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**PUBERTAL DEVELOPMENT, PARENT-TEEN COMMUNICATION,
AND SEXUAL VALUES AS PREDICTORS OF
ADOLESCENT SEXUAL INTENTIONS AND
SEXUALLY RELATED BEHAVIORS**

by

Cynthia R. Christopherson

**A dissertation submitted in partial fulfillment
of the requirements for the degree**

of

DOCTOR OF PHILOSOPHY

in

Family and Human Development

DEDICATION

This work is dedicated to my family, Michael and Jennifer, who make life worth living, and anything worth doing possible.

ACKNOWLEDGMENTS

It is my pleasure to express my feelings of appreciation to all those who have helped and encouraged me throughout this project. I have had the opportunity to work with many outstanding faculty members and other professionals whose support has been phenomenal.

I would first like to thank my major professor, Dr. Brent Miller, whose guidance and mentoring throughout this process was exceptional. His careful reading and thoughtful comments on this manuscript were invaluable. Dr. Miller's guidance and friendship have been a primary influence throughout my professional and personal development in graduate school. I am deeply appreciative to him.

I would also like to thank my other committee members for their support and encouragement. Thanks to Dr. Randy Jones for guiding me through an independent course in understanding path analyses and research methods, which was a significant contribution to this project. His careful critiquing of this manuscript and encouragement as a professor and friend were beneficial to my completion of this degree. The continual support and leadership throughout the *FACTS & feelings* project of Dr. Tom Lee and Dr. Glen Jenson were exceptional. Their guidance and expertise throughout all phases of this research were immeasurable. Dr. Shelley Lindauer has always been an invaluable source of information and support. Her knowledge and guidance have been an exemplary source of professional growth throughout

my graduate training. Dr. Don Sisson's ability to help me understand the process and theory of statistics has been valuable to this project and in other areas of my education.

There are many professors, colleagues, and friends I would like to express my appreciation to. I would like to thank Maria Norton for her statistical assistance and friendship, which were essential for the completion of this project. In addition, thanks are due to all faculty members and staff within the Department of Family and Human Development for their support, inspiring influence, and kindness.

My parents have been a critical source of love and encouragement in all I do. I could not have accomplished this or anything without them. They have always been there for me in all areas of my life and I love them.

Finally, my deepest love and gratitude goes to my husband and friend, Michael Christopherson, for his continual and unconditional love and support throughout this process. He was willing to give up much for me. I also thank my daughter, Jennifer, for making the application of my professional pursuits ever so real.

Thanks to all. This project and degree are a compilation of support and friendship from everyone.

Cynthia R. Christopherson

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ABSTRACT

Pubertal Development, Parent/Teen Communication, and
Sexual Values as Predictors of Adolescent Sexual
Intentions and Sexually Related Behaviors

by

Cynthia R. Christopherson, Doctor of Philosophy
Utah State University, 1993

Major Professor: Dr. Brent C. Miller
Department: Family and Human Development

Adolescent sexual intercourse can be viewed as a normal developmental experience, but intercourse also is linked to unplanned pregnancies, Sexually Transmitted Diseases (STDs), and Acquired Immune Deficiency Syndrome (AIDS). Consequently, there continues to be a high level of scientific interest in understanding antecedents of adolescent sexual behavior, especially early and more risky sexual intercourse. This study examined several key antecedents of adolescent sexual intentions and behavior, including pubertal development (pubertal status, change over time, and pubertal timing), parent/teen communication, and teen sexual values. Analyses were based on longitudinal data collected in 1991, 1992, and

1993 from parents and teens during the FACTS & *feelings* project conducted within three areas in northern Utah.

Regression and path analyses were used to test the direct and indirect effects among the variables. Parent/teen communication quality had a significant positive effect on teen sexual abstinent values for both males and females. Sexual abstinent values had a strong negative effect on sexual intentions for both males and females. Sexual values were more strongly related to sexual behavior for females than for males. Sexual intentions had a significant effect on sexual behaviors for both males and females, although this effect was stronger for males than for females. Pubertal timing had a significant effect on behaviors for males and a smaller although significant effect for females. Age also had a significant positive effect for both male and female adolescents. Overall, within these analyses, females were more influenced by values which directly and indirectly affect sexual behaviors. Males were more influenced by the FACTS & *feelings* treatment, pubertal timing, and sexual intentions. (116 pages)

CHAPTER I

INTRODUCTION

Problem Statement

With the increase in adolescent sexual behavior over the decades, a higher incidence of casual, less committed sexual activity has occurred (Dryfoos, 1990; Hayes, 1987). In a 1992 survey of 11,631 students in grades 9 through 12, 54.2% reported ever having had sexual intercourse; 39.4% reported having had sexual intercourse during the 3 months preceding the survey (Center for Disease Control, 1992). Male students (60.8%) reported a significantly higher incidence of having sexual intercourse than female students (48.0%), and black students (72.3%) were more likely than white (51.6%) or Hispanic students (53.4%) to have had sexual intercourse. The frequency of student sexual intercourse experience increased significantly by grade from 9th through 12th. According to Sonenstein, Pleck, and Ku (1989), only about 5% of adolescent males have had sexual intercourse by age 13, compared to over 80% of 19-year-old males. Similar data are also shown for females (Elliott & Morse, 1989).

Age is the most important variable distinguishing adolescents who have and have not had sexual intercourse, but the age of first intercourse itself has consequences. Billy and Udry (1985) found a relationship between sexual activity at earlier ages and lower school grades among adolescent males. For females, earlier sexual activity was related to lower educational

aspirations. Earlier sexual activity for females has also been related to the timing of marriage and childbirth; those who had sexual intercourse at young ages were most likely to begin family formation through childbirth rather than marriage (Miller & Heaton, 1991).

Adolescent pregnancy continues to be a national concern, with the United States having the highest rate of adolescent pregnancy and childbearing of all developed nations (Jones et al., 1985). Estimates show that 82% of conceptions that occurred to teenagers were unintended, and the younger the girl, the more likely the pregnancy was unplanned (Dryfoos, 1990). Attention has been directed toward adolescent pregnancy and childbearing because of the health and socioeconomic risks to the mother and child.

It is estimated that 2.5 million adolescents have had a sexually transmitted disease, and one in four sexually active teens will contract an STD before graduation from high school (Gans, 1990). The number of partners reported by sexually active adolescents is important in understanding the risk of sexually transmitted diseases. The percentage of 15- to 19-year-old females who reported two or more sexual partners increased from 38% in 1971 (Moore, Peterson, & Furstenberg, 1986) to 59% in 1988 (Pratt & Eglash, 1990).

One of the most recent and serious concerns of early unprotected sexual activity is the risk of AIDS. A great deal of media and educational

attention has targeted AIDS because the full impact of the disease on adolescents is hidden by its lengthy incubation period (National Center for Health Statistics, 1988). In February of 1992, it was reported that 808 AIDS cases had been confirmed in persons between the ages of 13 to 19 years (Center for Disease Control, March 1992). However, many of the 8,402 AIDS cases reported in persons 20 to 24 years old would likely have come from persons being infected during their teens. In 1990, AIDS was the seventh leading cause of death among 15- to 24-year-olds (Gans, 1990).

Adolescent sexual behavior previously considered deviant is increasingly viewed as part of normal development. There is, however, an increasing emphasis on preventing or minimizing negative outcomes. Moral reasons for abstinence are being replaced by pragmatic health-related reasons. Concerns focus on the age of first intercourse, frequent sexual activity, and multiple partners that increase the risk of unplanned pregnancy, contracting a sexually transmitted disease, and AIDS.

Purpose

To design prevention programs that can address these serious risks associated with adolescent sexual activity, it is essential to understand the antecedents of teenage sexual involvement. This study examined several key antecedents of adolescent sexual behavior, including: pubertal development, age, parent/teen communication, and teen sexual values in

relation to teen sexual intentions and behaviors. In the data which were analyzed these variables were measured at three periods of time as shown below.

<u>Time 1 (Jan. 1991)</u>	<u>Time 2 (Jan. 1992)</u>	<u>Time 3 (Jan. 1993)</u>
Age	Age	Age
Maturation	Maturation	Maturation
Parent/Teen Communication	Parent/Teen Communication	Parent/Teen Communication
Teen Sexual Values	Teen Sexual Values	Teen Sexual Values
Sexual Intentions	Sexual Intentions	Sexual Intentions
Sexual Behaviors	Sexual Behaviors	Sexual Behaviors

Bivariate and multivariate analyses were used to study direct and indirect relations among these variables. The general hypothesis was that physical development is related to sexual intentions and behaviors partly through parent/child communication and teen values. Communication and sexual values could also be intervening variables, between maturation and sexual intentions and behaviors; when a teen matures, parent/child communication and teen values may change, indirectly influencing the teen's sexual intentions and behaviors. These relationships are depicted in Figure 1.

The relationship between pubertal development and parent/teen communication will be examined in particular detail to better understand the effect of adolescent's pubertal development on the quality of communication with parents. Measures of pubertal development at time 1 will be related to communication measures at time 2. Further, pubertal development will be examined in relationship to teen sexual intentions and behaviors.

Summary and Justifications

1. Adolescent sexual intercourse can be viewed as a risky behavior in view of the extent of unintended pregnancies, STDs, and AIDS.

2. Prevention/intervention programs designed to postpone or reduce adolescent sexual intercourse must be based on a scientific understanding of what leads some teenagers to begin having sexual intercourse at young ages while others abstain.

3. This study is expected to clarify how several key antecedents of adolescent sexual behavior are related.

4. Pubertal development is considered a key variable that influences adolescent sexual activity. Other variables, such as parent/teen communication and sexual values, are also potentially relevant antecedents which, unlike physical maturation, are more likely to be amenable to manipulation.

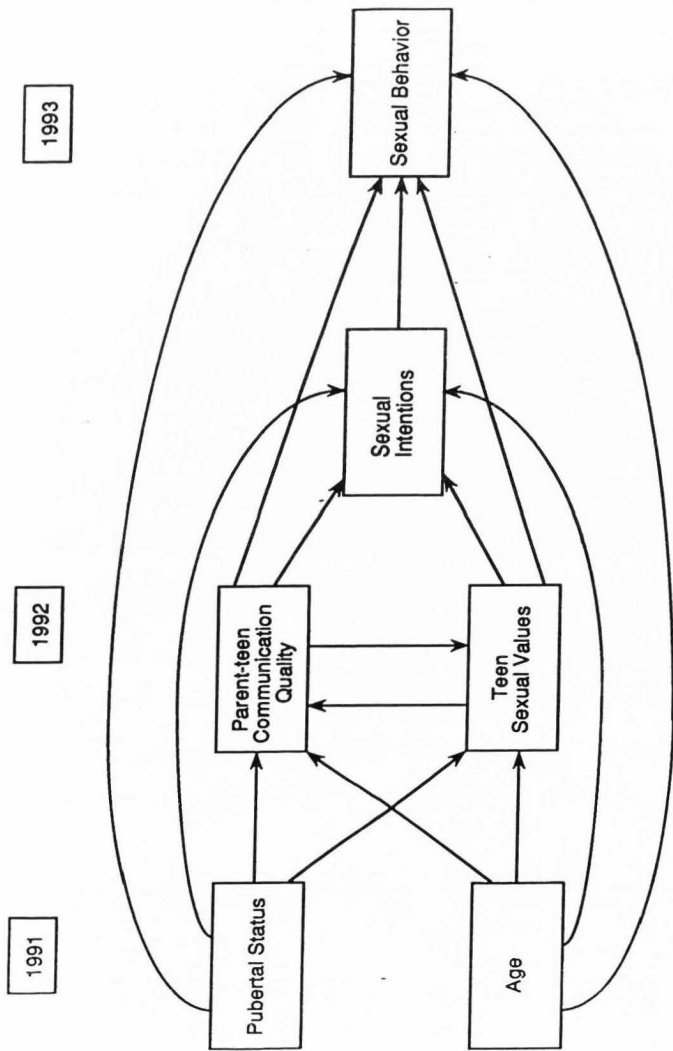


Figure 1. General conceptual model of the study.

CHAPTER II

LITERATURE REVIEW

Adolescent Pubertal Development

Puberty is a period of time during which physical and hormonal changes begin turning a child into an adult. Physical growth during adolescence is very rapid (Peterson, Crockett, Tobin-Richards, & Boxer, 1987; Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987; Brooks-Gunn & Warren, 1989). The processes in physical development during puberty have been theoretically and empirically connected to attitudes and behaviors.

Measurement

The measurement of puberty is a critical component in studying adolescent development. Assessing pubertal change in adolescents has proven to be a difficult process in providing acceptable ways in which the adolescents and others involved will agree to participate. Brooks-Gunn and Warren (1985) suggested that the most commonly used measures in behavioral research are peak height velocity, body weight, and body hair for both sexes, menarche and breast growth for girls, and penile growth for boys. Self-reports and parent reports of pubertal development are becoming more common and a significant amount of research has been conducted to examine the validity of such measures of pubertal development.

Several measures have been developed to assess the changes which occur during pubertal development. Tanner (1962) developed the Sexual Maturation Scale as an index to measure growth in secondary sex characteristics. This scale is based on the development of pubic hair, breasts, and male genitalia; in each developmental area, ratings range from immature to fully developed. Facial hair, axillary hair, body odor, and body shape are other aspects of pubertal change that have been indexed.

Petersen et al. (1987) developed the Pubertal Development Scale (PDS) so that a mean pubertal development score could be calculated for individuals. Classification into one of the five pubertal status categories (prepubertal, beginning pubertal, midpubertal, advanced pubertal, and postpubertal) is based on the level of development reported on the three indices of pubertal change thought to be most salient for each sex. For girls, PDS indices are pubic hair growth, breast development, and menarche; for boys, they are development of pubic hair, facial hair, and voice change.

