THE EFFECTIVENESS OF AN INFANT SIMULATOR AS A DETERRENT TO

TEEN PREGNANCY AMONG MIDDLE SCHOOL STUDENTS

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Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

August 2000

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Hillman, Carol Best, <u>The Effectiveness of an Infant Simulator as a Deterrent to Teen Pregnancy Among Middle School Students</u>. Doctor of Philosophy (Applied Technology, Training, and Development), August, 2000, 188 pp., 22 tables, 12 figures, references, 200 titles.

This research was one of the first longitudinal studies to determine the effectiveness of a computerized infant simulator as a deterrent to adolescent pregnancy. All of the female eighth-grade students (221) in 1994-1995 and 1995-1996 from a suburban North Texas middle school were part of this study. They were tracked from the eighth grade through high school graduation to determine whether and when pregnancies occurred. The Kaplan-Meier procedure for survival analysis was used to determine test statistics. Survival functions and hazard functions were created for each independent variable--parenting the infant simulator, ethnic and racial, involvement in co-curricular activities, and crime.

Results showed the computerized infant simulator to be highly effective in postponing the on-set of pregnancies for those students who participated in the parenting simulation. Hazards peaked at 3 years, 2 months for the experimental group and at 2 years, 21/2 months for the control group. Summertime and holiday seasons marked times of the year when the majority of pregnancies occurred. Caucasians peaked before the Other ethnic group. No significant differences were detected in regard to involvement in co-curricular activities, and no involvement in crime was self-reported.

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the assistance and cooperation of numerous individuals.

I owe a sincere depth of gratitude to Dr. Jerry Wircenski, my Major Professor, for his interest, patience, and professional assistance in completing this dissertation.

Sincere gratitude goes to the committee members for their counsel and assistance: Dr. John Holman, Dr. Michelle Wircenski, and Dr. Randall Schumacker.

Special gratitude is extended to Dr. Lynda Burr, my school principal who understood the stress, Dr. Earl McCallon, for heroic patience, Dr. R. C. Bunger, for professional friendship, Dr. Glenda Anderson, my initial inspiration, and Dr. Juneria Burgess, who made this study possible.

This writer owes a debt of gratitude to my sister, Judy, and her husband, Jim Zurlis, for graciously allowing me to invade their home. Without their electronic assistance, this study would not have been completed.

To Crae, Anne, Judy Lynn, Rebecca, and Hannah, thank you for tolerance beyond your years.

Thank you to Natasha Brown for the preparation of the final manuscript.

Finally, a very special acknowledgment is extended to my parents, Gladys and Melvin Best, who displayed continuous encouragement throughout my graduate program.

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CHAPTER 1

INTRODUCTION TO THE STUDY

This chapter presents an overview of the status of teenage pregnancies in the United States and then reviews some of the educational tools used to provide adolescents the experience of parenting, thus allowing them the opportunity to preview the possible consequences of their behavior. The purpose of the study, the statement of the problem, and the research questions are addressed. The delimitations and limitations are stated. The chapter closes with a list of terms and definitions.

Background

One out of 25 teenage girls ages 13-17-years in Texas gets pregnant. One out of 32 teenage girls ages 13-17-years gives birth. Every six hours, a 14-year old girl gets pregnant. Every two hours, a 15-year-old girl gets pregnant. Every hour, a 16-year-old girl gets pregnant. Every 38 minutes, a 17-year-old girl gets pregnant (Texas Department of Health, 1998).

Adolescence is a unique developmental age distinct from both childhood and adulthood. It is a stage of life with special vulnerabilities, health concerns, and barriers for accessing health care. The developmental needs of early adolescents are very different from the needs of late adolescents. While programs for older adolescents need to focus on such topics as completing formal schooling, entering the labor force, and maintaining responsible relationships, younger adolescents need sex education programs that begin before they become sexually active (Scott-Jones, 1993).

The lives of young students of all socioeconomic and ethnic backgrounds are drastically altered by unplanned pregnancies (Huerta-Franco & Malacara, 1999). When a teen becomes pregnant, regardless of the outcome of the pregnancy--adoption, marriage, remaining a single parent, miscarriage, or abortion--each solution causes emotional and psychological stress, financial hardships, and a burden to their physical health that could have been avoided if the pregnancy had never happened (Brantlinger, 1985; Davis & Harris, 1982; Kellogg, Hoffman, & Taylor, 1999; Rosenthal, Lewis,& Cohen 1996).

In the mid-90s, the United States Congress passed federal legislation enabling states to provide abstinence education in the public schools (Abstinence Education Federal Law, 1997). Senate Bill 1, Sec. 28.004 Human Sexuality Instruction (1997), the Texas mandate concerning human sexuality instruction, legislated Texas public schools may emphasize abstinence from sexual activity as the preferred form of birth control taught to Texas public school students (Human Sexuality Instruction, 1997). Instructing young teens in age appropriate concepts and learning activities on parenting and child development has been an exercise in judgment, initiative, imagination, and creativity while working with students, parents, and school administrators. What works in one classroom is shared by word-of-mouth with other educators via workshops and informal newsletters (G. N. McGinnis, personal communication, July 23, 1997).

Educators are challenged to select the most effective tools to meet the educational needs of their students while keeping within a budget. At the same time, instructional budgets have been reduced, forcing teachers to justify all expenditures. The introduction of the computerized infant simulator as a tool to educate teens about the responsibilities

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of parenting is the newest addition to the arsenal of weapons available to educators in the war to curb teen pregnancy.

The utilization of computerized infant simulators in parenting courses appears to work hand-in-glove with the abstinence movement. The infant simulator offers hope of an intervention that will provide teens a glimpse of a truer picture of parenting and will result in the teen choosing to remain abstinent in an attempt to avoid pregnancy and the resultant parenting responsibilities.

Significance of the Study

Computerized infant simulators have been available for use by career and technology educators since the summer of 1994. The first treatment group of this study experienced parenting with the simulators in December 1994. This is significant because they were among the first students in the nation to use the simulators and were not clouded with any preconceived ideas. The first two treatment groups graduated from high school in May 1999. The final two treatment groups graduated from high school in May 2000. This study is one of the first longitudinal studies to determine the effectiveness of the simulator as a tool to postpone teen pregnancy until after graduation from high school.

Purpose of the Study

The purpose of this study is to determine the effectiveness of an infant simulator as a deterrent to pregnancy. Many programs have been established either to prevent teenage pregnancy or to provide care to pregnant and parenting adolescents. In spite of the millions of dollars allocated to such initiatives, their effectiveness remains largely unknown (Card & Reagan, 1989). Survival analysis will be employed to analyze data in

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determining when rather than whether an unplanned teen pregnancy occurred to high school students after they had simulated parenting using an infant simulator while in the eighth grade. This study can be a basis for comparisons of the effectiveness of tools used in sex education units of study in parenting classes, career and technology education classes, health education classes, teenage pregnancy deterrent programs, and other at-risk student programs.

<div align="center">Statement of the Problem</div>

The problem on which this study is based is that we, in the United States, have adolescents who are experiencing unplanned pregnancies, who do not complete high school, who work in low-paying jobs, and who receive welfare benefits. "In 1990, 45% of all first births in the United States were to mothers who were either teenagers, unwed, or lacking a high school degree" (National Campaign to Prevent Teen Pregnancy, 1997). In the late 1970s Chilman (1985) was calling for a broad-based forum for taking bold and controversial steps in addressing early adolescent pregnancy. For the last two decades the unplanned pregnancy rate for adolescents has climbed, with the physical, social, psychological, and economical impact on multiple generations only beginning to be realized. Therefore, it is very important that we research this area.

"When a baby is born to a mother who has not yet grown up herself, both mother and baby are likely to have a limited future and to place a substantial burden on society" (Texas Department of Health, 1996, p. 1). In 1990, the birthrate for girls age 15 to 19 was 59.9 per 1,000, up from 50.2 in 1986. The greatest increase occurred in the age range of 15 to 17 (Texas Department of Health, 1999a). The swell in the adolescent population, plus the knowledge that teens wait nine months or longer, on average, before using

contraceptives contribute to the formula necessary for an explosion of new lives (Texas Department of Health, 1999c).

In 1993, the United States birth rate for teens 15 through 17 years old had dropped to 37.8 per 1000, but Texas ranked fourth highest among all states in the nation in teen birth rate for the same age group. The Texas teen pregnancy rate increased to 41.5 per 1000 women for the less-than-18 age group in 1994 (Texas Department of Health, 1996). Of the 43,587 adolescents in the 13 through 17 age range in Tarrant County in North Central Texas in 1995, 1,859 reported being pregnant and 1,206 had a live birth (Texas Department of Health, 1997).

By 1995, the United States birth rate for teens 15 to 17 had dropped to 36.0 per 1000 females, yet Texas rose to the third highest among all states in the nation in teen birth rates for the same age groups (Texas Department of Health, 1998). Of all births to teens in Texas, 13.1% were repeat births. By the year 2000, it is estimated that the total number of teens ages 15 to 19 in Texas will be 1,547,215, an increase of 9% over 1996.

In the 1970s, a major transformation in the sexual behavior of American women occurred that was most noticeable among teenagers: women were becoming sexually active at younger and younger ages, and fewer teenagers were marrying. Sexuality among teenagers became primarily non-marital or premarital (U. S. Bureau of Census, 1990).

Financial Hardships

The teen pregnancy costs in Texas are staggering. In 1994, Medicaid paid for 154,482 deliveries in Texas at a total cost of $503 million. Approximately 25.7% of these deliveries were to teen mothers, and $239 million was spent for deliveries to teens (Texas Department of Health, 1996).

Medicaid paid $130 million for approximately 40,098 deliveries in Texas in 1996 (Alan Guttmacher Institute, 1998). The Texas Department of Health family planning service prevented approximately 20,974 pregnancies that would have resulted in births to teens ages 19 and under, for a savings of $97 million in Medicaid prenatal, delivery, and first-year infant care. For each Medicaid dollar spent on family planning, more than $4.50 was saved in Medicaid prenatal, delivery, and first-year infant costs. With the increased number of teens in the population, the potential costs of teen pregnancy will be magnified (Texas Department of Health, 1996).

Pomeranz, Matson, and Nelson (1991) identified some of the complicating factors of adolescent pregnancy as the high rate of sexually transmitted diseases that have been associated with an increased risk of pre-term labor and low infant birth weight. The average hospital cost for an infant weighing less than 5.5 pounds ranges from $12,000 to $39,000. The average cost for an infant weighing less than 3.3 pounds ranges from $31,000 to $500,000 (Texas Comptroller's Office, 1997).

Low Education

Teen parents normally do not complete high school, which results in employment in low-paying jobs and enrollment on the welfare rolls. Pregnant adolescents--especially those with low levels of education and economic status and those not receiving prenatal health care--are more likely to experience health problems and bear low birth weight infants. These health problems are connected to parent problems associated with adolescent childbearing, such as low levels of education and socioeconomic status, single parenthood, and large family size. Welfare benefits, Medicaid, and food stamps are public expenditures associated with adolescent childbearing.

What Happens to the Kids of Kids?

Children of adolescent parents tend to experience physical, educational, and social problems and are more likely to become parents as adolescents. Approximately one-fifth of adolescent mothers have a second child within two years (Texas Department of Health, 1996; Voydanoff & Donnelly, 1990).

Research Questions

The examination of when rather than whether high school teens that have simulated parenting using an infant simulator during the eighth grade become pregnant concerns the following questions:

1. Will teens who participate in the parenting experience with a computerized infant simulator remain non-pregnant longer than teens who have not experienced parenting with a computerized infant simulator?

2. When are teens at the greatest risk of engaging in behaviors that might lead to unplanned pregnancy?

3. Are students from one ethnic group more inclined to become pregnant than students from other ethnic groups?

4. Are students who are not involved in co-curricular activities more inclined to become pregnant than students who are involved in co-curricular activities?

5. Are pregnant teens who commit crimes more inclined to commit crimes against people or crimes against property?

This research will contribute to the body of knowledge applied to the prevention, reduction, and delay of unwanted teen pregnancies. It will help measure the effectiveness of one teen pregnancy prevention program available for use by classroom teachers.

A wide range of groups and agencies can use infant simulators as a tool in educating adolescents about the roles of parenting including Career and Technology Education Classes, Family and Consumer Sciences Classes, Teen Pregnancy Deterrent Programs, Teen Parenting Programs, Childbirth Preparation Classes, At-Risk Student Programs, Substance Abuse Intervention Programs, Child Abuse Counseling, Religious Education Classes (Jurmain Prototyping Company, 1994). Decisions makers can use this study as a tool to determine if the use of computerized infant simulators would be cost-effective. The program can be costly to initiate, causing some districts to choose other tools that might not be as effective. This study might help some districts choose to implement this more costly, but possibly more effective, tool.

Delimitations

The subjects were female eighth grade middle school students enrolled in a career and technology course called Life Management Skills-Career Investigations (currently called Skills for Living) in Grapevine, Texas, a heterogeneous suburban community in northeast Tarrant County (Department of Development Services, 1997). Four sets of students were involved in this study that spanned two school years. Only the female students were studied, leaving the study of males for another researcher. Forty-two girls were in the first experimental group that parented the infant simulators in December 1994. Thirty-one girls were in the second experimental group of students that parented the infant simulators in April 1995. There were 43 girls who did not take the course and did not parent the infant simulators. They comprised the control group for the first two experimental groups. The teens in the first and second experimental groups and the first

control group were in the 1999 high school graduation class. There were 116 girls in the eighth grade class in 1994-1995.

The third experimental set consisted of 39 girls who parented the infant simulators in November 1995. The final experimental set consisted of 27 girls who parented the infant simulators in April 1996. Experimental groups three and four were a part of the graduating class of 2000, which contained 105 girls. The control group for that year was comprised of the 39 girls who did not take the course and did not parent the infant simulators.

Of the 221 subjects participating in the study, 190 were Caucasian; 22 were Hispanic; 4 were Black; 1 was American Indian; 2 were East Indian; and 2 were Asian.

All of the students were given a newborn-size infant simulator doll, a full-size stroller, an infant car seat, a diaper bag, three changes of clothing that were gender specific, five cloth diapers, a box of baby wipes, one blanket, two baby bottles, and a baby book journal to maintain during the simulation. Toys for the infants were optional and were student supplied**.**

<div align="center">Limitations</div>

Subjects were randomly assigned to the classes at the beginning of the school year via computer assignment.

<div align="center">Definition of Terms</div>

Birthrate--Includes all births, live and stillborn.

Censored--A student who has remained non-pregnant.

Co-curricula--Student organizations that are extensions of the academic classroom.

Coitus--Sexual intercourse.

Continuous abstinence--Subjects who have abstained from intercourse all their lives.

Current abstinence--Subjects who had engaged in sexual intercourse during their lifetime but have been abstinent during the three preceding months.

Current sexual activity--Subjects who had engaged in sexual intercourse during the three preceding months.

Data are tabulated according to the woman's age at the pregnancy outcome, not at conception.

Date of confinement--The estimated date of delivery.

Engagement sex--Sexual activity before marriage between two engaged individuals.

Hazard function--Represents the probability of the risk of experiencing a pregnancy event. It is computed by dividing the number of students who become pregnant at any time period by the total number at risk of experiencing the event.

Nulliparous--Having never borne a child.

Periodic abstinence--When subjects abstain from intercourse for an extended period of time.

Pregnancy rate--Includes births, abortions, and miscarriages.

Premarital sex--Sexual activity before marriage.

Survivor function--Represents the probability that the sample will remain not pregnant longer than each time assessed until everyone is pregnant or has graduated from high school.

Survivors--Students who graduate from high school without becoming pregnant.

Uncensored--A student who has become pregnant.

Women in poverty--Those whose family income is below the federal poverty level of

$15,569 for a family of four in 1995 (Alan Guttmacher Institute, 1998).

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The war on teen pregnancy has been waged on many fronts--schools, social service providers, churches, homes and government at all levels. Each of these entities has had its agenda and ultimately the same goal--to reduce unplanned teen pregnancies. Certainly, there are many opinions surrounding the thorny issues of abstinence, conception, contraception, and abortion, but there must be a unity of basic purpose in this war against unplanned teen pregnancies

Classroom teachers can be one of the early interventionists in the battle to thwart teen pregnancies. The exact description of that role is as varied as the number of opinions of what should be taught in the classroom. This study will not define that role nor will it dictate the course content. Rather, it will look at one of the ways teachers can help students realize the responsibilities of being a parent and full-time caregiver for infants. The objective of this study is to evaluate the effectiveness of a teaching tool that is used to prepare teens to make intelligent, informed decisions about participating in behaviors that could result in an unplanned pregnancy. The determination of when rather than whether teens become pregnant after simulating parenting with a computerized infant simulator will determine the effectiveness of the teaching method. The goal is to deter pregnancies until after graduation from high school. When and under what circumstances

parenthood is permitted varies from one culture to another, but no society leaves the

scheduling of parenthood purely to biological happenstance nor puts it entirely in the

control of the prospective parent (Davis & Blake, 1956; Goode, 1960, 1961).

<u>Predictors of Teen Pregnancy</u>

Abrahamse, Morrison, and Waite (1988) identified a set of individual and family

attributes that generally determine a young person's chances of becoming a single parent.

The criteria are race or ethnicity, academic ability, socioeconomic status (SES), and the

structure of his or her parental family. Empirical data re-enforces the importance of the

family structure by identifying the specific factors of family stress, strain, and conflict;

disrupted family structure (loss of a father or father figure during formative years,

maternal rejection); abuse, neglect, and abandonment; and parental substance addiction as

additional predictors of high risk for early pregnancy (Banks & Wilson, 1989; Casper,

1990; Corcoran, 1999; Garrett & Tidwell, 1999; Hanson, Myers, & Ginsburg, 1987;

Knowles & Tripple, 1986; Liang, 1994; McCullough & Scherman, 1991; Musick, 1993;

Ravert & Martin, 1997; Robbins, Kaplan, & Martin, 1985; Thornton & Camburn, 1987).

Two other salient factors reported by Garrett and Tidwell (1999) are lax parental

supervision (for example, being a latchkey child at an early age) and the desire to have

someone to love.

Miller (1983) includes having a low school involvement and poor academic

success, having parents with low educational attainment, having low aptitude test scores,

and having low aspirations as other descriptors. A white teenage girl from an advantaged

background is 5 times more likely to become a teen mother if she grows up in a single-

mother household than if she grows up in a household with both parents. Another

surprising identifier is weak social skills (Maynard, 1997; Rodriquez & Moore, 1995).

High school girls who are involved in sports are less than half as likely to get pregnant as

girls who did not play sports, are more likely to begin sex later in adolescence, are more

likely to be virgins, are more likely to have fewer partners, and are more likely to use

contraceptives (National Campaign to Prevent Teen Pregnancy, 1998).

Kirby (1997) stresses absent and uninvolved parents, disconnected communities,

peer pressure, and unstructured free time as the most critical factors. Adolescents at risk

for pregnancy also tend to be followers and to exhibit poor interpersonal communication

skills (Garrett & Tidwell, 1999; Robinson & Frank, 1994; Trad, 1992). Other less

unchangeable factors that impact at-risk behaviors include: (a) the "problem behavior"

syndrome, (b) the opportunity costs of unwed childbearing, (c) the young person's

willingness to bear a child out of wedlock, and (d) the willingness of the school peers to

bear a child out of wedlock (Abrahamse et al., 1988; Archer & Cahill, 1991; Rosenthal et

al., 1996; Wodarski & Wodarski, 1995). A high proportion of young women who exhibit

characteristics of problem behavior become single mothers.

> Children living in families with four or more of the following characteristics are considered at "high risk': (a) child is not living with two parents, (b) household head is high school dropout, (c) family income is below the poverty line, (d) child is living with parent(s) who do not have steady, full-time employment, (e) family is receiving welfare benefits, and (f) child does not have health insurance. [The] percent of children living in "high-risk" families, based on [the] definition above in 1996 in Texas was 15% and in the U. S. was 14%. (Annie E. Casey Foundation, 1999, p. 3)

Teens who are close to their parents are more likely to remain sexually abstinent,

postpone intercourse, have fewer partners, and use contraception. Strong parental

attitudes and values disapproving of adolescent sexual intercourse and pregnancy, or

about the dangers of unprotected intercourse, are related to lower adolescent pregnancy risk. Parental supervision and regulation are also related to lower adolescent pregnancy risk. Teens whose parents closely supervise them are more likely to be older when they first have sexual intercourse, have fewer partners, and use contraception. However, some studies indicate that very strict parental monitoring by parents is associated with greater risk of teen pregnancy, suggesting that less intrusive supervision may be more effective (Miller, 1998).

The total life situation of low-income youth tends to promote attitudes of fatalism and alienation which undermine the rational, planned use of contraceptive devices. Some girls report that they become pregnant in hopes of receiving more attention from friends or family. Others become pregnant in exchange for a commitment of affection and exclusivity from her partner. Many teens become pregnant through gross ignorance of the menstrual cycle and conception (Black & DeBlassie, 1985).

Global and National Epidemics

During the 1980s the world governments began to focus attention on the needs and problems of young people. The United Nations proclaimed 1985 the International Year of Youth, and numerous publications were written addressing teenagers from a variety of perspectives. The World Health Organization placed health and social problems associated with birth to unwed teenage mothers, sexual health education, and contraceptive services at the top of the list of prioritized adolescent programs (Olsen, 1993).

A study of 37 developed countries found that a greater openness about sex-related matters in the society is correlated with low levels of teenage pregnancy. In some

countries, sexual openness and widespread knowledge about sex-related matters are communicated through the school, such as in Sweden, but in others, communication takes place through such channels as the media, family planning organizations, and government-sponsored publicity programs (Wulf, 1986).

By 1986, the rate of pregnancies among adolescent girls in the United States was more than double the rate in Canada and other Western countries (Alan Guttmacher Institute, September 1999; McDaniel, 1986) and was nine times higher than the rate in Japan (Alan Guttmacher Institute, September, 1999; Centers for Disease Control & Prevention, 1997). By 1987, American teenage girls under 15 were at least 5 times more likely to give birth than young adolescents in any other developed country (Hayes, 1987).

Society began to recognize that adolescents are an important part of the population and require special consideration as a group when formulating legislation. Their problems mirror the complex problems of society, specifically their unintended pregnancies (Huerta-Franco, de Leon, & Malacara, 1996; Singh & Wulf, 1990). State and national welfare laws are being rewritten in an effort to reduce the personal and societal burden of adolescent childbearing.

The U. S. Department of Health and Human Services report on the nation's health objectives for the year 2000 identified three of the family planning objectives related to adolescent childbearing: (a) reduce pregnancies among girls aged 17 and younger to no more than 50 per 1,000 adolescents, (b) reduce to no more than 30 % the proportion of all pregnancies that are unintended, and (c) increase to at least 40 % the proportion of ever sexually active adolescents aged 17 and younger who have abstained from sexual activity

for the previous three months (U. S. Department of Health & Human Services, 1990; Warren & Johnson, 1989).

U. S. Pregnancy Rates

Of the estimated 12 million adolescents who were sexually active in the United States in 1972, 5 million were females (Davis & Harris, 1982; Diepold & Young, 1979). On average, teenage girls were becoming sexually active at 16 years of age, and at least one million teens were becoming pregnant every year (Alan Guttmacher Institute, 1981; Furstenberg, 1976; Jaffee & Dryfoos, 1980; Vance, 1985). In the early 1980s, 10 to 14-year-olds were beginning to experiment with sex, with 6% of the girls and 18% of the boys having engaged in sexual intercourse (Alan Guttmacher Institute, 1981). Of the expectant teens, about two-thirds carried their pregnancies to term and one-third opted for abortions (Baldwin, 1983).

Out-of-wedlock births in the U. S. increased just as all industrialized societies were cutting welfare spending. The assumption that welfare promotes such births was not borne out by the facts (Centers for Disease Control & Prevention, n.d.; Luker, 1996).

> That women of all ages are more willing to bear children out of wedlock is usually attributed to the fact that illegitimacy has lost its stigma. . . . Public attitudes toward what colonial Americans called bastard have changed dramatically in a relatively short time. In 1970 only about 1 American in 10 thought that childbearing outside marriage should be legal, but four years later that percentage had more than doubled, to 25%. By 1985 the figure had risen to 40%. Although a majority of Americans still oppose out-of-wedlock childbearing, opinion shifts of this magnitude can truly be called revolutionary. (Luker, 1996, p. 95)

Nationwide, the pregnancy rate declined 4% between 1995 and 1996, from 101.1 to 97.3 pregnancies per 1,000 for teens aged 15 to 19. White and black adolescents have

experienced declines in pregnancy rates, although the magnitude of the changes has

varied considerably. Among black teens aged 15 to 19, the nationwide pregnancy rate fell

20% between 1990 and 1996; among white teenagers, it declined 16%. The pregnancy

rate among Hispanic teenagers increased between 1990 and 1992, but then fell 6% by

1996. No longer is there a large disparity between ethnic groups or races in the pregnancy

rates (Centers for Disease Control and Prevention, 1997; Furstenberg, Morgan, Moore, &

Peterson, 1987).

The National Campaign to Prevent Teen Pregnancy has a different perspective.

They found the following:

> The teen birth rate has declined slowly but steadily from 1991 to 1998 with an
> overall decline of 18 percent for those aged 15 to 19. These recent declines
> reverse the 24-percent rise in the teenage birth rate from 1986 to 1991. The largest
> decline since 1991 by race for was for black women. The birth rate for black teens
> aged 15 to 19 fell 26 percent from 1991 to 1998. Hispanic teen birth rates
> declined 13 percent between 1994 and 1998. The rates of both Hispanics and
> blacks, however, remain higher than for other groups. Hispanic teens now have
> the highest teenage birth rates. In addition, despite the recent declines in teen birth
> rates in general, the overall teen birth rate for 1998 is still higher than it was in the
> mid-1980s when the rate was at its lowest point. Also, most teenagers giving birth
> before 1980 were married whereas most teens giving birth today are unmarried.
> (see Table 1; National Campaign to Prevent Teen Pregnancy, 2000, p. 1)

> Roughly 880,000 pregnancies occurred nationwide among women aged 15 to 19
> in 1996, 62% of these pregnancies occurring in 18 to 19 year olds. Nevada and
> California reported the highest number of adolescent pregnancies followed by
> Texas, New York, Florida, and Illinois (with about 40,000 – 80,000 each). The
> smallest numbers of teenage pregnancies were in Vermont, North Dakota,
> Wyoming, South Dakota, and Alaska, all of which reported fewer than 2,000
> pregnancies among women aged 15 to 19. (Alan Guttmacher Institute, April 1999,
> p. 1)

U. S. Teen Birth Rates

In 1990, the birthrate for girls age 15 to 19 was 59.9 per 1,000, a rise from 50.2 in

1986 when the greatest increase occurred in the age range of 15 to 17 (Stern, 1993). In

Table 1

U. S. Pregnancy Rates (Per 1,000 Females Aged 15-19) by Race/Ethnicity

Race or Ethnicity	1990	1991	1992	1993	1994	1995	1996	1997
Hispanics	189.6	189.6	185.2	180.4	172.5	158.7	153.3	99.1
Non-Hispanic Blacks	224.3	223.7	218.7	212.7	202.1	184.8	178.9	89.5
Non-Hispanic Whites	98.3	97.0	93.0	90.9	88.9	86.0	82.6	86.4

Note. Hispanics may be any race. From Alan Guttmacher Institute, April 1999, June 1999; Centers for Disease Control and Prevention, 1995a; Moore et al., 1999; Ventura et al., 1998.

1993, the United States birth rate for teens 15 to 17 years old fell to 37.8%. While the teen birth rate decreased in the U. S., the number of births to teens increased in 1994, which reflected an increase in the overall U.S. teenage population. This increase was concentrated among younger teens. The number of births to adolescents 18 and 19 was virtually unchanged from 1993 to 1994. The decline in the teen birthrate in 1995 led to a decline in the number of teen births in 1995 (Centers for Disease Control and Prevention, 1995; Moore, Romano, & Oakes, 1996)

Wide variation is also seen in state teenage birthrates for 1996. The highest rates (70 to 75 births per 1,000 women aged 15 to 19) were found in Mississippi, Arkansas, Arizona, Texas, and New Mexico, yet in the District of Columbia, 102 births occurred per 1,000 teenage women. The lowest rates (29 to 32 per 1,000) were in New Hampshire, Vermont, Maine, Minnesota, and Massachusetts (Alan Guttmacher Institute, April 1999; Centers for Disease Control and Prevention, 1997).

<u>Texas Pregnancy Birth Rates</u>

Texas ranked fourth highest among all states in the nation in teen birth rates for the same age group. The Texas teen pregnancy rate increased to 41.5 per 1000 women for the less-than-18 age group in 1994 (Texas Department of Health, 1996). By 1995 the 22,389 births to teens 17 and under represented a Texas teen pregnancy rate of 41.3 per 1000 women. There were 22,360 births to teens 17 and under in Texas in 1996. The 1996 Texas teen pregnancy rate had dropped to 40.3 per 1000, but the rate soared to 67.0 per 1000 by 1997 (see Table2).

Table 2

<u>Teen Pregnancies in Texas and U. S., 1996</u>

Age	No. of Pregnancies	Texas Rate	U. S.
15-19	80,490	113	97
15-17	31,800	74	62
18-19	48,690	174	153

<u>Note.</u> Rate is per 1,000 girls. From National Campaign to Prevent Teen Pregnancy, May 2000.

Of the 43,587 adolescents in the 13 to 17 age range in Tarrant County in North Central Texas in 1995, 1,859 reported being pregnant and 1, 206 had a live birth (see Table 3; Texas Department of Health, January 1997). According to the Texas Department of Health, in 1997 (the most recent data available) Tarrant County experienced an increase to 52.0 per 1000 for the teen birth rate (See Table 4; Texas Department of Health, January 1997).

