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Adolescent contraceptive problem-solving skills and contraceptive behavior: The relation of cognitive level, locus of control, self-esteem and peer influence

Saravalli, Susan K., Ph.D.
The Ohio State University, 1989

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ADOLESCENT CONTRACEPTIVE PROBLEM-SOLVING SKILLS
AND CONTRACEPTIVE BEHAVIOR:
THE RELATION OF COGNITIVE LEVEL, LOCUS OF CONTROL,
SELF-ESTEEM AND PEER INFLUENCE

DISSERTATION

Presented in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy
in the Graduate School of the Ohio State University
By
Susan K. Saravalli, B.S., M.S.

* * * * *

The Ohio State University
1989

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Dedicated to My Husband
I express sincere appreciation to Dr. Barbara Newman for her guidance and expertise throughout the research. Special thanks go to Dr. Rosemay Bolig and Dr. Gerald Winer for their valuable suggestions and comments. To the Springfield City School District, I offer thanks for their support and assistance. The technical assistance of Dr. Supapa Silva is greatly appreciated. To my parents and friends, I thank you for your support and understanding. To my husband, Tom, I offer sincere thanks for your unshakable faith in me and your willingness to endure with me the vicissitudes of my research.
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Introduction

While recent trends point to a growing percentage of adolescents at risk for pregnancy, pregnancy is a real and likely event when contraceptives are unused or misused. Despite the availability of highly effective contraceptive methods, many sexually active adolescents remain ineffective and inconsistent in their efforts to prevent pregnancy. Most adolescents are sexually active before they seek help in obtaining contraception. Younger adolescents delay the longest. Pregnancy risk is highest among adolescents just starting to have sex: half of all first pregnancies occur within six months of the initiation of sexual activity. When sex occurs on an unexpected or sporadic basis, adolescents are rarely prepared with contraception. Often the problems of obtaining and using contraception seem to many young people more immediate, and more overwhelming, than the problems of a possible pregnancy.

In this chapter, the significance of the problem of adolescent pregnancy will be examined. Contraceptive
problem-solving skills and contraceptive use will be explored. A problem statement will be made, research questions posed and definitions given.

Significance of the Problem

Research on adolescent contraceptive use has been limited to the last two decades; however, research on adolescent premarital sexual behavior and early pregnancy can be traced from the 17th century (circa 1650) to the present (Smith & Hindus, 1975; Vinvoskis, 1988).

Historically, premarital pregnancy rates have fluctuated between very low and high numbers; however, adolescent pregnancy and childbearing were not seen as important issues in American society (Vinvoskis, 1988). Early pregnancy and parenting were viewed as personal, private problems. This phenomenon was not seen as a major social issue or serious problem or handicap to individuals and thus interest in preventive measure was not as strong. In addition, preventive measures, e.g. contraceptive measures, were limited by religious doctrine and technological advances (Hayes, 1987; Vinvoskis, 1988). Women usually married if pregnant and early withdrawl from school was seen as only a minimal disadvantage (Vinvoskis, 1988). Before the 20th century, a young parent denied an education because of early pregnancy was not seen as "disadvantaged" intellectually or economically (Graff,
Education, in pre-industrial America, had little value beyond the ability to read and write (Graff, 1979) and probably brought few financial or status rewards before the late 19th century. Today, however, the exploration and experimentation with one's sexuality often carries high risks.

In the 20th century, adolescence has been viewed as a period where extensive changes occur in physiological and biochemical systems, and in social and emotional behavior (Blos, 1962; Hamburg, 1986), and in cognitive abilities (Inhelder & Piaget, 1958). During adolescence, individuals actively explore and compare conflicting roles and ideologies. The reality of the ambiguous and complex nature of adolescent, as well as adult roles are often moderated by easy access to potential life-threatening activities which make this period of time more difficult than ever before (Hamburg, 1989). The exploration and experimentation with problem activities and behaviors (e.g. alcohol, drugs, sexuality) that are manifested early often persist into later life (Committee on Adolescence, 1986; Hamburg, 1986).