Several studies have compared different scales and different sources in measuring pubertal development. Miller, Tucker, Pasch, and Eccles (1985) found that agreement between child, parent, and doctor on scales of pubertal development is generally better for girls than boys. Parents' reports of a child's pubertal development more closely approximate an "objective" report (using doctor as the standard) than the child's own self-report. Brooks-Gunn et al. (1987) reported that agreement between mothers and

doctors was just as high as agreement between girls and doctors in a sample of 11- to 13-year-old girls. Miller et al. (1985) reported that at all ages, boys agree more closely with doctors about their pubertal status than their parents do. They suggest that mothers do not know much about their sons' physical development and fathers may be better raters of sons. Boys systematically rate themselves as more mature than parents or doctors rate them. Doctors' ratings on the PDS are in fairly high agreement with their Tanner stage assignments. Using the Tanner schematics, both girls and boys tend to rate themselves as more mature than parents rate them. Overall, the Pubertal Development Scale and Tanner schematics may give very similar information if parents are reporting.

Petersen et al. (1987) developed the PDS, a self-report measure of pubertal changes, and concluded that the PDS is useful if the researcher is interested in a rough assessment of pubertal status. More direct measures, such as nude observation by researchers or doctors, are not acceptable to parents or participants in most studies. They found that measures of pubertal status can be measured through a self-report method. Young adolescents are able to make appropriate distinctions about the changes occurring in their bodies. Not only do they report these changes in the expected sequence, but the timing of the changes is generally similar to those found in other growth studies.

Relationship Between Pubertal
Development and Sexual Behavior

There is a large amount of evidence supporting the relationship between pubertal development and early sexual behavior. Zabin, Smith, Hirsch, and Hardy (1986) presented evidence that early pubertal development is related to early initiation of sexual intercourse. They also found that among adolescents who develop more slowly, age of puberty increases, and the cultural influences of social norms become stronger relative to the individual levels of development. Udry and Cliquett (1982) found a clear behavioral sequence relating age at menarche to age at first intercourse to age at first birth. Udry, Talbert, and Morris (1986) found that hormonal levels are strongly related to sexual behaviors in males. Udry et al. (1986), in a study on female adolescents, found that hormonal levels have a strong effect on the sexual intentions but less so on behaviors. Udry and Billy (1987) found that, among adolescent males, hormones (androgens) have a strong effect on the initiation of sexual behavior, including coitus. Among females, sexual motivation and noncoital sexual behavior are substantially influenced by androgens, but their coital behavior is primarily differentiated by social control processes, not hormones. In a later study by Udry (1988), hormonal levels were shown to be the most significant predictor of initiation of sexual intercourse among males, where sociological variables were not found to be significant predictors.

Many young adolescents have difficulty expressing their feelings about pubertal development and the values and meanings that these changes hold for them. This helps to explain the importance of a measure such as the Pubertal Development Scale in examining the effects of pubertal status on adolescent attitudes and behaviors.

Parent/Teen Communication About Sex

Parents and peers are most often considered to be the primary influences on adolescents' values and attitudes about sex. However, communication between children and their parents, especially the direct discussion of sexual subjects such as sexual intercourse and contraception, is minimal. Newcomer and Udry (1985) pointed out that children are frequently unaware of their parent's beliefs and the attitudes they have towards sex-related issues. Children and parents also disagree about the types of sex-related conversations they have had. Inazu and Fox (1980) showed that even though some mothers and daughters talk about sex-related issues, many feel uncomfortable discussing these topics and are confused about the roles each person plays in initiating discussion. When parents try to talk about sex, it is often difficult to actually discuss their true feelings and beliefs, resulting in incorrectly transmitted messages to the child.

Fisher (1985) found that when high levels of communication exist, there is a strong correlation between communication and adolescent attitudes, and when there are low levels of communication, there is a weak correlation between communication and adolescent sexual attitudes. Papini, Farmer, Clark, and Snell (1988) found that sexual disclosure with parents is strongly associated with the child's perception of the openness and adaptiveness of family communication.

Parental Concerns

In discussing sexual issues, the climate between parent and child is often defensive, perhaps therefore encouraging the child to turn to peers for information and support. Many parents regret that they did not receive adequate information from their parents. Most parents feel inadequate in their information to teach their own children about sex (Rozema, 1986). Marsman and Herold (1986) found that 69% of 130 mothers believed their own sexual communication with their parents was inadequate, indicating they would like help in learning how to better provide sexual information to their own children.

Silverstein and Buck (1986) found that parents were aware that their children needed sex education to better understand their own sexuality and values concerning sex. A study conducted by Martin and Christopher (1987) acknowledged that in order for parents to provide sex education,

there is a need for "parental attitudes, communication skills, and a solid knowledge base" (p. 363).

Parents as a Source of Sexual Information

In view of the high rates of pregnancy and sexually transmitted diseases, along with the controversy concerning sex education in schools and inaccurate information from peers, it would seem useful for parents to more conscientiously provide sex education to their children. Without "appropriate" sexual information, children turn to other sources for answers to their sexual questions. These sources can provide false and sometimes harmful information to children (Rozema, 1986).

Parent/teen communication is extremely complex, yet it is important. Jaccard and Dittus (1991) found that a more careful examination of communication between parents and teens focusing on both content and quality of communication is necessary in understanding this complex relationship and developing prevention programs.

Several studies have determined that the parent/child relationship and its influence on sexual attitudes and behaviors are important determiners of particular communication patterns (Petersen, Rollins, & Thomas, 1985). This includes discipline styles and the compatibility between the parent and child (Hogan & Kitagawa, 1985; Miller, McCoy, Olson, & Wallace, 1986). It has been verified that the mother/daughter relationship is the stronger

determinant of sexual behavior and understanding, though the father/child relationship is becoming more and more recognized (Inazu & Fox, 1980).

Parent/Child Relationships

Many studies verify that although sex education in the home is infrequent, the primary source of children's sexual knowledge comes from the mother for both sons and daughters. Not only do mothers give direct instructions regarding sexual values, but they act as an indirect control by supervising the child's interactions with the opposite sex (Inazu & Fox, 1980). Jaccard and Dittus (1991) looked at the parents' perspective on parent/child communication. They examined 210 couples with 12- to 16-year-old teens. Overall they found that maternal orientations to premarital sex and the depth and quality of maternal discussion are important for influencing teen sexual activity.

Mothers and Children

Research indicates that the closeness of mother-daughter or parent-daughter relationships is related to later sexual activity. Mothers are much more salient sources of information for daughters than for sons (Newcomer & Udry, 1985). Also, the fewer the topics discussed between parent and child, the more likely children will become promiscuous as adolescents (Walters & Walters, 1983).

Darling and Hicks (1982) suggested that the greater the number of sexual topics discussed by parents, the less likely the child will be sexually active in adolescence. There seems to be a direct correlation between the relationship of the mother and daughter and the daughter's sexual abstinence. Communication between mother and daughter is influential on later sexual behavior. Inazu and Fox (1980), in their sample of 449 mothers and daughters, suggested that nonvirgins were more likely to have had poor communication with their mothers, and virgins were likely to have frequent communication with their mothers on sexual issues.

Newcomer and Udry (1985) found that daughters were more likely than sons to hold attitudes and behave in a manner consistent with their mothers' own attitudes. In one study, seventh graders who waited to have sex reported a greater likelihood of talking to mothers than did the seventh graders who had their first sexual experience in eighth grade (Chewing et al., 1986). Daughters seemed to feel more comfortable communicating with their mothers than sons were communicating with their fathers.

Fathers and Children

Although we are less knowledgeable about the father and son dyad, some studies have explored their relationship. Fox (1981) stated that there is a need to know more about the role of fathers and their direct involvement in the sexual socialization of children. A supportive father who is warm and nonthreatening in a communication setting is important for influencing teen

sexual attitudes and behaviors (Jaccard & Dittus, 1991). Kahn, Smith, and Roberts (1984) found that, although increased communication with the mother was associated with a lower likelihood of sex in adolescence, sons who discussed sexual topics with their fathers were more likely to be sexually involved in adolescence.

Bennett (1984) reported that the most favorable environments for sexual learning are homes in which both the father and mother shared in the communication responsibility. It was also found that a healthy home environment was one in which there were positive parent/child and parent/parent relationships. The father's involvement in discipline and child care was found to be significantly important for a more positive climate for affection, rapport, expression of sexuality, discussion of sexual topics, and sexual behavior.

These studies provide the understanding that mothers have a stronger influence than fathers but the sexual socialization process should not be viewed as solely the mother's responsibility; fathers are often significant contributors to the sexual attitudes of their children.

Teen Sexual Values

Parent and adolescent sexual attitudes and values are relevant in understanding adolescent sexual behavior. Research shows that there are important and substantial differences in the attitudes of parents and their

children. Although, in general, the values of teenagers today are much less restrictive than those of their parents, the attitudes of parents seem to be reflected in the attitudes of their children. Children whose mothers have less permissive sexual attitudes have less permissive attitudes themselves. The sexual attitudes of mothers are also reflected in the sexual behavior of children. The influence of maternal attitudes is stronger for children's attitudes than behaviors (Thornton & Camburn, 1987).

Zabin, Hirsch, Smith, and Hardy (1984) suggested that most adolescents have values and attitudes consistent with responsible sexual behaviors, but some of them are unable to translate these attitudes into personal behavior. They found that it is difficult to completely understand if attitudes affect sexual behaviors or if behaviors have a greater effect on sexual attitudes.

Conclusion

A great deal of literature has shown that there is a relationship between pubertal development and adolescent sexual behaviors. Also, parent/child communication, and teen sexual values have been shown to be related to adolescent sexual behaviors. The measurement of each of these variables will be discussed in greater detail within the Methods section of this paper.

Hypotheses

Based on the review of related literature, and the development of further research ideas relating to these topics, the following research hypotheses will be tested:

1. There is a direct positive relationship between adolescent pubertal development and adolescent sexual behavior.
2. There is a direct positive relationship between age and adolescent sexual behaviors.
3. There is a direct negative relationship between quality of parent/child communication and adolescent sexual behavior.
4. There is a direct negative relationship between teen sexual abstinent values and adolescent sexual behavior.
5. There is a direct negative relationship between teen sexual abstinent values and teen sexual intentions.
6. There is a direct positive relationship between parent/child communication and teen sexual abstinent values.
7. There is a direct positive relationship between teen sexual abstinent values and parent/child communication.
8. There is an indirect relationship from adolescent pubertal development through parent/child communication to adolescent sexual behaviors.

9. There is an indirect relationship from adolescent pubertal development through teen sexual abstinent values to adolescent sexual behaviors.

10. There is an indirect relationship from adolescent pubertal development through parent/child communication and teen sexual values to adolescent sexual behavior.

CHAPTER III

METHODS

Sample

This research was based on data collected from parents and teens during the FACTS & *feelings* project conducted in three areas of northern Utah. FACTS & *feelings* was designed to help parents and teens communicate more effectively concerning sexual issues so that teens would remain sexually abstinent. Through FACTS & *feelings*, video and print materials were produced and disseminated that helped parents teach their children to have more sexually abstinent values and behaviors.

The FACTS & *feelings* sample of parents and adolescents was obtained by families volunteering to participate. First, school districts were identified by having school administrators agree to provide names and addresses of seventh and eighth grade students. These students were expected to range in age from 12-14 years old. This is the age which was thought to be most appropriate for the FACTS & *feelings* materials.

After student names and addresses had been obtained, approximately 6,000 letters were mailed to parents of all seventh and eighth graders in Cache, Ogden, Logan, and Box Elder School Districts. Approximately 590 (10%) families returned the interest form and indicated their willingness to participate in the study. In the initial data collection period of January 1991,

548 families actually participated. In January 1992, there were 504, a 92% retention rate. By the third wave of data collection in January, 1993, 473 families continued participation, an 86% retention rate of the original sample from whom data were collected.

This study used all family data from the FACTS & *feelings* study, including control and treatment families. Surveys were completed by 473 adolescents, in January 1991, January 1992, and January 1993; and in most cases, both parents (501 mothers, 457 fathers) in January 1991, and January 1992. Of the 473 teens, 235 males and 238 females were included in the study.

On the average, fathers were about age 42 and mothers age 40 in 1991 as shown in Table 1. Over 95% of the respondents were white and over 85% were Mormon. In terms of parents' education, 56% of fathers had graduated from college, compared to 38% of mothers. About 84% of fathers were in their first marriage as compared to 74% of mothers.

On average, children were about age 13 in January 1991 and about age 15 by January 1993 as shown in Table 2. Over 80% of males and 74% of females reported living with both their mother and father. Teens were in seventh and eighth grades. Both parents and teens thought education after high school was important (1 = not important through 5 = very important), but parents' hopes for their child's education were slightly higher (5.25 in Table 1) than teens' plans (4.91) (1 = leave school,

2 = high school, 3 = trade/vocational school, 4 = college, 5 = college graduate, 6 = graduate or professional school). About 75% of male teens and 85% of females reported obtaining grades of B or better. In all 3 years of data collection, females reported higher grades than males. Fathers, mothers, and teens reported attendance about once a week at religious services, but parents reported importance of religion (about 4.5) to be somewhat higher than teens (4.0) (1 = not important to 5 = very important).

