Age, Ethnicity, and Socioeconomic Patterns in Early Computer Use

A National Survey

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Parents were interviewed about the media habits of their 6-month to 6-year-old children. For children who had used computers, linear increases in computer usage occurred across this age range with a shift from using a computer on a parent's lap at about age 2½ to autonomous computer and mouse use at about age 3½. There were almost no gender differences in early computer patterns. Families with higher incomes and higher education levels were more likely to own computers and to have Internet access from home. Latino families were least likely to own a computer; Latino and African American families were less likely than Caucasian families to have Internet access at home. Parents perceived computers favorably for children's learning. No relationship was found between the frequency with which children play computer games and the likelihood that they can read, but increased nongame computer use was associated with increased likelihood of reading.

Keywords: *computers; infants; preschoolers; ethnicity; gender*

American children are born into and develop in a world in which media pervade their daily experiences. Five years ago, the American Academy of Pediatrics (1999, 2001) put forth a policy that children, particularly at young ages, should have limited exposure to screen media, including computers, even though the Academy did not know what effects this kind of exposure might have on children's development or even the extent to which exposure occurs. We will address early exposure to computers here.

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As parents are being told to avoid exposing their infants to screen media, they may also feel pressures to ensure that their children are media literate, particularly because the use of computers may be a gateway to success in the 21st century. Early exposure to computers may teach children basic technical skills, such as how to use a mouse or even help them learn to read.

The purpose of this study is to describe early computer use patterns in children who are from 6 months to 6 years of age. Among the questions we examine are the following: At what age do very young children first use computers? Are there differences by gender, with boys getting an earlier start than girls? Do wealthier children gain access to computers and the Internet before poorer ones? Does access vary by ethnicity, parental education, or family structure? How is early computer use related to the development of reading skills?

This study reports on data from a national sample of parents about the early computer use of their children, drawn from a survey about the overall early media-use patterns of very young children conducted by the Henry J. Kaiser Family Foundation in conjunction with the Children's Digital Media Center at the University of Texas–Austin (Rideout, Vandewater, & Wartella, 2003).

AGE PATTERNS IN COMPUTER USE

According to survey data collected in the census of 2000, 65% of all children aged 3 to 17 live in homes with computers, and 30% of all U.S. children use the Internet from their homes (Newburger, 2001). These trends reflect a linear increase in home access to both computers and the Internet that has taken place in the United States since 1984 (Newburger, 2001).

Older children have more access to computers in their homes than younger children do (Wartella, Heintz, Aidman, & Mazzarella, 1990). According to the 2000 census, age differences emerged in Internet usage patterns as well. Of all U.S. 3- to 5-year-olds, only 7% used the Internet at home. By contrast, 25% of all U.S. 6- to 11-year-olds and 48% of all U.S. 12- to 17-year-olds used the Internet at home (Newburger, 2001).

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The first way that very young children use computers is on their mother's lap (Shade & Watson, 1985). At young ages, gross motor control is far better developed than is fine motor control, making it difficult for very young children to guide and click the mouse. With greater control of one's hands and the development of the skills needed to point and click the mouse come greater autonomy to use the computer independently of one's parents. To date, data have not been available as to the age at which children are able to use a mouse by themselves, but given age norms in fine motor control, we expect children to be able to point and click with a mouse independently sometime during the preschool years.

This greater autonomy in mouse use, brought about by fine motor control, should enable more autonomous computer use. For example, once children can use a mouse, turning on the computer and loading a CD-ROM allow independent exploration and play.

GENDER PATTERNS IN COMPUTER USE

One initial concern of computing patterns was that boys were getting an earlier start than girls in using this emerging technology. Because early computer access is believed to provide opportunities for future academic and occupational success, this area has been researched extensively.

The findings that emerged from these studies did document a gender divide, but there were important qualifications. First, older boys seemed to use computers more so than older girls, but at younger ages a gender divide was not present (Essa, 1987; Hess & Miura, 1985; Lepper, 1985). Second, the gender divide appeared to be content dependent. More specifically, games, particularly violent or competitive games, seemed to be the purview of young boys more so than young girls (Kafai, 1995). In addition, boys gravitated to computer camps that taught programming skills more so than girls did (Hess & Miura, 1985; Miura, 1987).

With time, content that appeals to girls increasingly has emerged in the market place and except for playing games, computer use patterns are now similar for girls and boys (Subramanyam, Kraut, Greenfield, & Gross, 2001). Similarly, data collected in the census of 2000 reveal that there are no longer gender differences in children's use of computers at home for the 3- to 17-year-old age group (Newburger, 2001).