Through the evolution of this transition period youth were, and still are, confronted with decisions concerning their sexuality. Around the age of 12 or 13 the adolescent becomes more aware of their sexual and
reproductive capacities. And, as adolescents progress through their teen years, they are confronted with tasks that are bound to their unfolding sexuality. The problems associated with early adolescent sexual activity, e.g., sexually transmitted diseases, early pregnancy and AIDS, have increased through the years (Graff, 1977; Hamburg, 1986). The statistical risk of adolescent pregnancy has increased as the result of socioeconomic and emotional deprivations (Committee on Adolescence, 1986).

In the United States, a rise has been reported in premarital pregnancies in the 20th century, especially since World War II (Smith and Hindus, 1975; Furstenburg, Lincoln, and Menken, 1988; Ventura, 1984; Subcommittee on Census and Population Hearing Report, 1985). The rate of teenage pregnancy in the United States—about 95 births per 1,000 females between 15 and 19—far exceeds the rate in other industrialized countries. For example, in Sweden the birth rate is 35; in the Netherlands, it's 14; in France, it's 43; in Canada, its 44; the United States is almost two and half times this rate—96 (Alan Guttmacher Institute, 1985). Reports indicate that four out of every ten teenage females in the United States, or nearly one million adolescent girls, become pregnant each year and 500,000 of them deliver (Alan Guttmacher Institute, 1976). In 1981, almost half of the pregnancies to teens 15-19
years old resulted in live births, 4 out of 10 ended in abortion, and 18% ended in miscarriages or still births (Subcommittee on Census and Population Hearing Report, 1985). Even more startling is the statistic that 40% of today's female teenagers will become pregnant (U.S. Congress, 1978). For women who are under age 15 when they first have sexual intercourse, 20% will become pregnant within the first six months. Even though more teens are using contraception, teens do not usually begin to use contraception until after they are sexually active (Subcommittee on Census and Population Hearing Report, 1985). Delameter and MacCorquodale (1979) report similar data.

Furthermore, although, birth rates are falling sharply for older women, the proportion of births that are to teens are rising (Jaffe, 1977; Keane, 1988; Ventura, 1984; Vital Statistics, 1985). The average age of menarche in the United States has decreased from 16 years 150 years ago to 12 1/2 years today which has affected the shift toward more births to younger teenagers (under the age of 14) and fewer to older teenagers (15 to 19 year olds), even as fertility rates stabilized during the last 25 years (Chilman, 1983; Furstenburg, Lincoln, Menken, 1988; Hamburg, 1986; Vinvoskis, 1988).
Since 1950, a large increase in the percentage of children born are to unmarried teenagers. Thirteen percent of all teenage births in 1950 occurred out-of-wedlock; by 1982, this figure had risen to 53%. Zelnick and Kantner (1980a) have reported that the proportion of all unmarried female teenagers who had experienced pregnancy from 1971 to 1979 increased from 9% to 16%. The number of babies born to unmarried teenage women rose from under 100,000 in 1960 to almost 200,000 in 1970 to 270,000 in 1982 (Subcommittee on Census and Population Hearing Report, 1985). And of these teenage parents, 95% keep their children and raise them in single parent homes in comparison to earlier generations of unwed adolescent parents who often married or surrendered their child for adoption (Committee on Adolescence, 1986).

The decades of the 1960's and 1970's saw an increase in adolescent pregnancy and it is now seen as a major public issue with personal, social, and financial ramifications (Committee on Adolescence, 1986; Furstenberg, 1976; Jaffe, 1977; Vinvoskis, 1988). Although pregnancy in adolescence is not considered an illness, research has shown that it does increase the physical and emotional health risks to the mother and child, as well as adverse social and economic consequences for youth in our modern society (Alan Guttmacher

"Every single index of pathology in society is related to being born to a too-young mother...whether child abuse, delinquency, alcoholism, or drug abuse (it) shows a positive correlation with being born to a teenage mother (Gordon, cited in Dickman, 1984, p.4)."