Table 1

Descriptive Characteristics of the Sample: Parents

Variable	Jan. 91		Jan. 92	
	Father n = 425	Mother n = 496	Father n = 406	Mother n = 494
Age (\bar{X})	41.49	39.33	42.51	40.24
Race (% white)	96.9	95.3	97.5	97.0
Mormon (%)	87.7	86.3	87.2	86.4
College Grad. (%)	56.0	38.2	56.9	38.6
First Marriage (%)	83.0	74.9	84.5	74.8
Hours Worked WK (\bar{X})	46.0	31.12	44.69	32.31
Parents' Ed. \bar{X} hopes/teens plan	5.22	5.28	5.27	5.27
Religious Attendance \bar{X}	3.98	4.10	3.98	4.07
Religious Importance	4.44	4.65	4.44	4.53

Table 2

Descriptive Characteristics of the Longitudinal Sample: Teens

Variable	Jan. 91		Jan. 92		Jan. 93	
	Male n = 235	Female n = 238	Male n = 235	Female n = 238	Male n = 235	Female n = 238
Age	12.86	12.95	13.84	13.90	14.85	14.92
Race ^a (% white)	93.0	93.2	95.7	95.4	95.7	95.8
Mormon (%)	89.8	86.6	90.6	85.3	89.7	83.5
% living w/Mom & Dad (not including step-parent)	81.7	75.2	82.1	75.2	81.3	72.3
Grade in School \bar{X}	7.53	7.59	8.52	8.59	9.49	9.58
Teen's Education hopes \bar{X}	4.88	4.92	5.01	4.95	4.97	4.89
Grades % B or better	70.8	81.0	71.5	84.5	72.1	78.8
Religious Importance \bar{X}	4.20	4.20	4.04	4.0	3.93	3.92
Religious Attendance \bar{X}	4.13	4.23	4.12	4.06	3.94	3.96

^a Discrepancy in race across time is attributed to missing data.

Measurement

The parent survey was divided into conceptual areas, including background demographics, knowledge, communication, and sexual values. The adolescent survey included items in all these areas along with additional questions about sexual behaviors and intentions, physical maturation, avoidance skills, peer sexual environment, and dating. For purposes of the study, questions in the areas of teen physical maturation, parent/child communication, sexual values, sexual intentions, and sexual behaviors were utilized. Study group was also included as a primary variable within the analysis. Alternative means for measuring physical maturation (a pubertal status variable or a continuous pubertal score), parent/child communication (quality or frequency), sexual values (sexual abstinent values or sexual pressures for boys and girls), and sexual intentions (intentions before marriage or intentions in the next year) were examined throughout the study. It was necessary to examine alternative measures to determine which measures were most predictive of sexual intentions and behaviors. This process consisted of several analyses which will be discussed later. The measures themselves will be discussed in detail within this section.

Study Group

Families were randomly assigned to a treatment or control group, approximately 50% in each group. Within the treatment group, two

treatments were implemented on a random basis. The treatment consisted of videos and newsletters to help families more effectively discuss sexual issues within the home. One group received videos only; the other treatment group received both videotapes and newsletters every other month. These videos and newsletters were developed for the purpose of helping families discuss sexual issues within the home. It was found that the two treatment groups did not differ significantly in the findings, so the two were combined into one treatment group for this study. Control families were coded as 0 and treatment families were coded as 1.

Study group was considered a primary independent variable within this study as a possible predictor of parent/teen communication, sexual values, sexual intentions, and sexual behaviors. Because of the treatment involved in the FACTS & *feelings* study, it was necessary to control for possible treatment effects in these analyses.

Physical Maturation

The items pertaining to physical maturation in the adolescent's questionnaire were combined into two scores, using the scoring instructions of Petersen et al. (1987). A **maturation status variable** ranging from 1 to 5 was created, using Petersen's logic of a hierarchical order on the physical traits measured (Table 3). The possible scores on the status variable ranged from 1 (prepubertal) to 5 (postpubertal). Table 4 contains a summary of the logic used in the construction of the status variable.

A continuous pubertal development score also was calculated for each teen. This score was based on the three items utilized in the pubertal status variable in addition to two other items, growth spurt and skin changes. This score was continuous, ranging from a possible score of 5 to 25.

Table 3

Items Used to Develop Maturational Status Scores

Variable Name	Survey Question
Body Hair	1. And how about the growth of body hair ("Body Hair" means underarm and pubic hair)? Would you say that your body hair has:
Breast Development	2. Have your breasts begun to grow? (Female)
Voice Development	Have you noticed a deepening of your voice? (Male)
Menstruation	3. Have you begun to menstruate? (Had your first period) (Female)
Facial Hair	Have you begun to grow hair on your face? (Male)

Note. Each of the three salient indices for each gender were scored individually as follows: 1 = No, 2 = Yes, barely, 3 = Yes, definitely, and 4 = Development Completed (except for Menarche which was scored 1 = No, 2 = Yes).

Table 4

Maturation Status Scoring Criteria

Pubertal Development Status	Girls Criteria ^a		Boys Criteria ^a
	Menarche Score	Combined Score (Breast & Pubic Hair)	Combined Score (Voice, Pubic Hair, & Facial Hair)
1. Prepubertal	1	2	3
2. Beginning Pubertal	1	3	4 - 5
3. Midpubertal	1	≥ 4	6 - 8
4. Advanced Pubertal	2	≤ 7	9 - 11
5. Postpubertal	2	8	12

^a Each of the three salient indices for each gender were scored individually as follows: 1 = No, 2 = Yes, barely, 3 = Yes, definitely, and 4 = Development Completed (except for Menarche which was scored 1 = No, 2 = Yes).

Parent/Child Communication

Frequency of parent/teen communication was measured by asking teens "how often they had talked" about 15 sexual topics with either parent in the "last three months"; a response scale was used ranging from "no talk" to "four times or more" (Table 5). The alpha coefficient of frequency of communication was .92.

Table 5

Composite Measures of Teen Communication Frequency

Variable Name	Survey Question	Item-total Correlation	Coefficient Alpha
<u>Frequency Sexual Communication: Teen</u>			.92
FREQUENCY 1	What is <u>appropriate</u> in dating and sexual behavior.	.62	
FREQUENCY 2	What my <u>mother thinks</u> about teenagers having sex.	.67	
FREQUENCY 3	What my <u>father thinks</u> about teenagers having sex.	.50	
FREQUENCY 4	What my <u>friends think</u> about teenagers having sex.	.49	
FREQUENCY 5	<u>My questions</u> about sex.	.62	
FREQUENCY 6	<u>Reasons why I shouldn't</u> have sexual intercourse at my age.	.74	
FREQUENCY 7	How my <u>life would change</u> if I became a father or mother while I'm a teenager.	.77	
FREQUENCY 8	Sexually transmitted <u>diseases</u> .	.69	
FREQUENCY 9	Why it is best for teenagers to remain sexually <u>abstinent</u> (not have sexual intercourse).	.75	
FREQUENCY 10	<u>Reproduction</u> (how babies are made).	.70	
FREQUENCY 11	Media <u>messages</u> about sex (in popular songs, movies, TV).	.51	
FREQUENCY 12	Physical/sexual <u>development</u> (wet dreams, menstruation, increased interest in opposite sex, etc.).	.52	
FREQUENCY 13	How to handle <u>sexual pressures</u> (how to say "no").	.63	
FREQUENCY 14	How my <u>future marriage</u> partner might feel if I had been sexually active as a teenager.	.65	
FREQUENCY 15	What <u>others might think</u> of me if I became sexually active.	.70	

Two **quality** of parent/teen communication measures were developed by selecting 5 of 10 questions teens answered to assess the quality of communication with each parent. Responses were given on a five-point Likert-type "strongly disagree" to "strongly agree" format. Five of the items addressed mother-adolescent communication quality from the stand point of the adolescent ($\alpha = .75$), and five were about father-adolescent communication quality as viewed by the adolescent ($\alpha = .85$). The composite measures of communication quality were based on factor scaling and reliability analyses. Table 6 shows the specific questions utilized to develop the quality of communication composite score. Finally, a single composite variable was constructed by combining both fathers' and mothers' quality of communication with the teen. Its alpha coefficient was .86.

Teen Sexual Values

Sexual values were measured by many questions on the teen survey. The teen questions used in this analysis were of two types. The first, **sexual abstinent values**, consisted of a set of 12 items to measure the teen's values about appropriateness of teen sexual intercourse (Table 7). Its alpha coefficient was .85.

The second type addressed the acceptability of **boys pressuring girls** for sex ($\alpha = .86$) and **girls pressuring boys** for sex ($\alpha = .89$), measured by a set of seven items for each gender. All items were measured on a five-

point Likert scale ranging from "strongly agree" to "strongly disagree" (Table 8).

Sexual Intentions

Table 9 lists the specific items used to develop two measures of teens' sexual intentions. The first set of items asked about intentions to have sexual intercourse "**before you get married.**" Responses ranged on a five-point scale from "I'm sure I won't" to "I'm sure I will." The alpha coefficient for sexual intentions before marriage was .94.

The second measure was specific to intentions "**in the next year.**" Responses for this measure also ranged on a five-point scale from "I'm sure I won't" to "I'm sure I will." Its alpha coefficient was .85.

Table 6

Composite Measures of Teen Communication Quality

Variable Name	Survey Question	Item-total Correlation	Coefficient Alpha
<u>Quality of Communication: Teens/Fathers</u>			.85
QUALITY 1	1. I can go to my <u>father</u> when I have concerns or questions about sex.	.70	
QUALITY 3	2. (-) If I talk openly with my <u>father</u> about sex, he will think that I might be interested in experimenting with sex.	.52	
QUALITY 5	3. (-) I really don't want to talk with my <u>father</u> about sex.	.63	
QUALITY 7	4. (-) I feel when my <u>father</u> talks with me about sex he holds back information.	.75	
QUALITY 9	5. When my <u>father</u> talks to me about sex, he understands me and cares about my feelings.	.75	
<u>Quality of Communication: Teen/Mothers</u>			.75
QUALITY 2	1. I can go to my <u>mother</u> when I have concerns or questions about sex.	.56	
QUALITY 4	2. (-) If I talk openly with my <u>mother</u> about sex, she will think that I might be interested in experimenting with sex.	.45	
QUALITY 6	3. (-) I really don't want to talk with my <u>mother</u> about sex.	.52	
QUALITY 8	4. (-) I feel when my <u>mother</u> talks with me about sex she holds back information.	.63	
QUALITY 10	5. When my <u>mother</u> talks to me about sex, she understands me and cares about my feelings.	.66	

(-) Item was reversed in scoring.

Table 7

Composite Measures of Teen Sexual Values: Abstinence

Variable Name		Survey Question	Item-total Correlation	Coefficient Alpha
<u>Abstinent Values</u>				
VALUE 1		It is important for me not to have sexual intercourse before I get married.	.59	.85
VALUE 2	(-)	Having sexual intercourse should be viewed as just a normal and expected part of teenage dating relationships.	.36	
VALUE 3		It is against my values for me to have sexual intercourse while I am an unmarried teenager.	.67	
VALUE 4		A teen who has had sexual intercourse outside of marriage would be better off to stop having sexual intercourse and wait until marriage.	.69	
VALUE 5	(-)	Teens who have been dating the same person for a long time should be willing to go along and have sexual intercourse if their partner wants to.	.42	
VALUE 6		The risk of AIDS and other sexually transmitted diseases is reason enough for teenagers to avoid sexual intercourse before they're married.	.52	
VALUE 7		It is all right for teenagers to have sexual intercourse before marriage if they are in love.	.56	
VALUE 8		Having sexual intercourse is something only married couples should do.	.77	

(table continues)

Variable Name	Survey Question	Item-total Correlation	Coefficient Alpha
VALUE 9	Even if I am physically mature, that doesn't mean I'm ready to have sex.	.59	
VALUE 10	I think it is OK for kids my age to have sex.	.47	
VALUE 11	People who do not want to have sexual intercourse should have the right to say "No."	.51	
VALUE 12	My sexual values and beliefs agree with those of my parent(s).	.59	

Table 8

Composite Measures of Teen Sexual Values: Pressure

Variable Name	Survey Question	Item-total Correlation	Coefficient Alpha
<u>Sexual Pressures</u>	Is it ok for a <u>boy to pressure a girl</u> to have sexual intercourse if:		.86
PRESSURES 1	1. He spends a lot of money on her?	.60	
PRESSURES 2	2. He is so turned on he can't stop?	.65	
PRESSURES 3	3. She has had sexual intercourse with other boys?	.61	
PRESSURES 4	4. She says she's going to have sexual intercourse with him, then changes her mind?	.46	
PRESSURES 5	5. They have dated a long time?	.73	
PRESSURES 6	6. She has led him on?	.73	
PRESSURES 7	7. She gets him sexually excited?	.74	
<u>Sexual Pressures</u>	Is it ok for a <u>girl to pressure a boy</u> to have sexual intercourse if:		.89
PRESSURES 8	1. She spends a lot of money on him?	.61	
PRESSURES 9	2. She is so turned on she can't stop?	.75	
PRESSURES 10	3. He has had sexual intercourse with other girls?	.67	
PRESSURES 11	4. He says he's going to have sexual intercourse with her, then changes his mind?	.48	
PRESSURES 12	5. They have dated a long time?	.75	
PRESSURES 13	6. He has led her on?	.78	
PRESSURES 14	7. He gets her sexually excited?	.79	

Sexual Behaviors

Table 10 lists the specific items used to measure teens' sexual behaviors. Sexual behavior was assessed in the adolescent's survey by asking about a series of progressive sexual behaviors in a dichotomous scoring scheme ("Have you ever...", scored yes or no for each behavior). Since the behaviors are considered to be sequential in nature, the composite behavior score was constructed by considering the most advanced behavior first, then the second most advanced behavior next, etc. In other words, if the adolescent responded "Yes" for ever experiencing intercourse, the sex behavior variable was scored as the value 8. If intercourse was scored as "No," but the next most advanced behavior (the girl touching the boy's sex organs) was scored as "Yes," the sex behavior variable was scored as the value 7, and so on for each of the less advanced behaviors. An adolescent scoring "No" on all seven behaviors (held hands with opposite sex to intercourse) was scored as the value 0 on the sex behavior variable. Therefore, this new behavior variable is an hierarchical behavior (Guttman Scale), scored from 0-8, and the higher the score, the more sexual experienced the adolescent.