THE DIGITAL DIVIDE

Another significant concern has been the so-called digital divide in computer use: gaps in access to and use of computers based on income, race, or parent education. Because ethnicity is often correlated with persistent poverty and low socioeconomic status, African American and Latino groups may be less likely to have access to higher priced, newer technologies, such as the latest generation of computers and Internet access. To what extent is the digital divide associated

with race, and to what extent is it associated with disparities in income and education?

Early on, schools were expected to moderate this digital divide by providing computer access to all children. However, the increased use of home computers renewed concern about equal access for all children at young ages. As prices dropped, disparities in potential access became less likely. However, data collected in the census of 2000 reveal ongoing differences in computer access among different ethnic and income groups. For example, 77% of Caucasian children live in households with computers compared to 43% of African American and 37% of Latino children (Newburger, 2001).

Patterns of screen time exposure reveal that at least for television, African American and Latino children spend more time watching than Caucasian children (Comstock, 1991). Unlike Caucasian children, the socioeconomic status of the family is irrelevant to time spent with television for African American children (Brown, Childers, Bauman, & Koch, 1990). As computer access increases for African American and Latino children in the coming years, will their children become relatively heavy users of computers, just as they now are heavy users of television screens?

IMPACT ON READING

Because many computer products for young children are marketed as helping children learn, and because much computer content is text based, many parents (and others) believe that spending time with computers will help children read. For instance, young children's literacy skills benefit from having storybooks read repeatedly to them by a computer (Johnston, 1997). On one hand, then, if computer use helps children read, those who spend more time with computers may be more likely to be able to read at young ages than other children.

On the other hand, the American Academy of Pediatrics (1999, 2001) recommended that children younger than the age of 2 should spend no time viewing television and later proposed limiting screen time to 1 to 2 hours per day for all screen media, including computers, for children who were older than 2 years. These recommendations are based in part on concerns that the time children spend with screen media may be displacing other activities that are more important for children's development. If screen time per se, rather than the particular content that children are exposed to, disrupts the development of early reading skills, then heavier exposure may negatively affect early reading skills.

THE PRESENT STUDY

The purpose of this study was to provide descriptive information about the computer patterns of very young children, aged 6 months to 6 years. We were especially interested in age, gender, ethnicity, income, parental education, and family structure patterns in children's access to and use of computers. We were

also interested in whether there was any relation between computer screen time and reading skills.

METHOD

PARTICIPANTS

Participants were a national sample of 1,065 U.S. parents of children ages 6 months to 6 years. Parents were contacted via telephone using a list-assisted random-digit dialing methodology. The target child was either the youngest or oldest child who was 6 months to 6 years of age.

The target child was less than 12 months old for approximately 6% of the sample. The rest of the sample was fairly evenly distributed across 1-year intervals from age 1 to 6 (12% to 15% of the sample in each age interval). One half of the target children were female. Of those reporting race and ethnicity information (n = 1,052), 68% described themselves as White/non-Latino, 10.2% as Black/non-Latino, 17.0% as Latino, and 4.8% as other racial or ethnic groups.

PROCEDURE

Interviews were conducted by Princeton Survey Research Associates for the Kaiser Family Foundation from April 11 to June 9, 2003. Using a randomly selected participant list, phone calls were made at various times and days of the week. When someone was at home, the interviewer asked to speak to the person who spent the most time with the target child. If child care was equally shared, a parent was chosen randomly to answer the interview. A maximum of 10 calls were made to homes to find someone to interview about the targeted child. The response rate was 40%.

The interview began with an introduction by a member of the Princeton Survey Research Team who then confirmed that the parent had a child in the target age range of 6 months to 6 years of age. The interviewer then administered the questionnaire.

INTERVIEW

The interview was constructed in the following way. Initially, experts in the field of children and media convened for a 2-day conference to discuss the media exposure of very young children, the kinds of questions that should be asked in an interview, and the kind of methodology that should be employed. Using the information from this meeting, members of the Kaiser Family Foundation and the Children's Digital Media Center at the University of Texas developed the survey instrument. Princeton Survey Research Associates then piloted the measure and provided feedback to the Kaiser Family Foundation. Final

decisions were made about which questions to include, and those were put into an interview to be conducted as a national phone survey.

The full interview consisted of 59 questions about the target child and his or her access to and use of media. Eleven demographic questions about the family, such as their race, income, marital status, gender, employment status, educational achievement, age, household income, and language spoken at home were also asked. Screen media were separated from other forms of media (e.g., reading books, listening to audio tapes). For our purposes, 14 of these items were examined which focus on computer access and use patterns. These questions are presented in the appendix. Certain questions were skipped if parents reported, for example, that their child was not yet using a computer.