<u>Why Delay Childbearing?</u>

During the Great Society of the 1960s and into the 1970s, social research revealed that young women who gave birth in their teens not only seriously compromised their own educational, economic, and personal development but also jeopardized their children's life chances. Adolescent motherhood and the resultant families created a tremendous need for financial support in the form of welfare aid, increased medical supplements, and food and housing subsidies (Maynard, 1997; Singh & Wulf, 1990).

Why is it important to encourage teens to delay childbearing until they are 20 or 21, well past high school graduation? Among young women who gave birth within four years of the eighth grade, 62% dropped out at some point. 25% of teens dropped out prior to pregnancy, suggesting that they were already disengaged from school before they became pregnant. Thirty-seven percent dropped out after becoming pregnant, and only 38% remained in school during the pregnancy (Alan Guttmacher Institute, April 1999; Trad, 1999).

In 1992, the poverty rate for children whose parents had less than a high school education was 66% compared with 34% for children of high school graduates and 10% for those whose parents went beyond high school (see Table 5; Study says 26%, 1995). Texas ranked 44th in the nation in graduation rates in 1992 (Texas Employment Commission, 1992). The longitudinal dropout rate for grades 7 through 12 in Texas was 27% (82,325 students) in 1991 (Texas Education Agency, 1991). In 1985, one-third of all dropouts were pregnancy related (27,168 students). The resulting consequences to Texas taxpayers was approximately $17 billion annually to cover the costs associated with

Table 3

Birth, Pregnancies, and Population, By Age, Tarrant County, Texas, 1995

Female Age	Live Births	Reported Pregnancies	Female Population
10-12	2	2	28,988
13	6	10	9,183
14	43	71	9,373
15	206	308	8,970
16	377	575	8,393
17	574	895	7,868
18	808	1,274	7,299
19	956	1,446	6,675

Note. Caution should be used in analyzing birth and pregnancy outcomes in categories with fewer than 20 teen births. Pregnancies include live births, fetal deaths, and induced terminations of pregnancy. From Texas Department of Health, 1999d.

school dropouts, which included forgone income and lost tax revenues; increased cost in welfare, crimes, and incarceration; higher unemployment insurance payments and placement; and adult training and education expenses. In 1986, each dollar invested in educating dropouts while they were still in high school was estimated to result in a return of $10 dollars back to the Texas taxpayers (Department of Community Affairs, 1986).

As a group, teenage mothers tend to be less well educated, do not have adequate vocational skills, and are not financially and emotionally equipped to provide adequately for their children. They have motivations and attitudes that are psychologically questionable concerning the bearing and raising of children (Simkins, 1984). An

adolescent has not yet reached either physical or psychological maturity. Once the

teenager becomes pregnant, she can no longer continue the normal search for her identity.

Table 4

Teen Birth Rate (Births Per 1,000 Females Aged 15-19) – 1990-1998

United States; Texas; Tarrant County; and Fort Worth, Texas

Location	Age	1990	1991	1992	1993	1994	1995	1996	1997	1998
U. S.	15-19	[a]59.9	[a]62.1	[a]60.7	[a]59.6	[a]58.7	[a]56.9	[b]54.4	[b]52.3	[b]51.1
U. S.	15-17	[a]37.5	[a]38.7	[a]37.8	[a]37.8	[a]37.6	[b]36.0	[b]33.8	[b]32.1	[b]30.4
U. S.	18-19	[a]88.6	[a]94.4	[a]94.5	[a]92.1	[a]91.5	[b]89.1	[b]86.0	[b]83.6	[b]82.0
Texas	15-19	[a]75.0	[a]79.0	[a]79.0	[a]78.0	[a]78.0	[b]76.0	[c]75.3	[d]73.0	[e]73.8
Texas	<18	--	--	--	--	[f]41.5	[g]41.3	[h]40.3	[d]49.0	[ee]36.2
Texas	18-19	--	--	--	--	[a]116.0	--	[d]111.3	[d]111.0	[e]116.5
Tarrant Co.	15-17	--	--	--	--	[i]43.4	[h]46.2	[j]48.8	[j]52.0	--
Fort Worth	13-19	--	--	--	--	[a]69.3	[b]76.3	--	--	--

Note. [g]Represents girls 13-17 years. [ee]Girls 13-17 years. From [a]Moore et al., 1996; [b]Moore et al., 1999; [c]Texas Department of Health, 1997; [d]Alan Guttmacher Institute, April 1999; [e]Texas Department of Health,1999a; [f]Texas Department of Health, 1996; [g]Texas Department of Health, March 1997; [h]Texas Department of Health 1998a; [i]Texas Department of Health, 1995; Texas Department of Health, [j]August, 1999.

Rather, a kind of hold is placed on her development and she is forced to focus on the

pregnancy. As a result, the pregnant teen may engage in maladaptive behaviors and

inappropriate emotions that affect her own development and her relationship with her

child. This phenomenon occurs to older women, but much more seldom (Trad, 1999).

Several other sound arguments for teens to postpone pregnancy until at least age 20 are:

Table 5

U. S. High School Dropout Rates in 1994

	Total	Hispanics	Blacks	Whites
Did not drop out	38%	29%	47%	36%
Dropped out prior to pregnancy	25%	39%	10%	29%
Dropped out after pregnancy	37%	32%	44%	35%

Note. Among young women who had a high school age birth (a birth within four years of eighth grade), the majority (62%) had dropped out at some point. 25% of women dropped out prior to pregnancy, suggesting that they were already disengaged from school before they became pregnant. An additional 37% dropped out after the pregnancy, while only 38% did not drop out at any time. From: Alan Guttmacher Institute, April 1999.

1. Teen mothers have less formal education, work more hours, and are more likely to be and to remain single parents (Upchurch & McCarthy, 1989).

2. Almost half of unwed teen mothers go on welfare within one year of their baby's birth. By the time their first baby is 5 years old, 72% of white teens and 84% of black teens have received Aid to Families with Dependent Children. Older parents are less likely to receive welfare aide (Horn, 1996).

3. The incarceration rate of offspring born to adolescents is at least 12% higher than older mothers and the correctional costs escalate by more than $900 million to children of adolescents (Grogger, 1997).

4. Children born to teens perform lower in mathematics and reading recognition, have a greater likelihood of repeating a grade, and have a greater chance of being rated unfavorably by teachers in high school (Maynard, 1997).

5. The costs associated with foster care could be reduced by about $1 billion (Maynard, 1997).

6. The probability that the children of older mothers would graduate high school increases by 9% (Maynard, 1997; Trad, 1999).

7. Older mothers assume more of the medical costs for their children; thus costs paid by society are cut by almost 50% (Maynard, 1997).

8. Child support payments would increase almost $200 a year over the 18-year period following the child's birth (Maynard, 1997, Trad, 1999).

Incarceration-Related Costs

One may question whether early fertility on the part of a young mother actually leads to increased crime on the part of her children. Equivalently, one could ask whether the amount of crime committed by an adolescent would have been less if that adolescent's mother had delayed her childbearing. It is hard to imagine otherwise. Teen childbearing has been shown to reduce the mother's educational attainment, her employment, her earnings, and her likelihood of marriage. Single parents with lower human capital and lower income may transmit to their children the kinds of economic and social disadvantage that give rise to adolescent crime. Furthermore, a young mother simply may lack the maturity required to be a good parent. As a result, her children may act out; as adolescents, they may commit crime. (Grogger, 1997, p. 231)

Early childbearing and youth crimes are linked (Grogger, 1997; Simkins, 1984; Singh & Wulf, 1990). "The sons of young teen mothers are 2.7 times more likely to be incarcerated at some point during their 20s than the sons of older mothers," Grogger (1997) concludes and teen mothers could reduce the risk of incarceration on the part of their sons if they simply delayed childbearing until after age 21.

If young teen mothers were to delay childbirth until just after their 18th birthday, the incarceration risk would fall by about 6%. If all teen mothers so delayed their pregnancies, the number of young men in jails and prisons in the United States would fall by 21,000 to 26,000, and the correctional budgets could be reduced by roughly $22 million annually.

Longer delays could have much larger effects. If young teen mothers were to delay childbirth until they were almost 23 years old, which is the average age at

which other women begin their families, the incarceration risk would fall by 17%. The prison populations would fall by 52,000 to 65,000, and the correctional costs incurred by federal, state, and local governments would plummet by $1.25 billion per year. (Grogger, 1997, p. 252)

These figures represent only correctional costs and do not include the crime-related costs to individuals. The direct costs to crime victims plus the costs for private security measures and insurance, when combined with the costs associated with peoples' fears of being victimized, create a total crime-related cost of young teen childbearing that may exceed the incarceration-related costs by a great deal.

Health Concerns

Adolescent pregnancy poses a major public health problem in the United States. Teenage pregnancies are associated with substantially increased health risks for both the mother and child. Biological immaturity, nutritionally poor diets, and inadequate prenatal care contribute to the pregnancy-related health risks faced by adolescents. Adolescent pregnancies that result in childbirth often result in severe, adverse consequences, such as high incidences of pregnancy and childbirth complications and high incidences of low birth weight infants. Low birth weight is often associated with developmental and mental disabilities and high infant mortality and morbidity rates (see Table 6; Davis & Harris, 1982).

Research indicates that children born to teen mothers tend to have lower cognitive test scores and more difficulty in school; poorer health, yet receive less health care; less stimulating and supportive home environments; higher levels of incarceration; and higher rates of adolescent childbearing themselves. These patterns are found even when

Table 6

Birth Outcome Indicators for Teen Mothers in Texas for 1994 and 1996

	1994	1996
Low Birth weight <5 ½ lbs.	9.4%	10.0%
Late or No prenatal care	43.3%	42.1%

Note. From: Texas Department of Health, 1999a.

researchers considered the background differences that distinguish adolescents who

become mothers (Texas Department of Health, 1999c; Moore et al., 1986).

Financial Hardships

The financial hardships associated with teenage pregnancy are on 2 levels: the

impact on the individual and families and the impact on society. Teen parents may be

more vulnerable than their adolescent counterparts to economic dependence and are less

able to escape poverty. The lack of schooling, low wages, and high medical costs

associated with low-birth weight babies combine to create a pit of economic gloom for

the adolescent parent (Furstenberg, Levine, & Brooks-Gunn, 1990; Trad, 1999). Pregnant

teenagers, teen parents (both mother and father), and their children should have access to

necessary medical and economic assistance and they should be given the opportunity to

continue their education (Vinovskis, 1988).

In the 1970s, a major transformation in the sexual behavior of American women

occurred. Women were becoming sexually active at younger and younger ages, and fewer

teenagers were marrying. This change in the marriage and fertility patterns of American

women has been so drastic that sociologists have for some time now regarded teenage

parenthood as a clear deviation from American parenting norms (Furstenberg, 1976;

U. S. Department of Commerce, Economics, & Statistics Administration, 1992). The

change was most noticeable among teenagers where sexuality became primarily non-

marital or premarital (Hofferth, Kahn, & Baldwin, 1987; Luker, 1996; U. S. Bureau of

the Census, 1990; Vinovskis, 1988). Many of the problems we now associate with

adolescent childbearing are much more endemic to families with young mothers today

than they were three decades ago (Caldas, 1994).

Only 8% of individuals who finished high school, got married, and then waited at

least until age 20 to have their first child were living in poverty in 1992. In contrast, 79%

of those who did not finish high school, who did not get married before having their first

child, and who did not wait until age 20 to have their first child were living in poverty

(Annie E. Casey Foundation, 1999).

> Since low income has been found to predict pregnancy and parenting status,
> macrosystem-level intervention involving educational policy is warranted. Lack
> of academic inclination or performance may limit employment opportunities and
> income, and for those who are not academically inclined, alternative programs
> could be implemented so that they are prepared to earn a living when they
> graduate from high school. Academic instruction related to vocational training
> may have more relevance for such students. For example, math skills might be
> more easily acquired in the context of bookkeeping. Science and math instruction
> might be integrated into the mechanical trades. … In this way, adolescents would
> not only acquire skills and knowledge, they would also be exposed to role models
> and the realities of the work environment. Such adolescents would be less likely
> to jeopardize their future by becoming pregnant, and if they did have children, to
> be better prepared to provide financially for them. (Corcoran, 1999, p. 615)

However, one argument for early childbearing is associated with earnings. Teens

who start their families early have a tendency to complete their childbearing more

quickly. They tend to start their careers later but work more hours and earn more overall compared to women who postpone childbearing as a result of a miscarriage (Maynard, 1997).

Nearly one in three pregnant women in Texas receives little or no prenatal care. An average of $20,000 is spent on initial hospital care for each low-birth weight infant with a total of $400,000 spent on medical care over a lifetime. With the increased number of teens in the population, the potential problem of teen pregnancy costs could be astronomical (Texas Department of Health, 1996).

<u>Pregnancy Prevention Indicators</u>

What are factors associated with the prevention of the onset of an unwanted adolescent pregnancy? Once again, one can find numerous studies to support almost any point of view. Fortunately, some identified interventions do work. When adolescents and their parents hold values that stress responsibility, the adolescents' chances of experiencing an out-of-wedlock childbirth are significantly reduced (Hanson et al., 1987). Other studies suggest that while parents' normative beliefs have limited effect in the decision to become sexually active, they have considerable impact on later contraceptive use (Baker, Thalberg, & Morrison, 1988).

Allen and Bender (1980) report that social programs can reduce teen pregnancy. Teenage girls are less likely to become pregnant if they are involved in community-service projects (<u>Drop in teen pregnancies</u>, 1997). Kirby (1997) and the National Campaign to Prevent Teen Pregnancy name trustworthy mentors positively engaged with at-risk youth as a strong deterrent to unplanned pregnancy.

Huerta-Franco and Malacara (1999) noted that adolescent sexuality, attitudes, and knowledge may be related to family structure and functioning. The higher the quality of the parent-child relationship, the lower the rate of teen parenthood (Manlove, 1997). Close parental supervision has a similar but less consistent relationship. Affective involvement with parents encourages the development of more responsible attitudes towards sexuality. Sexually active teens appear to come from family backgrounds who support liberal sex role ideals (Fingerman, 1989).

Religiosity can be very influential, but its effect is complex and not uniform (de Gaston, 1994; de Gaston, Weed, & Jensen., 1996; Voydanoff & Donnelly, 1990). The National Campaign to Prevent Teen Pregnancy has formulated nine tips to help faith leaders and their communities to address teen pregnancy (McGeady, 1998). Research continues to examine the effectiveness faith-based organizations play in causing teens to refrain from engaging in certain behaviors.

Youth with goals that include continuing their education are less likely to bear children out of wedlock than those who do not desire more education. Manlove (1997) reports that for all racial and ethnic groups, high levels of school engagement are associated with postponing pregnancy. Particularly important are high grades, high test scores, and high expectations for postsecondary education. The attitude of peers toward teen pregnancy encountered at school also affects the young person's tendency to become a single parent or to postpone risky behaviors (Baker et al., 1988).

Young people who personally reject the idea of having a child outside of marriage often manage to remain childless, even when they come from backgrounds with an

inclination for single parenthood (Abrahamse et al., 1988). The National Campaign to

Prevent Teen Pregnancy commissioned a research review to determine which school and

community-based programs have demonstrated success in reducing teen pregnancy

(Kirby, 1997). Some indicate that the prevention of teenage pregnancy entails a

multifaceted approach that addresses health-risky behaviors, early sexual experiences,

and family life. Programs may be administered by public and private agencies as well as

schools studies (Berenson, San Miguel, & Wilkinson, 1992; Diorio, 1981; Duryea, 1992;

Kellogg et al., 1999). Interventions need to be implemented at both the family and

individual levels and should focus on physical, sexual, and substance abuse; appropriate

parenting techniques; and education (Nelson, 1989).

In 1990, the U. S. Department of Health and Human Services released a report

detailing the nation's health objectives for the year 2000. Objectives include

contraceptive devices, family planning, sexually transmitted diseases, maternal and child

health clinics, and teen pregnancy. Some of the objectives that pertain to teens are:

1. Reduce pregnancies among girls aged 17 and younger to no more than 50 per 1,000 adolescents. (Baseline: 71.1 pregnancies per 1,000 girls aged 15-17 in 1985.) (a) Black adolescent girls aged 15-19; 1985 baseline, 186 pregnancies per 1,000; year 2000 target, 120. (b) Hispanic adolescent girls aged 15-19; 1985 baseline, 158 pregnancies per 1,000; year 2000 target, 105.

2. Reduce to no more than 30% the proportion of all pregnancies that are unintended. . . .

3. Reduce the proportion of adolescents who have engaged in sexual intercourse to no more than 15% by age 15 and no more than 40% by age 17. (Baseline: 27% of girls and 33% of boys by age 15; 50% of girls and 66% of boys by age 17; reported in 1988). . . .

4. Increase to at least 40% the proportion of ever sexually active adolescents aged 17 and younger who have abstained from sexual activity for the

previous 3 months (Baseline: 24% of sexually active girls aged 15-19 in
1988.) Other objectives dealt with contraceptive devices, family planning,
sexually transmitted diseases, and maternal and child health clinics. (U. S.
Department of Health and Human Services, 1990, p. 272)

Parenting Education

Education is the Key

The subject of sex education remains a divisive one. On one side are those who argue that Americans should learn to accept adolescent sexuality and make guidance and birth control more easily available, as it is in parts of Europe. On the other side are those who contend that sex education is up to the parents, not the state, and that teaching children about birth control is tantamount to condoning promiscuity or violating family religious beliefs and values (Lachance, 1997).

Sex education has been a feature of public schools since the Progressive Era, yet we are just beginning to understand what makes a successful program. At least 31 states and the District of Columbia have policies that mandate or encourage sex education, but curricula vary widely in their length and their content, and relatively few have been systematically and rigorously evaluated. The juries are still arguing the merits of sex education courses as to whether or not they promote earlier sexual involvement or deter it. One can find an equal number of studies that support either side. At any rate, careful and rigorous review of all the studies on the matter suggests that taking sex education courses have virtually no effect on an individual's propensity to become sexually active. What is apparent, though, is that some sex education programs can reduce pregnancy under certain circumstances (Kirby, 1997; Luker, 1996; Muraskin, 1986).

Factors other than knowledge that influence decision-making have been summarized by Chilman (1979) and include total life situation, stage of development, and related lifestyles of adolescents. Since these factors are not easily changed and knowledge can be increased, as, sex education should play an important role, but not the only one, in prevention of unwanted pregnancies (Kirby, 1980).

Brief Review of Sex Education in the U. S.

A brief study of sex education in the United States reveals that the goal of sex education in 1900 was not meant to provide information that would encourage sexual adjustment but was merely to reinforce the old traditional values of restraint, and sex was for procreation only. In 1940, sex education was expected to help contribute to the long-term sexual adjustment of individuals, with emphasis on personal relationships and individual development rather than just the dangers associated with biology and "lack of control." By the 1980s, sex education included sexuality and the importance to human fulfillment, values, and life style choices; open communication techniques; the use of new teaching methods to ensure class participation; contraceptive techniques; and explicit films (Penland, 1981).

> Sex education is a complicated process with need for discussions, question-and-answer sessions, and time to absorb information and return for more information. In short, it is a continual process of exploration of the sexual aspects of one's being. This process cannot be measured in meaningful units of time. A one-hour exposure to information on adolescent development, human reproduction, birth control, and venereal disease at least opens the possibilities for the initiation of a dialogue between the growing adolescent and peers, counselors, and family. (Allen and Bender, 1980, p. 188)

The profile of sex education in the 21st century finds many abstinence-based programs that encourage young people to abstain from sex, warn them of the dangers of

sexual activity, and try to give them the communication skills needed to say no to sex. Many comprehensive programs include contraception information.

As with all issues, a divergence of opinion exists. A report from Planned Parenthood reveals that 89% of U. S. parents want sex education in schools; 81% of American parents prefer explicit sexual materials to fully inform teenagers about the dangers of sexually transmitted diseases; 73% support making contraceptives available in schools; and 65% believe sex education helps people avoid acquired immune deficiency syndrome (AIDS) (Planned Parenthood, n.d.).

The opposing values and beliefs held on sexuality education create conflicts. Negotiating these belief systems to achieve the final educational model can be challenging at best (Flamer, 1993; Forrest & Silverman, 1989). Rosenthal el al., (1996) and others (Fine, 1988; Garrett & Tidwell, 1999; Stanton, Black, Kalijee, & Ricardo, 1993; Taylor & Ward, 1991) suggest that girls remain confused about their sexuality and how to integrate it into emotional relationships. Sex education programs must incorporate these issues but in a culturally appropriate manner (Juhasz & Sonnenshein-Schneider, 1987; Taylor & Ward, 1991; Zabin, Hirsch, Smith, Streett, & Hardy, 1986).

To make an impact on the pregnancy rate among adolescents, interventions must focus on the context of relationships in which sexual decision-making occurs (Diorio, 1981; Rosenthal et al., 1996). Today sex education covers a wide range of topics in a variety of formats, yet most sex education courses in the United States are less than comprehensive in their scope and substance. Some programs are extremely short (5 to 20 hours) and are often limited to safer topics such as anatomy and physiology.

<u>When Should Sex Education Be Taught?</u>

Another factor limiting the effectiveness of sex education on the pregnancy rate among adolescents is the fact that many school districts postpone sex education courses until the later years of high school, when students are thought to be more mature. Between one-fourth and one-half of Americans do not finish high school (Department of Community Affairs, 1986). This means that a substantial number of youth, and a disproportionately number of at-risk ones at that, may never reach the grade level where the sex education courses are taught. If adolescents are bearing children at 12 and 13, then they obviously are sexually active. Schools should take a more active role in pregnancy prevention efforts. Allen (1995) endorses beginning sex education with kindergartner children by teaching them to protect the only body they will ever have then adding a little more to the curriculum every year. Banks and Wilson (1989) call for appropriate sex education for preteens before they start dating and before they become sexually active. When sex education is given to young people who are already sexually active, it seems to have little effect on their contraceptive and risk-taking behavior. To be more effective sex education should be emphasized at least by the sixth grade (Marsiglio & Mott, 1986). Hill (1991) calls for interventions in the fourth, fifth, and sixth grades classrooms. Howard and McCabe (1990) conclude that by the end of the eighth grade, students who had not participated in an abstinence program directed towards the prevention of unwanted teen pregnancies were as much as 5 times more likely to have initiated sexual activity than were those who had participated in such a program.

As a first line of defense, there is the need for a broad range of programs directed at forestalling coital contact at early ages (Hardy & Zabin, 1991; Rosoff, 1989;

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Voydanoff & Donnelly, 1990; Zitner & Miller, 1980). Large school districts clearly support education to help young people avoid becoming pregnant and in their curricula emphasize that abstinence from sexual relations is the most effective strategy for achieving this aim (Kenney, Guardado, & Brown, 1989).

A number of researchers have suggested that adolescents are generally ignorant about reproduction and contraception (Amonker, 1980; Goldsmith, 1972; Presser, 1974; Sorenson, 1973) while some studies (Cvetkovick & Grote, 1975; Goldsmith, Gabrielson, Gabrielson, Mathews, & Potts, 1972) imply that there is little, if any, relationship between levels of measured knowledge about contraception and contraceptive behavior. Others find that those adolescents who knew the least about the risks of becoming pregnant were also those who were most likely to have engaged in intercourse without contraception (Kantner & Zelnik, 1972; Sorenson, 1973; Zelnik & Kantner, 1972).

Although researchers generally agree that sex education is successful in increasing knowledge, they do not agree on the most effective content or methods for such programs (Kirby, Korpi, Barth, & Cagampang, 1997; Kirby, 1980). The amount of sex education adolescents receive is not as important as is the timing of the instruction. Curricula for sex education traditionally have been designed by educators or health professionals to teach what they believe the students should know. However, some sex educators believe it is important to involve the students themselves in the process of devising such curricula (Gordon, 1974; Reichelt, 1977).

Reichelt (1977) and Killion (2000) make several points that emphasize the desirability of involving students in curriculum development. First, without student

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representation, adults may not be aware of students' specific sex information needs.

Second, without student input, content and structure of the programs may not be tailored

to fit the target population. And third, getting students involved in program planning and

operation may be valuable for their growth and development. According to Reichelt,

students must be regarded as active partners in curricula development and policy

formulation, not as merely passive receivers of sex education.

In order to make the most effective use of student input, three things should be

determined: what they can understand, what they already know, and what they want to

know (Davis & Harris, 1982). Most adolescents do not receive the amount of sex

education that they want or need.

> Fewer than half (43%) of the [special education] teachers had ever included
> sexuality education in their programs, and most had not covered the subject in
> depth or detail. However, the same teachers describe their pupils as frequently
> sexually active, predominantly misinformed or uninformed about sex,
> experiencing problems in sexual and social interactions, and anxious to learn
> more about sexuality in school. (Brantlinger, 1985, p. 100)

> By age 18, according to the 1982 National Survey of Family Growth (NSFG),
> 68% of 15 to 19-year-old women have received formal instruction about
> pregnancy and contraceptive methods, 16% have had instruction about pregnancy
> only, and another 16% have received neither type of education. The age at which
> formal contraceptive education is first provided has been declining. Among 15
> year olds, for example, 47% have had instruction by their 15th birthday, compared
> with 33% of 17 year olds and 26% of 19 year olds.

> Forty-six percent of adolescent women have had premarital intercourse.
> Exposure to formal sex education appears to have no consistent effect on the
> subsequent probability that a teenager will begin to have intercourse. Sex
> education does influence contraceptive knowledge and behavior, however.
> Sexually active teenagers who have had formal instruction report knowing how to
> use more methods than do adolescents who have had no instruction. The former
> group is also significantly more likely to have practiced contraception at some

time. And among ever-users, those who have received pregnancy and contraceptive education before first coitus are significantly more likely to have used a method at first intercourse.

Nearly one-third of premaritally sexually active adolescents have had at least one premarital pregnancy. The NSFG data reveal no significant relationship between exposure to sex education and the risk of premarital pregnancy among sexually active teenagers. (Dawson, 1986, p. 162)

Giles (1987) discusses the need for sex education for pupils of special schools where the emphasis is to meet the needs of people with special needs. There is little evidence that special schools are developing sex education programs.

A survey of 5,000 students in selected schools from kindergarten through grade 12 was carried out in Connecticut in the 1960s. The purpose was to discover the health interests, concerns, and problems of students of all ages. Seventh grade students asked more questions about sex than any other topic. The questions ranged from very naïve to experienced. Eighth-grade students were interested in the ethical, moral, and practical importance of sexual interests and activities. If these ages are highly interested in sexual topics, to be the most effective, sex education should begin before seventh grade (Davis & Harris, 1982; Kirby, 1997; Luker, 1996). Calvert and Stanton (1992) suggest that boys desire the same information concerning sex education and parenting as do girls.

Often inner-city females desire pregnancy and prefer single parenthood to traditional family structure. Their low academic skills and poverty often result in pregnancy, rather than the pregnancy causing high school dropouts and a life of poverty. In designing sex education programs, the focus needs to be on pregnancy and the resultant parental responsibilities rather than on adolescent sexuality (Gordon, 1974).

Knowing the general background and demographic characteristics of the student body may allow for better planning of sex education programs when the most desirable alternative, that of assessing the specific needs of the actual students involved, is impractical. Moreover, knowing where students do get their information may also facilitate planning, particularly in dealing with possible misconceptions or in referring students to other sources of information outside the classroom.

Olsen, Jensen, and Greaves (1991) questioned the definition of a sexually active teen as one who has sexual intercourse only once or twice as the basis for estimating teenage sexual activity for policy and program decisions. The results of their research indicate the distinction between being sexually experienced, or having had intercourse, and being sexually active, or having had intercourse during the past month, was considerable and the indicated that substantial differences in the percentages exist. They propose that teens who have been sexually active can reverse their behaviors to become periodic or current abstinent. The differences illustrate the importance of focusing on sexual activity itself as a target behavior in programs for preventing teenage pregnancy and the spread of sexually transmitted diseases, including AIDS.

The primary sources of sexual information for adolescents fluctuates between family (mother then father), friends, schools (Inman, 1974) mass media (Amonker, 1980; Morris, 1992) literature, experience, physicians, and ministers (Thornburg, 1981). Teachers, school counselors, and nurses were rarely checked as a source of sexual information.

> Human sexuality is one of the most individual characteristics, and one must not lose sight of the fact that the cognitive, as well as the behavioral aspects, can be

influenced by a number of individual characteristics. Both developmental psychologists and sex educators would benefit by recognizing some of the diversity, which exists in adolescents' sexual interests, knowledge, and sources of information. (Davis & Harris, 1982, p. 490)

Teenage childbearing often averts or postpones education for both girls and boys. While 7 out of 10 teen mothers eventually complete high school or receive a General Equivalency Degree (GED), they are less likely than girls who delay pregnancy to go on to college (Garrett & Tidwell, 1999).

Educators, health care providers, interventionists, and politicians have increased attention to various proposals to prevent, reduce, or delay the onset of teen pregnancy. Some programs have been successful while others have missed the mark.

Common Characteristics of Effective Curricula

In the spring of 1996, The National Campaign to Prevent Teen Pregnancy was officially launched. The goal of the campaign is to reduce the teen pregnancy rate in the United States by one-third by the year 2005. Its mission is to use every available resource to reduce adolescent childbearing while supporting values and stimulating actions that are consistent with pregnancy-free adolescence. The Teen Pregnancy Reduction Act of 1997 was designed to provide funding for the evaluation of teen pregnancy prevention programs, with the goal of determining which programs really do work (Rodine, 1997).

> [The National Campaign to Prevent Teen Pregnancy commissioned a research review committee] to review research on the impact of various school-and community-based programs on teen pregnancy to summarize the theory and research literature on the risk factors for teen pregnancy, to examine carefully the quality of program evaluation research, to extract some "lessons learned" about what works, and to define the areas about which we need to learn more. . . .
>
> Most adolescents in this country know a considerable amount about the risks of unprotected sexual intercourse and about methods of preventing those

risks. . . . They learn this and other information through a variety of sources, including their school sex and human imunodeficiency virus (HIV) education programs, the media, their parents and other adults, their peers, and others. Presumably, this information does reduce the amount of unprotected sex among teenagers. . . .

