Gold Rush	12
Knights and Castles	11
Vikings	9
The Civil War	4

TABLE B: PAIRS IN CHRONOLOGICAL ORDER

<u>ITEMS PAIRED</u>		<u>NUMBER OF ANSWERS</u>		
		<u>RIGHT</u>	<u>NA*</u>	<u>WRONG</u>
Columbus	Indians	15	0	1
Columbus	Pilgrims	11	1	4
Washington	Pilgrims	8	4	2
Washington	Knights	14	1	1
Washington	Lincoln	10	1	5
Indians	Gold Rush	15	1	0
Indians	Spanish	16	0	0
Indians	Cavemen	14	1	1

* NA Indicates that the question was not asked because a student had not recognized one of the terms or that the answer was hedged.