SAMPLE DEMOGRAPHICS

Initial analyses indicated that racial and ethnic groups differed on socioeconomic status indicators. We examined whether the four race/ethnic groups in this study differed on dimensions of parental educational attainment, income, and marital status.

Parental educational attainment. Participants' educational attainment was classified on a 4-point scale ranging from 1 = *less than high school* to 4 = *college degree or higher.* On average, participants completed some college (M = 2.8, SD = 1.00). Univariate analysis of variance indicated education differed across racial and ethnic groups, $F(3, 1045) = 34.70$, $p < .001$. Post hoc Tukey's HSD tests indicated that Latino parents had significantly lower educational attainment (M = 2.2) than White non-Latinos (M = 3.0), Blacks (M = 2.7), or parents from other racial/ethnic backgrounds (M = 2.9).

Income. Measured on a 7-point scale ranging from 1 = *U.S.$10,000 or less* to 7 = *U.S.$100,000 or more*, average total annual household income was between U.S.$30,000 to less than U.S.$50,000 (M = 4.3, n = 977) and varied significantly by race and ethnicity, $F(3, 964) = 34.29$, $p < .001$. White households reported higher income (M = 4.6) than Latinos (M = 3.3), Blacks (M = 3.6), and others (M = 3.8).

Marital status and household composition. More than three quarters of the sample were married or living as married; 9% were divorced, separated, or widowed; and 12.3% were single or never married. The proportions of married, divorced, and single parents differed by race/ethnicity, $\chi^2(6) = 85.68$, $p < .001$. Approximately 51% of African American respondents, 77% of Latinos, 84% of Whites, and 80% of those with other racial/ethnic backgrounds were married or living as married at the time of the survey. A household composition variable was created to contrast two-parent (married, living as married) and one-parent (divorced, separated, widowed, single) families.

RESULTS

ANALYSES OVERVIEW

For each set of dependent variables, we present age-based descriptive statistics. Then we provide the results from regressing the relevant dependent variable on child's age, gender, race/ethnicity (measured as three separate dichotomous variables representing dummy-variable coding of African American, Latino, and Other race/ethnicity compared to White (coded as 0), and respondent's education, household income, and household composition (one parent vs. two parents). Changing experiences in children's lives (e.g., attendance at preschool, kindergarten, elementary school) suggest that age-based exposure to and use of computers may not change linearly across time because opportunities for exposure may differ when daily routines vary. In addition, some analyses were only on children with prior computer exposure, thereby attenuating the potential age effects on the dependent variables. Finally, some dependent variables, such as the age when children can use the mouse independently, were expected to increase with age, to peak during the preschool years, and then to decline by school age.

To evaluate nonlinear relationships with age, we included a quadratic and cubic age variable in each full hierarchical regression model; if the coefficient failed to reach significance, we present coefficients only from the first step containing the linear age term. Linear regression was used for continuous dependent variables and binary logistic regression for dichotomous outcomes. Only significant effects are reported for the regression analyses.

COMPUTER ACCESS AND ACTIVITIES

Our first set of analyses examined the relation of age, gender, ethnicity, income, parental education, and family structure on very young children's access to and use of computers.

Access to computers. About three quarters of the sample had a computer in their household. Of those families that did, 36% owned more than one computer and 88% had Internet access. Using logistic regression, computer ownership was more likely among households with higher income (odds ratio = 1.47), higher parental education (odds ratio = 1.92), and two parents (odds ratio = 1.96). Latino parents were less likely to report owning a computer (odds ratio = .53). Among families that owned a computer, parents with higher income (odds ratio = 1.32), higher education (odds ratio = 1.52), and girls (as the target child; odds ratio = 1.67) were more likely to have Internet access. African American (odds ratio = .43) and Latino (odds ratio = .31) parents were less likely than Whites to have Internet access on their home computer.

Use of computers. Parents reported that 21% of children 2 and younger (n = 85), 58% of 3- to 4-year-olds (n = 207), and 77% of 5- to 6-year-olds (n = 226) had ever used a computer. For children who had used a computer (n = 518), 14.2% of parents of children 2 and younger, 11.6% of parents of 3- and 4-year-olds, and 14.5% of parents of 5- and 6-year-olds reported that their child used a computer every day.