Abstinence-only programs focus upon the importance of abstinence from sexual intercourse, typically until marriage. Either these programs do not discuss contraception or they briefly discuss contraceptive failure to provide complete protection against pregnancy and sexually transmitted diseases (STD). To date, six studies of abstinence-only programs have been published. . . . None of these studies found consistent and significant program effects on delaying the onset of intercourse, and at least one study provided strong evidence that the program did not delay the onset of intercourse. Thus, the weight of the evidence indicates that these abstinence programs do not delay the onset of intercourse. . . .

On the other hand, this evidence is not conclusive, because all but one of the evaluations had significant methodological limitations that could have obscured program impact. . . . Given these limitations, there is too little evidence to determine whether or not different types of abstinence-only programs can delay the onset of intercourse. . . .

[Other] programs differ from the abstinence-only programs in that they discuss not only abstinence but also condoms and other methods of contraception as methods of providing protection against STD or pregnancy. This group includes a wide variety of programs, ranging from sex or STDS education programs taught during regular school classes or taught on school campuses after school. . . . They reflect the considerable creativity and differing perspectives of the agencies implementing them. . . .

[Evaluations of 30 middle school, high school, or community sexuality or HIV education] programs strongly support the conclusion that sexuality and HIV education curricula do not increase sexual intercourse, either by hastening the onset of intercourse, increasing the frequency of intercourse, or increasing the number of sexual partners. . . . These results are quite positive, indicating that some sex and HIV education programs can significantly increase condom or contraceptive use while other programs do not. . . .

Furthermore, these studies indicate that some, but not all, of these programs reduced sexual behavior, either by delaying the onset of intercourse, reducing the frequency of intercourse, or reducing the number of sexual partners. (Kirby, 1997, pp. v, 24-26)

Four curricula were identified by the Research Review Commission as having

particularly strong evidence for success in reducing sexual risk-taking. They share nine

common characteristics:

1. Effective programs focused clearly on reducing one or more sexual behaviors that lead to unintended pregnancy or HIV/STD infection.
2. The behavioral goals, teaching methods, and materials were appropriate to the age, sexual experience, and culture of the students.
3. Effective programs were based upon theoretical approaches that have been demonstrated to be effective in influencing other health-related risky behaviors.
4. Effective programs lasted a sufficient length of time to complete important activities adequately.
5. Effective programs employed a variety of teaching methods designed to involve the participants and have them personalize the information.
6. Effective programs provided basic, accurate information about the risks of unprotected intercourse and methods of avoiding unprotected intercourse.
7. Effective programs included activities that addressed social pressures on sexual behaviors.
8. Effective programs provided modeling and practice of communication, negotiation, and refusal skills.
9. Effective programs selected teachers or peers who believed in the program they were implementing and then provided training for those individuals. (Kirby, 1997, pp. 28-30)

A Texas study concluded that theory-based sexuality education programs as brief

as 8 to 12 hours in duration can facilitate behavioral changes that last for up to a year

(Eisen, Zellman, & McAlister, 1990). Kirby (1997) states that reducing teen pregnancy

"requires attention to broad social and environmental factors, such as poverty and social

disorganization, as well as to the individual characteristics of particular teens. Teen

pregnancy is a complex problem that often calls for complex interventions." Some

conventional programs have incorporated the teaching of resistance skills and do have

some success in encouraging teens to postpone their first sexual encounter for about six

months. Programs that are directive in their teaching, rather than neutral, are more likely

to change students' behaviors. However, a tradeoff occurs. The programs that focus on helping youth say no have little effect on subsequent contraceptive use, and the ones that impart contraceptive skills do not teach teens how to avoid sex (Luker, 1996). Luker suggests that since American teenagers will have 10 to 20 years during which they may be sexually active but not married, programs that urge postponing sex but that have no effect on contraceptive use may worsen the situation.

Texas Promotes Abstinence-Based Instruction

The Texas Department of Health has begun a campaign, Healthy Texas 2000, with the goal of reducing the teen pregnancy rate to 38.5 per 1000 by the year 2000 (Texas Department of Health, 1996). In compliance with the Abstinence Education Federal Law (1997), the Texas Senate passed Senate Bill 1, Sec. 28.004 Human Sexuality Instruction (1997). The Bill legislated that abstinence would be the primary birth control taught to Texas public school students (Harwell-Kee, 1997). The act provided $88 million per year in funding for programs that have as their exclusive purpose teaching the social, psychological, and health gains to be realized by abstaining from sexual activity. Also, the Texas Act requires that educators instruct young people that sexual activity outside of marriage is likely to have harmful psychological and physical effects. The abstinence-only program has been implemented in Texas and throughout the United States and is currently being evaluated.

The Grapevine-Colleyville Independent School District Health Education Advisory Council was created to provide guidance in the development of education programs that are compliant with the Human Sexuality Instruction Bill. Eighth grade

science classes are designated as target courses for abstinence based instruction using the directive approach. Answers to questions about sex are abstinence-based, family-centered, and age appropriate. Guidelines and standards are given and backed up by facts and truth, with no neutral positions taken. Teacher responses direct students to "abstinence as the only sure preventative to pregnancy and sexually transmitted diseases. Certainly, risks, diseases, emotional stress, and failure rates of contraceptives should be discussed. . . . Abstinence is presented as a healthy, achievable goal" (Harwell-Kee, 1997, p. 7).

Should abstinence fail and a pregnancy occur, efforts should be made to educate the adolescent as to why a second pregnancy should not occur. Equipping the adolescent parent with good parenting and family relations skills is one way to aid in breaking the cycle of teen pregnancy (Thornton & Camburn, 1987). Personal and Family Development and Individual and Family Living are career and technology courses of study with roots deep in the fundamentals of building successfully functioning family units.

The most recent data on nationwide teen pregnancy rate for teens 15 to 19 for 1997 showed a drop from 54.4 to 52.9 births per 1000 (Ventura et al., 1998). Empirical research will be needed to determine if the abstinence-only program can rightfully claim credit for any drop in the pregnancy rate in Texas or if other innovative programs contributed to the drop. Preliminary data indicates some short-range success.

> School-based family life and sex education programs for students reflect the basic concern over the lack of parent-child communication. Approximately 1/3 to ½ of all schools in the United States offer some form of family life and sex education. According to a Gallup Poll, 78% of Americans believe that it should be taught in the schools, despite vocal opponents' claim that family life education is designed

to accommodate permissiveness and will escalate sexual activity. Proponents say, however, that an effective curriculum can be used to counteract the media's exploitative sexual messages and enable adolescents to handle sexual peer pressure. (Levering, 1983, pp. 184-185)

The debate continues as to the content and curriculum for such instruction. Traditionally, human sexuality education has been addressed in three disciplines: the career and technology courses of Family and Consumer Science, physical education and health, and science. The task of teaching responsible parenting appears to reside solely under the Family and Consumer Science umbrella. Empirical data re-enforces the importance of the family structure as an identifier of attributes that generally determine a young person's chances of becoming a single parent (Abrahamse et al., 1988; Banks & Wilson, 1989; Casper, 1990; Corcoran, 1999; Garrett & Tidwell, 1999; Hanson et al., 1987; Kirby, 1997; Knowles & Tripple, 1986; Liang, 1994; McCullough & Scherman, 1991; Miller, 1983; Musick, 1993; Ravert & Martin, 1997; Robbins et al., 1985).

Classroom Curricula

The nine characteristics of effective curricula identified by the National Campaign to Prevent Teen Pregnancy center around education. Family and Consumer Science courses have in place the basic tools needed to create units of study that meet the requirements of the nine characteristics. Instructing young teens in age-appropriate concepts and learning activities on family development, parenting, and child development has been an exercise in judgment, initiative, imagination, and creativity for which family and consumer science instructors have been trained. Coordinating these efforts within the restrictions requested by parents and school administrators is common practice (Home

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Economics Curriculum Center, 1997; Jacobson, 1988). What works in one parenting

classroom is shared by word-of-mouth with other educators via workshops, newsletters,

and association conferences (Jackson, 1997).

In Texas, sex education is a part of the Texas Essential Knowledge and Skills

(TEKS) for many of the 26 Family and Consumer Science courses offered to middle and

high school students. The curricula for Family and Consumer Science courses that

include units on human sexuality are mandated by the Texas legislature. The Texas

Education Agency (TEA), however, does not advocate any instructional methods. The

classroom teachers, within the guidelines of local mandates, are free to employ the most

effective techniques necessary for their individual classrooms. (Home Economics

Curriculum Center, 1997).

The curriculum usually does not vary much, regardless of the tool used to

simulate parenting. A conservative syllabus will include the study of the human

reproductive anatomy, conception, pregnancy, labor and delivery. The study of sexually

transmitted diseases, abstinence and other forms of birth control, and HIV and AIDS may

also be a part of the curriculum. Many courses may also include discussions on self-

esteem, communications, decision-making skills, family planning and family relations,

and life styles. Comprehensive courses of study may also include the study of the

developmental stages for infants and children; parenting versus caregiving; health, safety,

and nutrition for young children; discipline; how to communicate with a child; grooming

and clothing for infants and children; and babysitting as an entry into the world of work

(P. Costephens, personal communication, April 18, 2000). Aggressive courses

incorporate abstinence-based instructions that include prenatal care, birth (without the vivid videos), information on preventing socially transmitted diseases, and birth defects (W. Green, personal communication, July 24, 1997). To assess the parenting knowledge and skills of the teens, educators may administer any one of a wide variety of questionnaires (Miller, 1983; Texas Agricultural Extension Service, n.d.).

<div align="center">Methods of Simulating Parenting Responsibilities</div>

To better equip students with the ability to make successful choices and decisions as parents, family and consumer science teachers have employed a variety of instructional strategies, including the use of props as a baby substitute (Teddlie, Barnes, Hillman, & Smith, 1996). In some districts, teachers begin the parenting activity by offering the opportunity for the students to wear a pregnancy Empathy Belly™ for a period of time lengthy enough to help the students realize the physical limitations imposed by pregnancy (see Figure 1; Birthways, n.d.). To simulate the birth of the baby, some teachers use a knitted sock to replicate the vagina and expel the prop into the waiting hands of a white-gowned mid-wife. The sex of the baby is announced, and the parenting experience begins (W. Green, personal communication, July 24, 1997). Computerized infant simulators are the newest tools available for students to use in simulating parenting (Baby Think It Over, 1996).

Egg Babies

Egg Babies, the first tool used to simulate parenting, appeared in classrooms in the late 1960s and are still used in a few areas. The purpose of this activity is to help students better understand what is involved in the day-to-day care of a baby. The students

Student Modeling the Empathy Belly™

Figure 1. Student modeling the Empathy Belly™ prior to beginning the parenting experience with the computerized infant simulator.

provide the proper care and attention for the egg baby and ensure that it remained

healthy. Simultaneously, the students are expected to parent the egg babies and

participate in the normal classroom activities. Students draw facial features on the eggs

and use bits of yarn or string to simulate hair. Tiny clothes and blankets and a soft,

sturdy, protective bed are created for the egg.

Some students may get twins or triplets; some eggs may have handicapping

conditions. The students must parent the egg for several days and nights, keeping the egg

with them at all times and tending to all of the needs of the newborn. Babysitters are

allowed but only if the parent pays the substitute caregiver while the egg baby is in their care. A daily diary and time schedule must be kept throughout the experience. Frequently the student fails to be diligent in the record keeping.

In reality, often the egg is placed in the student's locker at the beginning of the simulation where it remains until time to turn it in for a grade. Students who conscientiously parent the egg during the day put the egg into the refrigerator at night, enjoy a good night's sleep, then return to class the next day refreshed and ready to be the center of attention with their cute little egg baby.

Middle school-aged students often lack the maturity needed to care for a fragile egg, whether raw or boiled. Eggs tend to be smashed into lockers, cut up with band saws in the woodshop, or ground into the school carpeting. The financial impact is minimal to the classroom budget, as is the realism of the parenting experience (L. Perrin, personal communication, July 23, 1997; Ross, 1984; S. Smith, personal communication, August 14, 1996; J. Stanley, personal communication, August 26, 1997).

<u>Flour Sack and Sugar Sack Babies</u>

A variation to this scenario finds students using 5-pound sacks of flour or sugar as infants. Students are required to draw facial features on the sacks, dress the baby in newborn clothing, and wrap it in a blanket. A basket or box is usually chosen for a bed. The weight of the staple gives the students a glimpse of what a newborn baby weighs. Many teachers provide large diaper bags loaded with heavy essentials, such as diapers, powder, wipes, tissues, and several bottles of water. To compensate for the lack of interaction between "parent" and "infant," some instructors require the students to parent the flour sack for up to three weeks. Student lifestyle is greatly impacted by this

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requirement (Guttmacher, 1990). Once again, however, the teen parent receives much attention with their cute baby during the day, then enjoys a restful night's sleep before returning to school for another day of glorified parenthood. The teen experiences only a pleasant side of parenting.

Teddy Bears

Another tool available is the all-American favorite, the Teddy Bear. In a comprehensive family and consumer sciences course, students can construct their own bear during the apparel unit of study. This gives the students more ownership with the project, for they created, or birthed, their own teddy bear. The bears can be weighted to be more realistic of a newborn. A creative classroom teacher can name any handicapping condition germane to the birth of a newborn.

The students must supply a suitable basket or box for the infant carrier. Flying-football bears are common with this simulation. Some teachers designate a special Care Bear Center in the classroom and all bears go to Day Care for each class period (P. Costephens, personal communication, July 25, 1996; S. Smith, personal communication, August 14, 1996). Once again, only the pleasant side of parenting is experienced without the sleep-robbing 3 a. m. feedings.

Baby Dolls and Soda Bottle Babies

Through the years teachers have looked for ways to make the parenting simulation more realistic. In recent years large baby dolls have been used. They usually weigh several pounds and approach the size of a newborn. Girls bond more easily with the experiment and tend to play dolls more conscientiously than do boys.

Boys are often uncomfortable carrying around a baby doll. As an alternative, some teachers use 2-liter soda bottles filled with water as the basic body for the Bottle Babies. Heads, arms, and legs are constructed out of knitted tube socks that are securely taped to the soda bottle (the color of the socks indicates the race or ethnicity of the infant). Students draw faces, attach hair, if desired, and dress their babies in newborn clothing. An infant cradlette usually serves as the bed and carryall for the baby doll or bottle baby. For some reason boys do not appear to object to parenting the bottle babies as much as they do the baby dolls (W. Green, personal communication, July 24, 1997; P. Owen, personal communication, 1997).

This experience requires the student to contend with a bulky cradlette, a large infant simulator, and a blankets that cannot be placed in the locker and forgotten. Coupled with a heavy diaper bag and the normal load of schoolbooks, the teen soon physically tires from the overload. However, once bedtime comes, the student is free to enjoy a restful night's sleep and return to school rested and ready to bask in the attention their "baby" receives.

<u>Potted Plants</u>

A few communities prefer the parenting simulation to use potted plants as the infants. Students care for the plant in the same manner as other students parent the other props. Limitations include the difficulty in treating the plant like a real baby and the tendency to spill dirt and water from the plant (J. Stanley, personnel communication, August 8, 1997).

<u>Computerized Infant Simulators</u>

In May 1994, the first computerized infant simulators became available for young adults and teens to use to make informed, responsible choices about parenting (Cheakalos, 1994). It is a revolutionary tool in simulating parenting because it requires the caregiver to stay with the baby 24 hours a day for the duration of the project. Unlike students who parent other props, babysitters for infant simulators are not allowed. Students parenting an egg or a sack of flour or a teddy bear can place the egg in the refrigerator or the flour sack or teddy bear on a shelf to have time away from the baby. Students parenting an infant simulator cannot leave the baby for more than a minute, for fear that the infant will wake up and need tending.

When parenting an infant simulator, the full-time responsibilities of being a caregiver come alive (Rickel, 1989). The only way to satisfy the infant is for the teen parent to insert a tending key into the computer keyhole, rotate it to make the connection, then hold the key in place while holding the baby in the feeding position. The tending key is securely attached to the teen parent's wrist with a hospital wristband. The key cannot be removed from the parent's wrist and given to another individual to baby-sit, forcing the teens to remain with their infants 24 hours a day for the duration of the project (Jurmain & Jurmain, 1994).

The infant simulators weigh 61/2 pounds, measure 21 inches long, are anatomically correct, and come in 5 races, African-American, Asian, Caucasian, American Indian, and Hispanic. The "heart" of each baby is a microprocessor that is programmed to awaken the baby at random intervals ranging from 2 to 51/2 hours,

24 hours a day (Jurmain & Jurmain, 1994). When the baby needs tending, it begins to cry. The cry is the recorded cry of a real baby. The tending period can last from 5 minutes to up to 30 minutes, the normal length of time it takes to feed a newborn (Baby Think It Over™, 1995).

If the baby is neglected and allowed to cry for longer than one minute before the tending probe is activated, an indicator light records the event and tallies the number of minutes the infant is neglected. If the infant simulator is physically abused, another setting counts the number of abuse events. The computer in the infant simulator can be set to high or low sensitivity. Some models have an anti-tampering device that activates if the computer is removed from the infant simulator, shutting down the computer but maintaining the neglect, abuse, and head support data for the teacher. Newer generation simulators have indicator lights that register each time the head is not properly supported. A mercury level in the computer monitors the position of the baby. If the infant simulator is placed on its stomach, the baby cries, reinforcing the latest findings on sudden infant death syndrome that recommends babies sleep on their back or side (Baby Think It Over™, 1995).

The infant simulator program is unique in that it combines the stress of constantly being with an infant who is unpredictable in its demands and the necessity of lugging around the stroller, car seat, and diaper bag while juggling school books. The drastic alteration of the teen's lifestyle combined with sleep deprivation give the teen a much truer picture of the responsibilities and demands of full-time parenting.

The infant simulator used in this study was not a perfect replica of a newborn infant, did not imitate all of an infant's behaviors and bodily functions. Newer models are much more sophisticated. One model does give feedback to the student by cooing when the baby is satisfied from the tending session and burps after being fed (Nasco, n.d.). The RealCare Baby™ requires comforting, diapering, burping, rocking, and feeding using a bottle or a simulated breast device. It is more demanding than previous versions, since data from real infants was used to develop the tending schedule. The manufacturer estimates that RealCare Baby™ requires approximately three times as much care as the older versions (Jurmain, 2000). To realistically duplicate the role of a parent in a classroom setting, the teen is given the essential equipment needed to care for a baby and transport him or her to class each day. In spite of the shortcomings, infant simulators are intended to help students understand two important facts about babies: (a) the unpredictable demands of an infant must be promptly met, and (b) babies require a great deal of time and attention, thus having a profound effect on their parent's lifestyle (Baby Think It Over, 1995).

Summary

This chapter has presented a critique of the adolescent pregnancy problem in the United States and Texas. The predictors of teen pregnancy were identified, the teen pregnancy rates and birth rates were reported, and the impact on society was discussed. The findings of the National Campaign to Prevent Teen Pregnancy Review of Effective Programs were presented. Finally, the tools currently used in classrooms to simulate parenting were reviewed.

Some adolescents engage in sexual intercourse, and some have become pregnant or caused a pregnancy. However, during the last century and especially during the last few decades, three trends have changed the nature and outcomes of adolescent sexual activity. The average age of puberty has decreased, the average age of first sexual intercourse has also decreased, and the average age of marriage has substantially increased.

Organizations working to deter unwanted teen pregnancies must continue to wage the battle to stop risky behaviors that result in pregnancy. Some strategies for addressing teenage pregnancy issue include:

1. Encourage abstinence for the teenage years as a positive choice.
2. Promote male involvement, reinforcing positive messages to give our sons about manhood and what it takes to be a responsible father.
3. Provide resources to parents to support their efforts in educating their children on age-appropriate issues of family life.
4. Strengthen personal responsibility by providing programs that offer peer counseling and decision-making skills.
5. Connect young people with adult mentors who can assist them in achieving education and work-related goals.
6. Increase youths' knowledge about sexuality and responsible behavior through school, church, and other group education.
7. Develop a community environment that offers desirable role models for teens and provides social opportunities that do not place young people in high-risk situations.
8. Increase access to family planning service. (Texas Department of Health-Women's Health in Texas, 1999c, p. 3)

If we as a society are to make real progress in reducing teenage pregnancy, childbearing, and the problems associated with them, then adolescents should not only be told the facts of reproduction but how to use the tools of contraception. The abstinence movement, coupled with a comprehensive curriculum on responsible parenting that simulates the realistic hardships of 3 a. m. feedings, demands on personal time, isolation

from normal teen activities, and physical and financial hardships, can work together to educate adolescents how to make decisions that will prevent unwanted pregnancies.

CHAPTER 3

PROCEDURES

The purpose of this study was to determine the effectiveness of an infant

simulator as a deterrent to pregnancy. Survival analysis was employed to analyze data in

determining when rather than whether an unplanned teen pregnancy occurred to middle

school students after they had simulated parenting using an infant simulator (Ronco,

1994; Willett & Singer, 1991). This was one of the first longitudinal studies examining

the effectiveness of computerized infant simulators. This study can be a basis for

comparisons of tools used in sex education, parenting classes, and career and technology

education classes.

Participants

Population

The population for this study was female eighth grade students in suburban school

districts in Texas.

Sample

The treatment groups and control groups constituted the one 116 female students

in the eighth grade class in 1994-1995 and the 105 female students in the eighth grade

class in 1995-1996 in a middle school in a suburban school district in northeast Tarrant

County, Texas. Students were randomly assigned to classes via computer-created

schedules.

Instrumentation

The subjects from the 1994-1995 eighth-grade classes were scheduled to graduate from high school in May 1999. Most of the subjects from the 1995-1996 eighth-grade classes were seniors at the two local high schools during the study. Some of the subjects had dropped out of school or moved out of town. Those with viable telephone numbers or addresses were included in the study. Those without were lost to the study.

The subjects who were still students at the local high schools were contacted at school to complete a short Teen Pregnancy Questionnaire (see Appendix A). At the first meeting the purpose and scope of the study was explained. The students who were 18 years of age or older were asked to sign the permission slip; then they completed the Teen Pregnancy Questionnaire.

Only a few students were under the age of 18 and needed parental permission to complete the interview and questionnaire. Several days prior to the meeting, the office aides at the high schools delivered the Parental Consent for the Pregnancy Questionnaire letter to the subjects (see Appendix B). Those subjects under 18 had the opportunity to secure a parent's permission prior to attending the meetings that were held at the high schools.

The subjects who were no longer students in the school district were contacted by telephone. The purpose and scope of the study was explained. If any of the subjects were under 18 years old, copies of the student letter, the Teen Pregnancy Questionnaires, the Parental Consent for the Pregnancy Questionnaire letter (see Appendices A, B, and C), and a self-addressed stamped envelope were mailed to those students with a request for a

prompt response. Telephone interviews were conducted with those subjects who were over 18. Verbal permission was received prior to conducting the interview.

Data collected included (a) which school year the subject attended eighth grade; (b) whether or not the student parented with an infant simulator; (c) which semester she parented the infant; (d) if she had become pregnant since middle school, in which month the pregnancy occurred; (e) if she participated with the infant simulation, whether or not the experience cause her to postpone sexual intercourse or cease from participating in sexual intercourse for fear of becoming pregnant; (f) her ethnicity; (g) if she participated in co-curricular activities in the eighth grade, with which activities she was affiliated; (h) if she had become pregnant, whether or not she committed a crime; and (i) if she had committed a crime after she had become pregnant, whether or not the crime been a crime against a person or a crime against property. Student anonymity was protected at all times. The data was kept in a locked storage file at Grapevine-Colleyville Independent School District and then destroyed at the close of the study.

<div align="center">Design of the Study</div>

<u>Student Selection</u>

The subjects were female eighth-grade middle school students enrolled in Life Management Skills-Career Investigations classes (currently called Skills for Living Class) at Grapevine Middle School in Grapevine, Texas, a heterogeneous suburban community in northeast Tarrant County. Grapevine Middle School is in the Grapevine-Colleyville Independent School District and was named a National Blue Ribbon School of Excellence in 1995. Life Management Skills-Career Investigations was one of the career and technology courses offered to middle school students.

Four sets of students were involved in this study that began in December 1994. Only the female students were studied, leaving the study of males for another researcher (Chillman, 1985). Forty-two girls were in the first experimental group that parented the infant simulator dolls in December 1994. In April 1995, 31 girls comprised the second experimental group of students to parent the infant simulators. The teens in the first and second experimental groups were in the 1999 graduating class; there were 116 girls in the eighth-grade class. The control group during 1994-1995 consisted of 43 girls who were not enrolled in the Life Management Skills-Career Investigations classes and did not parent the infant simulator dolls.

The third experimental group was comprised of 39 girls who parented the infant simulators in November 1995. The final experimental group of teen parents consisted of 27 girls who parented the infant simulators in April 1996. Groups three and four were a part of the graduating class of 2000, which contained 105 girls. The control group during 1995-1996 consisted of the 39 girls who were not enrolled in the Life Management Skills-Career Investigations classes and did not parent the infant simulators.

Of the 221 subjects participating in the study, 190 were Caucasian. The minority females population included 22 Hispanics, 4 Blacks, 1 American Indian, 2 Asians, and 2 East Indians.

Skills for Life, formerly Life Management Skills, and Career Investigations are electives offered to eighth-grade students. At Grapevine Middle School the two courses were combined into a single elective and called Career-Life. A unit in child development introduced the students to the responsibilities of parenting and concluded with a parenting

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simulation experience. For this unit of study, each student was required to parent a computerized infant simulator for three days and three nights.

Students in the classes were given the option to complete a research project in lieu of parenting an infant simulator. Only one subject opted for the research project. She had recently given birth to a stillborn infant.

Parental Involvement

For the first experimental group, the Baby Think It Over ™ Parenting Simulation Project, December 2, 1994 (see Appendix D) was given to each student and was to be shared with their parents. Subsequent treatment groups received the Career-Life Parent/Student Information packet (see Appendix E). Both packets included a request for parental permission for their child to participate in the parenting experience and for their child to be interviewed and photographed. Parents also signed an agreement to pay for any damage done to the infant simulators or the ancillary equipment. Parents were invited to school to see the computerized infant simulators (see Appendix F), view two videos about the doll, and ask questions. The same written instructions on the operation and care of the infants that were given to the students was given to all parents (see Appendix G; Baby Think It Over, 1996).

Student Preparation

Detailed instructions were given to the students concerning the care of the infant simulator and how it worked. The students were expected to treat the dolls as if they were live human infants. Seldom were the babies referred to as dolls. The term babies was

used to re-enforce the standard that these infant simulators were to be treated as real babies. The students were to be with or near their babies at all times.

To prepare for the simulator experience, each student was instructed to talk with her parents to determine three consecutive days and nights which were best for participation in the experience. Students were to check their calendars for any conflicts that might interfere with them being able to devote full time to caring for the infant, i.e., a fine arts rehearsal or performance; an athletic practice or game; or a church, community, club, school, or family commitment. Some students chose to parent the infant simulator even though they had conflicts. Participation in the other activity became secondary to parenting the infant simulator. The classroom teacher also took great care to conduct the simulator experience at a time when students were not engaged in end-of-course exams or other required testing, such as the Texas Assessment of Academic Skills (TAAS) tests. The teacher compiled the schedule according to the wishes of the students and their parents and the availability of equipment (see Appendix H). The ethnic background or race of the students was considered in assigning equipment. The availability of equipment also affected the scheduling.

Beginning the Simulation

The teacher was the stork and determined the sex of the baby each student received. Students could request a baby from their own ethnic background or from an ethnic background different from their own but could not request the sex of the child. Male and female infants that were Caucasian, African-American, Asian-American, or Mexican-American were available.

In this study only single births were allowed. Multiple births were requested by numerous students, but the limitations of equipment disallowed this option.

Fresh batteries, supplied by the students, were installed in each computer, and the sensitivity switches were set to normal. The computers were placed in the babies and several layers of heavy plastic tape were bound around the babies' torsos to prevent the computers from being removed from the infant simulators. The teacher signed her name across the tape to insure the original tape was in place at the end of the parenting experience. Design improvements in the simulators now include locking mechanisms that make it impossible to remove the computers from the dolls. If the computers are removed from the newer models, an anti-tampering device shuts down the computers but maintains the lights, readings, and data.

The summer between the two school years found contractors replacing the air conditioning in the Grapevine Middle School building. One new unit over the storage closet in the Life Management Skills classroom leaked during a rainstorm, resulting in water damage to the infant simulators and the computers. All of the infant simulators and computers were replaced with a newer model, the G4. The model changes included a computer with an anti-tampering device that prohibited the removal of the computer from the body of the doll and a locking mechanism on the door of the computer that prevented access to the batteries inside the computer. These two improvements meant the teacher no longer had to wrap the torso of the infant simulator with tape to insure that the integrity of the computer was compromised. The configuration of the tending key also changed slightly. The earlier models used a special magnet that made contacts inside the computer. The newer models used a molded plastic key that had to be inserted into the

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computer and rotated to make the connections. This feature necessitated that the teen remain awake while tending the infant. If the teen fell asleep and loosened the torque on the tending key, the key would disengage and the infant simulator would commence crying again.

The students were encouraged to meet in the classroom before the beginning of school to receive their babies. The babies were enclosed in clear plastic bags as they were passed out to the students. The students birthed their babies by removing them from the plastic bags. Diaper bags with all of the clothing and feeding equipment were given to each new teen parent. Students selected strollers and car seats. Birth Certificates (see Appendix I) and baby journals (see Appendix J) were distributed.

All of the students were given a newborn-size infant simulator doll, a full-size stroller, an infant car seat, a diaper bag, three changes of clothing that were gender specific, five cloth diapers, a box of baby wipes, one blanket, two baby bottles, a birth certificate, and a baby book journal to maintain during the simulation. Toys for the infants were optional and were student supplied.

The infant tending key was securely attached via a hospital-type wristband to the non-writing hand of each student-parent. Great care was taken to guarantee that the student could not remove the wristband nor remove the tending key from the wristband. A student's grade suffered greatly if the tending key or wristband was removed from the student's wrist.