Significant amounts of money are spent by various agencies to support unwanted early pregnancies. The most recent statistics indicate that the public cost for the half million babies born to teenage girls was 6.4 billion dollars (Polit, 1986). This includes costs to be incurred over a 20 year period (1985-2005) for those teens giving birth in a single year (Polit, 1986). If these births could be delayed until the mother was twenty years old,
approximately 2.42 billion dollars could be saved (Polit, 1986). A more complete understanding of adolescent contraceptive problem-solving and contraceptive use could contribute to prevention and intervention efforts that could potentially save vast sums of money (Wilson, 1985).

In summary, demographics suggest that a large proportion of America’s youth who enter parenthood at an early age often do so facing considerable socioeconomic, emotional and physical disadvantages.

**Contraceptive Use**

In regards to contraceptive use there is an initial and important question to be addressed and, that is, what constitutes 'contraceptive use'. Research has shown that contraceptive use often occurs 6-12 months after the onset of sexual intercourse; and that, it is frequently inconsistent and sporadic (Chilman, 1979; DeLameter & MacCorquodale, 1979; Jorgensen & Sonstegard, 1984; Smith, 1984; Sonnenstein, 1987; Zelnik & Kantner, 1977). Furthermore, more adolescents are relying on less effective forms of birth control, such as, withdrawal and the condom; and, fewer are using the most reliable medical methods (Jaffe, 1976; Zelnik and Kantner, 1980). Differing definitions of contraceptive use have also been used. Pregnancy, as an index of compliance, can result from method failure, inconsistent use, or complete lack of
adherence (Herold, 1981).

The study of contraceptive use is a multidetermined issue and has been examined from several perspectives. Research has concentrated on factors that predict consistent contraceptive use and on designing interventions that enhance adherence. Research has revealed several important issues affecting contraceptive use including: 1) cultural issues, e.g. societal or cultural norms and education (Kantner & Zelnick, 1972); 2) medical issues, e.g. fear and difficulty in access or use (Beck & Davies, 1987; McKenry et al., 1979; Miller, 1976; Rains, 1971; Zelnik & Kantner, 1973); 3) relationship issues, e.g. infrequency of intercourse, seriousness of heterosexual relationship, parental and peer influence (Furstenberg, 1971; Kirkendall, 1961; Reiss et al., 1975; Sachs, 1978; Sebald, 1986; Settlage et al., 1973; Thompson & Spanier, 1978; Venham, 1972); dating experience (Hornick et al., 1979; Sachs, 1978), frequency of intercourse (Delamator & MacCorquodale, 1979; Kantner & Zelnik, 1973; Sachs, 1978; Thompson & Spanier, 1978), age at first intercourse (Delamator & MacCorquodale, 1979); and 4) cognitive and psychosocial issues, e.g. doubt that pregnancy can occur, problem-solving behaviors, expectations, self-esteem, locus of control (Kantner & Zelnick, 1972; Flaherty, Marecek, Olsen & Wilcove, 1983; Sachs, 1985).
Cultural Issues

Adolescent norms or attitudes towards contraceptive use are often a reflection of cultural expectations or more specifically to community and neighborhood standards of tolerance and acceptability (Chilman, 1983; Gruber & Chambers, 1987; Harai, 1979; Hayes, 1988; Jones & Philliber, 1988). Differences in pregnancy rates and contraceptive use among socio-economic and ethnic groups in the United States versus other developed countries may be significantly linked to cultural norms concerning sexuality and contraceptive use (Hayes, 1987).

Despite declining fertility rates since 1970, rates of adolescent pregnancy, abortion and childbearing are higher in the United States than in a majority of other developed countries with comparable levels of early sexual activity (Hayes, 1987, Vinvoskis, 1988). The Alan Guttmacher Institute study (1985) of pregnancy, abortion and birth rates in developed countries showed that the rate of pregnancy per year in the United States was 96 per 1,000 15-19 year olds, compared to 14 in the Netherlands, 35 in Sweden, 43 in France, 44 in Canada, and 45 in England and Wales. Especially dramatic are the pregnancy rates for adolescents under the age of 15. The rate in the United States is 5 births per 1,000 which is four times greater than Canada (one birth per 1,000), the only
other country with as many births to adolescents under the age of 15 (Hayes, 1987; Subcommittee on Census and Population Hearing Report, 1985). According to The Alan Guttmacher Institute (1985), the level of sexual activity in all these countries is about the same, and the rate of abortion is often higher in the United States. This shows that United States teens are less likely to use contraception.