Among the entire sample (n = 964), the likelihood of ever having used the computer increased with age (odds ratio = 1.96), household income (odds ratio = 1.18), and parental education (odds ratio = 1.49). Children of Latino parents were less likely than children of White parents to have ever used a computer (odds ratio = .62). When the computer ownership variable was added to this equation, it became the most powerful predictor of use (odds ratio = 13.20). Age (odds ratio = 2.15) and parental education (odds ratio = 1.28) remained significant, but the effects of household income and ethnicity became nonsignificant.

As seen in Figure 1, the acquisition of specific computer skills demonstrates linear trends with age for using a mouse to point and click, using a computer without sitting on a parent's lap, loading a CD-ROM by themselves, and turning on the computer by themselves.

Among those children who had ever used a computer, parents reported that their children first began to use computers at about 2.7 years on a parent's lap and used the computer by themselves at 3.7 years. As seen in Figure 2, the mean age when children began to use a mouse to point and click was 3.5 years. These data suggest that very young children are capable of using a computer.

Separate logistic regressions evaluated demographic contributors to the ability to engage in nine computer-related tasks among children with prior computer experience. Four tasks involved technical aspects of computer use[1]—using a computer without sitting on a parent's lap (n = 472), turning a computer on (n = 469), using a mouse (n = 471), and putting a CD-ROM in the computer (n = 470); three involved viewing the Web[2]—looking at Web sites for children (n = 471), asking to see a particular Web site (n = 199), and going to a Web site by himself or herself (n = 197); and two involved e-mail—sending e-mail with (n = 78) or without help (n = 78). Child's age was the most consistent predictor of technical aspects of computer use and a few Web-related activities.

Technical aspects of computer use. Of those children who have ever used a computer, 70% or more could use the computer without sitting on a parent's lap and 86% could use a mouse. About 50% could turn the computer on by themselves and insert a CD-ROM. The older the child, the greater the likelihood that the child could engage in each of these activities: using the computer without sitting on a parent's lap (odds ratio = 1.75), turning the computer on (odds ratio = 1.28), using a mouse (odds ratio = 2.29), and putting in a CD-ROM (odds ratio = 1.56). Higher household income increased the odds of using the computer without sitting on a parent's lap (odds ratio = 1.24) and being able to put in a CD-ROM (odds ratio = 1.18). Girls were less likely to be able to load a CD-ROM

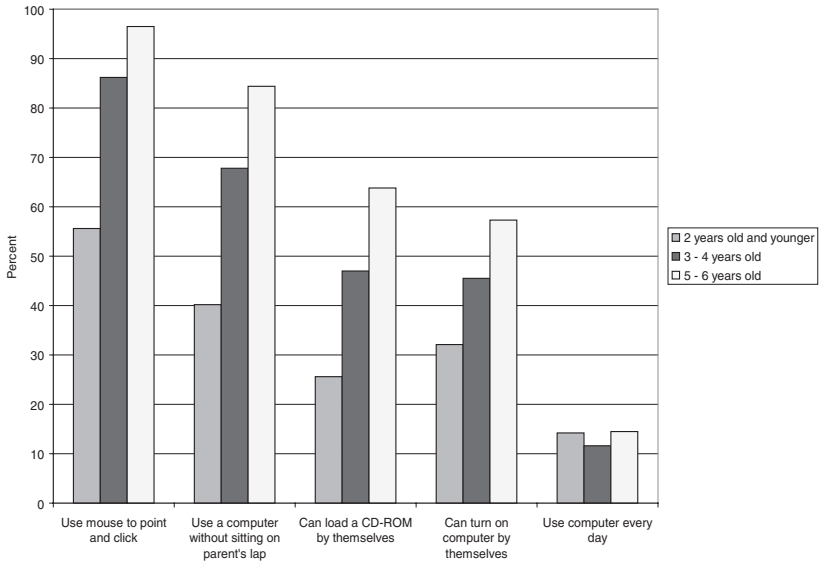

Figure 1: Age Patterns of Computer Skills and Use Among Children With Any Prior Computer Experience (*n* = 518)
NOTE: Parents reported that 21% of children 2 and younger (*n* = 85), 58% of 3- to 4-year-olds (*n* = 207), and 77% of 5- to 6-year-olds (*n* = 226) had ever used a computer. Thus, the number of 2-year-olds and younger is relatively small compared to other ages when computing these statistics.

than boys (odds ratio = .67; boy = 0, girl = 1). Race, parental education, and household composition did not contribute significantly to these models.

Using the World Wide Web. Of children with computer experience, 42% have looked at Web sites for kids. Of those that have, 60% have asked to go to a particular Web site, but only 22% are able to go to a Web site on their own. The only significant model involved asking to see a particular Web site. Older children (odds ratio = 1.47) were more likely to have ever made such a request.