Texas law requires infants to be securely fastened into an approved car seat when in a moving vehicle. The students were required to use car seats for their infants, even on

the school bus. The school district transportation services permitted the car seats on the school buses but would not allow the students to transport the strollers on the buses. Nighttime storage of the strollers was the responsibility of the student. The students had to ask permission of another faculty member to store the stroller and car seat in the classroom. The Career-Life classroom was not available for storage, forcing the students to encounter another hardship of parenting--what to do with the bulky equipment when it was not needed.

Many students rode the school buses to and from school and were unable to attend the early morning meetings to receive their babies. Those students were given their babies and equipment in their academic classrooms.

Child Protective Services

The faculty was extremely supportive of these simulations and graciously accepted classroom interruptions caused by the simulators. When a faculty or staff member witnessed an undesirable parenting situation, they coached the students as needed. Positive reinforcements were employed as a teaching tool.

The faculty and staff served as the Child Protective Services (CPS) agency. If an abusive and inappropriate behavior was observed, the adult would instruct the student in appropriate parenting skills. If the behavior continued, or if a baby was found unattended, i. e., in the cafeteria or in the classroom while the parent went to the restroom, CPS would seize the infant and put it in protective custody in the Career-Life classroom. Reports on subjects that fit the crime were assigned to the delinquent parents.

Students Were the Sole Caregivers

Babysitters were not allowed. The only person who could parent an infant was the student. If the tending key was securely fastened to their wrist, they could not leave the infant with a babysitter and circumvent the structure of the experience of being the sole caregiver. This criteria was unique to the computerized infant simulators. In other studies where students parented items such as egg babies, teddy bears, flour sacks, etc., the student-parents did not have to keep the baby with them at all times. They could employ babysitters and have time off from parenting to sleep or go out with their friends. Or, they could simply put the item on a shelf and retrieve it in time to turn it back in to the teacher. The fact that the tending keys could not be removed from the students' wrists forced the students to stay with the babies for the length of the treatment.

When the baby needed tending, it began to cry. The teen parent had one minute to insert the tending key into the computer and engage the key. If the baby was neglected and allowed to cry for longer than one minute before the tending key was activated, an indicator light recorded the event and tallied the number of minutes the infant was neglected. If the teen parent left the doll with someone, the babysitter would not have had the tending key to use should the doll commence crying.

The students were to be the sole caregivers for the infants for 3 days and nights, 72 consecutive hours. This time frame allowed two rotations of equipment per week. The original preliminary field trials on the infant simulators used 2 to 4-day intervals (Jurmain, Jurmain, & Hillman 1994). Other studies employed time intervals of 2 days (Wurzer, 1996), 3 days (Strachan & Gorey, 1997), and 7 days (Rosenbaum & Parietti, 1997; Space & Wood, 1998).

The students had to take the babies everywhere they went including class, the mall, co-curricular activities, and church. If they chose to parent the infant during the time of an athletic event or fine arts concert and the baby needed tending during the event, the student had to remove herself from the event and tend the baby. The baby always came "first."

The teen parents had to juggle an infant in a stroller, a bulky car seat, and a heavy diaper bag in addition to all of their school books while dealing with sleep deprivation, isolation from their peers, and a deviation from their normal routines. If the infant began crying during class, they had to quickly tend to the baby so it would not interrupt the others. They also had to keep up with their own schoolwork while contending with the hardships of parenting. They were required to keep a baby journal that logged the tending sessions, their feelings, and their perceptions of the experience. The journal was turned in at the end of the parenting experience for grading.

Evaluating Each Simulation

Each teen parent met with the teacher daily to evaluate the teen's parenting skills. The factors used for evaluation included the number of neglect events, the number of minutes of neglect, the number of abuse events, whether the teen's armband and tending probe were intact on her wrist, the condition of the doll (clean clothes and face, no ink marks, etc.) the intactness of the electronics box, the condition of the auxiliary equipment, and the completeness of the entries in the Baby's 1st Book journal (Baby Think It Over™, 1995).

<u>Students Parent Infant Simulators</u>

The subjects were given their babies early the first day. They parented the babies at school, took the babies home, and continued parenting them all night. Some of the babies awakened four or five times during the night. Some awakened only two or three times. Most of the students were very tired when they arrived at school the next morning and many complained about the lack of sleep they had received because of the crying infants.

The students continued to parent the babies the second school day and at home for the second night. Most students were extremely tired when they arrived at school the third morning. Some students begged to be allowed to end their parenting experience after two nights. Permission was denied.

The final day of parenting at school found students who could barely stay awake during their classes; who were short tempered, rude, and lethargic; and who were showing signs of physical illness due to lack of sleep. They did not want to keep their babies for the final night of sleep deprivation, but they were required to anyway.

The morning that the students were allowed to turn in their babies was most interesting. Some students could not get rid of their babies fast enough! They were ready to chunk them into the playpen. Comments such as, "Here! Take it! I'm never getting pregnant!" were common. Others had become very attached to the babies and begged to keep them longer.

As each student turned in her infant, the monitoring displays were checked, the daily journals were collected, and the equipment inventory was completed. On the

display panel the neglect number showed how many times the infant had cried for more than one minute before the tending key had been engaged. Another number indicated the total number of minutes the doll had cried before being tended. An abuse events number displayed the number of abuse events that had taken place.

<div align="center">Statistical Hypotheses</div>

The answers to the research questions were provided through the following statistical hypotheses:

H$_1$:   There will be no statistically significant difference in the length of time teens who participate in the parenting experience with a computerized infant simulator remain non-pregnant and teens who have not experienced parenting with a computerized infant simulator remain non-pregnant.

The null hypothesis is:

H$_0$: $\mu_{\text{time} \atop \text{simulator}} = \mu_{\text{time} \atop \text{non-simulator}}$

with an alternative hypothesis of:

H$_A$: $\mu_{\text{time} \atop \text{simulator}} > \mu_{\text{time} \atop \text{non-simulator}}$

H$_2$:   There will be no statistically significant difference between minority and non-minority ethnic groups in the length of time they remain non-pregnant after they have experienced parenting with a computerized infant simulator.

The null hypothesis is:

H$_0$: $\mu_{\text{ethnic} \atop \text{White}} = \mu_{\text{ethnic} \atop \text{Others}}$

with an alternative hypothesis of:

$$H_A: \mu_{\substack{\text{ethnic} \\ \text{White}}} > \mu_{\substack{\text{ethnic} \\ \text{Others}}}$$

H_3:   There will be no difference among students involved in co-curricular

activities versus students not involved in co-curricular activities in the

length of time they remain non-pregnant after they have experienced

parenting with a computerized infant simulator.

The null hypothesis is:

$$H_0: \mu_{\substack{\text{co-curricular activities} \\ \text{involved}}} = \mu_{\substack{\text{co-curricular activities} \\ \text{not involved}}}$$

with an alternative hypothesis of:

$$H_A: \mu_{\substack{\text{co-curricular activities} \\ \text{involved}}} > \mu_{\substack{\text{co-curricular activities} \\ \text{not involved}}}$$

H_4:   There will be no difference in the delinquency rate for students who

become pregnant after they have experienced parenting with a

computerized infant simulator and students who become pregnant who did

not experience parenting with a computerized infant simulator.

The null hypothesis is:

$$H_0: \mu_{\substack{\text{crimes committed} \\ \text{simulator}}} = \mu_{\substack{\text{crimes committed} \\ \text{non-simulator}}}$$

with an alternative hypothesis of:

$$H_A: \mu_{\substack{\text{rimes committed} \\ \text{simulator}}} > \mu_{\substack{\text{crimes committed} \\ \text{non-simulator}}}$$

Data Analysis

<u>Data Collection</u>

Data was collected retrospectively for discrete points in time. The close of each

six-week grading period marked the data collection times during the school years. The

mid-point of the summer vacations (which was approximately six weeks) and the last day

of summer prior to the first day of the next school year (which was approximately

another six weeks) completed the data collection point dates.

The fall 1994 experimental group and the fall 1995 experimental group passed

through 36 time periods before graduating from high school. The two spring

experimental groups passed through 33 time periods before graduating from high school.

The control groups passed through the same 36 time periods as their cohorts in the

experimental groups.

> In retention studies, data collection must end at some arbitrarily defined period
> without some of the subjects having experienced the target even. . . . This
> phenomenon, called right–censoring, means that the researcher has incomplete
> information about event occurrence, which is the very question of interest . . . . A
> relatively new method for studying the relationship between the occurrence of
> events and selected predictors is event history analysis, also known as survival
> analysis or hazard modeling. These methods, originally developed by
> biostatisticians studying clinical lifetime data, have several advantages over
> traditional OLS regression methods. First, they are able to incorporate both
> uncensored and censored events in a single analysis. Second, survival analysis has
> the ability to study time-varying predictors, those whose values change from one
> time period to the next during the observation period. Survival methods allow the
> effects of these variables to fluctuate over time, thus modeling dynamic processes
> dynamically. Finally, by documenting variation in risk over time, survival
> analysis permits researchers to disentangle the effects of predictors on events. The
> time frame becomes an integral part of the answer by highlighting, rather than
> obscuring, variation over time.

The hazard function, which is the fundamental dependent variable in event history data analysis, summarizes the risk of event occurrence in each time period. . . . In discrete time survival analysis, where time is measured not continuously but in intervals like years or semesters, hazard is defined as the conditional probability that a randomly selected individual will experience the target event in time j, given that she did not experience the event prior to j. . . . Event occurrence is inherently conditional because an individual can experience a target event once and only once. (Ronco, 1994, pp. 4-5)

In survival analysis the researcher is focused on determining the length of time the subjects survive the censoring event post treatment (Denson & Schumacker, 1996; Miller, 1981; Schumacker & Denson, 1994). The unique properties of survival analysis make possible the comparison of the four treatment groups over differing periods of time. Table 7 shows the beginning and ending data collection periods for the four experimental groups and the two control groups.

Retrospective self report data collection has been used successfully by researchers studying the first date of an occurrence, i. e., first use of alcohol, tobacco, and drugs or age at last date (Hirschi, 1969; Nye & Short, 1956; Singer & Willett, 1991; Willett & Singer, 1993a). Retrospective self report data are imperfect at best. The longer the time lapse between the occurrence of the event and the collection of the data, the greater the error.

Rare events. . . may be remembered indefinitely and highly salient events. . . may be remembered for two or three years, but habitual events. . . are forgotten almost immediately. . . . Three errors are common: (a) memory failures, in which respondents forget events entirely; (b) telescoping, in which events are remembered as having occurred more recently than they actually did; and (c) rounding, in which respondents drop fractions and report even numbers or numbers ending in 0 or 5. These errors create different biases: Memory failures lead to underreporting, telescoping to overreporting, and rounding to both. Retrospective data collection is especially problematic if informants, not the individuals themselves, provide the data. (Singe and Willett, 1991, pp. 274-275)

Table 7

Data Collection Periods for the Experimental and Control Groups

Dates	Fall, 1994 Group	Spring, 1995 Group	94-95 Control Group	Fall, 1995 Group	Spring, 1996 Group	95-96 Control Group
12/16/94	1		1			
02/17/95	2		2			
04/07/95	3		3			
05/26/95	4	1	4			
07/06/95	5	2	5			
08/15/95	6	3	6			
09/22/95	7	4	7			
11/03/95	8	5	8			
12/20/95	9	6	9	1		1
02/15/96	10	7	10	2		2
04/04/96	11	8	11	3		3
05/23/96	12	9	12	4	1	4
07/05/96	13	10	13	5	2	5
08/14/96	14	11	14	6	3	6
09/27/96	15	12	15	7	4	7
11/01/96	16	13	16	8	5	8
12/20/96	17	14	17	9	6	9
02/21/97	18	15	18	10	7	10
04/11/97	19	16	19	11	8	11
05/29/97	20	17	20	12	9	12
07/05/97	21	18	21	13	10	13
08/13/97	22	19	22	14	11	14
09/19/97	23	20	23	15	12	15
10/31/97	24	21	24	16	13	16
12/19/97	25	22	25	17	14	17
02/20/98	26	23	26	18	15	18
04/09/98	27	24	27	19	16	19
05/29/98	28	25	28	20	17	20
07/05/98	29	26	29	21	18	21
08/11/98	30	27	30	22	19	22
09/18/98	31	28	31	23	20	23
10/30/98	32	29	32	24	21	24
12/18/98	33	30	33	25	22	25
02/19/99	34	31	34	26	23	26
04/09/99	35	32	35	27	24	27
05/28/99	36	33	36	28	25	28
07/09/99				29	26	29
08/15/99				30	27	30
09/17/99				31	28	31
10/29/99				32	29	32
12/17/99				33	30	33
02/18/00				34	31	34
04/14/00				35	32	35
05/31/00				36	33	36

Note. Dates coincide with the end of the 6-week grading periods, mid-summer, and end of summer.

Pregnancy to a teen would be classified as a high life event (Ravert & Martin, 1997). Teens may be wary of reporting unfavorable behaviors or attitudes, which could cause a researcher to doubt the veracity of self-report data of at-risk adolescents (Brown, 1999). As suggested by Diepold & Young (1979), the data for this study was collected from the participants and was verified whenever possible by accessing school district records.

Censored Observations

Survival analysis is concerned with the time to occurrence of a critical event of interest. This study is concerned with the on-set of pregnancy. The time until the event is the survival time and is measured from the time of the treatment until the occurrence of the event.

Survival analysis techniques are unique in that they use information from cases that have not experienced the terminal event during the time of observation. On-set of pregnancy is the terminal event for this study. Some subjects will remain non-pregnant during the course of this study. The terminal on-set status of these subjects is hidden from view; thus, the term censored is applied to them.

Kaplan-Meier Estimators

Life tables are created for situations in which event times are specified only to an interval. More precise estimates are available when the exact times are known by using the Kaplan-Meier method. The probability of a terminal event is calculated at every occurrence of the event. The Kaplan-Meier techniques are useful for studies with few cases where the survival intervals are variable, such as in this study (Steinberg, 1999).

The categorizing of time into six-week grading periods allows the use of life tables. The probability of the terminal event for each interval was determined by dividing the number of cases experiencing the terminal event during the interval by the number of cases entering the interval alive (after the denominator was adjusted for censored observations). The data for this study was stored in a file with seven columns. Table 8 shows seven dummy entries.

Table 8

Seven Dummy Cases of Infant Simulator Data File

Simulation	Status	Time	Ethnicity	Co-curricular	Crime	Person/Property
1	1	2	1	0	0	0
2	0	4	0	0	0	0
3	1	9	0	1	0	0
4	0	9	0	1	0	0
5	0	9	1	0	0	0
6	1	10	0	1	1	0
1	1	14	0	0	1	1

In the column Simulator, a case will be coded 1 if the subject participated in the parenting experience during the first treatment period in December 1994; a 2 if the subject participated in the parenting experience during the second treatment period in April 1995; a 3 if the subject did not participate in the treatment sessions of parenting the infant simulators while in the 8th grade in 1994-1995; 4 if the subject participated in the parenting experience during the fourth treatment period in November 1995; 5 if the

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subject participated in the parenting experience during the fifth treatment period in April; or 6 if the subject did not participate in the treatment sessions of parenting the infant simulators while in the 8th grade in 1995-1996. Status was coded 1 if the case became pregnant and 0 if the case did not become pregnant by the end of the study (censored). Time was the survival time in periods. The periods corresponded with the end of each six-week grading period, the midpoint of the summer vacation, and the day before the first day of classes for the new school year. The two summer vacation time periods were each approximately 6 weeks long. There were 36 collection dates for the groups that parented the dolls in the fall terms and the two non-treatment groups. There were 33 collection dates for the groups that parented the dolls the spring semesters. Ethnicity was the racial or ethnic background of each case. A case was coded 0 if the subject was Caucasian and 1 if the subject was of any other racial or ethnic origin. Co-Curricular was coded 0 if the subject was not in athletics, band, cheerleading, choir, PALS, FHA/HERO, Foreign Language Club, or Student Council and was coded 1 if the subject was in athletics, band, cheerleading, choir, PALS, FHA/HERO, Foreign Language Club, or Student Council. Crime was coded 0 if the subject did not commit a crime after becoming pregnant or 1 if the subject did commit a crime after becoming pregnant. Person/Property was coded 0 if the committed crime was against a person or 1 if the committed crime was against property.

Treatment of the Data

The dependent variable of interest for this study was time, the length of time the participants remained non-pregnant. There were five independent variables and each had two levels.

For the first research question, the independent variable of interest was parenting experience. The participants were randomly assigned to one of two levels: those who participated in a parenting experience with an infant simulator and those who did not participate in a parenting experience with an infant simulator. The experimental subjects were the cases who participated in parenting the infant simulators. The control subjects were the cases who did not participate in parenting the infant simulators.

For the second research question, the independent variable was the ethnic background of the subjects from the experimental group. This variable had two levels: Caucasian and Others.

For the third research question, the independent variable of interest was involvement in co-curricular activities. The two levels of this variable were those subjects from the experimental group who were involved with co-curricular activities and those subjects from the experimental group who were not involved with co-curricular activities.

For the fourth research question, the independent variable of interest was crime. The two levels of this variable were those who did not commit a crime after they became pregnant and those who did commit a crime after they became pregnant. The Teen Pregnancy Questionnaire also queried those who responded in the affirmative as to the nature of the crime, against a person or against property.

Computing Cumulative Survival

For the first hypothesis, cumulative survival for the experimental subjects was computed separate from the control group and was computed first. Secondly the cumulative survival for the control subjects was computed. The experimental subjects

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were the cases who participated in parenting the infant simulators while the control subjects were the cases who did not experience parenting the infant simulators. For the second hypothesis, the Caucasian cases from the experimental group were computed, followed by the cases from the experimental group for the subjects from the other ethnic/racial backgrounds. For the third research hypothesis, the experimental cases who were active in co-curricular activities were computed first, followed by the experimental cases who were not involved in co-curricular activities. For the fourth research hypothesis, the experimental cases who had parented the infant simulator before they got pregnant and committed a crime was computed first, followed by the control cases who had not parented the infant simulator before they got pregnant and committed a crime. Calculations on the crimes against persons and calculations on the crimes against property were also computed.

Table 9 is an example of the output for each computation. It contains the Time and Status columns for all of the cases. The other columns in Table 9 were computed from the Time and Status columns.

SPSS Kaplan-Meier Procedure

The results from submitting the pregnancy data to the Statistical Package for the Social Sciences (SPSS) Kaplan-Meier procedure are displayed in table format. The Kaplan-Meier method produced two survival tables, one for each level of the independent variable (see Table 10). Tables for each level of all independent variables were prepared. The Time column indicates the survival time in time periods since the treatment. The Status column indicates whether the subject has become pregnant or whether the subject

Table 9

(Dummy Table) Computing Cumulative Survival: Time to On-Set of Pregnancy with the

Factor Simulator

Time	Status	Prior No. Not Pregnant	Number Remaining	Proportion Not Pregnant	Cumulative Survival
2	1	219	218	218/219	218/219=0.9954337
4	0	218	217	217/218	0.9954337 X (217/218)=0.9908674
9	1	217	216	216/217	0.99.8674 X (216/217)=0.9863077
9	0	217	214	214/216	0.9863011 X (214/217)=0.9771686
9	1	217	214	214/216	0.9863011 X (214/217)=0.99771686
10	1	214	213	213/214	0.9771686 X (213/214)=0.9726024
14	1	213	212	212/213	0.9726024 X (212/213)=0.9680361

Note. Time is the data collection periods which coincide with the end of the 6-week grading periods, mid-summer, and the end of summer.

is censored. The Prior Number Not Pregnant is the number of cases alive prior to the

event time. The Number Remaining is the number of cases active after the event time.

The probability of surviving for any given time period is Proportion Not Pregnant and is

determined by dividing Number Remaining by Prior Number Not Pregnant. After each

event occurs, the Prior Number Not Pregnant is reduced by one or the number of times

Table 10

(Dummy Table) Kaplan-Meier Table for Survival Analysis for Time with the Factor

Simulator

Number of Cases: 219	Censored: xx		(xx.xx%)	Events: x
	Survival Time	Standard Error	95% Confidence Level	
Mean:	xx.xx	xx.xx	(xx.xx, xx.xx)	
(Limited to	36.00)			
Median:	xx.xx	xx.xx	(xx.xx, xx.xx)	

Note. Two tables are produced: one table, for the experimental group, with the values for Simulator = 1,2, 4, and 5 and another table, for the control group, with the values for Simulator = 3 and 6.

the event occurred in the time period, and the Number Remaining is reduced by one or

the number of times the event occurred in the time period. Cumulative Survival for any

given time period is the product of the current probability and the probability from the

previous time period.

The Kaplan-Meier Table for Time represents the following information:

1. Time is the time of occurrence of the on-set of pregnancy or the time at which the subject was withdrawn while still not pregnant.
2. Status indicates whether the subject had experienced the terminal event or was censored.
3. Cumulative Survival is an estimate of the probability of surviving longer than the time listed in the Time column. It is not computed for censored events.
4. Standard Error is the standard error of the Cumulative Survival estimate.
5. Cumulative Events is a count of pregnancies that occur up to and including the current time. It is not incremented for censored events.
6. Number Remaining is the number of students who are not pregnant after the specified time. It is decremented for censored events.

7. Mean Survival Time is not the arithmetic mean. It is equal to the area under the survival curve for the uncensored cases. . . . The survival curves for censored and uncensored students is shown in Figure 2.
8. Median Survival Time is the first event at which cumulative survival reaches 50% or less. It is estimated more exactly by interpolation within the table. The mean survival time is designated as Limited to 36. If the cases with the longest survival times are censored, the mean that is calculated using the uncensored cases may be an underestimate. The case with the longest survival time is figured into the calculation, and the mean is reported to be limited to the survival time of that censored case. (Steinberg, 1999, pp. 247-248)

Dummy Survival Curves

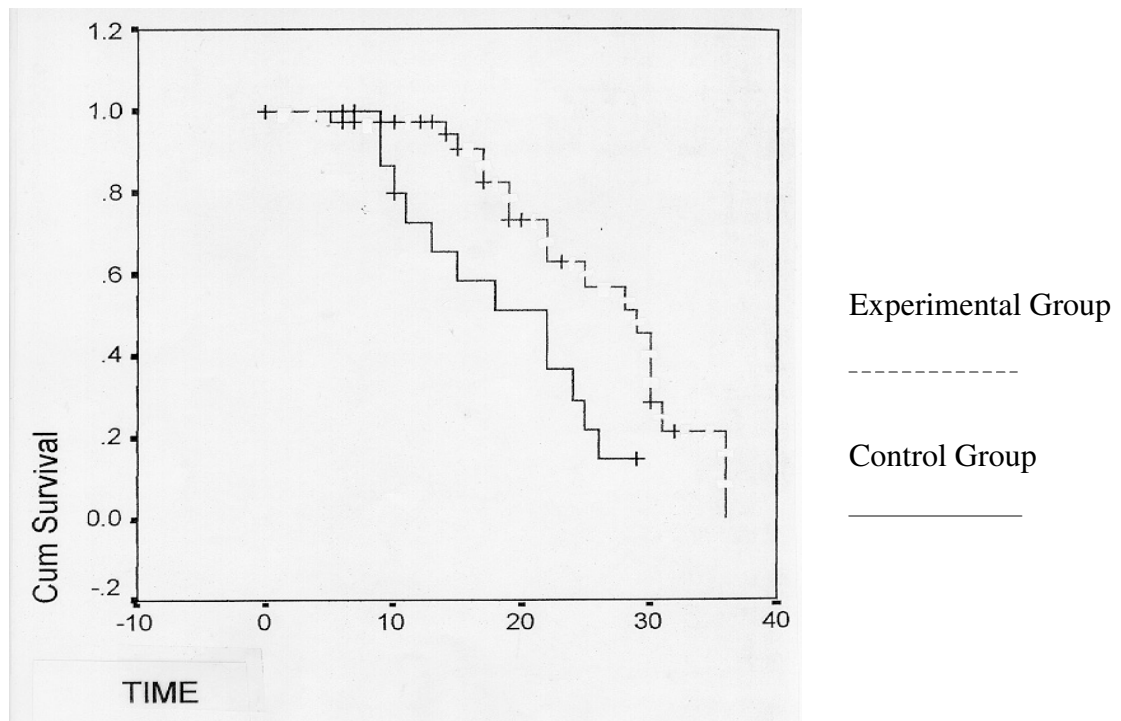Figure 2. Figure demonstrates a dummy cumulative survival function for the factor Simulator over the duration of the research. Each corner represents a terminal event. Each + mark represents a censored case that exited the study.

The difference in the two survival functions for each comparison can be displayed on a single figure. Figure 2 shows a plot with two cumulative survival curves, one for

each level of the independent variable. Separate figures for each independent variable were prepared.

The curves are step functions because the survival function changes only at the occurrence of a terminal event. The survival functions should descend because the probability of survival decreases as the pool of survivors decreases. The survival function for the experimental group that parented the infant simulators (Simulator 1, 2, 4,or 5) descends more gradually than the survival function for the control group (Simulator 3 and 6). This is consistent with the greater mean and median for this group (Steinberg, 1999).

Tests of Statistical Significance

The Kaplan-Meier procedure provides three statistical tests: the log-rank (or Mantel-Cox) test, the Breslow (or generalized Wilcoxon) test, and the Tarone-Ware test. Each of these tests compares the number of terminal events actually observed (D_i) to the number of expected terminal events (E_i), which is calculated from the number at risk and the number of pregnancy events at each event time in the study. The sum of the resulting differences is then calculated:

$$U = \sum_{i-1}^{K} w_i (D_i - E_i)$$

(Steinberg, 1999, 249)

The only difference among the tests is the w, or weight, factor. The w factor is 1 for the log rank test; hence, all events are weighted equally. The w factor is the number at risk at each time point for the Breslow test; hence, early events are weighted more heavily than later events because the number in the risk pool decreases as event occur over time. The w factor is the square root of the number at risk for the Tarone-Ware test, so that it weights early cases somewhat less heavily.

The log rank test is considered more powerful than the Breslow test under the special condition that the mortality rate in each group being compared is proportional to that of the others (they differ by a constant multiple). If this is not the case, the Breslow test may be more powerful, but the Breslow test has very

low power when the percentage of censored cases is large. (Steinberg, 1999, p. 250)

Producing Statistical Tests

Table 11

(Dummy Table) Summary Statistics and Statistical Tests for Two Levels

of Simulator

Level of Simulator	Time	Number Events	Number Censored	Percent Censored
Control Group	xx	xx	xx	xx.xx
Experimental Group	xx	xx	xx	xx.xx
Totals:	xx	xx	xx	xx.xx

Test Statistics for Equality of Survival Distributions for Simulator

	Statistic	Df	Significance
Log Rank	x.xx	xx	.xxxx
Breslow	xxx	xx	.xxxx
Tarone-Ware	xxx	xx	.xxxx

Note. This concise table is produced by the Kaplan-Meier procedure.

Table 11 shows the results of three statistical tests performed on the pregnancy data with Simulator as the independent variable. The procedure produces complete survival tables for each level of Simulator and standard errors and confidence limits for the mean and median of each level of Simulator. Only the summary comparisons for the two levels of Simulator and the results of the statistical tests have been reproduced in Table 11.

If the significance levels for each of the three tests are larger than 0.05, the treatments will not be significantly different. The effectiveness of the parenting experience with an infant simulator as a deterrent to teen pregnancy among middle school students will then be evaluated.

Summary

In this chapter the methodology of the study was discussed. The discussion was subdivided into five segments: (a) Participants, (b) Instrumentation, (c) Design of the Study, (d) Statistical Hypotheses, and (e) Data Analysis. Analysis of the data will be reported in Chapter 4.

CHAPTER 4

ANALYSIS OF DATA

To establish conclusions regarding the investigation, the Kaplan-Meier statistical

method was used to analyze the data. The Kaplan-Meier procedure produced a separate

survival table for each level of the independent variables of interest. The mean and

median for each comparison were computed. A plot with the two cumulative survival

curves for each variable was prepared. The Log Rank statistical test was computed for

determining whether the difference of two sample means was significant at the .05 level.

A t-test and probability levels were calculated on the four treatment groups and two

control groups to determine whether the differences of the means were significant at the

.05 level.

Restatement of the Hypotheses

H_1:   There will be no statistically significant difference in the length of time

teens who participate in the parenting experience with a computerized

infant simulator remain non-pregnant and teens who have not experienced

parenting with a computerized infant simulator remain non-pregnant.

The null hypothesis is:

H_0: $\mu_{\text{time}_{\text{simulator}}} = \mu_{\text{time}_{\text{non-simulator}}}$

with an alternative hypothesis of:

H_A: $\mu_{\text{time}_{\text{simulator}}} > \mu_{\text{time}_{\text{non-simulator}}}$

H$_2$:   There will be no statistically significant difference between minority and non-minority ethnic groups in the length of time they remain non-pregnant after they have experienced parenting with a computerized infant simulator.

The null hypothesis is:

$$H_0: \mu_{\substack{ethnic \\ White}} = \mu_{\substack{ethnic \\ Others}}$$

with an alternative hypothesis of:

$$H_A: \mu_{\substack{ethnic \\ White}} > \mu_{\substack{ethnic \\ Others}}$$

H$_3$:   There will be no difference among students involved in co-curricular activities versus students not involved in co-curricular activities in the length of time they remain non-pregnant after they have experienced parenting with a computerized infant simulator.

The null hypothesis is:

$$H_0: \mu_{\substack{co\text{-}curricular\ activities \\ involved}} = \mu_{\substack{co\text{-}curricular\ activities \\ not\ involved}}$$

with an alternative hypothesis of:

$$H_A: \mu_{\substack{co\text{-}curricular\ activities \\ involved}} > \mu_{\substack{co\text{-}curricular\ activities \\ not\ involved}}$$

H$_4$:   There will be no difference in the delinquency rate for students who become pregnant after they have experienced parenting with a computerized infant simulator and students who become pregnant who did not experience parenting with a computerized infant simulator.