Table 9

Composite Measures of Teen Sexual Intentions

Variable Name		Survey Question	Item-total Correlation	Coefficient Alpha
<u>Intentions Before Marriage</u>				.94
INTENTION 1	1.	Do you think that you will have sexual intercourse <u>before you get married?</u>	.88	
INTENTION 2	2.	Do you think that you will have sexual intercourse <u>if you become engaged?</u>	.85	
INTENTION 3	3.	Do you think that you will have sexual intercourse before you are married <u>if you are in love?</u>	.84	
INTENTION 4	4.	Do you think that you will have sexual intercourse before you are married <u>if your boyfriend wants to?</u>	.82	
INTENTION 5	5.	Do you think that you will have sexual intercourse before you are married <u>if all of your friends are having sex?</u>	.79	
<u>Intentions Next Year</u>				.85
INTENTION 6	1.	How <u>likely</u> is it that you will have sexual intercourse in the <u>next year?</u>	.69	
INTENTION 7	2.	How would you feel about having sexual intercourse in the <u>next year?</u>	.64	
INTENTION 8	3.	Do you <u>intend</u> to have sexual intercourse in the <u>next year?</u>	.72	

Table 10

Composite Measures of Teen Sexual Behaviors

Variable Name	Survey Question
<u>Sexual Behavior</u>	HAVE YOU EVER:
BEHAVIOR 1	held hands with a girl? held hands with a boy?
BEHAVIOR 2	put your arm around a girl or she put her arm around you? put your arm around a boy or he put his arm around you?
BEHAVIOR 3	kissed a girl? kissed a boy?
BEHAVIOR 4	made out (kissed a girl for a long time)? made out (kissed a boy for a long time)?
BEHAVIOR 5	touched a girl's breasts? allowed a boy to touch your breasts?
BEHAVIOR 6	touched a girl's sex organs? allowed a boy to touch your sex organs?
BEHAVIOR 7	allowed a girl to touch your sex organs? touched a boy's sex organs?
BEHAVIOR 8	had sexual intercourse?

Rescission in sexual intercourse behavior was examined. The same teens were included in all waves of data collection. It was not logical to include teens who had answered yes to sexual intercourse and later answered no to ever having had sexual intercourse. Seven teens who were logically inconsistent in their reporting of sexual intercourse were excluded from future analyses.

Analysis Plan

Regression and path analyses were used to test the direct and indirect effects among the variables as outlined in the hypotheses (p. 18-19). Before completing the regression equations within the model, bivariate correlations were examined on every variable within the model at all three time periods (Jan. 91, Jan. 92, and Jan. 93). The bivariate correlations were a primary analysis to help determine the best measure of communications, sexual values in predicting sexual intentions and behaviors, and the best measure of sexual intentions in predicting sexual behavior. Thirty-six regression equations were completed, using alternative measures of communication, values, and intention constructs. A pubertal timing variable was constructed so that each individual's pubertal development could be compared to the norm of the sample.

Based upon completion of the correlation matrix, running preliminary regression equations, developing a pubertal timing variable, and the original theoretical assumptions as indicated within the hypotheses, it was determined the following variables within the time periods as indicated below would be utilized (Table 11). It was also decided that path analyses would be run separately for each gender.

Table 11

Variables to be Tested in the Regression Models

January 1991	January 1992	January 1993
Study Group	Parent/Teen Communication 1. Frequency 2. Quality	Teen Sexual Behavior
Pubertal Development 1. Change 2. Timing	Teen Sexual Values 1. Abstinence 2. Pressures	
Age	Teen Sexual Intentions 1. Before Marriage 2. Next Year	

CHAPTER IV

DESCRIPTIVE AND BIVARIATE RESULTS

Pubertal Development

Pubertal Development Status

Pubertal Development is considered as the primary independent variable. Table 12 shows the means and standard deviations of pubertal status variables and frequencies of pubertal indicators within pubertal status categories for both boys and girls. Girls tend to be more physically mature than boys at all three time periods. Also in all cases, the frequencies within each pubertal indicator show an increase from "not yet begun" (1) to "seems completed" (4) as the teens increase in age.

Rescission of Pubertal Development

The decision to use the three-item pubertal status variable versus the continuous pubertal score was based on a rescission analysis of the items used to measure pubertal development. Rescission means that the teens gave self-reports which were logically inconsistent, such that pubertal development changed in a backward direction. For example, if an adolescent reported a score on hair growth as a 3 ("definitely underway") in January 1991 and then reported a 1 ("not yet begun") or 2 ("barely started") at January 1992, that would be logically inconsistent and would be considered rescission.

All items had some degree of rescission, yet as indicated in Table 13, growth spurt and skin changes had the highest number of cases with rescission. In examining the total rescission of the Pubertal Status variable and the Pubertal Score, Pubertal Status had a total of 21 cases of rescission, where the Pubertal Score variable had 110 cases of rescission. Based on these findings, Pubertal Status was selected as the most valid means of measuring pubertal development. Peterson, Crockett, Tobin-Richards, and Boxer (1988) reported similar findings in their studies on rescission on these same items and made a similar decision within their studies on pubertal development.

The pubertal status variable was selected rather than the pubertal score variable as the most accurate measurement of pubertal development for these analyses. The 21 cases found to have rescission in their pubertal status measurement were deleted from the path analyses in order to show a clearer picture of pubertal development without rescission, resulting in $n = 452$.

Table 12

Pubertal Status Indicators and Composite Scores for Boys and Girls

BOYS n = 235					GIRLS n = 238				
Pubertal Status		Jan 91	Jan 92	Jan 93		Jan 91	Jan 92	Jan 93	
Indicator Category					Indicator Category				
Pubic Hair Growth	\bar{X}	2.44	2.86	3.15	Pubic Hair Growth	\bar{X}	3.03	3.45	3.75
	SD	(.71)	(.55)	(.48)		SD	(.80)	(.61)	(.46)
1 = Not Yet Begun	1	22	3	0		1	10	0	0
2 = Has barely started	2	93	45	12		2	42	15	3
3 = Is definitely underway	3	108	167	175		3	114	100	54
4 = Seems completed	4	8	19	46		4	70	120	181
Voice Change	\bar{X}	1.99	2.52	3.12	Breast Development	\bar{X}	2.78	3.10	3.31
	SD	(.86)	(.89)	(.77)		SD	(.63)	(.65)	(.61)
	1	77	34	7		1	5	3	0
	2	90	74	35		2	62	29	18
	3	55	99	115		3	147	143	127
	4	10	28	76		4	21	60	92
Facial Hair	\bar{X}	1.50	2.06	2.46	Menarche	\bar{X}	2.85	3.60	3.86
	SD	(.66)	(.81)	(.75)		SD	(1.46)	(1.02)	(.63)
	1	136	65	27	1 = not begun	1	90	31	11
	2	75	97	82	4 = has begun	4	145	202	227
	3	21	62	115					
	4	0	6	10					

(table continues)

BOYS n = 235				GIRLS n = 238			
Pubertal Status	Jan 91	Jan 92	Jan 93	Jan 91	Jan 92	Jan 93	
Indicator Category				Indicator Category			
Pubertal Status based on: \bar{X}	2.58	3.12	3.58	Pubertal Status \bar{X}	3.64	4.08	4.32
1 = prepubertal SD	(.70)	(.73)	(.58)	SD	(.69)	(.60)	(.55)
2 = beginning puberty							
3 = mid-puberty							
4 = advanced puberty							
5 = post							

Table 13

Rescission of Maturational Indicators Over Two Years of Early Adolescent Development

	Body Hair	Skin Changes	Growth Spurt	Breasts (g) Voice (b)	Menses (g) F. Hair (b)	TOTAL Rescission	PUBERTAL STATUS Rescission
Jan 91 - Jan 92							
Girls	3	3	6	5	1	18	2
Boys	1	4	11	6	4	26	5
TOTAL	4	7	17	11	5	44	7
Jan 92 - Jan 93							
Girls	7	12	4	5	1	29	5
Boys	6	7	7	7	10	37	9
TOTAL	13	19	11	12	11	66	14

Pubertal Change

Preliminary regression equations were computed utilizing the Pubertal Development Status (PDS) variable, and also a variable defined as pubertal change. This variable was computed as the difference in PDS between January 1991 and January 1993. It was concluded that the PDS change variable was incomplete in fully understanding pubertal development. Change over time was not applicable for teens who reported high pubertal status rating in January of 1991, missing an important issue of not only change over time, but each teen's beginning pubertal development in comparison to all other teens in the sample who were their own age.

This was determined by first running a cross tabulation to determine the number of adolescents who had increased in their pubertal development within 2 years of time. Table 14 shows the number of males and females who changed from 0 to 3 degrees change in pubertal status on the scale from 1 = prepubertal to 5 = development completed. Table 13 shows that 132 teens reported no change, 259 were scored as increasing by 1 point, and 65 were scored as increasing by 2 or more. Table 14 shows that 15 teens were at postpubertal, 147 at advanced pubertal, and 184 at mid-pubertal status in January 1991, not allowing for a significant degree of change over time in their pubertal development status.

Because many adolescents were advanced or postpubertal in January of 1991, it was decided that calculating pubertal change between January

of 1991 to January of 1993 would not accurately capture the effect of pubertal change we were seeking in this study. Therefore, we decided to attempt still another way of measuring pubertal development.

Table 14

Cross-tabulation of Pubertal Development Status in 1991 and 1993

(Pubertal change on a scale of 1 to 5)

Change in PDS	Count	Gender		Row Total
		Male	Female	
No Change	.00	39	93	132 28.9%
Gained 1 PDS Status	1.00	142	117	259 56.8%
Gained 2 PDS Statuses	2.00	42	22	64 14.1%
Gained 3 PDS Statuses	3.00	1	0	1 .2%
Column Total		224 49.1%	232 50.9%	456 100.0%

Number of Missing Observations: 14

Pubertal Timing

For the reasons noted above, a pubertal development timing variable was constructed so that pubertal development could be examined in terms of early, on time, and late development in comparison to the entire sample of same age teens. Several steps were involved in developing this variable.

To obtain greater precision, age was first computed to the nearest 1/2 year for each teen. Second, a Z score was created by age and gender to

determine how each teen compared to the rest of the sample in terms of pubertal development for their age and gender. In this analysis each teen was considered as a separate individual at each of the three time periods. Therefore, rather than having a sample of 473 teens to calculate this variable, each teen was examined according to his/her age, which provided a sample of 1,416 teens based on their age at each time period.

Finally, the pubertal timing variable was created by utilizing a cumulative distribution function for a normal distribution with a mean of 0 and a standard deviation of 1. The Z score that was computed for the pubertal timing variable for each age was utilized within the logic to calculate early (upper 20%), on time (middle 60%), and late (lower 20%) developers within the sample at that age. These calculations were determined based on other studies which examined timing of pubertal development classifying adolescents in the highest and lowest 20th percentiles for their ages as early and later, respectively. Those in the middle 60 percentiles were classified as on time in their development (Brooks-Gunn & Warren, 1989; Tobin-Richards, Boxer, & Petersen, 1983).

It was decided to use pubertal timing variable within the model at January of 1991. Pubertal timing at January of 1991 had a correlation .70 with pubertal status for the entire sample, so it was decided to exclude pubertal status from the model since pubertal status is a function of pubertal

timing. Pubertal timing was preferable because it captured pubertal development adjusted for age.

At this point it was of interest to examine the pubertal development continuous score as discussed in the measurement section to see the relationships between this variable, sexual behavior, and the new Z-score pubertal timing variable. The correlation between the pubertal development continuous score at January of 1991 and pubertal timing at all three times was above .70, suggesting problems of multicollinearity in future analyses, which once again verified the decision to exclude pubertal status and use pubertal timing within the analyses. Pubertal status was difficult to understand with regard to age because of the 184 teens who were already at 3 (mid-puberty) and 147 teens who had reported achieving 4 (advanced puberty) (refer to Table 15). Based on these preliminary analyses, pubertal timing appeared to be the best way to operationalize early, on time, or late pubertal development within the path models to be tested.

Bivariate Correlation Findings

Pubertal Development

Pubertal status. Pubertal status at January of 1991 was previously determined to be the main independent variable within the model. It was not significantly related to frequency or quality of communication or sexual

values. It was significantly correlated with sexual behavior (Jan. 1993) at .28 for girls and .18 for boys.

Table 15

Pubertal Change 1991-93 by Pubertal Status

PUBERTAL STATUS	Pubertal Change 1991-92				Row Total
	.00	1.00	2.00	3.00	
Prepubertal		2	9	1	12 2.6%
Beginning Puberty	5	61	36		102 22.2%
Mid-Pubertal	22	143	19		184 40.0%
Advanced Pubertal	91	53			144 32.0%
Postpubertal	14				14 3.3%
Column Total	132 28.9%	259 56.8%	64 14.1%	1 .2%	456 100.0%

Number of Missing Observations: 14

Pubertal timing. Pubertal timing was related significantly to pubertal status, .70. Pubertal timing was not significantly related to parent/child communication, sexual values, sexual intentions, or sexual behaviors at this point in the analyses.

Study Group

Study group was not significantly related to any of the variables for girls, but was correlated to sexual behavior (Jan 1993) at $-.17$ for boys.

Age

Teens' age at January of 1991 was not correlated to any of the variables for females, although age was significantly related to pubertal timing for males, $-.25$.