Sending e-mail. Approximately 21% of children with computer experience have sent e-mail with the help of a parent; less than 2% have sent e-mail on their own. Neither of the equations predicting e-mail use produced a significant model.

COMPUTER USE ON TARGET DAY

The vast majority of young children were not frequent computer users. When examining the entire data set, on the most recent day on which a typical routine

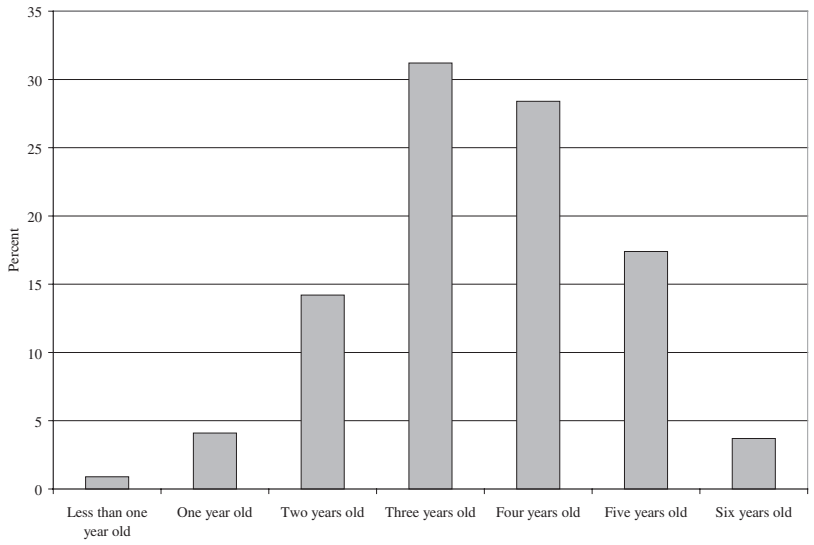

Figure 2: Age of First Mouse Use Among Children With Prior Computer Use (*n* = 436)

was followed (referred to as the target day), only 18.3% of 6-month to 6-year-old children had used a computer. Of those who did use computers on the target day, the average amount of time was approximately 1 hour.

For all children, a logistic regression examined whether the computer was used (yes/no) on the target day ($n = 955$). The likelihood of any use on the target day increased with child's age (odds ratio = 2.64) and for African Americans (odds ratio = 2.35). The quadratic age term was also significant (odds ratio = .92), indicating a slight curvilinear trend (see Figure 3) where computer use by 6-year-olds was slightly lower than that of 5-year-olds.

AMOUNT OF COMPUTER USE (IN MINUTES) ON TARGET DAY

Among those who used computers on the target day, total time ranged from 5 minutes to 6 hours with an average of 56 minutes ($SD = 49.7$) and a median of 45 minutes. No significant predictors were found in a linear regression of total minutes of computer use on the target day for the demographic variables.

Playing computer games. Of all parents, 15% reported that their child spent time playing computer games on the target day. Children who played computer games did so for an average of 51 minutes ($SD = 34.4$). The median use on the target day was 45 minutes. Among all those who used computers on the target

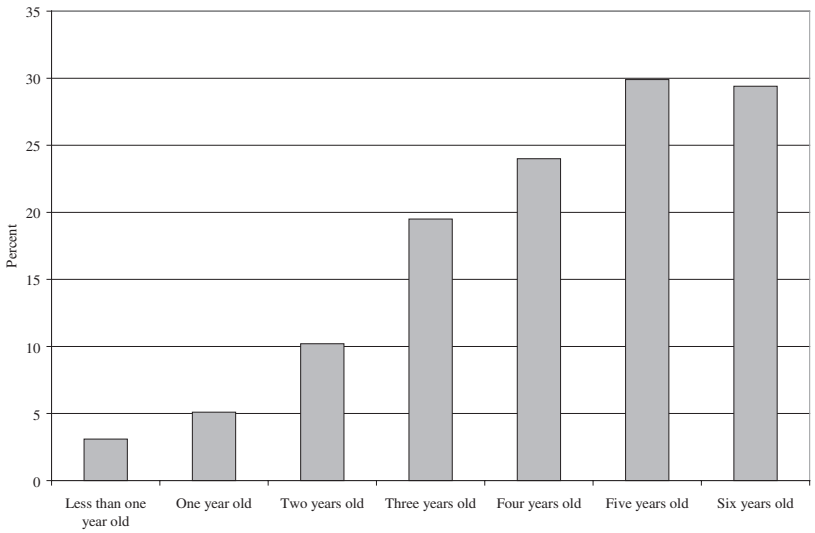

Figure 3: Percentage of Children Who Used the Computer on Target Day by Age (*n* = 955)

day (*n* = 166), no significant predictors of total minutes of time spent playing computer games were found.