A lack of openness about sex, restricted access to birth control, and an unequitable distribution of income in the United States, in comparison to other developed countries who also report high teenage birth rates, have been reported as factors which contribute to the high pregnancy rate in the United States (Subcommittee on Census and Population Hearing Report; Zelnik & Kim, 1982). Countries with the lowest teenage pregnancy rate have liberal attitudes toward sex, conservative attitudes towards responsibility, accessible contraceptive services and the most effective programs for sex education include Canada, England, France, Sweden and the Netherlands. (Alan Guttmacher Institute, 1985; Hayes, 1987). The governments of Canada, England, France, Sweden and the Netherlands do not discourage free access to sexuality information, contraceptives and decision-making education in the schools or in the media (Alan Guttmacher Institute,
Confidentiality is another important issue. Teenagers are more able to obtain contraception, at low cost, and without parental consent in these countries (Alan Guttmacher Institute, 1985). There is a higher consensus of the role of the government in these countries. Helping teenagers who are sexually active avoid pregnancy and childbearing through providing services to them is seen as the responsibility of the government.

Although contraceptive use is up, pregnancy rates have failed to decrease appreciably. Access to reliable contraception is an important reason why American teens fail to use contraception. Adolescents often do not know where to locate reliable contraceptives without fear of reprisals or believe that contraceptives are too expensive. Consequently, less reliable contraceptive methods such as withdrawal and condoms, are used when more reliable methods, e.g. the pill, are unavailable or unaccessible to them (Goldsmith, Gabrielson & Gabrielson, 1972; Shah, Zelnik & Kantner, 1977; Subcommittee on Census and Population Hearing Report, 1985; Zelnick & Kantner, 1980).
Another part of the cultural barrier to adolescent contraceptive use is the effect of adults' widespread ambivalence towards sex in our society, especially for adolescents. American teens, in comparison to teens in other developed countries, constantly receive conflicting messages concerning sexual behavior and related responsibility. The media portrays sex as romantic and exciting; however, nice girls say no (Elkind, 1986; Pestrak & Martin, 1985). Few opportunities exist for open discussion which provide accurate and timely information. In the United States, it is not a societal or cultural norm to openly consider sexual intercourse or contraceptive use during the teen years (Chilman, 1983). In addition, consistent and responsible decisions are not often made by 15-18 year olds much less by 14 year olds. Research has shown that 14 year olds are different from 18 year olds in their social and cognitive domains. Their legal and mobility status are also different. The ability of an 18 year old to set life goals and appraise opportunities and options and assess risks is different than for 14 years olds (Hayes, 1987).

Conservative, negative, diverse and often ambiguous cultural norms in the United States regarding sexual knowledge, physiology and contraceptive use as well as inaccurate knowledge of anatomy during the teen years have
presented adolescents with a situation in which they must make decisions concerning the use or non-use of contraceptives that either brings their beliefs in line with social norms or does not (Vinvoskis, 1988). Whether consciously or unconsciously, actively or passively, American adolescents consider choices concerning sexual behavior and, in most cases, must make the contraceptive decision without the benefit of either guidance or education (Hayes, 1987).

Presented with covert and overt societal norms adolescents often suffer from negative emotions which, in turn, interfere with learning and retention. Consequently, actions often lead to avoidance of contraception (Byrne, 1983). Choices made reflect different degrees of rational thinking and conscious decision-making. Thus, the use of contraceptives is not only complex in itself but is significantly influenced by circumstance and available options and thus, multidetermined. Diversity and ambiguity in cultural attitudes and expectations make decision-making a relevant concept in contraceptive compliance in the United States (Hayes, 1987).