Parent/Teen Communication

Quality of communication. Quality of parent/teen communication at January of 1992 was significantly related to sexual values, $.32$ for boys and $.39$ for girls. Quality of communication was also significantly correlated with sexual intentions for the next year at January 1992, $-.25$ for boys and $-.26$ for girls. Sexual behavior and communication quality were also significantly related, $-.28$ for boys and $-.19$ for girls.

Frequency of communication. Frequency of parent child communication at January of 1992 was not significantly related to sexual values or sexual intentions, and had a small correlation with sexual behavior at January of 1993 for girls, but was not related to any of these variables for boys.

The magnitude of these bivariate correlations determined that **quality** of parent/child communication should be included in the regression models, whereas communication **frequency** should be omitted.

Sexual Values

Sexual abstinent values. The variable, sexual abstinent values, was significantly related to quality of communication for both boys .39 and girls .32. Sexual abstinent values were not related to frequency of communication. Sexual abstinent values at January of 1992 were strongly related to sexual intentions for the next year, -.65 for boys and -.66 for girls, and sexual behaviors, -.56 for boys and -.41 for girls.

Sexual pressures. Values concerning sexual pressures were also related to quality of parent/child communication, -.36 for boys pressuring girls and -.36 for girls pressuring boys as reported by male adolescents. Correlations for female adolescents were also significant, -.19 for boys pressuring girls and -.20 for girls pressuring boys. Values about pressuring someone sexually were also significantly correlated to sexual intentions, .61 for boys and .31 for girls, and sexual behaviors, .35 for boys and .30 for girls, but not as strongly as sexual abstinent values. Consequently, the decision here was to include abstinent values and to delete sexual pressures.

Sexual Intentions

Intentions about sexual behavior for the next year at January of 1992 were significantly related to sexual behavior at January of 1993, .52 for boys and .52 for girls. Intentions for sexual intercourse before marriage had similar correlations with sexual behavior, .53 for boys and .54 for girls.

Preliminary regressions. After the bivariate correlations had been examined, regression equations were completed for each possible model using both intentions for the next year and intentions before marriage. It was confirmed that quality of parent/child communication at January of 1992 and teen sexual abstinent values at January of 1992 were the best constructs for understanding the model. Although teen sexual intentions for the next year and sexual intentions for the future had similar bivariate findings, intentions for the next year was a better fit for the regression models.

Tables 16 and 17 show the bivariate correlations for all the variables which were selected to use within the final model as shown in Figure 2.

Table 16

Bivariate Correlations for Variables Used in the Final Model for Males (n = 235)

	Study Group	Age	Quality of Communication	Sexual Values	Sexual Intentions	Pubertal Timing	Sexual Behavior
Study Group	1.00						
Age	-.03	1.00					
Quality of Communication	-.08	-.03	1.00				
Sexual Values	.13	.06	.39	1.00			
Sexual Intentions	-.11	-.05	-.26	-.65	1.00		
Pubertal Timing	-.01	.25	-.04	-.12	.10	1.00	
Sexual Behavior	-.17	-.06	-.19	-.41	.52	.11	1.00

Table 17

Bivariate Correlations for Variables Used in the Final Model for Females (n = 238)

	Study Group	Age	Quality of Communication	Sexual Values	Sexual Intentions	Pubertal Timing	Sexual Behavior
Study Group	1.00						
Age	.03	1.00					
Quality of Communication	-.06	.02	1.00				
Sexual Values	-.01	.02	.32	1.00			
Sexual Intentions	.05	-.06	-.25	-.66	1.00		
Pubertal Timing	.03	-.09	-.05	.05	.05	1.00	
Sexual Behavior	.03	-.07	-.28	-.56	.52	.08	1.00

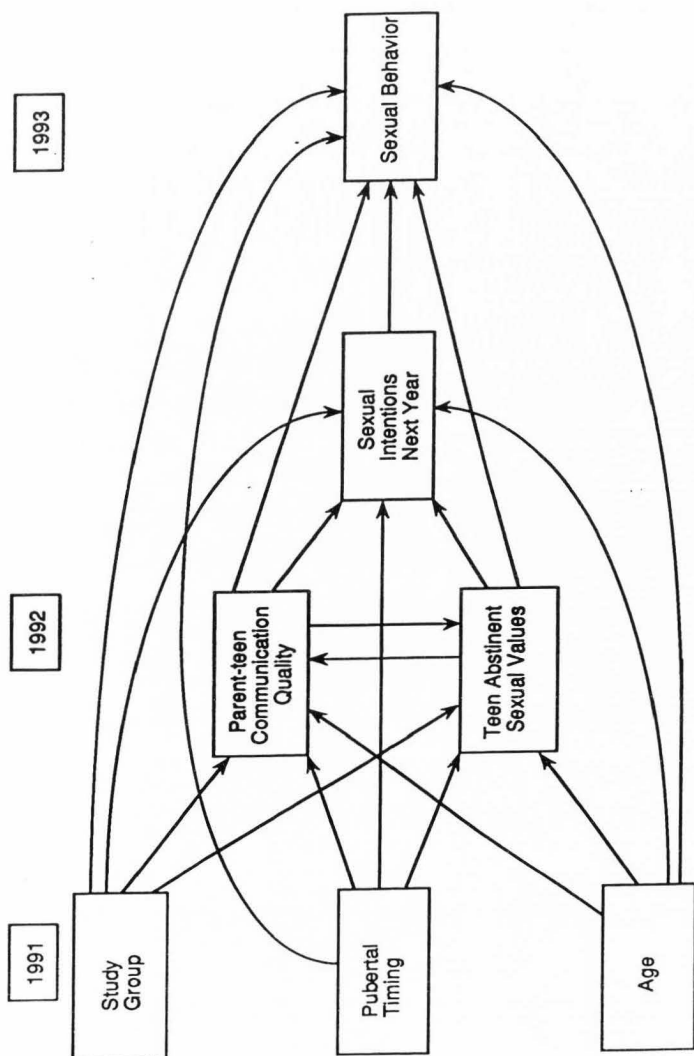


Figure 2. Conceptual model to be tested.

Sexual Behaviors

Descriptives. Sexual behavior, the primary dependent variable in this study, was viewed as a continuous variable ranging from 0 (none of the above behaviors) to 8 (sexual intercourse). To better understand the complexity and patterns of sexual behavior, analyses were completed to examine its hierarchical nature. The first analyses examined the frequencies of each sexual behavior (Table 18). It was found that as each behavior became more "advanced," the number of teens reporting each behavior decreased. It was also found that as teens increased in age, the number of teens reporting each sexual behavior increased. For example, 80 teens had "made out" in January of 1991, but only 8 teens had had sexual intercourse; in January of 1993, 203 teens had made out and 35 of them had had sexual intercourse (Table 18).

Another analysis was done to examine the number of teens who had answered "yes" to their most advanced sexual behavior and "no" to all later behaviors (see Table 19). For example, in January of 1991, 59 teens reported that holding hands was their most advanced behavior, yet in January 1993, only 19 teens reported that holding hands was their most advanced behavior. In comparison, at January of 1991, only 13 teens reported that touching a boy's sex organs was their most advanced behavior, yet in January 1993, 59 teens reported this as their most advanced behavior.

Table 18

Frequencies of Sexual Behaviors Reported by Adolescents

		"YES" RESPONSE TO BEHAVIOR ITEM					
		January 1991	%	January 1992	%	January 1993	%
1	Held Hands	274	58.1	334	70.8	371	78.8
2	Arm Around	222	47.5	298	63.3	369	78.3
3	Kissed	183	38.8	258	54.7	303	64.5
4	Made Out	80	17.0	145	30.8	203	43.1
5	Touch Breasts	37	7.8	104	22.1	163	34.6
6	Touch Girl's Sex Organs	18	3.8	57	12.1	88	18.7
7	Touch Boy's Sex Organs	18	3.8	54	11.5	94	20.0
8	Intercourse	8	1.7	22	4.7	35	7.4
0	None of the above behaviors						

Table 19

Frequencies of Most Advanced Sexual Behaviors Reported by Adolescents

TEENS WITH CODE AS HIGHEST (MOST ADVANCED BEHAVIOR) I.E., SAYING YES TO CODE AND NO TO LATER CODES							
		January 1991	%	January 1992	%	January 1993	%
1	Held Hands	59	12.5	43	9.2	19	4.0
2	Arm Around	64	13.6	60	12.8	71	15.1
3	Kissed	98	20.8	96	20.5	86	18.3
4	Made Out	46	9.7	56	11.9	57	12.1
5	Touch Breasts	18	3.8	42	9.0	62	13.2
6	Touch Girl's Sex Organs	2	.4	10	2.1	9	1.9
7	Touch Boy's Sex Organs	13	2.8	34	7.2	59	12.6
8	Intercourse	8	1.7	22	4.7	35	7.4
0	None of the above behaviors	164	34.7	106	22.4	72	15.2

A cumulative analysis was completed to examine how many teens who said "yes" to a sexual behavior also said "yes" to all preceding behaviors. It was found that there was a sequential nature to these sexual behaviors. In looking at behavior 6, for example (touch girl's sex organs), Table 18 shows 88 teens reporting this behavior in 1993 whereas Table 20 shows 82 teens who reported yes to this behavior and yes to all preceding behaviors in 1993.

Adolescent sexual behavior is more complicated than just having sexual intercourse; there is a sequential nature to the preceding behaviors leading to this more advanced behavior. Based on the original theoretical decisions, and the descriptive and bivariate findings as discussed above, pubertal timing, teen age, quality of parent/child communication, sexual abstinent values, sexual intentions for the next year, and sexual behaviors were selected as the most appropriate measures to operationalize constructs within the multivariate model to be tested (refer to Figure 2).

Table 20

Cumulative Frequency of Sexual Behaviors Reported by Adolescents

TEENS WHO SAY YES TO CODE AND SAY YES TO ALL PRECEDING CODES							
		January 1991	%	January 1992	%	January 1993	%
1	Held Hands	274	58.1				
2	Arm Around	200	42.4	271	57.7	343	72.8
3	Kissed	154	32.6	227	48.3	387	60.9
4	Made Out	78	16.5	142	30.2	201	42.7
5	Touch Breasts	32	6.8	87	18.5	146	30.1
6	Touch Girl's Sex Organs	14	3.0	47	10	82	17.4
7	Touch Boy's Sex Organs	10	2.1	38	8.1	74	15.7
8	Intercourse	4	1.7	18	3.8	35	7.4
0	None of the above behaviors						

CHAPTER V

MULTIVARIATE RESULTS AND MODEL TESTING

Introduction

The logic for calculating the direct, indirect, and spurious effects in the multivariate models is shown in Table 21. The direct effect of each variable X on an endogenous variable Y is estimated by the regression of Y on X when all other measured effects of Y are included in the equation (Figure 3). When at least one variable that is an effect of some variable(s) is also an effect of one or more others, the model will also have indirect effects; thus indirect effects are estimated by products of direct effects. The total effect is the sum of the direct and indirect effects for each variable within the model. Spurious relationships are those due to common effects, which can be found as the difference between the zero-order (nothing partialled) B for that variable and the total effect of that variable. Within this chapter a summary of the direct, indirect, total, and spurious effects on communication, sexual values, sexual intentions, and sexual behaviors will be discussed (refer to Table 21).

Table 21

Path Analyses Logic

Zero-Order Bs:	Direct Effects:	Indirect Effects:
QUALITY PARENT/TEEN COMMUNICATION		
B_{CS}	$B_{CS \cdot TAV}$	$(B_{VS \cdot TAC})(B_{CV \cdot STA})$
B_{CT}	$B_{CT \cdot SAV}$	$(B_{VT \cdot SAC})(B_{CV \cdot STA})$
B_{CA}	$B_{CA \cdot STV}$	$(B_{VA \cdot STC})(B_{CV \cdot STA})$
B_{CV}	$B_{CV \cdot STA}$	0
SEXUAL ABSTINENT VALUES		
B_{VS}	$B_{VS \cdot TAC}$	$(B_{CS \cdot TAV})(B_{VC \cdot STA})$
B_{VT}	$B_{VT \cdot SAC}$	$(B_{CT \cdot SAV})(B_{VC \cdot STA})$
B_{VA}	$B_{VA \cdot STC}$	$(B_{CA \cdot STV})(B_{VC \cdot STA})$
B_{VC}	$B_{VC \cdot STA}$	
SEXUAL INTENTIONS NEXT YEAR		
B_{IS}	$B_{IS \cdot PACVT}$	$(B_{CS \cdot TAV})(B_{IC \cdot STAV}) +$ $(B_{CS \cdot TAV})(B_{VC \cdot STA})(B_{IV \cdot STAC}) +$ $(B_{VS \cdot TAC})(B_{IV \cdot STAC})$
B_{IT}	$B_{IT \cdot SACV}$	$(B_{CT \cdot SAV})(B_{IC \cdot STAV}) + (B_{VT \cdot SAC})(B_{IV \cdot STAC}) +$ $(B_{CT \cdot SAV})(B_{VC \cdot STA})(B_{IV \cdot STAC}) +$ $(B_{VS \cdot TAC})(B_{CV \cdot STA})(B_{IC \cdot STAV})$
B_{IA}	$B_{IA \cdot SPCV}$	$(B_{CA \cdot STA})(B_{BC \cdot STAVI}) + (B_{VA \cdot STC})(B_{IV \cdot STAC}) +$ $(B_{CA \cdot STV})(B_{VC \cdot STA})(B_{IV \cdot STAC}) +$ $(B_{VA \cdot STC})(B_{CV \cdot STA})(B_{IC \cdot STAV})$
B_{IC}	$B_{IC \cdot SPAV}$	$(B_{VC \cdot STA})(B_{IV \cdot STAC})$
B_{IV}	$B_{IV \cdot SPAC}$	$(B_{CV \cdot STA})(B_{IC \cdot STAV})$

(table continues)

Zero-Order Bs: Direct Effects: Indirect Effects:

SEXUAL BEHAVIORS

B_{BS}	$B_{BS \cdot TACVI}$	$(B_{CS \cdot TAV})(B_{BC \cdot STAV}) + (B_{VS \cdot TAC})(B_{BV \cdot STACI})$ $+ B_{IS \cdot TACV}(B_{BI \cdot STACV}) +$ $(B_{CS \cdot TAV})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{VS \cdot TAC})(B_{CV \cdot STA})(B_{BC \cdot STAVI}) +$ $(B_{CS \cdot TAV})(B_{IC \cdot STAV})(B_{BI \cdot STACV}) +$ $(B_{VS \cdot TAC})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{CS \cdot TAV})(B_{VC \cdot STA})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{VS \cdot TAC})(B_{CV \cdot STA})(B_{IC \cdot STAV})(B_{BI \cdot STACV})$
B_{BT}	$B_{BT \cdot SACVI}$	$(B_{CT \cdot SAV})(B_{BC \cdot STAVI}) + (B_{VT \cdot SAC})(B_{BV \cdot STACI})$ $+ (B_{IT \cdot SACV})(B_{BI \cdot STACV}) +$ $(B_{CT \cdot SAV})(B_{VC \cdot STA})(B_{BV \cdot STACI}) +$ $(B_{VT \cdot SAC})(B_{CV \cdot STA})(B_{BC \cdot STAVI}) +$ $(B_{CT \cdot SAV})(B_{IC \cdot STAV})(B_{BI \cdot STACV}) +$ $(B_{VT \cdot SAC})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{CT \cdot SAV})(B_{VC \cdot STA})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{VT \cdot SAC})(B_{CV \cdot STA})(B_{IC \cdot STAV})(B_{BI \cdot STACV})$
B_{BA}	$B_{BA \cdot TSCVI}$	$(B_{CA \cdot STV})(B_{BC \cdot STAVI}) + (B_{VA \cdot STC})(B_{BV \cdot STACI})$ $+ (B_{IA \cdot STCV})(B_{BI \cdot STACV}) +$ $(B_{CA \cdot STV})(B_{VC \cdot STA})(B_{BV \cdot STACI}) +$ $(B_{VA \cdot STC})(B_{CV \cdot STA})(B_{BC \cdot STAVI}) +$ $(B_{CA \cdot STV})(B_{IC \cdot STAV})(B_{BI \cdot STACV}) +$ $(B_{VA \cdot STC})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{CA \cdot STV})(B_{VC \cdot STA})(B_{IV \cdot STAC})(B_{BI \cdot STACV}) +$ $(B_{VA \cdot STC})(B_{CV \cdot STA})(B_{IC \cdot STAV})(B_{BI \cdot STACV})$
B_{BC}	$B_{BC \cdot SAVIT}$	$(B_{IC \cdot STAV})(B_{BI \cdot STACV}) + (B_{VC \cdot STA})(B_{BV \cdot STACI})$ $+ (B_{VC \cdot STA})(B_{IV \cdot STAC})(B_{BI \cdot STACV})$
B_{BV}	$B_{BV \cdot SACIT}$	$(B_{IV \cdot STAC})(B_{BI \cdot STACV}) + (B_{CV \cdot STA})(B_{BC \cdot STAVI})$ $+ (B_{CV \cdot STA})(B_{IC \cdot STAV})(B_{BI \cdot STACV})$
B_{BI}	$B_{BI \cdot SACVT}$	
B_{BT}	$B_{BT \cdot SACVI}$	

Subscripts S = Study Group
 A = Age
 C = Communication Quality
 V = Sexual Values
 I = Sexual Intention
 T = Pubertal Timing
 B = Sexual Behaviors

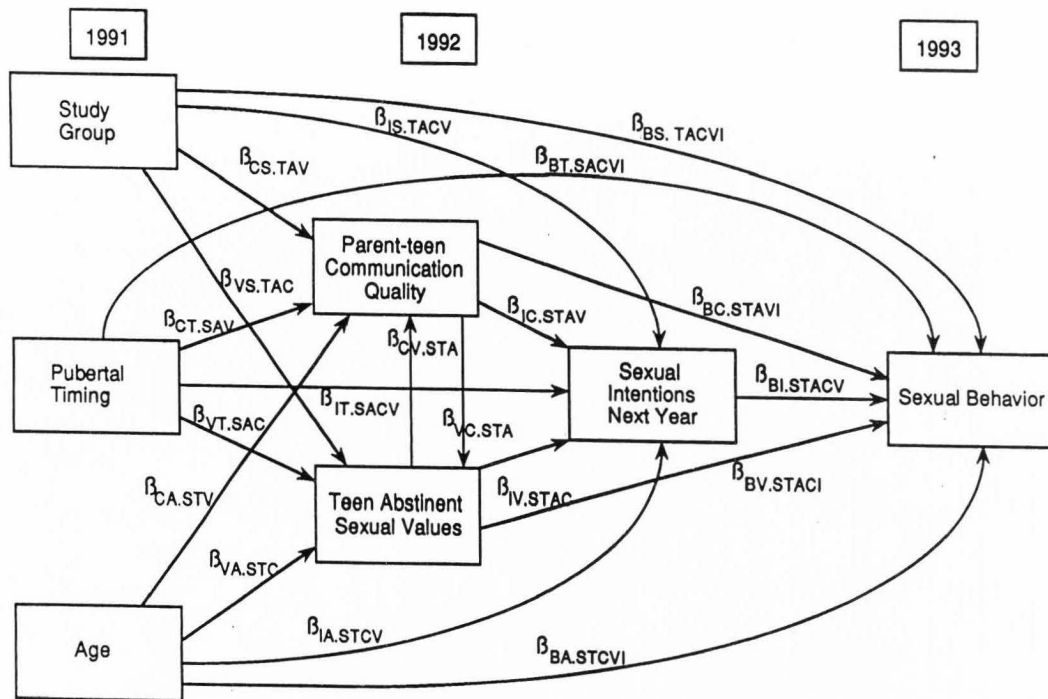


Figure 3. Model showing path formulas.

Findings for Males

Quality of Communication

Study group was shown to have a negative direct effect on quality of communication (-.15) for males, yet when the indirect effects of sexual values were added into the model, the total effect was not significant (-.07). Pubertal timing did not have a significant direct or total effect on quality of communication for males (-.06). Indirect and spurious effects on quality of communication were minimal for both study group and pubertal timing. Effects of age on quality of communication were also minimal (refer to Table 22 and Figure 4).

Table 22

Summary of Direct, Indirect, and Spurious Effects on Quality of Communication for Males

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group via Sexual Values	-0.079	.008	-.145	<u>.074</u>	-.071
Pubertal Timing via Sexual Values	-0.039	-0.022	-.003	<u>-.058</u>	-.061
Age via Sexual Values	-0.029	-0.052	-.061	<u>-.014</u>	-.081
Sexual Values	.393	-.018	.411	0	.411

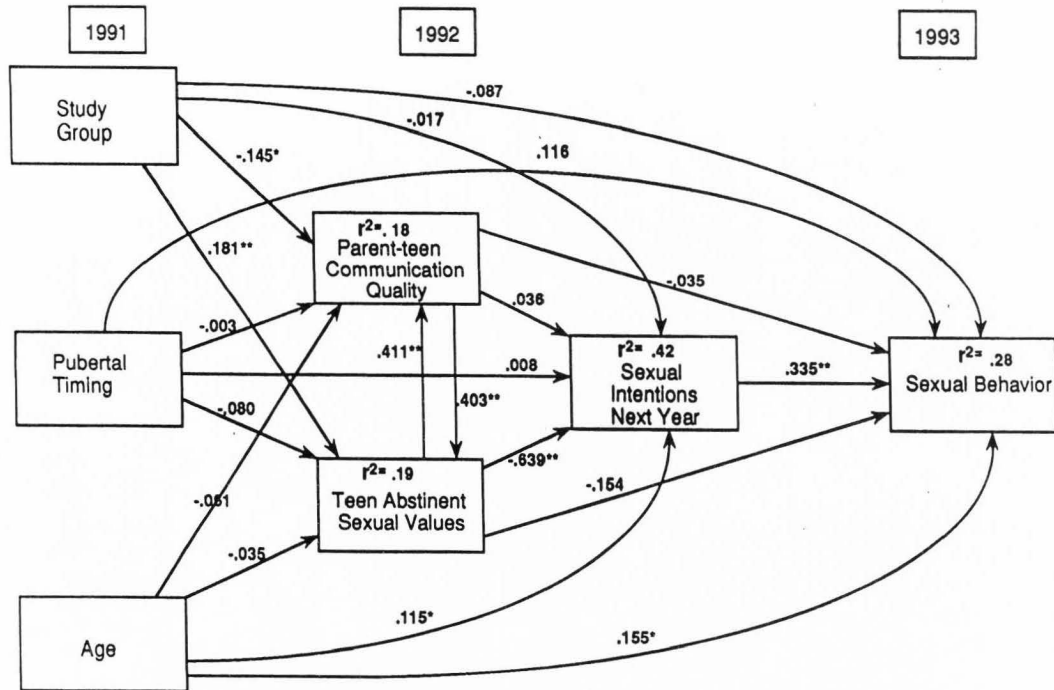


Figure 4. Tested path analysis model for male adolescents.

The effects of sexually abstinent values on quality of communication were significant. The direct and total effect (.41 for males) shows that sexually abstinent values and the quality of parent/teen communication are substantially related.

Sexual Abstinent Values

The total effect of the study group on sexual values for teens was significant for males (.12), suggesting that male teens who received the FACTS & *feelings* program had higher sexually abstinent values than male teens in the control group. Pubertal timing had little effect on sexual values of male teens, although the total effect was negative for males (-.08).

Age did not have a significant effect on sexual values for males. Quality of parent/child communication about sexual issues did, however, have a significant positive effect on sexual values for males (.40), suggesting that as quality of communication increases, sexually abstinent values of teens increase (refer to Table 23).

Table 23

Summary of Direct, Indirect, and Spurious Effects on Sexual Values for Males

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group via Quality of Communication	.129	.006	.181	<u>.058</u> .058	.123
Pubertal Timing via Quality of Communication	-.124	.043	-.080	<u>-.001</u> -.001	-.081
Age via Quality of Communication	.058	-.002	-.035	<u>-.025</u> -.025	-.060
Quality of Communication	.393	-.010	.403	0	.403

Sexual Intentions

Within this model (Figure 4), sexual intentions yielded $R^2 = .42$ for males, suggesting that the variables within this model are explaining over 40% of sexual intentions. Study group and pubertal timing did not have significant direct or indirect effects on sexual intentions for the next year for male adolescents. However, age had a significant total effect on sexual intentions for male adolescents (.15). The spurious relationship, however, was large for males (-.20), suggesting a considerable amount of shared effect among variables when examining the effects of age on sexual intentions.

Quality of parent/child communication had a small direct effect (.04) on sexual intentions for males. However, the indirect effects (-.26) were

significant due to the effects of sexual values on parent/child communication, which indirectly affect sexual intentions (-.21 for males) (Table 24). Sexual values had a significant direct effect on sexual intentions for males (-.62). Adolescents who hold sexual abstinent values are not likely to intend to have sexual intercourse in the next year (Table 24).

Table 24

Summary of Direct, Indirect, and Spurious Effects on Sexual Intentions for Males

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group					
via Quality of Communication				.032	
via Sexual Values				<u>-.113</u>	
	-.109	.012	-.017	-.080	-.097
Pubertal Timing					
via Quality of Communication				.001	
via Sexual Values				<u>.050</u>	
	.104	.045	.008	.051	.059
Age					
via Quality of Communication				.014	
via Sexual Values				<u>.022</u>	
	-.053	-.204	.115	.036	.151
Communication					
via Sexual Values				<u>-.260</u>	
	-.261	.037	.036	-.260	-.224
Sexual Values					
via Quality of Communication				<u>.015</u>	
	-.646	.022	-.639	.015	-.624

Sexual Behaviors

The primary outcome variable, sexual behaviors, showed an $R^2 = .28$ for males, indicating that over one-fourth of the sexual behavior variable for males is being explained by variables within the presented model. As shown in Table 25, study group had an effect on sexual behaviors for males (total effect = $-.14$), suggesting that male teens who received the *FACTS & feelings* treatment were lower in their sexual behaviors. Pubertal timing also had a significant effect on sexual behavior for males (total effect = $.15$), showing that male adolescents who were early in their pubertal development (compared to other same-age teens within the sample) reported a higher amount of sexual behaviors.

Age also had a significant direct effect on sexual behaviors for male adolescents ($.16$), suggesting that as adolescents increase in age, their sexual behaviors increase. The spurious (shared effect) relationship between age and sexual behavior was high for males ($-.27$).

Quality of communication was also significantly influential on sexual behaviors working indirectly through sexual values and intentions for males (total effect = $-.17$). Sexual abstinent values had a significant effect for males; however, the indirect effect for males ($-.22$) contributed more to the total effect ($-.38$) than the direct effect ($-.15$). This suggests that the effects of age on sexual behavior are shared with the other variables in the

model, especially through sexual intentions. Sexual intentions for the next year had a significant direct effect on sexual behaviors for males (.34).