Using a computer for something other than games. Approximately 7% of all parents reported that their child used the computer for something other than games on the target day. Those children spent, on average, 41 minutes on nongame play (*SD* = 35.2) with median use of 30 minutes. Among all those who used computers on the target day, nongame use was predicted only by age (β = .27, $p < .001$). The model explained 4% of the variance, $F(8, 157) = 2.31$, $p < .05$.

RELATIONSHIP BETWEEN READING AND COMPUTER USE

Next we used stepwise logistic regression to predict whether the parent reported that the child could read. Parents of all children older than the age of 2 (*n* = 747) were asked this question. Parents reported that 4% of 2-year-olds, 11% of 3-year-olds, 20% of 4-year-olds, and 48% of 5-year-olds could read. The majority of 6-year-olds (87%) could read. The likelihood that a child currently reads increased for age (odds ratio = 4.08), African American children (odds ratio = 3.35), and those children of other races (odds ratio = 3.05).

The second step of the model included two variables for frequency of computer use (games and other than games), which gives some sense of the nature of

current computer use (ranging from never to every day) in relation to reading time and the potential enhancement or disruption of literacy skills. Adding these two variables significantly increased the chi-square ($p < .05$). Age (odds ratio = 4.17), African American race (odds ratio = 3.19), and other race (odds ratio = 2.74) remained significant predictors. Frequency of game play (ranging from never to every day) was unrelated to reading. However, the more frequently a child used computers for activities other than games, the higher the probability that parents reported the child could read (odds ratio = 1.55; see Figure 4).

PARENTAL ATTITUDES ABOUT COMPUTER USE

Parents were asked whether they thought that computer use was mostly harmful, had little/no effect, or was mostly helpful for children's learning. A majority of parents reported that computer use is mostly helpful (72% of total sample). Linearly regressing the standard demographic variables on this attitude (coded as 1 = mostly harmful, 2 = little/no effect, 3 = mostly helpful) revealed no significant relationships. The regression (n = 869) predicted a significant amount of variance (5%), $F(10, 859) = 3.70$, $p < .001$; when we added the two frequency of use variables (game and nongame computer use), only computer use for games was significant, $\beta = .17$, $p < .001$. Parents whose children spent the most time playing computer games were more likely to perceive the computer as beneficial to their children's learning. However, the direction of this relationship is unclear. Perhaps parental beliefs that computers assist their children's learning lead them to allow their child to play more games, which tend to be educational for this age group. Alternately, playing games, again which tend to be educational for this age group, may lead to parental attitudes that their children are learning something of value. Or perhaps a third variable is causing the relationship between these two variables (see Figure 5).

DISCUSSION

The purpose of this study was to describe the early computer use patterns of infants and very young children. Based on parent interviews from across the United States, age, gender, race, socioeconomic, and other demographic patterns for children 6 months to 6 years old were examined.

About 75% of parents reported that their families had a computer and 88% of those had Internet access. However, this study finds a socioeconomic and racial divide in access to computers and the Internet in early childhood. Consistent with prior research, families with higher incomes, higher educational levels, and in two-parent families were more likely to own computers and to have Internet access (Wartella et al., 1990). Regardless of income, education, and family structure, African American and Latino families were less likely to have Internet