The null hypothesis is:

$H_0: \mu$ crimes committed $\quad = \quad \mu$ crimes committed

            simulator   non-simulator

with an alternative hypothesis of:

$H_A: \mu$ rimes committed $\quad > \quad \mu$ crimes committed

            simulator   non-simulator

Computing Cumulative Survival

The length of time for the delay of the on-set of pregnancy for the treatment group versus the control group was addressed. Cumulative survival for the experimental subjects was computed separate from the control group and was computed first. This study also made the same comparisons between minority and non-minority groups to determine how long each group remained pregnant-free and between those students who were activity in co-curricular activities versus those students who were not active in co-curricular activities. The same data analyses were conducted for all comparisons.

The final research question dealt with crime committed by students after they became pregnant. There were no reports of committed crime in the self-report data. Many of the subjects were minors, making it difficult to verify the accuracy of the reported data.

Analysis of the Independent Variables

Hypothesis one is:

H_1:   There will be no statistically significant differences in the length of time

          teens who participate in the parenting experience with a computerized

infant simulator remain non-pregnant and teens who have not experienced

parenting with a computerized infant simulator remain non-pregnant.

The null hypothesis is:

$H_0: \mu_{\substack{time \\ simulator}} = \mu_{\substack{time \\ non\text{-}simulator}}$

with an alternative hypothesis of:

$H_A: \mu_{\substack{time \\ simulator}} > \mu_{\substack{time \\ non\text{-}simulator}}$

The two levels of the variable Simulator were designated as the treatment group

and the control group. The Kaplan-Meier table was produced for the experimental group

that participated in the parenting experience with the infant simulator (Table 12) and for

the control group that did not (Table 13). The mean survival time for the treatment group

Table 12

Kaplan-Meier Table-Survival Analysis for Time with the Factor Simulator for the

Treatment Group

Number of Cases: 139	Censored: 122	[a](87.77%)	Events: 17
	Survival Time	Standard Error	95% Confidence Level
Mean:	26.28	1.62	(23.09, 29.46)
Median:	29.00	1.98	(25.13, 32.87)

Note. [a]Percentage of censored cases

was 26.28 time periods, which equates to 3 years, 2 months, while the mean survival time

for the control group was 18.88, which equates to 2 years, 2 ½ months. The mean

survival time for the treatment group was 7.4 time periods longer that the mean survival

88

time for the control group, or 11 1/2 months. The mean and median for the experimental group were 26.28 and 29.00 respectively. The mean and median for the control group were 18.88 and 22.00. The larger mean and median survival suggest that those students who participated in the parenting experience remained pregnant-free for a longer time.

Table 13

Kaplan-Meier Table-Survival Analysis for Time with the Factor Simulator for the Control Group

Number of Cases: 82	Censored: 70	[a](85.37%)	Events: 12
	Survival Time	Standard Error	95% Confidence Level
Mean: (Limited to 29.00)	18.28	1.689	(15.18, 22.59)
Median:	22.00	4.14	(13.89, 30.11)

Note. [a]Percentage of censored cases.

The self reported data submitted by the subjects in each treatment group and each control group were verified by records obtained from the Grapevine-Colleyville Independent School District. Confirmation of some of the pregnancies was made possible by obtaining various records from the Grapevine-Colleyville Independent School District.

The difference in the two survival functions is displayed graphically in Figure 3. The plot displays two cumulative survival curves, one for the treatment group and one for the control group. The curves are step functions because the survival function changes

Cumulative Survival Function for the Factor Simulator

Figure 3. The cumulative survival function output for the independent variable Simulator for the duration of the data collection times. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

only at terminal events. The survival functions descend because the probability of

survival decreases as the pool of survivors decreases. The plot reveals that the first

terminal event occurred at the fifth time period to a treatment subject, but the next five

terminal events occurred to subjects from the control group. Two events occurred at the

ninth time period and one event each at the 10th, 11th, and 13th time periods. The second

terminal event occurring to a treatment subject did not happen until the 14th time period.

The treatment subjects experienced six terminal events between time period 14 and time

period 19, while only two terminal events occurred to the control group subjects for the

same time span. The survival function for the experimental group that participated in the parenting simulation descends more gradually than the survival function for the control group and began about 5 time periods later than the control group. The 5 time periods interval is approximately 7 months in length. The findings are consistent with the greater mean and median (longer survival time) for the treatment group.

Pregnancies began occurring to the control group during the spring semester of the 9th grade year while the on-set of pregnancies for the treatment group were delayed until the fall semester of the 10th grade. The on-set of pregnancies for the treatment group seemed to cluster around holidays: summer vacation, Thanksgiving, and the end of the school year. Figure 4 displays the hazard probability for the treatment group and the control group.

The Kaplan-Meier procedure provides three statistical tests: the Log Rank test, the Breslow test, and the Tarone-Ware test. The Log Rank test is considered more powerful than the Breslow test under the special condition that the mortality rate in each group being compared is proportional to that of the others. The Breslow test has very low power when the percentage of censored cases is large, as in this study. The Log Rank test yields a test statistic of 6.27 that has a significance level of 0.0123. Accordingly, the null hypothesis is rejected permitting the conclusion that students who participated in the parenting experience did not get pregnant as quickly as their counterparts who did not participate in the parenting experience. With a level of significance of 0.0123, the null hypothesis is rejected and the alternative hypothesis is accepted (see Table 14; Steinberg, 1999).

Cumulative Hazard Function for the Factor Simulator

Experimental Group
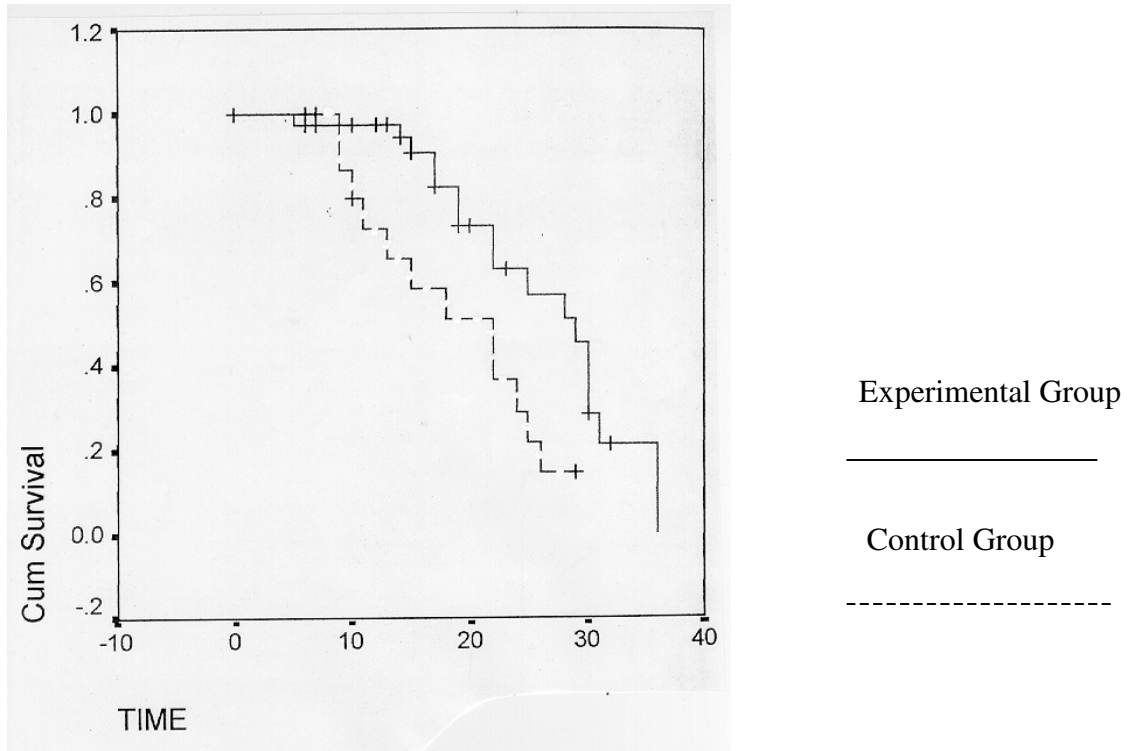
_____

Control Group

- - - - - - - - - - - - - - - - - -
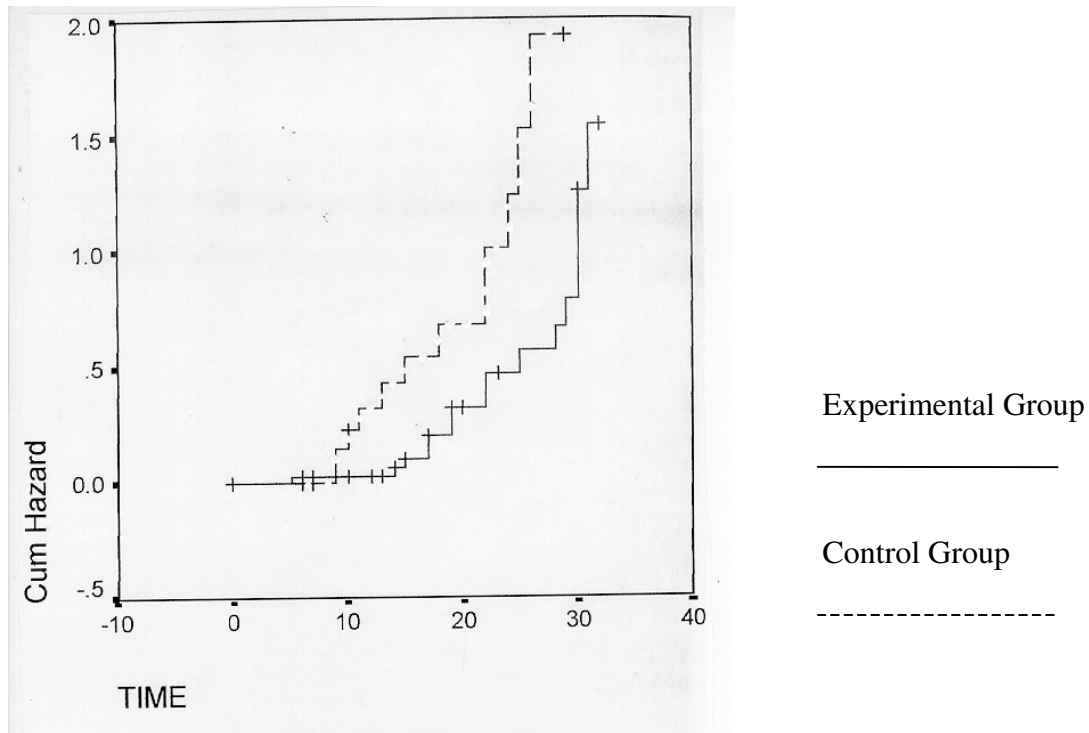
Figure 4. The cumulative hazard function output for the independent variable Simulator for the duration of the data collection times. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

A comparison of the mean survival times of the treatment groups and the control groups for the 1994-95 and 1995-96 school years was computed. T-tests were performed on the mean survival times to evaluate the difference between the effects of participating in the parenting simulation by the treatment groups and not experiencing parenting simulation by the control groups. For this analysis, the arithmetic mean survival times were employed.

For the classes of fall 1994 and spring 1995, the mean (arithmetic) survival time for the students having participated in the simulation was 24.0 time periods, whereas the mean survival time for the control group (students who did not participate in the

Table 14

Test Statistics for Equality of Survival Distributions for Simulator

Type of Test	Statistic	df	Significance
Log Rank	6.27	1	.0123
Breslow	6.41	1	.0114
Tarone-Ware	6.61	1	.0101

simulation) was 21.167 time periods. The mean survival times for the two groups were not different at any meaningful level of significance (t=1.0, df=14, p=.334) (Table 15).

For the classes of fall 1995 and spring 1996, the mean (arithmetic) survival time for the students having participated in the simulation was 21.29 time periods, whereas the mean survival time for the control group (students who did not participate in the simulation) was 12.83 time periods. The mean survival times for the two groups were different at a level of significance of 0.077 (t=1.969, df=10) (Table 16).

The differences in the survival functions for the fall 1994, spring 1995, fall 1995, and spring 1996 treatment groups and the 1994-1995 control group and the 1995-1996 control group are presented graphically in Figure 5. The plot displays the cumulative survival curves of all the groups in the study. The plot is consistent with the findings of the t-test on the means for these groups.

The fall 1994 treatment group experienced eight pregnancies prior to graduation from high school. The first on-set of pregnancy was at the 14th time period, the end of the summer prior to the beginning of the 10th grade. The second conception occurred around Thanksgiving of the 10th grade (time period 17), and two pregnancies were

Table 15

t-Test Two-Sample Assuming Unequal Variances for 1994-1995

	Simulator	Control
Mean	24	21.16667
Variance	53.33333	16.16667
Observations	10	6
Hypothesized Mean Difference	0	
Df	14	
T Stat	1	
P(T<=t) one-tail	0.167141	
T Critical one-tail	1.761309	
P(Y<=t) two tail	0.334282	
T Critical two-tail	2.144789	

conceived at time period 22, during the summer before the 11th grade. The next

three pregnancies took place during the summer prior to the 12th grade, while the

final on-set of pregnancy occurred at the close of the senior year during the final time

period.

The spring 1995 treatment group experienced only two pregnancies. The first

pregnancy occurred in February of the 10th grade, and the other occurred at the end of

the 11th grade, time period 25.

The control group for 1994-1995 experienced six pregnancies. They occurred

during time periods 15, 18, two at 22, 24, and 26. These conceptions follow the pattern

Table 16

t-Test Two-Sample Assuming Unequal Variances for 1995-1996

	Simulator	Control
Mean	21.28571	12.83333
Variance	84.90476	37.76667
Observations	7	6
Hypothesized Mean Difference	0	
df	10	
T Stat	1.969204	
P(T<=t) one-tail	0.038623	
T Critical one-tail	1.812462	
P(Y<=t) two tail	0.077247	
T Critical two-tail	2.228139	

set by the fall 1994 treatment group. The first pregnancy occurred in the fall of the 10th grade, the second in February of the 10th grade, the third and fourth at the end of the summer vacation prior to the beginning of the 11th grade, the fifth during October of the 11th grade, and the final pregnancy in February of the 11th grade (see Figure 6).

A wider variance occurred between the fall 1995 and spring 1996 treatment groups and the 1995-1996 control group. The first pregnancy for the fall 1995 treatment group occurred at time period 5 (approximately 5 months), immediately at the close of the eighth grade. During an interview, the subject, who was two years older than most

eighth graders, revealed that she had been sexually active for several months. The second

conception was at time period 19, spring break of the 10th grade; the third at time period

28, May of the 11th grade; and the final conception at time period 31, the beginning of

the 12th grade.

Cumulative Survival Function for the Factor Simulator for Each of the 6 Groups

Fall 1994 Experimental Group

∇ ∇ ∇ ∇

Spring 1995 Experimental Group

1994-1995 Control Group

X X X X

Fall 1995 Experimental Group

_____

Spring 1996 Experimental Group

▬▬▬▬▬

1995-1996 Control Group

………………
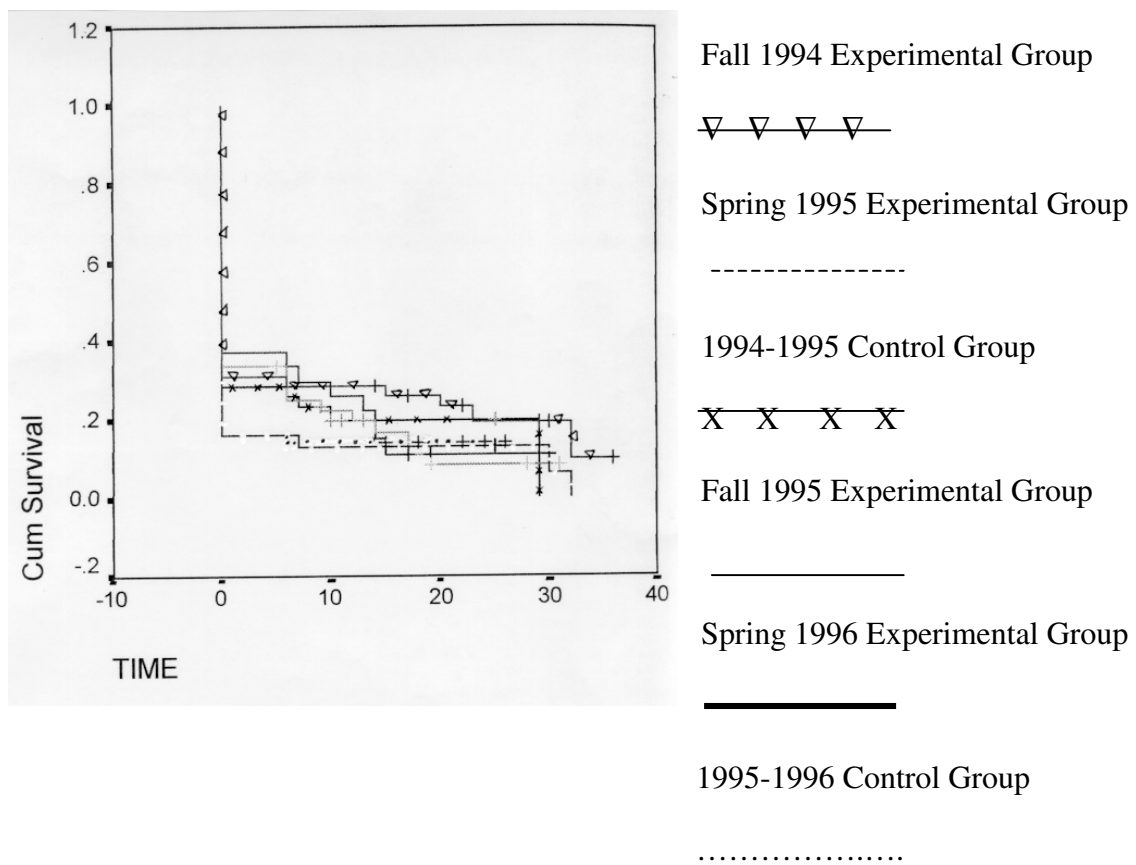
Figure 5. The cumulative survival function output for the independent variable Simulator
for the six groups in this study for the duration of the data collection times. Each corner
represents a terminal event. Each + mark represents a censored case that exited the study
for a reason other than pregnancy.

The first of three pregnancies for the spring 1996 treatment group was conceived

at time period 17, the end of the 10th grade; the second at time period 19, the end of the

Cumulative Survival Function for the Factor Simulator, 1994-1995

Fall 1994 Experimental Group

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Spring 1995 Experimental Group

_ _ _ _ _ _ _ _ _ _ _ _

1994-1995 Control Group

…………………

Figure 6. The cumulative survival function for the independent variable Simulator for the duration of the data collection times for the three groups for the school year 1994-1995. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

summer preceding the 11th grade; and the final pregnancy at time period 30,

Thanksgiving of the 12th grade.

Subjects from the 1995-1996 control group experienced six pregnancies. The first two

pregnancies occurred around Thanksgiving during the ninth grade (time period nine). The

third conception was at time period 10, February of the ninth grade, and the fourth

occurred during spring break of the ninth grade (time period 11). The fifth pregnancy

happened at time period 13, early summer after the ninth grade. The final pregnancy of

the group occurred at time period 25, around Thanksgiving of the 11th grade (see

Figure 7).

Cumulative Survival Function for the Factor Simulator, 1995-1996

Fall 1995 Experimental Group

Spring 1996 Experimental Group
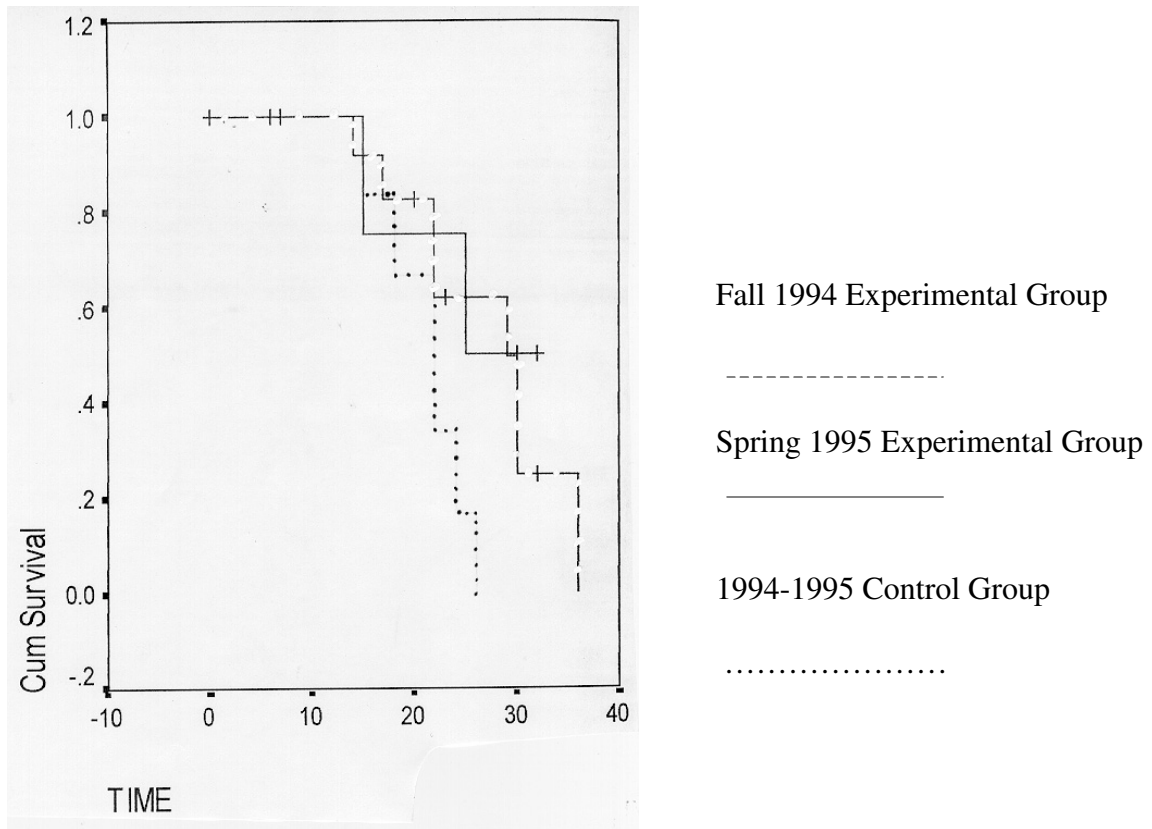
_____

1995-1996 Control Group

………………..
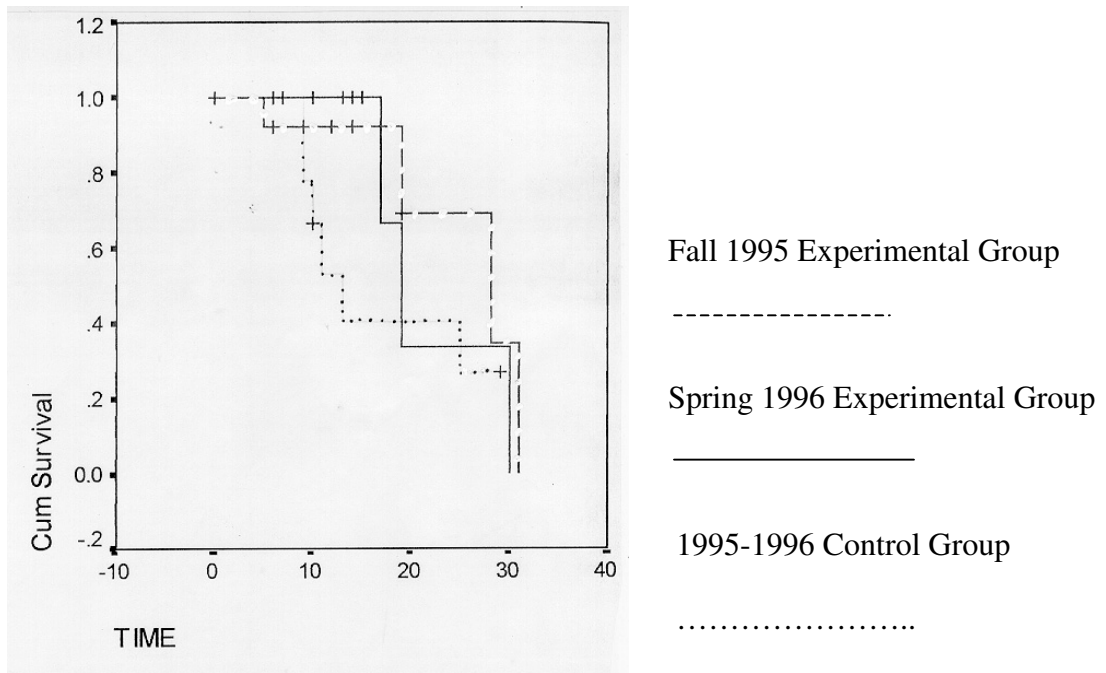
Figure 7. The cumulative survival function for the independent variable Simulator for the duration of the data collection times for the three groups for the school year 1995-1996. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

Four pregnancies occurred around Valentines Day, two during spring break, three at the end of the school year, four during the first part of the summer, eight during the last art of the summer, three in the early fall, and 5 around Thanksgiving (see Figure 8).

H_2:   There will be no statistically significant difference between minority and non-minority ethnic groups in the length of time they remain non-pregnant after they have experienced parenting with a computerized infant simulator.

Calendar of When Pregnancies Occurred
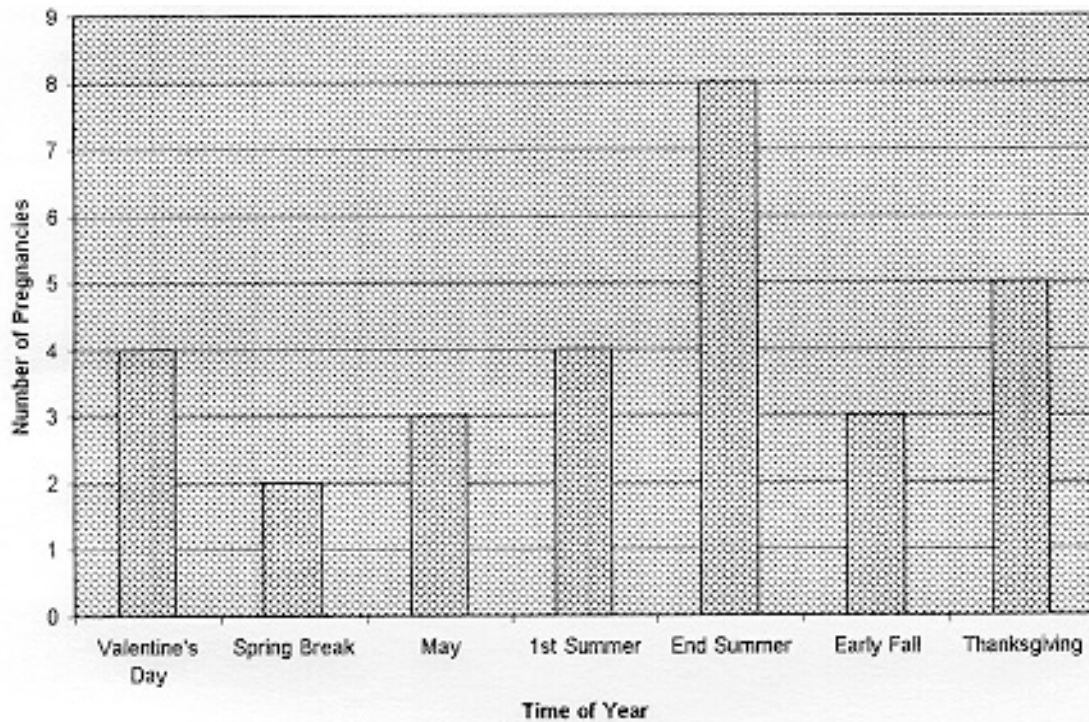
Figure 8. Pregnancy on-sets throughout the data collection periods were tallied and are displayed as a single calendar year to indicate when students might be at risk for engaging in risky behaviors that could lead to a pregnancy.

The second hypothesis is:

The null hypothesis is:

$$H_0: \mu_{ethnic_{White}} = \mu_{ethnic_{Others}}$$

with an alternative hypothesis of:

$$H_A: \mu_{ethnic_{White}} > \mu_{ethnic_{Others}}$$

The two levels of the variable Ethnic were designated as Caucasian and Other.

The Kaplan-Meier table was produced for the two levels of ethnic diversity of the

treatment group that participated in the parenting experience with the infant simulator.

The mean survival time for the Caucasian group was 22.92 time periods, which equates to 2 1/2 years, while the mean survival time for the Other group was 26.74, which equates to 3 years, 2 months (see Table 17). Subjects from all other ethnic groups were pooled to create the level of the independent variable-Other. The mean survival time for the Other group was 3.82 time periods longer that the mean survival time for the control group, or approximately 5 months (see Table 18). The mean and median for the

Table 17

Kaplan-Meier Table-Survival Analysis for Time with the Factor Ethnic for the Caucasian Group

Number of Cases: 190	Censored: 166	[a](87.37%)	Events: 24
	Survival Time	Standard Error	95% Confidence Level
Mean:	22.92	1.21	(20.55, 25.29)
(Limited to 36.00)			
Median:	22.00	2.00	(20.08, 27.92)

Note. [a]Percentage of censored cases.

Caucasian group were 22.92 and 24.00 respectively. The mean and median for the Other group were 26.74 and 30.00. The larger mean and median survival times suggest that those subjects who were members of the Other ethnic groups remained pregnant-free for a longer time than the subjects who were Caucasian. The ethnicity or race of the subjects was verified by data obtained from the Grapevine-Colleyville Independent School District.

Table 18

Kaplan-Meier Table-Survival Analysis for Time with the Factor Ethnic for the Other Group

Number of Cases: 31	Censored: 26	[a](83.87%)	Events:5
	Survival Time	Standard Error	95% Confidence Level
Mean:	26.74	4.06	(18.78, 34.70)
(Limited to 29.00)			
Median:	30.00	12.51	(5.49, 54.51)

Note. [a]Percentage of censored cases.