Table 25

Summary of Direct, Indirect, and Spurious Effects on Sexual Behaviors for

Males

	Zero- order B	Spurious	Direct	Indirect	Total
Study Group					
via Quality of Communication				.025	
via Sexual Values				-.068	
via Sexual Intentions				<u>-.006</u>	
	-.166	.030	-.087	-.049	-.136
Pubertal Timing					
via Quality of Communication				.001	
via Sexual Values				.030	
via Sexual Intentions				<u>.003</u>	
	.106	-.043	.116	.033	.149
Age					
via Quality of Communication				.005	
via Sexual Values				.013	
via Sexual Intentions				<u>.039</u>	
	-.059	-.271	.155	.057	.212
Communication					
via Sexual Values				-.148	
via Sexual Intentions				<u>.012</u>	
	-.189	.018	-.035	-.136	-.171
Sexual Values					
via Quality of Communication				-.009	
via Sexual Intentions				<u>-.214</u>	
	-.411	.034	-.154	-.223	-.377
Sexual Intentions	.524	.189	.335	0	.335

Findings for Females

Quality of Communication

For female adolescents, the total effect of study group on quality of communication was -.06. Pubertal timing did not have a significant total effect on quality of communication for females (-.05). Indirect and spurious effects were minimal. Effects of age on quality of communication (-.09) were also minimal. The direct and total effect of sexual abstinent values on quality of parent/child communication was .33. The spurious effect was minimal (refer to Table 26 and Figure 5).

Table 26

Summary of Direct, Indirect, and Spurious Effects on Quality of Communication for Females

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group via Sexual Values				<u>.022</u>	
	-.055	-.003	-.085	.022	-.063
Pubertal Timing via Sexual Values				<u>.029</u>	
	-.054	.001	-.082	.029	-.053
Age via Sexual Values				<u>.004</u>	
	.020	-.067	-.081	.004	-.087
Sexual Values				0	
	.315	-.016	.331	0	.331

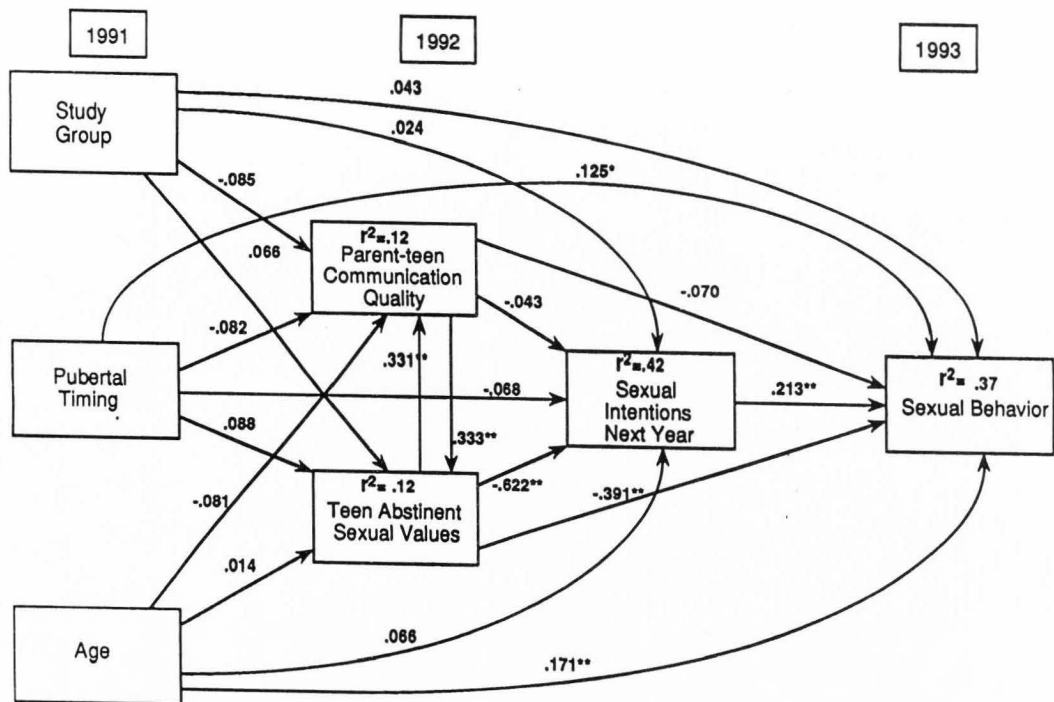


Figure 5. Tested path analysis model for female adolescents.

Sexual Abstinent Values

The direct effect of sexually abstinent values on quality of communication was significant. The total effect (.33 for females) shows that sexually abstinent values and the quality of parent/teen communication are substantially related. The effect of study group on sexual abstinent values (.04) was not significant for female adolescents. Pubertal timing had little effect on sexual values for female teens, although the total effect was positive for females (.06).

Age did not have a significant effect on sexual values (-.01) for females. Quality of parent/child communication about sexual issues did, however, have a significant positive effect on sexual values for females (.33), suggesting that as quality of communication increases, sexually abstinent values of teens increase (refer to table 27).

Table 27

Summary of Direct, Indirect, and Spurious Effects on Sexual Values for Females

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group via Quality of Communication	-.001	.039	.066	<u>-.028</u> -.028	.038
Pubertal Timing via Quality of Communication	.050	-.011	.088	<u>-.027</u> -.027	.061
Age via Quality of Communication	.015	.028	.014	<u>-.027</u> -.027	-.013
Quality of Communication	.315	-.018	.333	0	.333

Sexual Intentions

Within this model (Figure 5), sexual intentions showed an $R^2 = .42$ for females, suggesting that the variables within this model are explaining over 40% of sexual intentions. Neither study group nor pubertal timing had significant direct or indirect effects on sexual intentions for the next year for female adolescents. Age had only a slight effect for females (.08). The spurious relationship, however, was large for females, -.13, again indicating a shared effect between the variables within this equation.

Quality of parent/child communication had a small direct effect on sexual intentions for females (-.04). However, the indirect effects were significant due to the effects of sexual values on parent/child communication, which indirectly affect sexual intentions (-.26 for females) (Table 28). Sexual values had a significant direct effect on sexual intentions for females (-.62) and a total effect of -.64.

Sexual Behaviors

The primary outcome variable, sexual behaviors, showed an $R^2 = .37$ for females, indicating that over one-third of females' sexual behavior was explained by variables within the presented model.

Table 28

Summary of Direct, Indirect, and Spurious Effects on Sexual Intentions for Females

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group					
via Quality of Communication				.021	
via Sexual Values				<u>-.042</u>	
	.048	.045	.024	-.021	.003
Pubertal Timing					
via Quality of Communication				.021	
via Sexual Values				<u>-.056</u>	
	-.055	-.048	-.068	-.035	-.103
Age					
via Quality of Communication				.020	
via Sexual Values				<u>-.009</u>	
	-.057	-.134	.066	.011	.077
Communication					
via Sexual Values				<u>-.207</u>	
	-.252	.002	-.043	-.207	-.250
Sexual Values					
via Quality of Communication				<u>-.014</u>	
	-.656	.020	-.622	-.014	-.636

There was a small total effect (.08) of pubertal timing on females' sexual behaviors. Age did have a significant total effect on sexual behaviors of female adolescents (.20), suggesting that as adolescents increase in age, their sexual behaviors increase. The spurious (shared effect) relationship between age and sexual behavior was exceptionally high for females (-.27).

Quality of communication was also significantly influential on sexual behaviors working indirectly through sexual values (-.17) and intentions (-.01) for females (total effect = -.25). Sexual abstinent values had a

significant effect for females; however, the direct effect (-.39) contributed more to the total effect (-.55) than the indirect effect (-.15) (Table 29). Intentions had a significant direct effect on sexual behaviors for females (.21).

Discussion of Findings in Relation to Hypotheses

In general, the findings of this study were consistent with the majority of the research hypotheses presented on pages 18-19. The findings of this study will be discussed in relation to each of these research hypotheses.

Hypothesis 1

The model was consistent with research hypothesis 1 in showing the direct positive relationship between the timing of pubertal development and adolescent sexual behaviors for males and females. However, the total effect of pubertal timing to sexual behaviors was stronger for males than for females, suggesting that the pubertal timing of males in comparison to other teens their age is predictive of their future sexual behaviors.

Table 29

Summary of Direct, Indirect, and Spurious Effects on Sexual Behaviors for Females

	Zero-order B	Spurious	Direct	Indirect	Total
Study Group					
via Quality of Communication				.021	
via Sexual Values				-.035	
via Sexual Intentions				<u>.005</u>	
	.036	.002	.043	-.009	.034
Pubertal Timing					
via Quality of Communication				.021	
via Sexual Values				-.048	
via Sexual Intentions				<u>-.014</u>	
	.079	-.004	.125	-.042	.083
Age					
via Quality of Communication				.021	
via Sexual Values				-.008	
via Sexual Intentions				<u>.014</u>	
	-.074	-.272	.171	.027	.198
Communication					
via Sexual Values				-.174	
via Sexual Intentions				<u>-.009</u>	
	-.277	.024	-.070	-.183	-.253
Sexual Values					
via Quality of Communication				-.026	
via Sexual Intentions				<u>-.132</u>	
	-.563	.013	-.391	-.158	-.550
Sexual Intentions	.516	.303	.213	0	.213

Hypothesis 2

As indicated in hypothesis 2, the positive relationship between age and adolescent sexual behaviors for both males and females was also supported by the results. As adolescents increase in age, their sexual behaviors also increase. This finding is consistent with the literature

supporting the relationship between age and sexual behaviors (Sonenstein et al., 1989; Elliot & Morse, 1989).

Hypothesis 3

Another expectation as indicated in hypothesis 3 of this study was that parent/child communication would have a negative effect on adolescent sexual behaviors. The direct effect of parent/child communication quality on adolescent sexual behaviors was not significant. However, quality of parent/child communication affected sexual behaviors indirectly through sexually abstinent values and sexual intentions. This effect was not stated as a research hypothesis, although it was an important finding of this study.

Hypothesis 4

As indicated in hypothesis 4, sexual values had a direct effect on sexual behaviors, suggesting that as teens' sexually abstinent values increase, their sexual behaviors decrease. This effect was stronger for females than for males. Zabin et al. (1984) suggested that sexual values are valuable in predicting sexual behaviors, although it is difficult to determine how much values affect behaviors and vice versa.

Hypothesis 5

The effect of sexually abstinent values on sexual intentions was highly significant, as stated in hypothesis 5. Teens who value sexual abstinence

are much less likely to have intentions to have sexual intercourse, because these values and intentions are fundamentally incompatible.

Hypothesis 6

The quality of parent/teen communication concerning sexual issues is predictive of high sexually abstinent values. This finding is supportive of the research of Jaccard and Dittus (1991) which stresses the importance of quality of communication between parent and teen in understanding teens' sexual attitudes and behaviors.

Hypothesis 7

The effect of sexually abstinent values on quality of parent/teen communication was also shown to be significant. This suggests that teens who have values of sexual abstinence are more likely to have quality communication about sexual issues with their parents. The question arises as to whether quality of parent/child communication has the greater effect on teens' sexually abstinent values, or whether teen values have a stronger effect on parent/teen communication quality.

Hypothesis 8, 9, & 10

Hypotheses 8, 9, and 10 indicated that pubertal development would work indirectly through values and communications, which was not the case in the findings of the path analyses; timing of pubertal development had a

direct relationship, with sexual behavior not having significant indirect effects through these other variables.

Overall, the model was consistent with theory in showing the relationships between parent/child communication and sexually abstinent values, sexual values and adolescent sexual intentions, sexual values and adolescent sexual behavior, and sexual intentions and sexual behaviors.

CHAPTER VI
DISCUSSION AND CONCLUSION

There is a high level of scientific interest in understanding antecedents of adolescent sexual behavior, because of its links to unplanned pregnancies, STDs, and AIDS (Miller & Moore, 1990; Hayes, 1987). The purpose of this study was to examine several key antecedents of adolescent sexual intentions and behaviors, including age, pubertal development, parent/teen communication, and teen sexual values. Analyses were based on longitudinal data collected in 1991, 1992, and 1993 from parents and teens during the FACTS & *feelings* project conducted within three counties in northern Utah. The sample (n=473) consisted of primarily Caucasian adolescents who were about age 13 in January 1991, and close to age 15 in January 1993. Over three-fourths of the sample reported living with both their father and mother.

Pubertal development was somewhat complex to measure; however, after considerable analyses, a pubertal timing measure was developed. This variable was best able to capture not only where teens were in their development, but also how they compared in their development (early, on-time, late) to other teens their age in the sample. Sexual behavior was also somewhat complex to measure. The sexual behavior variable used in the study ranged from 0-9 (no sexual behavior to sexual intercourse). Descriptive analyses indicated that sexual behavior is a sequential

phenomenon, and that intercourse usually is the end result of this sequence. These findings are consistent with the literature, suggesting that sexual behaviors are progressive (McCabe & Collins, 1984; Smith & Udry, 1985).

In more fully understanding sexual behaviors, especially with younger teens, the behaviors preceding sexual intercourse are usually only "potentially risky" in that they do not cause pregnancy, STDs, and AIDS. These preliminary behaviors are still necessary in understanding how other variables are related to sexual behaviors, including coitus.

Communication quality and teen sexual abstinent values were selected as the most appropriate measures to relate to other variables within the model based on preliminary correlations. Sexual intentions for the next year were found to be the best variable for measuring a teen's intentions. It may be appropriate to presume that a teens' understanding of his/her intentions for the next year is more perceivable than what the teen intends to do many years later.

Preliminary correlational analyses showed that communication quality and sexual values were highly correlated. This finding is consistent with the literature suggesting that quality of parent/child communication is important in the transmission of sexual values and attitudes (Fisher, 1985; Jaccard & Dittus, 1991; Inazu & Fox, 1980).

Sexual abstinent values also were highly correlated with sexual intentions and sexual behaviors. Sexual intentions were shown to have a

strong positive relationship with sexual behaviors. Pubertal timing showed a weak positive relationship to sexual intentions and behaviors.

Multivariate analyses showed some interesting similarities and differences for males and females. Study group had a small negative effect on communication quality for males but no effect for females. Pubertal timing and age had little effect on communication quality for either males or females. Sexual abstinent values, however, had a significant positive effect on communication quality for both males and females.