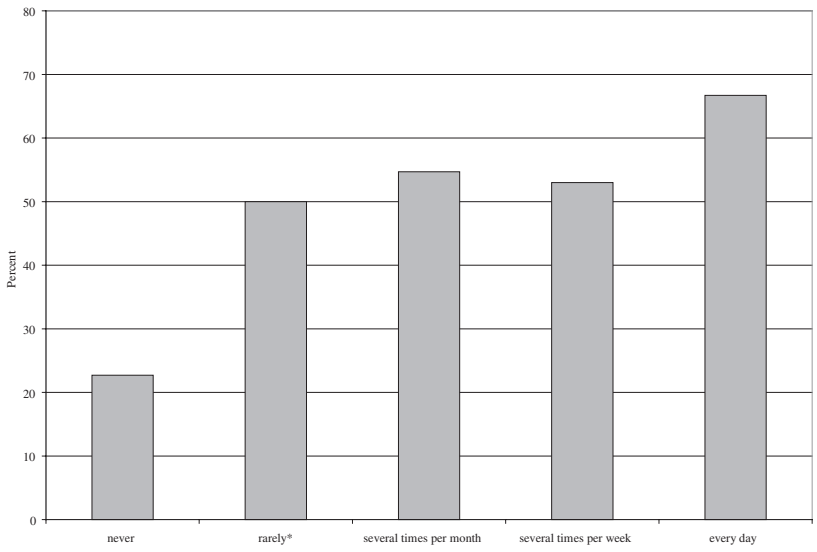

Figure 4: Percentage of Parents Reporting That Child Can Read (For All Children Ages 2 and Older) by How Often Child Uses Computer for Nongame Activities (*n* = 747)
NOTE: Rarely = less than several times per month.

access, and Latino families were less likely than Caucasian families to report that they owned a computer.

Children were more likely to have used a computer when they were older and when they lived in more affluent, better educated families. Children from Latino families were less likely than children from Caucasian families to have used a computer, but ethnicity and family income no longer predicted computer use when computer ownership was considered. Such findings suggest a digital divide in computer use for the less affluent, the less educated, and minority families, with access and education being the key to computer use.

Parents reported that African American children were more likely to use computers on the target day than Caucasian children. These data echo earlier reports finding African American and Latino children had less access to computers but still found ways to spend just as much time on computers as Caucasian children (Rideout, Foehr, Roberts, & Brodie, 1999). Taken together, the findings suggest that African American children tend to be heavier screen users than Caucasian children (Brown et al., 1990; Comstock, 1991; Rideout et al., 1999).

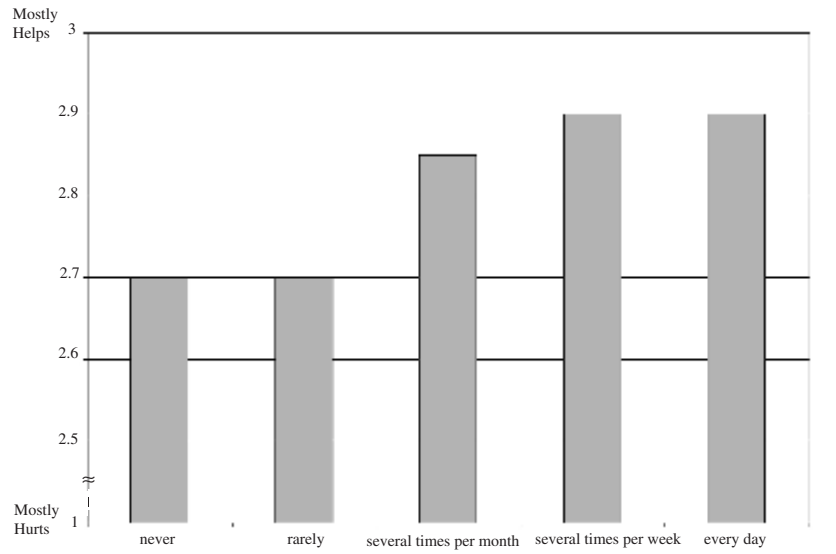

Figure 5: Parent Beliefs in the Helpfulness of Computers for Children's Learning by How Often Child Uses Computers for Games (*n* = 869)
NOTE: Rarely = less than several times per month, 1 = mostly hurts children's learning, 2 = little/no effect, 3 = mostly helpful.

For those children who have access to computers, parents reported that toddlers begin using computers during the 2nd year of their lives, generally from a parent's lap. By the middle of the 3rd year of life, most American children with computers are capable of controlling the mouse to point and click, can load CD-ROMs by themselves, and can turn on the computer by themselves. Such skills provide considerable autonomy for a very young child that gets them off to an early start on the basic skills that will be needed along the digital highway.

A gender divide favoring boys over girls was not found in our data. Boys and girls began to use the computer at about the same point in development, and they had similar skills in diverse areas ranging from turning on the computer to asking to go to specific Web sites. The only difference was that boys were more likely to be able to load a CD-ROM by themselves than were girls. Contrary to past research, we did not find that boys were more likely to have played games on the target day than girls (Subramanyam et al., 2001), suggesting that the content of games may now be more favorable to girls, at least for computer games directed at very young children. These findings further support the premise that gender patterns in computer interactions favoring older boys over older girls are learned (Hess & Miura, 1985; Kafai, 1995).