The difference in the two survival functions is displayed graphically in Figure 9 in a plot that displays two cumulative survival curves, one for the ethnic group Caucasian and one for the ethnic group that combines all other ethnic groups into a pool, Other. These curves are also step functions that have changed only at terminal events. The survival functions descend because the probability of survival decreases as the pool of survivors decreases. The survival function for the Other ethnic subjects from the treatment group descends more gradually than the survival function for the Caucasian ethnic subjects from the same treatment group. This is consistent with the greater mean and median (longer survival time) for this group.

Pregnancies began occurring to the Other group within 5 months of completing the parenting experience, but the second occurrence was delayed to the 14th time period (a span of 13 months), and the third to the 17th time period (a gap of 4 more months).

Cumulative Survival Function for the Factor Ethnic

Figure 9. The cumulative survival function output for the independent variable Ethnic for the duration of the data collection times. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

The on-set of pregnancies for the Caucasian group began about 12 months post treatment, at time period nine with two conceptions. Other pregnancies happened to Caucasian subject at time periods 10, 11, 13, two at 15, and 17. The Other ethnic subjects only experienced two more pregnancies, one at time period 30, just before the beginning of the 12th grade, and the final at time period 36, just prior to graduation from high school. There was a 20-month period that was pregnancy-free for the Other group between period 17 and 30.

Pregnancies occurred at a consistent rate for the Caucasian group, with

conceptions occurring in practically every time period to time period 31, the fall of the

12th grade. Figure 10 displays the hazard probability for the two levels of the

independent variable, Ethnic.
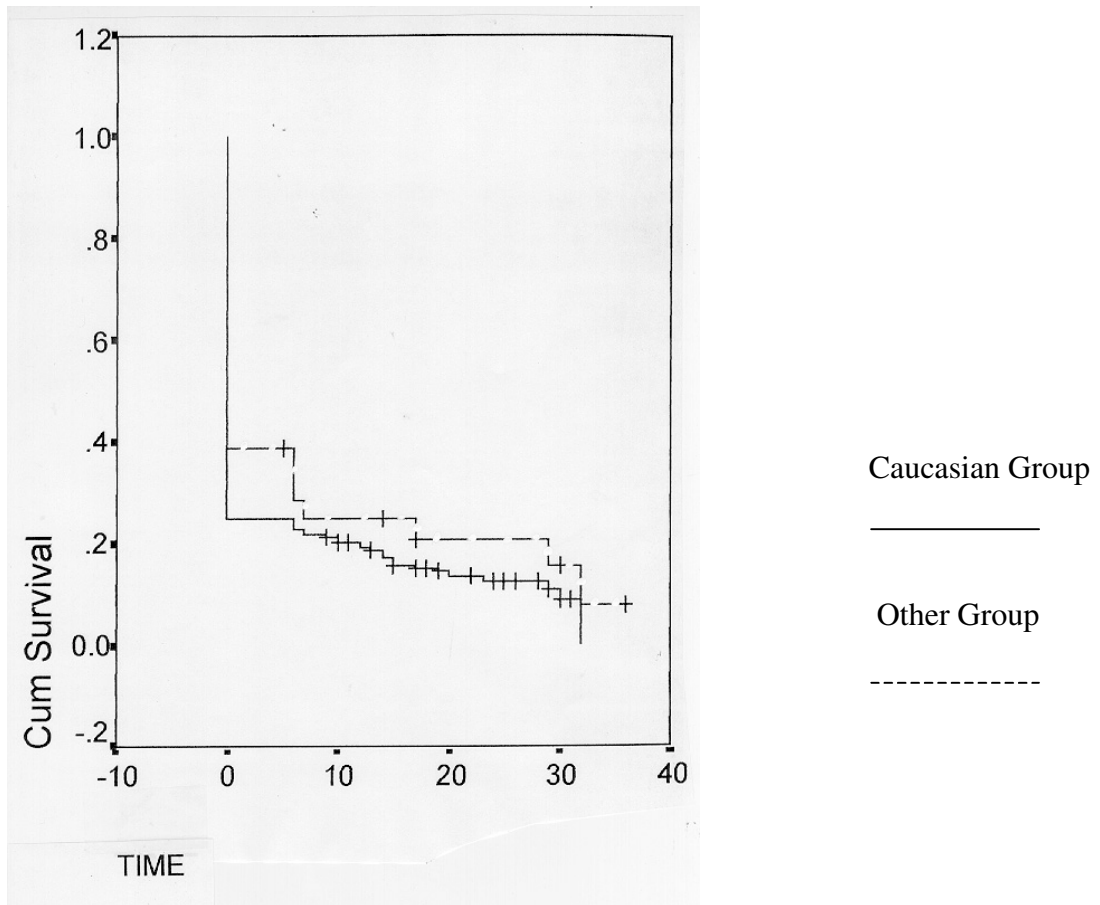
Cumulative Hazard Function for the Factor Ethnic
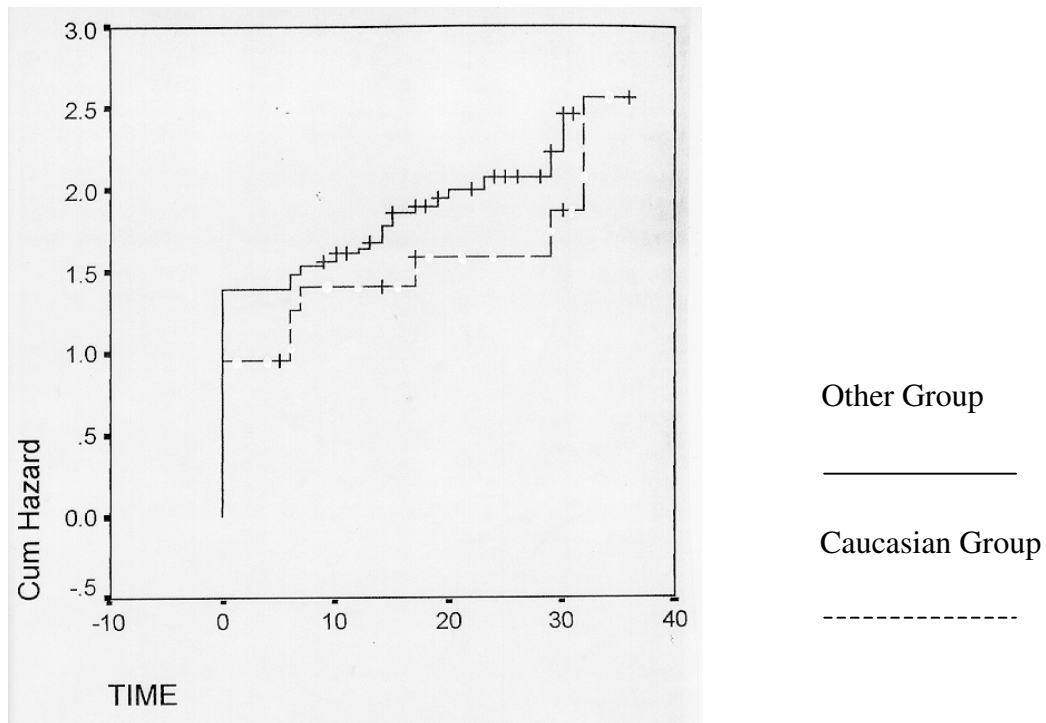
Figure 10. The cumulative hazard function output for the independent variable Ethnic for
the duration of the data collection times. Each corner represents a terminal event. Each +
mark represents a censored case that exited the study for a reason other than pregnancy.

The Kaplan-Meier procedure provides three statistical tests: the Log Rank test, the

Breslow test, and the Tarone-Ware test. The Log Rank test is still considered more

powerful than the Breslow test under the special condition that the mortality rate in each

group being compared is proportional to that of the others. The Breslow test has very low

power when the percentage of censored cases is large, as in this study. The Log Rank test

yields a test statistic of 1.50 that has a significance level of 0.2213. Having failed to

support the alternative hypothesis that the survival functions are not equal, the null

hypothesis of the equality of the survival function is accepted (see Table 19; Steinberg,

1999).

Table 19.

The test statistics for the equality of survival distributions for the factor Ethnic.

Type of Test	Statistic	df	Significance
Log Rank	1.50	1	.2213
Breslow	.01	1	.9184
Tarone-Ware	.42	1	.5182

Hypothesis three is:

H$_3$:   There will be no difference among students involved in co-curricular

activities versus students not involved in co-curricular activities in the

length of time they remain non-pregnant after they have experienced

parenting with a computerized infant simulator.

The null hypothesis is:

H$_0$: $\mu_{\text{co-curricular activities involved}}$ = $\mu_{\text{co-curricular activities not involved}}$

with an alternative hypothesis of:

H$_A$: $\mu_{\text{co-curricular activities involved}}$ > $\mu_{\text{co-curricular activities not involved}}$

The two levels of the variable Co-curricular were designated as those not involved

in co-curricular activities and those involved in co-curricular activities. The Kaplan-

Meier table was produced for the two levels of involvement in co-curricular activities for the treatment group that participated in the parenting experience with the infant simulator. The mean survival time for the treatment group subjects that were not involved in co-curricular activities was 22.23 time periods, which equates to 2 years, 8 months. The mean survival time for the treatment group subjects who were involved in co-curricular activities was 26.35, which equates to approximately 3 years, 2 months (Table 20). The mean survival time for the involved group was 4.12 time periods longer that the mean survival time for the not involved group, or approximately 5 months (Table 21). The mean and median for the not involved group were 22.23 and 22.00 respectively. The mean and median for the involved group were 26.35 and 28.00. The larger mean and median survival times suggest that those subjects who are members of the treatment group that were involved in co-curricular activities remained pregnant-free for a longer time than the subjects who were members of the treatment group but were

Table 20

Kaplan-Meier Table-Survival Analysis for Time with the Factor Co-Curricular for the Not Involved Group

Number of Cases: 122	Censored: 104	[a](88.89%)	Events: 18
	Survival Time	Standard Error	95% Confidence Level
Mean:	22.23	1.52	(19.24, 25.22)
(Limited to 32.00)			
Median:	22.00	3.05	(16.02, 27.98)

Note. [a]Percentage of censored cases.

Table 21

Kaplan-Meier Table-Survival Analysis for Time with the Factor Co-Curricular for the

Involved Group

Number of Cases: 99	Censored: 88	[a](88.89%)	Events: 11
	Survival Time	Standard Error	95% Confidence Level
Mean:	26.35	2.28	(21.87, 30.82)
Median:	28.00	5.19	(17.84, 38.16)

Note. [a]Percentage of censored cases.

not involved in co-curricular activities. Accuracy of the responses to the questionnaire

item number three, "Circle the clubs, organizations, activities, etc. that you were

involved in during the eighth grade," was verified by inspecting club membership rosters

and course attendance records.

The difference in the two survival functions for the independent variable

Co-curricular is displayed graphically in Figure 11 in a plot that displays two cumulative

survival curves, one for the subjects from the treatment group who were not involved in

co-curricular activities and one for the treatment group subjects who were involved in co-

curricular activities. These curves are also step functions that have changed only at the

terminal events. The survival functions descend because the probability of survival

decreases as the pool of survivors decreases. The survival function for the involved

subjects from the treatment group descends more gradually and has fewer cases than the

survival function for the not involved subjects from the same treatment group. This is

consistent with the greater mean and median (longer survival time) for this group. The

Cumulative Survival Function for the Factor Co-Curricular

Figure 11. The cumulative survival function output for the independent variable Co-curricular for the duration of the data collection times. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

on-set of pregnancy for the involved subjects began at the seventh time period, which was about 7 months post treatment. Pregnancy on-set for the Not Involved subjects began at the ninth time period, which was approximately 12 months post treatment. The other pregnancies were equally dispersed throughout the length of the study for the subjects not involved in co-curricular activities. The hazard function for the independent variable, co-curricular activities is presented in Figure 12. The Kaplan-Meier procedure provides three statistical tests: the Log Rank test, the Breslow test, and the Tarone-Ware test. The Log Rank test is still considered more powerful than the Breslow test under the special
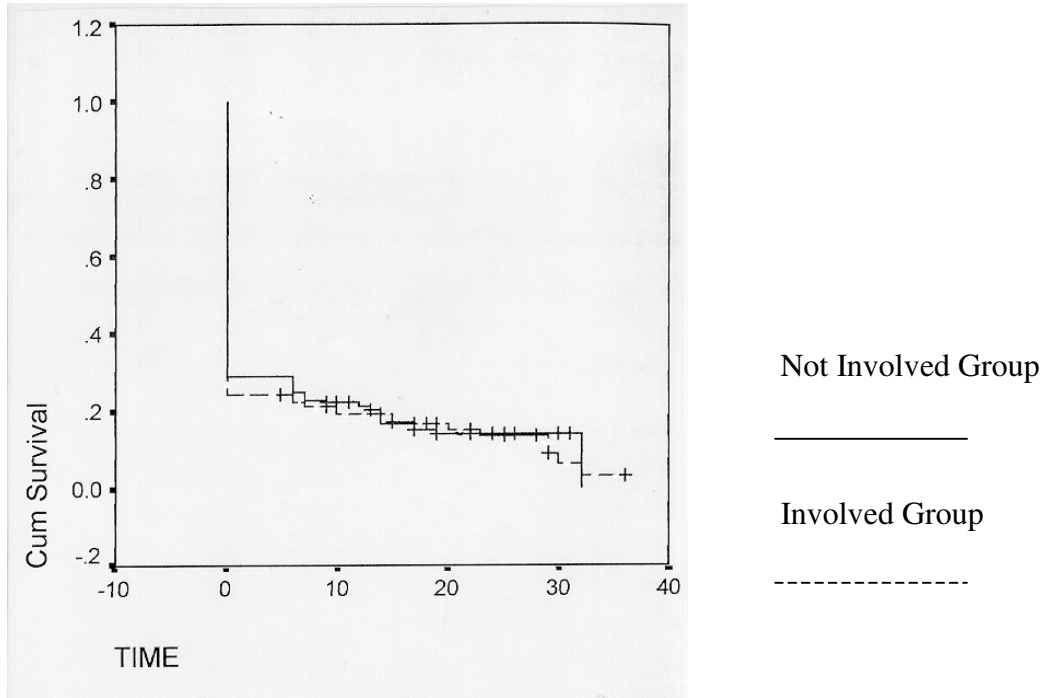
Cumulative Hazard Function for the Factor Co-Curricular
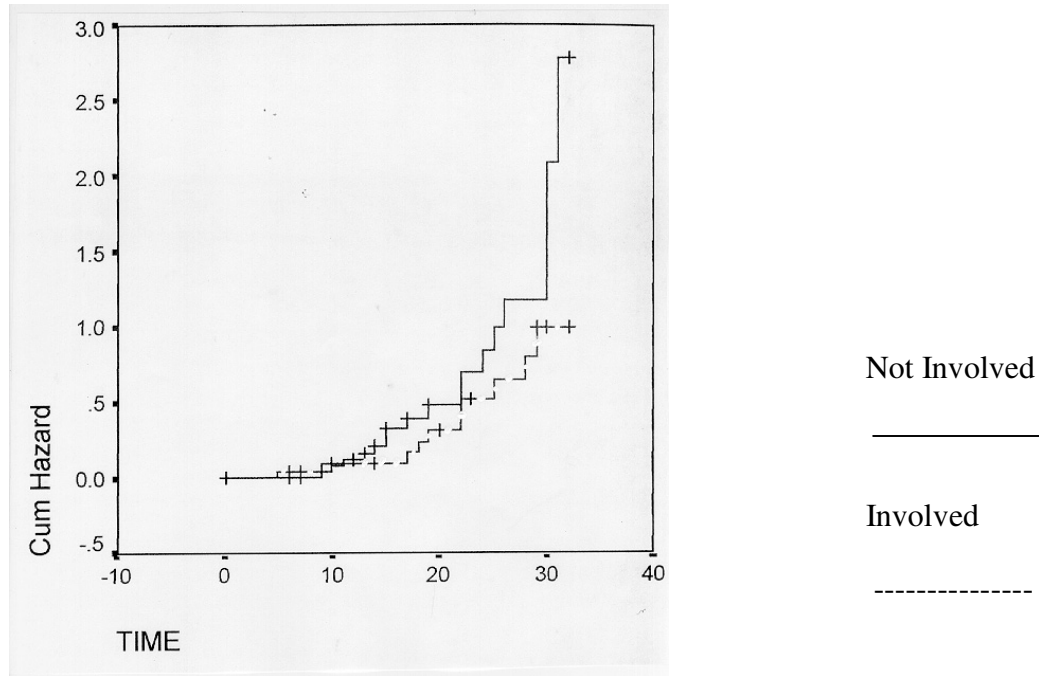
Figure 12. The cumulative hazard function output for the independent variable Co-Curricular for the duration of the data collection times. Each corner represents a terminal event. Each + mark represents a censored case that exited the study for a reason other than pregnancy.

condition that the mortality rate in each group being compared is proportional to that of the others. The Breslow test has very low power when the percentage of censored cases is large, as in this study. The Log Rank test yields a test statistic of 1.75 that has a significance level of 0.1860. Having failed to support the alternative hypothesis that the survival functions are not equal, the null hypothesis of the equality of the survival function is accepted (see Table 22; Steinberg, 1999).

The fourth hypothesis is:

H_4:   There will be no difference in the delinquency rate for students who

become pregnant after they have experienced parenting with a

computerized infant simulator and students who become pregnant who did

not experience parenting with a computerized infant simulator.

Table 22

The Test Statistics for the Equality of Survival Distributions for the Factor Co-Curricular.

Type of Test	Statistic	Df	Significance
Log Rank	1.75	1	.1860
Breslow	0.74	1	.3910
Tarone-Ware	1.17	1	.2800

The null hypothesis is:

$$H_0: \mu_{\substack{\text{crimes committed} \\ \text{simulator}}} = \mu_{\substack{\text{crimes committed} \\ \text{non-simulator}}}$$

with an alternative hypothesis of:

$$H_A: \mu_{\substack{\text{rimes committed} \\ \text{simulator}}} > \mu_{\substack{\text{crimes committed} \\ \text{non-simulator}}}$$

Of the 29 subjects who reported being pregnant, none reported having committed

a crime. As many of the subjects were minors, it was difficult to verify the accuracy of

the data. The factor variable only had one value for every strata; therefore, no test of

comparison analysis could be performed. The lack of statistical tests prohibits the

acceptance or rejection of the null hypothesis.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The intent of this study was to investigate the effectiveness of a computerized infant simulator as a deterrent to teen pregnancy. After parenting a computerized infant simulator, girls are better informed of the responsibilities a caregiver has to an infant. Such knowledge should encourage girls to avoid risky behaviors that could lead to pregnancy.

Summary of Findings

The indicators measured for this study included the computerized infant simulator experience, race or ethnicity, co-curricular involvement, and crime. The following null hypotheses were formulated to accomplish this purpose.

1. Will teens who participate in the parenting experience with a computerized infant simulator remain non-pregnant longer than teens who have not experienced parenting with a computerized infant simulator?

2. When are teens at the greatest risk of engaging in behaviors that might lead to unplanned pregnancy?

3. Are students from one ethnic group more inclined to become pregnant than students from the other ethnic groups?

4. Are students who are not involved in co-curricular activities more inclined to become pregnant than students who are involved in co-curricular activities?

5. Are pregnant teens who commit crimes more inclined to commit crimes against people or crimes against property?

Upon evaluating the data from the computers, this researcher observed a difference in the care given to the babies between the students who wanted to continue the experience and those who were ready to end the experience. Most students in both groups were conscientious in tending the infants as evidenced by the display panels with few or no delayed tending incidents, few or no minutes of delayed tending, and few or no abuse events. Yet, the students who were eager to end the simulation had by far the larger number of delayed tending incidents and abuse events. Some computers registered up to 45 minutes of unattended crying and some had as many as five abuse events. The students reported that they had slept through the onset of crying and a family member had had awaken them to tend to the baby.

The students in the first treatment group had no preconceived notions to cloud their parenting experience. Even though the next three experimental groups of test subjects had been biased by observing the first simulation, each group reacted in the same manner as the initial experimental group. There was virtually no difference in the number of abuse events and in the rate of unattended crying over the four semesters of the study.

The quest for answers to these research questions was provided through the study of the following statistical hypotheses:

H_1:　　There will be no statistically significant differences in the length of time teens who participate in the parenting experience with a computerized infant simulator remain non-pregnant and teens who have not experienced parenting with a computerized infant simulator remain non-pregnant.

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The test statistics for equality of survival distributions for simulator presented statistically significant results at the .0123 level, which was well within the .05 level of significance. The investigation disclosed that, based on the mean and median, the treatment group remained pregnant-free on average almost a year longer than the control group (7.4 and 7.0 time periods longer respectively). One time period equaled about 61/2 weeks. Closer scrutiny of the data revealed other considerations. The first pregnancy to occur in this study was an example of everything one hopes not to see. The pregnancy, at time period 5, was to a subject from the treatment group who, during her interview, revealed that while she had been 2 years older than most of the other girls in the eighth grade, she had also been sexually active for several months and had not ceased participating in sexual intercourse even after experiencing the parenting simulation with the computerized infant simulator. No form of contraception had been used to prevent pregnancy. These revelations support the finding from the Texas Department of Health (1997) that the pregnancy rate for 15 year olds is much higher than for 13 and 14 year olds. Once she became pregnant, she immediately dropped out of school, again supporting the statistic that 37% of young women who give birth within 4 years of the eighth grade drop out of school (Alan Guttmacher Institute, April 1999). At this writing, she is the mother of two and is expecting her third child, is unemployed, and does rely heavily on the welfare system, again supporting the fact that 79% of those individuals who do not finish high school before getting married and who do not wait until at least age 20 to have their first child, live in poverty (Annie E. Casey Foundation, 1999). Texas, which ranks close to the bottom in the nation in graduation rates, loses one-third of the

drop-outs because of pregnancy (Texas Education Agency, 1991). This young mother fits the model: less education, inadequate vocational skills, and not financially equipped to provide adequately for her children, plus she, too, is a child of an uneducated teen mother and was raised in a single-parent home with her mother as head of household (Horn, 1996; Simkins, 1984).

The second pregnancy (at time period 14) to occur to a subject from the treatment group was to a cousin of the subject who had experienced the first pregnancy. She was 15 when the pregnancy occurred. Thirteen months separated the two pregnancies. Perhaps this pregnancy supports the theory that adolescents at-risk for early pregnancy associate with peers who are willing to bear children out of wedlock and are the product of multi-generations of teen mothers (Abrahamse et al., 1988; Luker, 1996; Miller, 1998; Rosenthal et al., 1996; Wodarski & Wodarski, 1995).

The first five pregnancies that occurred to subjects from the control group were from time period 9 to time period 13, which is approximately from the summer after the eighth grade until the beginning of the 10th grade. There were five pregnancies to subjects from the control group before the treatment group experienced its second pregnancy.

The first two students from the treatment group who became pregnant and the first five students from the control group who became pregnant all dropped out of school. In total, 7 of the 17 subjects (41%) from the treatment group who became pregnant dropped out of school and 8 of the 12 subjects (67%) from the control group who became pregnant dropped out of school. These figures support the findings of the Alan

Guttmacher Institute (1999) that only 38% of students who become pregnant during high school remain in school.

The cumulative survival function produced two lines with gradually descending slopes. The difference between the two lines is the on-set point of the decline and the rate of decline. The on-set point of the decline is the time of the first pregnancy. The rate of decline is represented by the steepness of the slope of the line. After the initial pregnancy for the treatment group, there were no more pregnancies until the 14th time period. This corresponded with the summer prior to the start of the 10th grade, at which time most of the subjects would have been approaching 15 years of age. In Tarrant County in 1995 there were 10 pregnancies reported by 13 year olds and 308 reported by 15 year olds. The pregnancy rates for the subjects in this study were consistent with the findings of the Texas Department of Health (1997).

A t-test on the arithmetic mean of survival time for the students having participated with the infant simulator in 1994-1995 was not different at any meaningful level of significance from the arithmetic mean of survival time for the students who did not participate with the infant simulator during the same school year (t=1.0, df=14, p=.334). However, a separate t-test on the arithmetic mean of survival time for the students who participated with the infant simulator in 1995-1996 was different at the .077 level of significance from the arithmetic mean survival time for the students who did not participate with the infant simulator during the same school year (t=1.969, df=10). This difference could be attributed to subtle changes in the size and weight of the infant car seats or to the configuration of the tending keys. A future study could test for these variations.

H$_2$:   There will be no statistically significant difference between minority and non-minority ethnic groups in the length of time they remain non-pregnant after they have experienced parenting with a computerized infant simulator.

Study of the mean and median for the two groups revealed larger mean and median survival times for those subjects who were members of the Other group. All of the subjects from the Other group who became pregnant were of Hispanic ethnicity. The larger mean and median suggest that the students from the Other group did not experience a pregnancy as early as did the subjects from the Caucasian group by approximately 5 months. The differences in the pregnancy rates do not support the findings of the Alan Guttmacher Institute (April 1999) and the National Vital Statistics Report (Ventura et al., 1998) which reported that in 1994 through 1996 the pregnancy rates for Hispanics was double that of Caucasian. Slightly more than 12.5% of the subjects who were Caucasian became pregnant, while 16.13% of the subjects from the Other group experienced pregnancy; 22.72% of the Hispanics in this study became pregnant.

The null hypothesis was accepted based on the 0.2213 level of significance from the test statistics for equality of survival distributions for factor Ethnic. The alternative hypothesis was rejected.

H$_3$:   There will be no difference among students involved in co-curricular activities versus students not involved in co-curricular activities in the length of time they remain non-pregnant after they have experienced parenting with a computerized infant simulator.

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Examination of the data on involvement in co-curricular activities versus non-involvement in co-curricular activities suggested that there was very little difference in the on-set of first pregnancy and the rate of frequency of pregnancies between the two groups. The students involved in co-curricular activities had a slightly larger mean and median than the subjects who were not involved in co-curricular activities. The students involved in co-curricular activities remained pregnancy-free approximately 5 months longer, which is about 4 time periods. These findings slightly supported Miller (1983) who identified involvement in school activities as a deterrent to teen pregnancy. Four of the 29 students who became pregnant were involved in athletics. There was insufficient data to determine if involvement in athletics or any other specific co-curricular activity was a factor in deterring behaviors that might lead to pregnancy (National Campaign to Prevent Teen Pregnancy, Summer 1998).

Study of the survival function (see Figure 11) revealed two lines that crisscrossed each other and followed almost identical slopes. However, study of the hazard function (see Figure 12) indicated a difference in the times when pregnancies occurred. The students not involved in co-curricular activities were in danger of experiencing a pregnancy about 5 months earlier than those involved in co-curricular activities. Figure 11 also indicated more pregnancy occurrences to the students who were not involved in co-curricular activities between time periods 11 and 19. These time periods equated to the time period from the spring of the 9th grade to the spring of the 10th grade. The students involved in co-curricular activities experienced more pregnancies between periods 17 and 21, approximately from the spring of the 10th grade until early summer after the 10th

grade. When one considered the differences between the means and medians of the two groups and the differences on the hazard function, one could determine that involvement in co-curricular activities tended to postpone the on-set of pregnancy. However, when one examined of the survival function and the Log Rank test for equality of survival distributions for co-curricular, the opposite could be deducted. The 0.1860 level of significance from the Log Rank test strengthened the support of the null hypothesis.

> H_4: There will be no difference in the delinquency rate for students who become pregnant after they have experienced parenting with a computerized infant simulator and students who become pregnant who did not experience parenting with a computerized infant simulator.

None of the students in this study who became pregnant reported any involvement in crime. Numerous studies link early childbearing and crime (Maynard, 1997; Simkins, 1984; Singh & Wulf, 1990). For years, Grapevine, Texas, has been a relatively high socioeconomic area with a high employment rate and high standard of living. The crime rate has been very low (Department of Development Services, 1997). No pregnant subjects were involved in crime, which was consistent with this area but inconsistent with the nation. The families of many of the adolescent parents in this study were supportive of the physical needs of the teen parents and their children and helped provide the necessities and many of the luxuries desired by most teenagers. Gainful employment was readily available to teens desiring full or part-time work, and the current minimum wage paid to entry level workers was well above the federal minimum wage. Texas law was structured in such a manner that many of the teen parents received child support for their

children if they had complied with the paternity laws. The area was fortunate to have a well-developed local community service center that provided assistance to citizens in need. Area churches and Parent Teacher Associations also provided assistance to families in need. All of these factors combined to create an atmosphere wherein teen parents, whether or not they remained in school, did not need to engage in criminal activity to obtain material items. If this study is replicated, one should consider continuing the study until the subjects are 18 years old so criminal records could be accessed to verify self-report data. A study of the effects of pregnancy on young fathers might produce different results.

Conclusions

Officials in the Grapevine-Colleyville Independent School District recognized that unplanned adolescent pregnancies interrupted the education of too many of its students and desired to pursue strategies to combat the problem. The district must be praised for its willingness to invest in innovative teaching tools with untested effectiveness. Fortunately, the experience of parenting a computerized infant simulator was as effective as this researcher had anticipated.

The implications from the findings of this study have been discussed and explicated in the Summary of Findings section. On the basis of those discussions the following conclusions are stated. Support for these conclusions is based on the presentation of data in the tables and in the discussions of those data.

The experience of parenting the computerized infant simulator appears to be highly effective in delaying the on-set of pregnancy for at least 11/2 years post treatment.

Even though the majority of the treatment subjects reported that their experience with the computerized infant simulator was still vivid in their memories, it was at the 21/2 year mark that some pregnancies began to occur. According to the interviews with the research subjects, the infant simulator seemed to continue to influence the behaviors of teens for at least 4 to 5 years post treatment. A vast majority of the treatment subjects reported that their experience with the infant simulators was still vivid in their memories and still made them "not want to be a parent yet."