The effect of values on communication is interesting. It seems logical that teens who have values consistent with their parents would be more likely to have quality discussion of these issues. On the other hand, if a teen's values are inconsistent with his/her parents, the communication regarding these issues would either be somewhat conflictual or would not take place at all. Rozema (1986) has suggested that the climate of sexual discussion between parent and teen is often defensive, especially when there is inconsistency in their views.

Study group had a small positive effect on sexual values for males, but no effect for females. Pubertal timing and age again had very little effect on sexual values. Communication quality had a significant total effect on sexual values for male and female teens, supporting other research findings (Fisher, 1985; Newcomer & Udry, 1985).

Understanding whether quality of parent/child communication affects sexually abstinent values, or whether sexually abstinent values affect quality of communication, is complex. It would seem that in order for teens to incorporate sexually abstinent values, that quality communication with their parents concerning these issues would be necessary. On the other hand, teens who have values consistent with their parents' would be more likely to discuss these issues with them. Zabin et al. (1984) found that it is difficult to determine whether attitudes affect behaviors or if behaviors affect attitudes. The same could be true of communication and values.

The direct, indirect, spurious, and total effects were interesting in understanding how males and females differ in their sexual intentions and behaviors. A large percentage of variance in sexual intentions was explained within the model. Study group had only a small effect on male teens' sexual intentions and virtually no effect for females. Pubertal timing was somewhat predictive of sexual intentions for females, which was not the case for males. However, communication quality significantly affected intentions indirectly through sexual values for males and females. Sexual values had a strong effect on intentions for both males and females.

Although sexual values and intentions are highly related to each other, they are very different conceptually. Sexually abstinent values are deeply held beliefs and feelings about the appropriateness of teens having sexual intercourse; on the other hand, sexual intentions are what one actually plans

or intends to do. Often times there are inconsistencies between values and intentions, just as there are often times inconsistencies between adolescents' sexual intentions and their actual behaviors.

Study group had a small effect on sexual behaviors for males with a combination of direct and indirect effects (through communication and values). There was no effect for females. Although this effect was small, it was interesting that males would be influenced in this way by a program such as FACTS & *feelings* and females would not. In respect to the literature concerning parent/daughter versus parent/son communication about sexual issues, Walters and Walters (1983) have pointed out that the sexual communication between parents and their children, specifically mothers and daughters, is more salient for daughters than for sons. If parents and daughters are already communicating about these issues, it would seem that a program stressing communication between parent and teen might be more effective for sons than for daughters.

Pubertal timing had a significant direct effect for males, although this effect was smaller for females. Age, however, was significantly predictive of sexual behavior for both males and females, consistent with the literature (Udry et al., 1987). It is interesting that a males' pubertal timing is more predictive of sexual behaviors than females. A significant amount of literature has examined the relationship between hormones and sexual behaviors. Other research indicates that among adolescent males, hormones

have a strong effect on the initiation of sexual behavior; however, for females their coital behavior is primarily influenced by social factors, not hormones (Udry et al., 1986; Udry & Billy, 1987; Udry, 1988). Interpreting the effects of hormone levels versus pubertal timing can be examined in a couple ways. First, it would seem that if a male is more sexually advanced physically than other same-age males, it is likely that his hormone levels are also increasingly advanced, resulting in more advanced sexual activity. Second, it may be that the perceptions of one's physical maturity and the perceptions of others regarding one's physical maturity are related to a teen's sexual behaviors. Differentiating between hormone levels in relationship to sex drive versus physical maturity in terms of perceptions of self and others is complex, but can be viewed as important in understanding reasons for sexual activity among adolescents.

Communication quality significantly affected behaviors indirectly through values, more so for females than for males. This finding was extremely valuable in reinforcing the traditional view of parents as a primary source of influence on their teens. In examining the direct effect of communication on sexual behaviors, no significance was found, yet the indirect effect through values verified that parent/child communication, particularly if it is quality communication, is important in predicting teens' sexual behaviors. This finding was meaningful, in that the influence of parents on teens decreases primarily due to the increasing effect of peers on

teens. It is reassuring to find support for the influence that parents can have on their adolescents' sexual behaviors, indirectly by communication quality through values and intentions. The application of such a finding for programs promoting parent/child communication and internalization of sexually abstinent values is potentially useful.

Sexual values had a significant direct effect on sexual behaviors for females, although males' behaviors were more indirectly affected by values working primarily through sexual intentions. This is consistent with the research showing that adolescents have values and attitudes consistent with their sexual behaviors (Thornton & Camburn, 1987; Zabin et al., 1984; Udry et al., 1986). Sexual intentions for the next year significantly affected males' and females' sexual behaviors, although this effect was stronger for males than females. It would seem logical that intentions for sexual behavior would be significantly related to actual behavior, although why males' intentions are more predictive of their behaviors than females is not clear. It is interesting to note that females are influenced more by social controls (Udry et al., 1986), suggesting that females' intentions to behave in a specific way may be inconsistent with their actual behaviors based on a social situation.

In general, males and females differ in their paths from pubertal timing and age to sexual behaviors. Both males' and females' behaviors are affected by age. Females' sexual behaviors were most affected by sexual

values, whereas males' behaviors were influenced more by treatment effects, pubertal timing, and intentions.

Limitations of the Study

The limitations of this study are primarily related to the sample. Because of the geographical area in which the study took place, the sample was very homogenous. Over 95% of the sample was Caucasian, and almost 90% were Mormons. The Socioeconomic Status (SES) level of these families was also high. There was little variation in the dependent variable (sexual behaviors) especially in sexual intercourse experience. In January 1991 less than 2% of the sample reported sexual intercourse, in January 1992 less than 5% of the sample reported sexual intercourse, and in January 1993 less than 8% of the sample had had sexual intercourse. The religion and age of the teens within this sample contributed to the lack of variation in sexual intercourse behavior. Younger teens are not as likely to be sexually active as older teens (Sonenstein et al., 1989). The sample was also self-selected. Recruiting families to participate in a study about adolescent sexual behavior was a self-selective process, and because of these limitations, it is difficult to generalize these results to more diverse populations.

Limitation in measurement is often an area of concern when studying human beings. Devising any error-free measure in the social sciences is an

extremely difficult process. Although the alpha coefficients for each composite variable were fairly high (.80 to .97), there was still measurement error. Although these measures were carefully thought out and produced based on reliability measures and previous studies, there is still some error.

Conclusions

The findings of this study confirmed that both biological and social variables influence adolescent sexual behavior. Pubertal development in general can be complex to measure. Pubertal status, pubertal change over time, and pubertal timing were three means of measuring this phenomenon. Pubertal timing (one's development in comparison to other teens in the sample) was the most appropriate means for measuring pubertal development within this study. Quality of parent/child communication more accurately predicted sexual values than frequency of communication.

Based on the findings from this study, the strongest influencers on sexual behaviors are sexual values and intentions, although pubertal timing and age also have direct effects. Quality of parent/teen communication has an effect on behaviors indirectly through sexual values and intentions. Although males and females differ in their development both biologically and socially, the similarities regarding values and intentions are significant in understanding sexual behavior.

Traditionally, parents have been viewed as having the main influence on their children's behaviors (Newcomer & Udry, 1985). Researchers are now recognizing that there are many more influences on adolescent behavior which become increasingly important in the teen years, including social (peers, media), biological (hormones), and psychological (identity, self-esteem) variables. There is no simple answer in understanding why teens behave as they do; however, as antecedents of sexual behaviors are examined by researchers, a clearer understanding of these behaviors may be obtained.

The model which was tested in this study showed some interesting and valuable results. Pubertal timing and age affecting sexual behaviors were supportive of previous literature studying this issue. The role of quality of parent/child communication and sexually abstinent values and their direct and indirect relationships to sexual behaviors was exciting. Quality of parent/teen communication may not directly affect sexual behaviors, but as it works through sexual values and intentions it becomes significant. The large effect of sexual values on sexual intentions and sexual intentions on sexual behaviors was also logical, but important in understanding the process leading up to the behaviors themselves.

In addition to these conclusions, it was surprising that pubertal timing was not more strongly related to values and intentions, in that they were so highly related to sexual behaviors.

The purpose of understanding antecedents of teen sexual behaviors goes beyond an increase in knowledge. It is also a means by which programs can be developed, society can be informed, educators can teach, and teens can better understand means to reduce the risks associated with these risky behaviors.

In applying these findings in general, it would seem important to examine them in terms of program development, education, and future research. In program development, applying, for example, quality of parent/child communication to a program could be resourceful in helping parents to contribute to their childrens' value systems, especially in regards to sexual issues. Also, realizing the importance of sexual values may lead to more responsible sexual intentions and behaviors. In terms of education, parents are often unsure of their ability to communicate with their teens. Parent and teen education concerning communication should be considered. In regards to future research, it is important, if not imperative, not only to retest a study such as this on similar and diverse samples, but also to expand the research and use alternative models in understanding adolescent sexual behaviors.

Based on these findings and the above discussion, several recommendations can be made.

1. This model needs to be tested with a more diverse sample so that the generalizability of the findings can be answered (diverse SES levels, different races, various geographical locations, etc.).

2. Constructing a pubertal timing variable based on the norm of the population of adolescents in general would seem appropriate.

3. Examining additional constructs, such as peer relationships and individual motivations such as identity and self-esteem, could possibly add to our understanding of adolescent sexual behaviors.

4. Examining the similarities and differences associated with pubertal timing and hormone levels of adolescents could prove beneficial.

5. The relationship between quality of parent/child communication and sexually abstinent values needs to be examined in greater detail to better understand which has the greater effect on the other.

6. Finally, the application of these findings to programs and education makes this process worth the effort.

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Educational Background

- 1994 Ph.D. Family and Human Development,
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(Emphasis - Adolescence; family relationships)
- 1990 M.S. Family and Human Development, Utah State
University, Logan, UT.
(Emphasis - Family relationships; adolescence)
- 1988 B.S., Family and Human Development, Utah State
University, Logan, UT.
(Emphasis - Marriage and family relationships)
- 1986 Associate, Family Studies, Ricks College,
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Professional Experience

September 1991 - Present

.50 Research specialist and Home Visitor Supervisor to OAPP Pregnancy Prevention Program "FACTS & *feelings*: Families Talk About Sexuality." Directing and supervising 40 home visitors throughout Utah, working with over 500 families and their questions and concerns, reviewing and analyzing data, and preparation of manuscripts.

June 1990 - September 1991

.50 Research specialist; to OAPP Pregnancy Prevention Program "FACTS & *feelings*". Revising program questionnaires, training interviewers, interviewing, development of curricula materials, and reviewing and analyzing data.

September 1989 - September 1990

.25 Research Assistantship; to OAPP Pregnancy Prevention Program "FACTS & feelings". Collection and reviewing of several sex education programs, developing curriculum and script materials, auditioning, and developing educational video tapes and print materials.

September 1988 - May 1990

.25 Research Assistantship; Department of Family and Human Development. Participation in various research projects and teaching opportunities (for Dr. Brent C. Miller).

September 1988 - June 1989

Internship with Shelley Lindauer, director of Child Development Laboratories. Duties included participation in various research projects.

September 1987 - June 1988

Practicum; Sky View High School. Internship included experience in developing counseling skills and practicing these skills in counseling settings with adolescents with various school, peer and family problems.

Teaching Experience

January 1993 - March 1992

Instructor: FHD 150 - "Human Growth and Development". Developing course materials, lecturing, assigning and grading papers, and developing and grading exams.

January 1992 - March 1992

Co-Instructor: FHD 150 - "Human Growth and Development" - Two courses. Developing course materials and lecturing, assigning and grading papers, and developing and grading exams.

May 1990

Extension teaching workshop - "Adolescent Pregnancy Prevention." Teaching educators and administrators throughout the state concerning adolescent pregnancy and prevention programs.

March - June 1990

Instructor: FHD 120 - "Marriage and the American Family". Developing course materials, lecturing, assigning and grading papers, and developing and grading exams.

September - December 1989

.25 Assistantship; FHD 120 - "Marriage and the American Family".
Lecturing, developing and grading exams.

March - June 1989

.25 Assistantship; FHD 376 - "Contemporary Families in American Society".
Lecturing and grading exams.

(All of the courses listed above were offered in the Dept. of Family and Human Development, Utah State University).

Awards and Honors

- 1993 Utah State Graduate Summer Fellowship
- 1990 Family Life Don C. Carter Fellowship
- 1989 Named to the National Dean's List
- 1988 Named to the National Dean's List
- 1988 Family Life Moen Memorial Scholarship
- 1987 Family Life Stella Y. Griffiths Scholarship
- 1987 Phi Upsilon Omicron Honors Society Membership
- 1987 National Mortar Board Honors Society Membership
- 1986 Utah State University Academic Scholarship
- 1985 Ricks College Honors Society

Professional Memberships

- 1987 - Present National Council on Family Relations (NCFR)
- 1987 - Present Utah Council on Family Relations
- 1987 - Present Phi Omicron Upsilon
- 1987 - Present Mortar Board

Masters Thesis

Christopherson, Cynthia R. (1990). Mothers' preferences regarding sex education in the home. Dept. of Family & Human Development, Utah State University, Logan, UT 84322-2905.

Dissertation

Christopherson, Cynthia R. (1993). Adolescent pubertal development, parent/child communication, and teen sexual values as predictors of adolescent sexual intentions and sexually-related behaviors. Dept. of Family & Human Development, Utah State University, Logan, UT 84322-2905.

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Professional Papers and Conference Presentations:

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Current Research Interests:

Antecedents of Teenage Sexual Behavior
 Parent/Child Communication
 Marriage and Family Relationships
 Home-Based Sex Education
 Teenage Pregnancy Prevention

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