Most of the time young children spend with computers is spent playing games. On one hand, this study did not document any relationship between time spent playing computer games and a child's ability to read. On the other hand, some nongame computer use is associated with parental reports that their child can read. The implication is that children who are frequently engaged in nongame activities may be using the computer in ways that facilitate their reading skills, but that the computer games young children are playing neither help nor harm the reported emergence of reading. Nonetheless, these findings are preliminary. The survey did not specify what was meant by games or nongames, and it is unclear how parents interpreted those questions. Another caveat of these findings is that there are no objective data about what very young children are actually doing with computers or about when or how well they can read.

Therefore, further research is needed to document whether early computer use has any effect on a child's ability to read, either positive or negative; and if there is an effect, whether it is due to the content or the medium.

Another limitation of this study involves the relatively small sample size for certain subgroups such as Latino children or 2-year-old children who use computers. Further exploration with larger samples of toddlers and minority groups are warranted, and variations within ethnic groups as a function of socioeconomic status and education are also worthy of further investigation.

In addition, the design of some of the survey questions was not optimal. For example, the questions concerning the age at which children first did certain activities rely on potentially faulty parent memories and may not be reliable. Questions that focus on a target day may also differ from more general use patterns that could be captured more precisely through a weekly diary of computer and reading activities.

In conclusion, this survey documents that by the time they are in their 2nd year of life, many toddlers are using computers as they sit on their parent's lap and many are in control of some of their interactions by the middle of their 3rd year. Boys and girls are equally likely to use computers at a young age. However, due to a socioeconomic divide in early access to computers, these experiences are more available to Caucasian children and those from higher income and higher educated families. Parents who believe that computers are mostly helpful to their children's learning have children who play more computer games. Nongame computer activities were associated with increased parental reports that their child could read, but playing computer games was not. As very young children develop in this emerging world of converging technologies, researchers need to continue to monitor the role of technologies in children's lives and the impact of those experiences on their development.

APPENDIX
The Kaiser Study Survey: Selected Questions Regarding Computer Use

1. Did your child spend any time yesterday [or that day] (a) playing computer games or (b) using a computer for something other than games?
2. About how much time did your child spend yesterday [or that day] (a) playing computer games or (b) using a computer for something other than games?
3. Do you have any computers in the household? This would include laptops as well as desktops. If so, how many?
4. Do you have Internet access on your home computer/any of your home computers?
5. Do you have high-speed Internet access such as a cable or DSL hook-up, or is your Internet access through a dial-up modem?
6. How often does your child (a) play computer games or (b) use a computer for something other than playing games? (Response options were every day, several times a week, several times a month, less often, never, child too young, child not allowed, or don't know.)
7. Do you have any rules about (a) what your child can or can't do on a computer or (b) how much time your child can spend on a computer? (Response options were yes, no, or don't know.)
8. Does your child have a computer in their bedroom? Does the computer in your child's bedroom have Internet access? (Response options were yes, no, or don't know for both questions.)
9. Has your child ever (a) used a computer without sitting on a parent's lap? (b) turned on a computer by themselves? (c) used a mouse to point and click? (d) put a CD-ROM into the computer? (e) looked at Web sites for children? (f) asked to go to a particular Web site? (g) gone to a particular Web site on their own? (h) sent e-mail with help from a parent or someone else? (i) sent e-mail by themselves? (Response options were yes, no, don't know, child doesn't use a computer, or child doesn't visit Web sites [for items f and g only].)
10. At what age did your child (a) use a computer while sitting on a parent's lap? (b) use a computer without sitting on a parent's lap? (c) turn on a computer by themselves? (d) use a mouse to point and click? (e) put a CD-ROM into the computer? (f) look at Web sites for children? (g) ask to go to a particular Web site? (h) go to a particular Web site on their own? (i) send e-mail with help from a parent or someone else? (j) send e-mail by themselves?
11. In general, do you think that using a computer mostly helps or mostly hurts children's learning—or doesn't have much effect either way?
12. Does your child know how to read? (Based on children 2 and older, $N = 823$; response options were yes, no, and don't know.)
13. How old was your child when they learned to read? (Less than 1, 1, 2, 3, 4, 5, 6, child doesn't read, child younger than 2.)
14. Does your child have any of the following at home? (a) a computer mouse designed especially for children? (b) a computer keyboard or keyboard topper designed for children? (Response options were yes, no, don't know, or child doesn't use a computer.)

NOTES

1. The sample sizes in parentheses refer to the number of participants with usable data for that analysis, not those that responded affirmatively to the question.

2. Responses to the two questions about whether children ask to go to a particular Web site or go on their own were restricted to those parents who reported that their children had ever looked at Web sites for kids.

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