**Education**

Researchers and practitioners working in the areas of family planning and teenage childbearing have often proposed that unwanted pregnancies are the result of the
lack of adequate sexual education, as well as the existence of economic, moral and legal barriers that interfere with the acquisition of knowledge and the use of contraception (McCormick et al., 1981; Reichelt, 1979). Research has found that adolescents with more sexual knowledge initiate coitus at a later age (Fisher, 1983). However, even though education and availability are unquestionably important factors, teens still risk pregnancy without contraception even when appropriate and accurate sexual and contraceptive knowledge has been provided (Byrne, 1977; Cvetovich, Grote, Bjorseth & Sarkissian, 1975; Landry, Bertrand, Cherry & Rice, 1986; Maskay & Juhasz, 1983; Oskamp & Mendick, 1983). It has also been documented that contraceptive use is low even for those who frequently engage in sexual intercourse and do receive information (Byrne, 1979; Furstenberg, Lincoln & Menken, 1988). At Indiana University, a study examined bright, well-educated, late adolescents and young adults who were exposed to contraceptive education and who had easy access to contraception (Byrne, 1977). Of the 61% of the students who reported current engagement in sexual intercourse, less than one-third of these sexually active individuals reported using contraceptives regularly (Byrne, 1977). Over two-thirds of those examined, reported using birth control irregularly which is not
unlike the data reported from populations that are less intelligent, less cognitively advanced, less well-educated and are younger in age for whom contraceptive information is lacking or difficult to obtain (Byrne, 1977; Keller, Sims, Henry & Crawford, 1970). It must be noted that this is a university that houses the internationally known Kinsey Institute for Sex Research, that provides birth control as part of its student health program and that has an active contraceptive service (Byrne, 1977).

**Medical Issues**

Medical issues have also been suggested as factors that influence contraceptive use. Delameter and MacCorqoudale, (1979) Thompson and Spanier (1978) and Furstenberg, Lincoln, and Menken (1988) also report a decrease in the use of reliable methods, as well as a decrease in the use of contraceptives. Fear and difficulty in using many contraceptive measures have also shown to be barriers to contraceptive use (Jorgensen & Sonstegard, 1984; Kornfield, 1985; Zelnik, Kantner & Ford, 1981). Perceived high-risk measures both financially and personally, e.g., as the pill and I.U.D., and methods that are awkward to use and involve planning, e.g. gels and suppositories, are not used. And, since it is hard to get males to use condoms, they have also been unsuccessful in reducing the pregnancy rate (Black & Deblassie, 1985).
Other medically related factors that have shown a relationship to contraceptive use include: reduced pleasure related to condom use (Jorgensen & Sonstegard, 1984; Zelnik, Kantner & Ford, 1981); time and contraceptive counseling (Marcy, 1983).

Relationship Issues

Relationship issues provide further insight into adolescent contraceptive use. Consistent contraceptive use is also influenced by the fact that young unmarried adolescents engage in sex intermittently (DeLameter & MacCorquodale, 1979; Herold & McNamee, 1982; Hornick, Doran & Crawford, 1979; McCormick, Izzo & Folcik, 1985; Zelnik & Kantner, 1980b). Researchers report that fewer than three out of ten adolescent females report intercourse as occurring as many as three times a month. Consequently, contraceptive use is not a priority in many adolescent's minds.