There is a possibility that the control group exhibited some degree of bias. Though the control group did not participate directly in the parenting simulation, the students in the control group were in the same school setting and attended many of the same classes as students in the treatment group. Therefore, they were presented with the opportunity to observe and interact with the treatment group. To some extent, then, some students' attitudes and behaviors may have been modified by their observations of the treatment groups' trials and tribulations as they dealt with simulated parenting. Many of the questionnaires from the control subjects contained comments such as, "Even though I was not in your class and did not parent one of the dolls, I saw my friends parenting them and saw what trouble it was. That was enough for me!" Though a number of the control group students commented negatively concerning the simulation's effect on their treatment group contemporaries, it was not possible to discern from the data whether this bias existed or was measured it, if it did exist. The effect of this bias on this investigation, if existed, would be to increase the mean survival time for the control group, which would cause the results to indicate a lesser level of significance than would have been

found if no bias existed. Future researchers should consider designing studies wherein the treatment group and the control group do not have any interaction.

Hispanic students constituted 9% of the research population yet produced 17% of the pregnancies that occurred in this study. Almost 23% of the Hispanics became pregnant, compared to 12.63% of the Caucasians. According to the self-reports from the Hispanic students, some of them were sexually active during the intervention and did not become abstinent after the treatment.

All but four of the research subjects who were a part of competitive athletics remained pregnancy-free until after graduation from high school. Similar claims by student involvement in other school activities could not be made. The effectiveness of involvement in co-curricular activities as a deterrent to teen pregnancy was not be supported by this study.

This was a very costly program to implement, but in this researcher's opinion, it was well worth the expense. The initial cost of the infant simulators was great, but that was only a portion of the expense. The cost of full-size strollers was much more than the umbrella strollers. Infant car seats, diaper bags, extra diapers, changes of clothing, blankets, baby wipes, and disposable hospital-type wrist bands had to be secured for each doll. Many of the students in this affluent area of North Texas were offended at the used strollers and car seats that were secured at garage sales and from dusty attics during the first year of the research. Several students supplied their own equipment. Adequate storage for the equipment was also a concern.

The structure of the family has been identified as an attribute that generally determines a young person's chances of becoming a single parent (Abrahamse et al.,

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1988). With the dysfunctional families of today, many young people have not experienced life in a functional family and have not been taught the skills needed to maintain a healthy family. A sizeable number of students drop out of school during the eighth or ninth grade before they have had the opportunity to participate in classes that teach skills for family living.

A combination of factors meshed to create an atmosphere that contributed to the success of this parenting simulation. The atmosphere of the school was conducive to trying state-of-the-art, innovative programs, evidenced by the openness with which the faculty accepted the program. For the 2 years of the experiment, this researcher never received one complaint from a teacher concerning classroom interruptions. Most faculty comments were centered around the quality of parenting skills exhibited by the students.

This was a serious simulation. Great care was given in making this simulation as realistic as possible. It was constantly stressed that these were real babies and were to be treated as such. No inappropriate behaviors at any level were tolerated. The students policed each other. They were outraged when a baby was mistreated and usually reported the incident. The faculty re-enforced the seriousness of the simulation.

The students bought into the idea that the dolls were real babies and were very protective of them. The quality of the appearance and construction of the infant simulators made it easy for the students to treat the dolls as live infants. Most students wanted to survive the experience without having any lights turn on. They worked hard to take good care of their babies by monitoring who could hold their baby. They were careful to avoid crowds where someone could bump into the stroller. They learned to

navigate through closed doors and through rain, snow, and sand to reach portable classrooms while keeping their baby warm and dry and the equipment clean. Many students became very attached to their infant simulators and actually cried when they had to turn them in. It was not uncommon for a student to recognize their doll during a subsequent simulation and react warmly to it.

The students were not allowed to withdraw early from the simulation unless their parents so requested. The only times this happened involved male students. The requirement to parent for 72 hours was long enough to pass the "Gee, this is fun and I love all of the attention I am getting" stage to the "I am TIRED, this baby won't let me sleep, and I can't go anywhere with my friends like I normally do!" stage and on to the "I'm too young to be a parent! This is not fun! The baby doesn't show me the love and affection I am seeking!" stage. It became a reality check that parenting is filled with responsibilities never before imagined.

There is overwhelming evidence that programs that focus on sexuality, including sex and AIDS/HIV education programs, school-based clinics, and condom availability programs, do not increase sexual activity. Currently no scientifically credible, published research demonstrating that abstinence-only programs actually delay or hasten the on-set of sexual intercourse or reduce any other measure of sexual activity exists. The computerized infant simulator blends well with abstinence-only and abstinence plus contraception pregnancy prevention programs.

Media interest in the parenting simulations was great. Two television news stories and numerous print articles were produced on the simulation experiences. As a result of

the Associated Press wire coverage, requests for information concerning the infant simulators were received from all over the United States and from several foreign countries.

Recommendations

The results of this research and review of literature support the following recommendations.

1. Communities would be well served to launch an all-out war on the eradication of unplanned, unwanted teen pregnancies. Schools, social organizations, businesses, faith-based organizations, social service agencies, and governmental entities should unite to form a broad base of support for this effort. The nine points identified as common characteristics exhibited by the four curricula that have a strong success for reducing sexual risk-taking should become the framework for the project.

2. School districts should follow the example of the Connecticut State Board of Education and study their population kindergarten through 12th grade to determine the health and sexual interests, concerns, and problems of students at all ages.

3. Abstinence-based programs should be implemented in early elementary school, well before the beginning of sexual involvement.

4. This study strongly recommends the use of computerized infant simulators as an effective deterrent for teen pregnancy. To be even more effective, this researcher suggests the first interventions should be used at the sixth or seventh grade, again,

well before the preventions are needed. The on-set of menarche is much earlier than in previous decades. Children as young as 10 and 11 years old are becoming pregnant. Adolescents are normally involved in intercourse for 9 months before using contraception. By eighth grade, too many young people have become pregnant, reducing the effectiveness of this program. Methods of preventing the spread of sexually transmitted diseases, HIV, and AIDS should be a part of the curriculum.

5. A second treatment should be administered 21/2 to 3 years later to remind the students why they do not want to engage in activities that could lead to an unwanted pregnancy. It should be of such a length that the lifestyle of the student is impacted, a minimum of 1 week and possibly as long as 2 or 3 weeks. The curriculum should be expanded to include an in-depth study of a variety of subjects related to teen sexuality. The needs of the students should be predetermined by the instructor and the curriculum designed based on those needs.

    A conservative syllabus would include the study of the human reproductive anatomy, conception, pregnancy, labor and delivery. The study of sexually transmitted diseases, abstinence and other forms of birth control, and HIV and AIDS should also be a part of the curriculum. Discussions on self-esteem, communications, decision-making skills, family planning and family relations, and life styles take on a different perspective to high school students as opposed to middle school students. Comprehensive courses of study could include the

study of the developmental stages for infants and children; parenting versus caregiving; health, safety, and nutrition for young children; discipline; how to communicate with a child; grooming and clothing for infants and children; and the economics of raising children.

6. Interventions to the Hispanic population should begin well before the eighth grade, possibly at the sixth or seventh grade.

7. Equipment should be purchased to allow each middle school and high school class ready access to the equipment.

8. Research should be conducted to determine the pregnancy rates for the students from the other middle schools who do not participate in the computerized infant simulation program.

9. Students who drop out of school in the eighth or ninth grade because of pregnancy need to be equipped with skills for parenting and family living. At-risk students should be given training in family living while they are in middle school. Skills for Living should be a required course in middle school.

10. Society would be better served if students were prepared to enter the work force prior to becoming school drop-outs. Career planning, especially for students at risk of dropping out of school, should be provided to all students while they are in middle school. Not all students will remain in school long enough to benefit from career and technology courses that are offered to older students. Teen parents, who are vulnerable to economic dependence, are less able to escape poverty than are older parents and are greatly in need of career training. Therefore, Career

Investigations should be a required course in middle school to introduce career options to all students.

11. Students should be encouraged to enroll in Family and Consumer Science courses in high schools. The curricula for courses such as Individual and Family Living, Personal and Family Development, Preparation for Parenting, and Child Development all intimately address many of the issues of self-esteem, interpersonal skills, communications skills, and health and well-being that have been identified through research as absent in dysfunctional families.

12. A future study could track students through high school, as this study did, but could factor in co-curricular involvement for each year of high school. The focus could be on involvement in general, involvement in specific activities, and the degree of involvement necessary to make a difference.

13. Examination of the various roles that boys play in causing and preventing teen pregnancy, and involving boys in teen pregnancy prevention programs are important components of a comprehensive approach to reducing teen pregnancy. The influence of fathers on the health and well-being of children deserves further study.

14. Parents must be educated as to the seriousness of the teen pregnancy problem and the need to implement effective interventions.

15. The location of this study was in a relatively high socioeconomic area. None of the students acknowledged any involvement with criminal activity after they became pregnant. Other research associates criminal activity with teen parenting.

Further research could investigate under what conditions adolescent parents do turn to crime.

16. The structure of the American family is identified as an attribute that generally determines a young person's chances of becoming a single parent. Other studies could research possible interventions for single parents to help strengthen families units into positive role models for their children.

17. Family and school problems are often related. The involvement of a school district in preventing teen pregnancy goes beyond the walls of the sex education classroom. School districts could address interventions aimed at the broader-based issues of family structure and family functioning, family counseling, peer influence, self-esteem, socioeconomic status, and adult education rather than maintaining a single emphasis on sex education. Providing counseling and intervention services after school hours might also increase parental involvement.

APPENDIX A

TEEN PREGNANCY QUESTIONNAIRE

TEEN PREGNANCY QUESTIONNAIRE

1. Please circle the semester you were in Career/Life and parented a Baby Think It Over™ doll or circle the year you were in the 8th grade but did not take the class and did not parent a doll.

    Fall, 1994   Spring, 1995   Did not take class in 8th grade, 1994-1995

    Fall, 1995   Spring, 1996   Did not take class in 8th grade, 1995-1996

2. Please circle your race/ethnic background.

    White, not Hispanic   African American   Hispanic   Asian

    American Indian   East Indian

    Other: please specify _____

3. Circle the clubs, organizations, activities, etc. that you were involved in during the 8th grade. The list below is not complete. Please add any other activities below.

    Athletics   Band   Cheerleader   Choir   FHA/HERO   Class Officer

    PALS   Foreign Language Club   Student Council

    Other activities: _____

4. Have you gotten pregnant since the 8th grade?   YES   NO

5. What month and year did the pregnancy occur? _____

6. Did your experience with the Baby Think It Over™ doll cause you to postpone behaviors that might result in an unwanted pregnancy?   YES   NO

7. If YES, for how long did the doll have an affect on your behavior?
    6 months   1 year   2 years   3 years   4 years

8. If you have become pregnant, have you been involved in any kind of criminal act?
        YES   NO

9. If YES, circle PERSON if the crime was against a PERSON or circle PROPERTY if the crime was against PROPERTY.   PERSON   PROPERTY

10. When DID or when WILL you graduate from high school? _____

11. Which high school did you attend? _____

Please return this questionnaire immediately. Your responses will remain confidential.

Remember, to get your name in the drawing for the $100 gift certificate to Grapevine Mills Mall, you must return this questionnaire immediately.

_____

<u>Detach and return in the envelope with your questionnaire</u>

I understand that the completion of this questionnaire is voluntary and I have the right to skip questions that make me uncomfortable. Ms Hillman has explained why this research is being conducted and how the results will be used. Given these rights, I agree to participate in the study.

_____ _____ _____
Please Sign Your Name Here   Birth Date & Year Parental Consent Signature
                                                                        for Subjects Under 18 years of age

Thank you for participating in this research.

APPENDIX B

PARENTAL CONSENT FOR THE PREGNANCY QUESTIONNAIRE

PARENTAL CONSENT FOR THE PARENTING QUESTIONNAIRE

Bridges Accelerated Learning Center
736 East Northwest Highway
Grapevine, TX 76051
817-251-5474

Dear

When your child was in the 8th grade at Grapevine Middle School (GMS), the school was involved in many cutting edge learning experiences as GMS traveled on the road to becoming a Blue Ribbon School of Excellence. One of them may have been the *Baby Think It Over* parenting experience. I, too, have continued to go to school and am preparing to collect the research to write my dissertation for the degree of Doctor of Philosophy in Technology and Cognition at the University of North Texas.

I am conducting research on those students who were in the 8th grade at GMS the two years my students parented the dolls. The *Baby Think It Over* dolls were first available to schools in the summer of 1994. This study is one of the first longitudinal studies ever conducted to measure the effectiveness of the infant simulators.

This research will contribute to the body of knowledge applied to the prevention, reduction, and delay of unwanted teen pregnancies. It will measure the effectiveness of one teen pregnancy prevention program available for use by classroom teachers. The purpose of the study is to determine if the dolls had any influence as a deterrent to teen pregnancy.

Schools everywhere can use the results of this study to decide if they want to implement this very costly program to try to curb teen pregnancy. Texas ranked 3rd highest among all states in the nation in teen birth rate for ages 15 – 17 in 1995

If your daughter **WAS NOT** in my classes, you are probably wondering why she is involved. She would be in the "Control Group." She did not go through the parenting experience and, therefore, brings to the table a different set of circumstances.

If your daughter **Was** in my classes, she would be a part of the "Experimental Group."

Attached to this letter is a very short questionnaire that I would like for her to complete. She should be very honest and complete with her answers. **<u>NO ONE BUT ME WILL EVER SEE HER COMPLETED QUESTIONNAIRE</u>**. I will not let anyone know how she answered the questions. Her secrets are safe. The eleven (11) questions should take five to ten minutes to answer. Her participation is completely voluntary and she can withdraw at any time without penalty or prejudice.

After your daughter has answered the questions, she should put the questionnaire in the self-addressed, stamped envelope I have supplied and mail it back to me. As an incentive for early response, I will have a drawing for a $100 gift certificate to Grapevine Mills Mall. She may use it at any participating store. To get her name in the drawing just complete and return the questionnaire immediately.

If you have any questions regarding this study please contact me at 817/251-5474 or my faculty sponsor at the University of North Texas, Dr. Jerry Wircenski, at 940/565/2714.

Sincerely yours,

Carol Hillman
Project Director

APPENDIX C

STUDENT LETTER

STUDENT LETTER

Bridges Accelerated Learning Center
736 East Northwest Highway
Grapevine, TX 76051
817-251-5474

Dear

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I am conducting research on those of you who were in the 8th grade at GMS the two years my students parented the dolls. The *Baby Think It Over* dolls were first available to schools in the summer of 1994. This study is one of the first longitudinal studies ever conducted to measure the effectiveness of the infant simulators.

This research will contribute to the body of knowledge applied to the prevention, reduction, and delay of unwanted teen pregnancies. It will measure the effectiveness of one teen pregnancy prevention program available for use by classroom teachers. The purpose of the study is to determine if the dolls had any influence as a deterrent to teen pregnancy.

Schools everywhere can use the results of this study to decide if they want to implement this very costly program to try to curb teen pregnancy. Texas ranked 3rd highest among all states in the nation in teen birth rate for ages 15 – 17 in 1995.

Those of you who **WERE NOT** in my classes are probably wondering why you are involved. You are the "Control Group." You did not go through the parenting experience and, therefore, bring to the table a different set of circumstances.

Those of you who **WERE** in my classes constitute the "Experimental Group."

Attached to this letter is a very short questionnaire that I would like for you to complete. Please be very honest and complete with your answers. **<u>NO ONE BUT ME WILL EVER SEE YOUR COMPLETED QUESTIONNAIRE</u>**. I will not let anyone know how you answered the questions. Your secrets are safe. The eleven (11) questions should take five to ten minutes to answer. Your participation is completely voluntary and you can withdraw at anytime without penalty or prejudice.

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After you have answered the questions, you should put the questionnaire in the self-addressed, stamped envelope I have supplied and mail it back to me. As an incentive for early response, I will have a drawing for a $100 gift certificate to Grapevine Mills Mall. You may use it at any participating store. To get your name in the drawing just complete and return the questionnaire immediately.

If you have any questions regarding this study please contact me at 817/251-5474 or my faculty sponsor at the University of North Texas, Dr. Jerry Wircenski, at 940/565-2714

Sincerely yours,

Carol Hillman
Project Director

APPENDIX D

BABY THINK IT OVER ™ PARENTING SIMULATION PROJECT,
DECEMBER 2, 1994

To: Students, Parents, and Teachers.

From: Carol Hillman

RE: BABY THINK IT OVER PARENTING SIMULATION PROJECT

Date: December 2, 1994

Today Grapevine Middle School is embarking on new ground. Our district has received Federal monies to purchase Baby Think It Over for use in teaching responsible parenting skills to 8th grade students enrolled in the Life Management Skills classes. Preliminary field testing has found this doll to provide significant motivation to teens to remain childless until they are much older. We at GMS are fortunate to be among the first schools in the nation to test the effectiveness of this teaching method.

EQUIPMENT NEEDED FOR THE SIMULATION

Since this is the first time the babies have been used here, the rules for the child care unit will have to change somewhat. It is important to simulate as closely as possible a real life experience. Ideally, each student would have EACH PIECE OF EQUIPMENT, BUT SINCE THE PROJECT IS NEW, OUR EQUIPMENT SUPPLY IS VERY LIMITED. Hopefully each student will have at least one of the following pieces of baby equipment: full-size stroller (no umbrella strollers. Baby must lie down or else he/she will cry, newborn car seat (Texas law requires all children under the age of 4 to be strapped into a car seat.), and a heavy diaper bag filled with essentials. Possible we could substitute a cradlette for a stroller until enough strollers can be located. If you know of anyone who might be interested in donating these baby items to the Baby Think It Over project, please let me know immediately.

IN THE CLASSROOM

Students will take the babies and their equipment from class to class as they proceed through their normal day. When the baby awakens to be fed, the students should immediately feed the baby. The student should take great care in making sure the baby does not disturb the classroom setting. Each student will be required to keep a detailed journal of their Baby Think It Over simulation. Since the babies can begin crying at any given moment, it would be better if the students keep their babies close by rather than in the designated BEAR CARE CENTER that has been used with the Teddy Bears. Of course the teachers have the final say as to where the babies stay in a classroom.

CHILD PROTECTIVE SERVICES

Students who ignore, abuse, abandon, or otherwise mistreat their children will lose them to "Child Protective Services." Teachers, this experience can be a very rewarding and eye-opening one for our students. As with all new projects, ways of improving the learning experience will be discovered. Your patience in helping with this project will be greatly appreciated. Your SUGGESTIONS for IMPROVEMENT will be welcomed!

(Please excuse any grammatical errors. This paper has been typed very quickly!)

December 2, 1994

I give permission for my son/daughter, _____, to participate in the Baby Think It Over simulation project. If my child damages the doll, I will assume the responsibility of paying for the repairs. My child may be photographed and interviewed.

_____
Parent/Guardian Signature   Date

APPENDIX E

CAREER/LIFE

PARENT/STUDENT INFORMATION

CAREER/LIFE
Parent/Student Information

Teacher: Carol Hillman   Conference Time: 11:45-1:30
School Phone No. 488-9592   Home Phone No.: 214-242-6936

Career/Life (CL) is an introductory course that acquaints the students with a wide variety of subjects. The curriculum is broad-based with topics including Personal Development and Self Awareness, Career Choices, Economic Development, Leadership, Nutrition, Sewing, Family Relations and Child Development.

GRADES: Student grades will be based on daily grades, classroom participation, book work, labs, tests, and projects.

Daily Grades	35%
Projects, Tests, and Folders: each	20%
Bonus Grades	5%

SEMESTER EXAM: Authentic assessment will take place throughout the semester. Six to eight grades for major projects will be averaged for determining the semester exam grade.

SUPPLIES:
  Organizer or spiral notebook
  Standard notebook paper-students MAY NOT write on spiral paper
  Pens with blue or black ink   Pencils
  Box of Puffs or Kleenex   Felt markers or map colors
  Glue sticks or glue
  Sewing supplies for bears:
   ½ yard of cotton or cotton blend WOVEN fabric-no KNITS, FELTS, OR FURS. (The
   pattern of the fabric should be printed on the true grain)
   thread to match the background color of the fabric
   package of embroidery thread for nose, mount, and belly button-may want 2 colors
   2 four hole buttons-must have 4 holes rather than 2 holes in button
   package of EMBROIDERY NEEDLES
   straight pins and pin cushion
   package of polyfill stuffing
   bobbin for a BERNINA sewing machine
   SHARP scissors for cutting fabric-ones used for paper will not work, too dull!

LATE WORK: CL will follow guidelines established by GMS concerning makeup work after absences, for late work, and for homework.

FHA: Career/Life students participate in FHA/HERO club activities during class time and during Advisory Time

PARENTING SIMULATION PROJECT:

Last fall the school district received 16 Baby Think It Over dolls to share between the three middle schools to teach responsible parenting and child care skills for babysitting. The teachers are preparing a schedule that will allow all student an opportunity to work with one of the dolls. Students will also get to "parent" the bear baby that they will construct during the sewing unit. Preliminary field testing has found the Baby Think It Over dolls to provide significant motivation to teen s to remain childless until they are much older. We at GMS are fortunate to be among the first schools in the nation to test the effectiveness of this teaching method.

Equipment Needed for the Simulation

It is important to simulate as closely as possible a real life experience. Ideally, each student would have a full-sized stroller (no umbrella strollers because the babies must lay flat), a newborn car seat (Texas law requires all children under the age of 4 to be strapped into a car seat), and a large diaper bag filled with essentials. If you know of anyone who might be interested in donating these baby items to the Baby Think It Over project, please let me know immediately.

In the Classroom

Students will take the babies and their equipment from class to class as they proceed through their normal day. When the baby awakens to be fed, the students should immediately feed the baby. The student should take great care in making sure the baby does not disturb the classroom setting. Since the babies can begin crying at any given moment, it would be better if the students keep their babies close by. Of course the teachers have the final say as to where the babies stay in a classroom.

Child Protective Services

Students who ignore, abuse, abandon, or otherwise mistreat their children will lose them to "Child Protective Services." Teachers will fill the role of CPS here at school. Parents are asked to be the CPS employees when your child has the doll at home. Any child picked up by CPS should be returned to Ms. Hillman immediately. Be sure to leave a note explaining the circumstances surrounding the CPS action. Parents are urged to call me at home whenever necessary.

Students who lose their children to CPS will receive a "0" for the simulation. They will also have to write a 400 word paper on a topic assigned by Ms. Hillman. The topic will relate to the "crime."

Grading

Students are to keep a detailed journal while parenting the baby. After the simulation is completed, each student will critique the project. Papers will be graded for grammar and spelling and must follow GMS rules for writing papers.

How the Doll Works

In the back of the doll is a microprocessor chip that is programmed to awaken the doll at various intervals of 2 to 5 ½ hours. The baby will start crying. Sometimes the baby only needs to be comforted, other times it requires a full feeding that takes from 5 to 30 minutes, the normal length of time it takes to feed a newborn infant. The "parent" (your child) will be the only one who can feed and comfort the baby because he/she will have a hospital wrist band on his/her wrist and a special key/probe attached to the wrist band. The band cannot be removed and given to someone else, thus ensuring that the student is the one who has to get up in the middle of the night to care for the baby. The probe is inserted into the center hole on the back of the baby and held in place for the feeding. The baby must be held in the normal feeding position during the feeding. If the baby is left to cry for one minute a yellow light comes on. If the baby is abused physically in any way, a green light comes on. The student cannot turn off the lights. Any attempt to remove the tape on the back of the baby will result in a grade reduction. After feeding the baby, changing the diaper, and sometimes changing the clothes, the baby just be placed on his left side or on his back to sleep. When the baby is sitting up, laying on his right side, or laying on his stomach, he will cry if he is in the sleep mode.

Currently we have 10 Caucasian babies, 5 males and 5 females. Six ethnic babies, 3 males and 3 females, are on back order. All weigh about 8 pounds, are 20 ½ " long, and are anatomically correct. Their cry is the recorded cry of a real baby. These dolls are extremely life-like. Students must parent the dolls for 72 hours.

Care of Equipment

The student will be required to return the doll, equipment, and clothes on time. Other students will be waiting their turn. Students and their parents are responsible for paying for damages and loss of supplies to the dolls and equipment.

Video for Parents to View

The inventor of Baby Think It Over has sent to me a 15 minute video that parents are urged to view prior to beginning the simulation. Please contact me for arranging a time for you to view the video.

I am looking forward to a great semester! Your support and cooperation will aid in my development of the proper educational climate needed for making this a successful time

for your child and my student. At various times during the semester, I would welcome volunteer help from parents in the classroom.

Guest speakers on careers are welcomed, too. If you are interested in speaking to a class about your career, please contact me.

Throughout the semester I will give to the students information to take home for a parent's signature and return to me the next class day. For those students who return the papers correctly filled out and signed, they will get bonus point.

I am in graduate school and have classes on Wednesday evenings. Late night phone calls are the only way to reach me on that day. The answering machine is always on.

Please feel free to contact me or visit the classroom throughout the semester.

_____

Please sign and return this form. I have read and understand the information, guidelines, and rules.

I give permission for my son/daughter to participate in the class activities and projects. My child may be photographed and/or interviewed.

Student's Signature _____Phone No._____

Parent's Signature_____

Father's Phone No. (DAY)_____(NIGHT)_____

Name of Company where Father works_____

Mother's Phone No. (DAY)_____(NIGHT)_____

Name of Company where Mother works_____

I am interested in speaking to a class YES_____ NO_____

Comments:

APPENDIX F

THE ONLY INFANT SIMULATOR
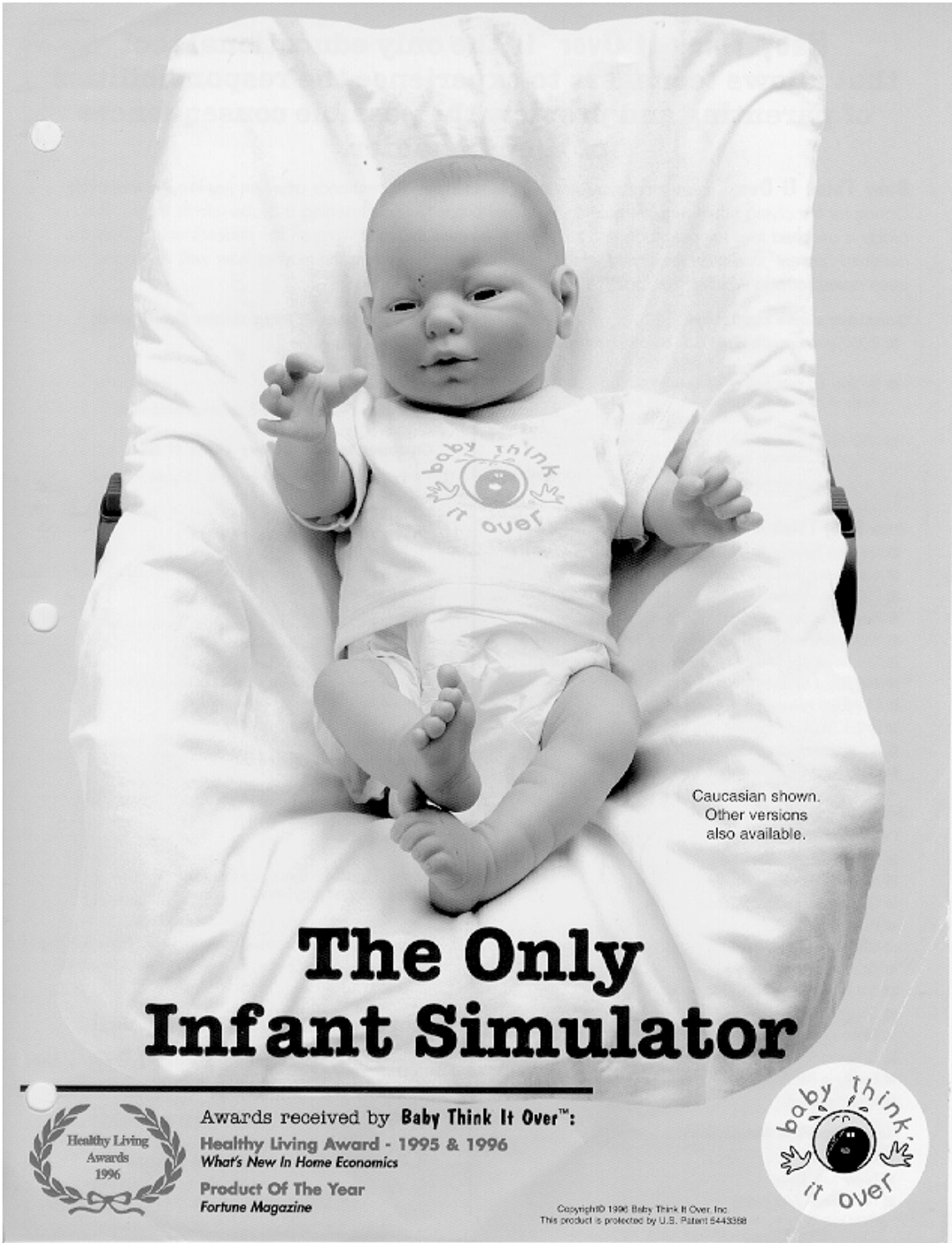
Caucasian shown.
Other versions
also available.

The Only
Infant Simulator

Awards received by **Baby Think It Over™**:

Healthy Living Award - 1995 & 1996
What's New In Home Economics

Product Of The Year
Fortune Magazine

Copyright© 1996 Baby Think It Over, Inc.
This product is protected by U.S. Patent 5443388

APPENDIX G

INFANT SIMULATION PROJECT

INFANT SIMULATION PROJECT

Rationale for Inclusion in the Career Investigations Course:

After a student spends a semester researching the career that he/she believes is the "right" one, it is unfortunate if an unplanned pregnancy prevents a student from reaching the desired career goal. Many middle school students are not sexually active, however, some are. This short unit can be integrated into the curriculum to help the students make informed choices concerning the responsibilities of parenting and/or of being a care giver to children. The tie-in with a career in child care/child development is obvious.

The following information can be given to students in the form of a resource manual:

INFANT SIMULATION PROJECT

Congratulations! You're a parent! For the next _____ days you will be responsible for taking care of a baby.

Baby Think It Over(TM) is an "infant simulator" designed to help you understand what it's like to be the primary care giver for a baby. Obviously, it can't do everything a real baby can do. Probably the biggest differences are that Baby Think It Over(TM) does not wet or soil her/his diapers and does not laugh, smile, or coo at you when she/he is happy. The only form of feedback the baby can give you is crying. When your baby cries, you will know he/she need something. It's your job to determine what type of care is needed and provide it quickly, day or night.

In order to provide the proper care for your baby, it will be necessary for you to keep your baby with you at all times. That means the baby goes with you to the store, to sports practice or games, to dance/piano/whatever lessons, to parties, to church, to relatives homes...everywhere. A real parent would not leave a child at home unattended and you can't either. Remember, you are the ONLY ONE WHO CAN TAKE CARE OF YOUR BABY BECAUSE YOU HAVE THE TENDING KEY/PROBE ATTACHED TO YOUR WRIST. Plus, you'll soon figure out how to take a quick shower while your baby sleeps and how to do your chores and homework with one hand while feeding the baby with the other.

A Note for Fathers: Since it is more common in our society for women rather than men to be primary care givers for children, you may feel uncomfortable and embarrassed about pushing around a stroller and carrying a doll. It may help to remind yourself that hundreds of other young men have participated in these simulations. As more and more schools use Baby Think It Over(TM), teens of both sexes pushing strollers will become a common sight.

Think of yourself as a trailblazer! It also doesn't hurt to remember that female students will probably flock to you to see your "baby!"

The dolls are 20 1/2" long, weigh 8 1/2 pounds, are anatomically correct, and come in four races: Caucasian, African-American, Hispanic, and Asian. In the backs of all of the dolls are computer electronics boxes that are programmed to awaken the dolls at various intervals of 1 1/2 to 3 hours.

A great amount of equipment is necessary with a real baby. You should take this equipment with you everywhere you go.

1. Equipment that students' use:
   A. baby
   B. full-size baby stroller
   C. newborn infant car seat

D. blanket
E. five baby diapers
F. Several changes of clothing (jump suits, dresses, night gowns, socks)
G. diaper bag
H. wipes box
I. Key/probe
J. Wristband

2. Grading

When you return your baby you will be given a grade. Your grade will be based on the criteria listed below. If you receive a good evaluation, congratulate yourself. You handled the responsibility and hard work of parenting well. If your evaluation was not as good as you had hoped, it does not necessarily mean that you will not be a good parent someday. However, it may mean that becoming a parent is not right for you at this time. The important thing to remember is that you now have much more information with which to make choices about your future.

A. JOURNAL - The journal will be graded as the primary portion of this simulation. Usually I am aware of unusual events that occur concerning the babies so be sure to include EVERYTHING that happens to your baby. Record the good things and the bad things. I look for journals that chronicle details.

B. INDICATOR LIGHTS - I give a grade based on the indicator lights. Inside the electronics box are lights and numbers that record how well you have cared for the baby.

^^^the first number, displayed at the same time as the green light, is the number of times the baby was roughly handled. If the baby is thrown, hit, dropped, or shaken, or the stroller or car seat jarred extremely hard, the child will cry for 30 seconds and can not be comforted. These are called "abuse events." The grade will drop five points for each abuse event.

^^^The second number, displayed at the same time as the yellow light, is the number of times the baby's crying was neglected for longer than one minute. These are called "neglect events." The grade will drop five points for each neglect event.

^^^The third number, displayed at the same time as the red light, shows the total minutes the baby has cried, excluding a grace period of one minute for each neglect event. The maximum number that can be displayed is 99. The grade will drop one point for each neglect minute that is registered.

^^^If the numbers blink while being displayed, this indicates that the electronics box was removed from the baby's back for over five minutes, and that a tamper-related shut down has occurred. The blinking numbers reflect the baby's memory up to the time of shutdown. The grade will drop one letter grade if the anti-tampering circuit is activated.

DO NOT REMOVE THE ELECTRONICS BOX FROM THE BABY OR ATTEMPT TO OPEN THE ELECTRONICS BOX!! TO DO SO WITHOUT PERMISSION WILL RESULT IN A GRADE REDUCTION OF AT LEAST ONE LETTER GRADE!!!

C. EQUIPMENT RESPONSIBILITY GRADE - All equipment must be returned on time for the next student. The doll, equipment, and clothes must be clean and not smelling of cigarette smoke; marks on the doll are not allowed. The original wristband and key/probe must be attached to your wrist. Failure to return the equipment on time will result in a grade reduction. LOST PROBES COST $20.00 AND DAMAGED DOLLS CAN COST AS MUCH AS $200.00.

D. CHILD PROTECTIVE SERVICES - a grade of "0" will be given only if the CPS has taken custody of the baby. If CPS has taken your baby an appropriate written report will be assigned and will be graded.

Report topics will "fit the crime." For instance, if the baby is abused, a report on Child Abuse will be assigned.

3. Written work
   A. Baby's 1st Book Journal
   B. Birth Certificate
   C. Written reports will be assigned in special
      circumstances.

4. Child Protective Services

IT'S YOUR JOB AS A CARE GIVER TO PROTECT YOUR CHILD. This means you don't put your baby in dangerous situations. Put your books down before handling the baby. Don't give the baby to other teens who might think it is funny to hurt it. And, no matter how frustrated you feel when the baby wakes you up in the middle of the night, don't hurt the baby yourself. Being a care giver takes a lot of patience! You should be vary careful to protect your child from injury. Career/Life students understand how to handle the babies but other students do not always realize how fragile the babies are and abuse the dolls unintentionally...sometimes on purpose! For this reason you should be vary careful to protect your baby from injury by the other students. Sometimes they find it tempting to jar the stroller or "bump" the baby hard enough to cause the abuse light to turn on. Any student guilty of abusing the babies can be assigned to a Saturday School detention. Your Lights Grade will be affected. You might want to immediately bring the student who abused the baby to me.

If you slip up and your baby is handled roughly, it will cry for 30 seconds, and will not be able to quiet it.

While you are at school the faculty and staff will fill two roles at the same time: teacher/instructor and protector. The adults at GMS will be available to guide you in appropriate methods of parenting. They will also be aware of situations that could be hazardous to infants and will serve as the Child Protective Services workers. When you are at home, your parents will be the CPS workers as well as instructors of how to care for a child. If you neglect or abuse your baby, CPS will take the child into protective custody and will return the baby to me. I will assign a written report for you to complete in place of completing your parenting simulation.

*****THIS PARAGRAPH IS VERY IMPORTANT*****

A student MIGHT be unable to handle the responsibility and frustration of the crying baby. Rather than damage the doll because you cannot stop it from crying, you should remove the box from the back of the baby. This will activate the anti-tampering circuit. This action should be used only as a last resort, for the penalty will be great. There will be a grade reduction and you will be assigned a written report similar to the report given for Child Protective Services infractions.

Before you remove the electronics box and suffer the grade reduction and the assignment of the written report, you must call me. My home phone number is 214-242-6936. If the phone is not answered the answering machine should be on. If I am not at home, please tell Judy, Anne, or Crae what the problem is and leave your name and phone number.

5. Car Seats and Strollers

Texas law requires that infants must be securely strapped into an infant car seat when riding in a moving vehicle; i. e., car, truck, school bus. It may be inconvenient to use the car seat, but that's too bad...you must protect your child! You do not have a choice in this matter. However, you do have a choice of whether or not you take the car seat to each class. If you choose to store it for the day, it is your responsibility to find your own storage place. My classroom is not available for storage of car seats. At the end of the day, you must take the baby home in the car seat. Sometimes students say they never go anyplace in a car after school and ask why they have to take the car seat home. A good parent is always prepared to protect their child...take the car seat home!

Full-sized strollers are for you to use. You must take the babies from class to class in the stroller. I strongly advise you to take the stroller home at night. Sometimes students are not allowed to take the strollers on the school bus so try to arrange other transportation to and from school while you are caring for your baby. Students who walk home may find it much
easier to put the car seat on the stroller and push the baby home. There is usually a place for your books and diaper bag on the stroller.

Do not attempt to leave your baby in the car seat all of the time. If the doll were a real baby the baby would be very uncomfortable if left in the car seat all of the time. His/her movements would be restricted too much. Leave the baby in the stroller except when traveling in the car or walking to school.
The stroller can serve as a bed for your baby during the day and during the night. Many students find it convenient to put the stroller beside their bed at night so they can easily feed the baby in the middle of the night. Turn on a night light so you can quickly see what you are doing in the middle of the night.

If you do not take the stroller home, you must prepare a safe sleeping place. In bed with you is not safe. Recent statistics have reported a great increase in Sudden Infant Deaths among infants who sleep in the bed with adults. Talk to me personally about your choice for a baby bed if you do not take the stroller home.

6. Sleep Mode
The babies sleep on their BACKS and/or ONE side. Doctors no longer recommend that infants be allowed to sleep on their stomachs, so the new dolls have been made so they cannot do so. The parent will have to determine which side their baby prefers by noticing that the baby cries when placed on one side but sleeps when placed on the other side. The baby will cry when placed on the side it does not like. The dolls may not sit upright because very young infants cannot sit. Their heads, backs, and bottoms must be supported at all times. This means that car seats, strollers, and carriers must be the type that permits the doll to lie flat or only slightly upright. A doll that is quiet when left undisturbed in the sleep position is in the "sleep mode." When the baby is in the sleep mode it may be handled as long as it remains in the sleep position. If you insert the key/probe into the box while the baby is in the sleep mode, the baby will cry. If the baby is moved to a position not designed for the sleep mode, the baby will cry.

7. Why your baby cries
Real babies cry for many reasons. They may be hungry, wet, sick, or just want attention. Your infant simulator will cry for only four reasons:

- A. he/she does not like the position you have put her/him in
- B. he/she needs feeding or tending
- C. she/he wants to go to sleep
- D. she/he has been handled to roughly

8. Tending
At random intervals your baby will cry because she/he needs care. With a real baby this care could be feeding, diaper changing, or bathing. You will simulate all of those activities with the key/probe that is strapped to your wrist. You will not actually be doing any of those things, but you must spend about the same amount of time that those activities would take.

Baby Think It Over(TM) periodically, and at random intervals, will require "tending." Do not actually think that when the baby cries it wants to be fed. Sometimes the dolls cry but do not need to be fed. The tending is designed to simulate a variety of parenting behaviors, diaper changing, bathing, playing, comforting. This is why the manufacturer designed a probe in the doll's back rather than a bottle in its mouth. Feeding babies every time they cry encourages overfeeding of infants and obesity after infancy.

The baby will start crying, the signal to you to pick the baby up, hold him/her in a normal feeding position, and insert the probe in the small hole in the electronics box in the back. Push the probe in gently, and turn it GENTLY on clockwise. THE PROBE WILL BREAK IF OVERTORQUED. WHEN THE PROBE IS POSITIONED PROPERLY AND IF THE BABY IS ON HIS/HER BACK OR SIDE, THE CRYING WILL STOP WITHIN THREE SECONDS. It is not necessary to push the probe hard or try to force it; be gentle! Securely hold the key/probe in place. The key/probe will not stay in if you let your hand drop. If the key/probe falls out or "unturns", the doll will resume crying. This insures that if you fall to sleep during a late night feeding you will be quickly awakened again. Change the diaper. RECORD IN THE JOURNAL WHAT TIME THE TENDING BEGAN, WHEN IT ENDED, WHAT PARENTAL ACTIVITY WAS INTERRUPTED, AND THE NUMBER OF THE NEW DIAPER.

Sometimes the baby only needs to be comforted for about 5 minutes; other times the baby requires a full feeding that takes from 15 to 35 minutes, the normal length of time it takes to feed a newborn infant. THE SIGNAL THAT THE BABY IS FINISHED IS WHEN HE/SHE STARTS TO CRY AGAIN DURING TENDING. THIS MEANS THE TENDING SESSION IS OVER. TAKE OUT THE PROBE AND PUT THE BABY ON HIS/HER BACK OR SLEEPING SIDE. The doll will be quiet until the next feeding/care period begins. You are the only one who can feed your baby because you have the key/probe attached to your wrist. DO NOT REMOVE THE WRISTBAND OR KEY/PROBE. IF YOU DO, YOUR GRADE WILL BE REDUCED. Do not twist, pull, tug, etc., on the wristband or key/probe. They will break if you abuse them. Your grade will suffer. You may bathe, shower, wash dishes, do laundry, wash the dog, etc., with your wristband on. It may get wet. Do not give the key/probe to anyone else to care for your child. IT IS YOUR RESPONSIBILITY TO DO ALL OF THE TENDING OF YOUR CHILD.

The sleep mode/tending mode cycle continues 24 hours a day, just like for a real baby. The doll will cry for tending periodically on a semi-random basis, throughout the day and night. It is your responsibility to care for your child by yourself.

9. Indicator lights
If the crying is not responded to within one minute, internal sensors record this as neglect. The number of neglect events and the total minutes the baby cried due to neglect are indicated inside the computer box. The number of abuse events are also indicated inside the computer. If the computer box is tampered with the tampering light will blink. DO NOT TRY TO OPEN THE COMPUTER BOX!

10. Baths
DO NOT BATHE THE BABIES!!! Water will ruin the computer that is in the box in the baby's box. You may use a damp washcloth to wipe off the face, arms, legs, head, and body. Do not get the back wet. The vinyl doll body is washable, although you should never immerse it in water, even after removing the electronics box, because the weighting material that fills it will not be able to dry out properly. Never place the doll on newsprint or on new, unwashed clothing because the inks and dyes can stain its vinyl "skin." New blue jeans are especially prone to cause this problem. REMEMBER: IF YOU RUIN THE DOLL OR COMPUTER, YOU BUY THE SCHOOL A NEW DOLL...$220.

11. Batteries
Each of you are to bring 4 AA batteries for this unit. The batteries will last the four days that you have the baby if you tend to the doll in a timely manner. If the doll is allowed to cry, the batteries will run down, resulting in a reduction of your grade.

12. Written work
Remember to keep a complete journal of your experiences with your baby. The journal is due the day you return your baby.

13. In the classroom
It is your responsibility to parent the baby. Do not let other students take care of your doll during classes.

When you are in <u>class</u>, you are the only one who should hold the doll, feed it, change its clothes, or record information in the journal.

14. Your parents

Your parents can be a valuable source for "Help! What Do I Do Now???!!!" Let your parents be the grandparents who are anxious to help you have a successful parenting experience. If you have sisters or brothers who want to provide more "help" than what you want, ask your parents to explain why they must leave the doll alone. Just remember, YOU are the parent who must take care of the baby.

CAROL HILLMAN - HOME PHONE # 214-242-6936; GMS PHONE # 488-9592
I DO <u>NOT</u> ACCEPT COLLECT CALLS FROM STUDENTS.

*Adapted from materials provided by Baby Think It
Over; Eau Claire; Wisconsin

APPENDIX H

PARENTING/EQUIPMENT SCHEDULE

Parenting/Equipment Schedule
STUDENT ASSIGNMENTS, INVENTORY, FINAL LIGHTS READINGS - Mon, April 8 - Thurs, April 11

STUENT		CLOTHES	DIAPER BAG	BLANKET	ABUSE	NGLCT	MIN	TMPR
Chris K.	A/1	Pink Chicks Dress, white socks	Green/white	Fuzzy white	Day 1			
	Girl	Sasson Jumpsuit	plastic	Blue,pink bear	2	3	24	0
	A	Orange/Blue bear gown			Day 2			
		Diapers 1a-d; a	Wrist band-100		0	1	10	0
Final grade		stroller-1	Birth Certificate grade-93		Day 3			
	76	car seat-1	Journal-88		0	2	18	0
		wipes-1						
Melissa J.	B/2	Yellow dot dress w/socks	Red/blue	Blue stars	Day 1			
	Girl	Pink fish jump	mine	Circle animals	0	0	0	0
	A	R,C,B, Y bear gown			Day 2			
		diapers 2a-d; b	Wrist band-100		0	1	3	0
Final grade		stroller-2	Birth Certificate grade-91		Day 3			
	93	car seat-2	Journal-94		0	1	5	0
		wipes-2						
Aimee H.	C/3	White lace dress, white socks	Baby Things	Fuzzy white	Day 1			
	Girl	White,yellow,orange jump		Pink/white	0	2	0	0
	C	Pink collar rosebud jump		edge	Day 2			
		diapers 3a-d;c	Wrist band-100		0	0	0	0
Final grade		stroller-3	Birth Certificate grade-85		Day 3			
	93	car seat-3	Journal-98		0	0	0	0
		wipes-3						
Jeremy I.	D/4	White pleated dress,pink socks	Multicolored	White colored lambs &	Day 1			
	Girl	White,yellow rainbow jump		hearts	0	2	3	0
	C	White clown gown			Day 2			
		diapers 5a-d;d	Wrist band-100		0	0	0	0
Final grade		stroller-4	Birth Certificate grade-98		Day 3			
	89	car seat-4	Journal-75		0	0	0	0
		wipes-4						
	E/5	Pink pleated dress, pink socks	Red	Waffle	Day 1			
	Girl	White squares jump	Chipmunk					
	AA	White rabbits gown	w/train		Day 2			

Final grade		diapers 5a-d;e stroller-5 car seat-5 wipes-5	Wrist band- Birth Certificate grade- Journal-		Day 3				
Mitch B.	F/6	Pink Flowers dress,white socks	Navy/white plaid	Pastel plaid	Day 1	0	1	0	0
	Girl	Pink Terry w/lace jump	plaid		**Day 2**				
	C	White, yellow trim gown	Wrist band-94			0	2	1	0
		diapers 6a-d;f	Birth Certificate grade-95		Day 3				
Final grade		stroller-6	Journal-95			0	1	0	0
93		car seat-6 wipes-6							
	G/7	White/blue rosebuds dress	70's purple	Zip ABC	Day 1				
	Girl	w/ Green socks		123					
	C	ABC Gown			Day 2				
		Pink Minnie & Mickey Top w/pink pants, white socks			Day 3				
Final grade		diapers 7a-d;g strollers-7 car seat-7 wipes-7	Wrist band- Birth Certificate grade- Journal-						
Amanda D	H/8	Pink rayon ruffle bottom	Purple, yellow ducks	Primary colors ABC	Day 1	0	3	3	0
	Girl	Chicks,lamb jump		123 Bears	Day 2				
	C	Solid pink gown				0	0	0	0
		diapers 8a-d;h	Wrist band-100						
Final grade		stroller-8	Birth Certificate grade-80		Day 3				
85		car seat-8	Journal-80			0	1	1	0
		wipes-8							
Larry U.	I/9	White rayon short set w/socks	Navy w/ugly face	zip rocking horse	Day 1	0	2	5	0
	Boy	Mickey Mouse jump							
	AA	Gerber gown			Day 2				
		diapers 9a-d;I	Wrist band-95			0	0	0	0
Final grade		stroller-9	Birth Certificate grade-99		Day 3				
90		car seat-9	Journal-84			0	1	1	0
		wipes-9							
Taryn B.	J/10	#3 Terry jump white socks	Navy/red/	White w/ colored	Day 1				
	Boy	Blue w/ red snaps jump	white T	stars		0	0	0	0
	H	White w/ blue baby jump			Day 2				

Name	Code	Clothing	Diaper bag	Other	Day				
		diapers 10a-d;j	Wrist band-98			0	0	0	0
			Birth Certificate grade-						
Final grade		stroller-10	100		Day 3				
96		car seat-10	Journal-90			0	0	0	0
		wipes-10							
				White					
	K/11	White,red puppy jump	Green/white	fuzzy	Day 1				
	Boy	w/ red,white socks	baby boom	2/ bunny					
	C	Green terry jump			Day 2				
		White w/pink blue terry jump							
		diapers 11a-d;k	Wrist band-		Day 3				
Final grade		stroller-11	Birth Certificate grade-						
		car seat-11	Journal-						
		wipes-11							
Ryan L.	L/12	Carpenter green rompers w/	Black/red	Yellow	Day 1				
	Boy	white knob socks	black handles			0	1	1	0
	C	Terry bows jump			Day 2				
		Little slugger jump				0	0	0	0
		diapers 12a-d;l	Wrist band-100		Day 3				
Final grade		stroller-12	Birth Certificate grade-95			0	0	0	0
88		car seat-12	Journal-72						
		wipes-12							
			Navy w/						
Liz T.	M/13	Blue lion romper, socks	black	Seafoam w/	Day 1				
	Boy	Blue jump red anchor	red horse	strip		0	0	0	0
	C	Blue/white chicks jump			Day 2				
		diaper 13a-d;m	Wrist band-100			0	0	0	0
			Birth Certificate grade-						
Final grade		stroller-13	100		Day 3				
99		car seat-13	Journal-97			0	0	0	0
		wipes-13							
		Dallas Cowboys							
Canyice K.	N/14	Rompers/sock	Taz	White w/	Day 1				
				blue chick					
	Boy	Yellow Terry green puppy jump		&		0	1	1	0
	C	Green Terry Pooh Bear jump		bears	Day 2				
		diapers 14a-d;n	Wrist band-100			0	1	1	0
			Birth Certificate grade-						
Final grade		stroller-14	100		Day 3				
96		car seat-14	Journal-94			0	0	0	0
		wipes-14							

	O/15	Blue Train 2 piece red socks	Animals	Nash pink/	Day 1				
	Boy	Sears Terry dogs, bows		blue knitted					
	H	Blue w/ white collar jump			Day 2				
		diapers 15a-d;o	Wrist band-						
Final grade		stroller-15	Birth Certificate grade-		Day 3				
		car seat-15	Journal-						
		wipes-15							
				Blue					
	P/16	Dallas Cowboys jump	Maroon	rosebuds	Day 1				
	Boy	Terry kitty & puppy jump							
	C	White terry robe w/ hood			Day 2				
		diapers 16a-d;p	Wrist band-						
Final grade		stroller-16	Birth Certificate grade-		Day 3				
		car seat-16	Journal-						
		wipes-16							
Jason W.	Q/17	Red jump	9S Blue	Rebecca's	Day 1				
	Boy	All star t-shirt		white		0	0	0	0
		Blue jeans, white							
	AA	socks(Taylor			Day 2				
		Farden) red jump	Wrist band-100			1	1	10	0
		White terry blue purple	Birth Certificate grade-						
		design	100		Day 3				
		diapers 17a-d;Q	Journal-71			0	2	2	0
Final grade		stroller-17							
81		car seat-17							
		wipes-17							
Mike C.	R/18	Dreamland terry jump	Blue/green	Rebecca's	Day 1				
	Girl	Corduroy yellow short outfit	stretch straps	yellow		0	1	12	0
	H	w/ lace socks			Day 2				
		Carter white w/ blue gown				0	0	0	0
		diapers 18a-d;r	Wrist band-100		Day 3				
Final grade		stroller-18	Birth Certificate grade-97			0	1	0	0
89		wipes-18	Journal-82						

APPENDIX I

BIRTH CERTIFICATE

BIRTH CERTIFICATE

This certifies that _____ was born

on _____ the _____ day of _____ 19____

The mother's name is _____
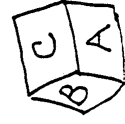
Weight when born _____ lb. _____ oz.

Height when born _____ inches.

Berjusa

APPENDIX J

BABY'S 1st BOOK

BABY'S 1ST BOOK

Name _____

Period _____

Date _____

What's it like to be a CAREGIVER?

Has caring for a newborn been the experience you had expected? Share your thoughts, feeling, knowledge, opinions etc. Yes? No? What?

Ms. Hillman's phone #: 214-243-6936

(12)

PAGES 1 & 12 OF BABY'S 1ST BOOK

VOLUME III - 32

PAGES 2 & 11 OF BABY'S 1ST BOOK

This book is all about

BaBy's Name

my- very first Baby Think it Over (TM) doll one!

This baby likes to sleep, cuddle, eat, make noise, be quiet, and play toys. Whether smiling or crying, this baby is always loved.

These first few days together will be filled with new experiences for Both of US...

Sleeping		
crib and mattress		
2 waterproof mattress covers		
3 sets of sheets		
bumper pads		
4 blankets		
SUBTOTAL		
Medical Care		
pediatrician visits		
vitamins		
nose drops		
2 safety gates		
safety covers and locks for doors		
infant car seat		
SUBTOTAL		
Dressing		
Yearly supply of diapers		
40 undershirts (diff. sizes needed as baby grows)		
10 creepers		
8 pairs of socks (different sizes)		
4 pairs of booties		
10 pairs of pajamas		
2 pairs of overalls		
1 pair of walking shoes		
1 snowsuit with mittens		
1 hat		
SUBTOTAL		
Extras		
washing machine and dryer or laundromat		
high chair, baby swing, walker		
camera and film		
playpen, crib mobile, toys		
bassinette or cradle		
SUBTOTAL		
GRAND TOTAL!		

COMMENTS? SHARE THEM HERE...

164

My Baby's (Family) Tree

GREAT-GRANDMOM
GREAT-GRANDDAD
GRANDMOTHER
GREAT-GRANDMOM
GREAT-GRANDDAD
GRANDFATHER
MOM OR DAD

BABY'S NAME

All about my Baby's Name — what does it mean, is it a family name, why was it chosen?

③

My Baby's Budget $

$ My baby is cute, but where does the money go? I have to find, clothe, entertain, and care for my baby. Write down your

$ first guess — things to the mall, the grocery store, discount stores, yard sales, ask your parents, etc. Call the doctor's office or

$ ask a nurse for the medical costs. Do research to locate the actual costs. Add up both

$ columns then compare the two.

Baby Care Item (one year supply)	Estimated Cost	Actual Cost
Feeding		
formula for one year		
6 baby bottles		
6 bibs		
24 boxes of infant cereal		
432 jars of baby food		
feeding dish		
3 baby spoons		
SUBTOTAL		
Bathing		
baby bathtub		
baby shampoo		
2 bottles of baby soap		
baby nail clippers		
baby oil and lotion		
baby powder		
520 cotton balls		
SUBTOTAL		

★ ADAPTED FROM BABY THINK IT OVER (TM)

⑩

PAGES 3 & 10 OF BABY'S 1ST BOOK

VOLUME III - 34

Baby's
Tending Schedule

Time Crying Begins	Time Tending Ends	PARENT ACTIVITY INTERRUPTED	Comments (DIAPER #)	DATE

NEWS FLASH!

Best Movie:

Favorite Song:

News Headlines:

Top Fashions:

Who's President?

Mom's/Dad's Favorite Teacher:

♂ ♂ ♂ ♂ ♂ ♂

PAGES 4 & 9 OF BABY'S 1ST BOOK

VOLUME III - 35

Baby's First Trips

Where did you go, what did you do, who was there?

DAY ONE

DAY TWO

DAY THREE

DAY FOUR

Baby's Tending Schedule

Time Tending Begins	Time Tending Ends	PARENT ACTIVITY INTERRUPTED	COMMENTS (DIAPER #)	DATE

PAGES 5 & 8 OF BABY'S 1ST BOOK

VOLUME III – 36

Baby- Read- Aloud

for learning to talk,
read, & learn!!!

Length of
Time

AUTHOR

DATE

NAME of
BOOK

⑦

Baby Goes to...
School

What is it like caring for a
baby at school?
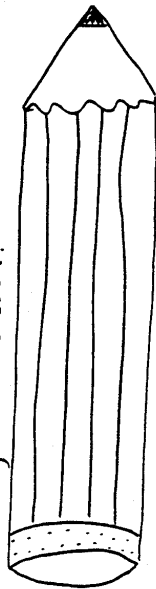
Out With your
Friends....
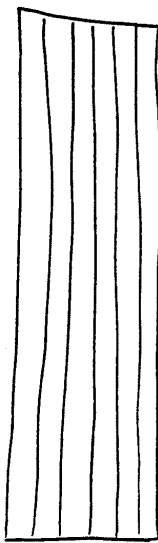
to dinner, shopping, to
relatives' homes, to
Church...

⑥

PAGES 6 & 7 OF BABY'S 1ST BOOK

VOLUME III - 37
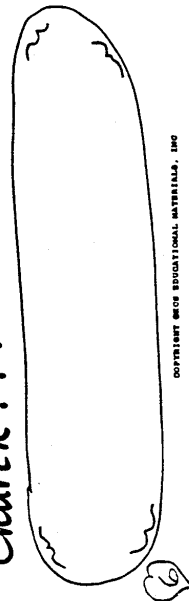
APPENDIX K

GRAPEVINE-COLLEYVILLE INDEPENDENT SCHOOL DISTRICT

AUTHORIZATION LETTERS
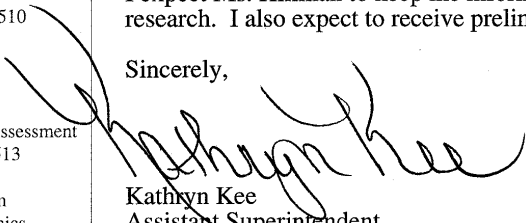
April 11, 2000

To Whom It May Concern:

This is to confirm that Grapevine-Colleyville ISD is approving the study of Ms. Carol Hillman. Her position over many years has played a critical role in support to our pregnant teens. I feel her findings can provide wonderful data to support educational decisions in our district that can help many young girls in the future.

I expect Ms. Hillman to keep me informed regarding the steps and phases of her research. I also expect to receive preliminary and final copies of this research.

Sincerely,

Kathryn Kee
Assistant Superintendent
Instructional Services

Recognized for Excellence

Grapevine-Colleyville

Independent School District

May 8, 2000

Ms. Sheila Bourns
University of North Texas
Denton, Texas
FAX 940-565-4277

The Grapevine-Colleyville Independent School district will not, at any time, attempt to access individual student's questionnaires collected by Ms. Carol Hillman from her research study.

Sincerely,

Kathryn Kee
Assistant Superintendent
Instructional Services

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The model was developed to use as a guideline for implementing a pregnancy prevention unit in schools. This model could be used by Family and Consumer Sciences classes, teen pregnancy prevention programs, childbirth preparation classes, at-risk student programs, substance abuse intervention programs, and religious education classes.