Parental support, control, communication and lack of motivation to comply with parental wishes are several such factors (Fox & Inazu, 1980; Furstenberg, Hercog-Brown, Shea & Webb, 1984; Hogan, Astone & Kitagawa, 1985; Jessor & Jessor, 1974; Miller, McCoy, Olson, Wallace, 1986; Newcomer & Udry, 1984, 1985; Noller & Bagi, 1985; Olson & Worobey, 1984; Shah & Zelnik, 1981). Parental discipline and control attempts might be antecedent and influential
in the development of sexual attitudes and behaviors of adolescents. Thomson (1982) and Green (1985) conclude that adolescents perceiving restrictive, absolute parental attitudes and rules are less likely to use contraceptives but not postpone sexual intercourse. Furthermore, parents who are perceived as permissive with fewer rules, or strict with many rules are directly related to initiation of sexual intercourse without effective contraceptive use (Miller et al, 1982; Miller, McCoy, Olson & Wallace, 1986; Shelley, 1981). Supportive maternal behavior is more influential than maternal informative discussions in female postponement of sexual intercourse and in the use of effective contraceptives (Hepburn, 1983; Nathanson & Becker, 1986; Newcomer & Udry, 1985). Research by Thorton and Camburn (1986) and Brown and Newcomer (1984) support this finding. Most interesting is a consistent finding that the mother-daughter relationship is vital to postponement of sexual activity and more responsible contraceptive use. Alternatively, a distant frigid, emotionally cold mother-daughter relationship restricts information and, thus, contraceptive use decreases.

Evidence also exists that adolescents are influenced by peers' contraceptive use (Herold & Goodwin, 1981; Hornick, Doran & Crawford, 1979; Nathanson & Becker, 1986; Newcomer, Udry & Cameron, 1983; Sachs, Billingham &
Howard, 1987; Shah & Zelnik, 1981). In a study of undergraduate students, Sachs, Billingham and Howard (1987) found that males and females who used contraceptives had more friends who also used birth control, knew their partners for a longer period of time and had coitus frequently. As in many studies of contraceptive use, (e.g. Delameter & MacCorquodale, 1979) these results can not be generalized to the adolescent population aged 15-18 because the sample was selected from a non-married college group. Replication is required on younger aged adolescent samples.

Problem-solving Skills and Psychosocial Issues

Research has shown that contraception is often avoided among those teens who 1) do not wish to conceive, 2) who can expect to suffer numerous negative consequences should pregnancy occur and 3) who have the knowledge and access to contraception. A cognitive link has been suggested by researchers when adolescents experience difficulty with contraceptive decision-making (Cvetkovitch & Grote, 1975; Emens, 1983; Flaherty, Walsh, Olsen & Wilcove, 1985; Jorgensen, 1981; Pestrak & Martin, 1985; Sachs, 1985; Siddique & Darcy, 1984). Inhelder and Piaget (1958) have indicated that during adolescence advanced cognitive skills, e.g. formal operations, allows for the understanding of cause and effect, the ability to
formulate hypotheses, to think about the past and present, and predict the future (Erikson, 1968). Piaget's theory of cognitive development (Inhelder & Piaget, 1958) would suggest, then, that adolescents should possess the cognitive tools necessary to enact appropriate pregnancy prevention decisions each and every time the dilemma is presented, clearly, statistics cited earlier have shown otherwise.

Predicting future events, e.g. long-term effects of unprotected intercourse, is an important point especially since a rise in under age 14 pregnancies while a decrease in the number of pregnancies in the 15-18 year age group has been reported (Furstenberg, Menken & Lincoln, 1988; Hayes, 1987; Vinvoskis, 1988). The 14 and under age group may still primarily utilize concrete thinking skills. Adolescents under the age of 14, according to Piaget's theory, may not yet be able to exhibit advanced cognitive operations such as futuristic thinking and reasoning skills when planning the use of contraceptives. The fact that women over the age of 25 have fewer unintended pregnancies than adolescents suggests that developmental variables may impact on contraceptive use (Jorgensen & Sonstegard, 1984; McCormick, Izzo & Folick, 1985; Urberg, 1982). Research efforts have revealed important findings in how psychosocial variables, e.g., self-esteem,
locus-of-control, predict actual contraceptive use. However, research needs to investigate how these variables may also relate to critical behaviors that precede and may facilitate planned use of contraceptives. Research is just beginning to apply a cognitive developmental framework to understanding and predicting adolescent contraceptive use (Beck & Davies, 1987; Urberg, 1982). Adolescents, especially those who possess contraceptive knowledge, may be prevented from utilizing such information due to certain cognitive, psychosocial or environmental influences.

Adolescents are aware of their emerging reproductive and sexual capacity but often suffer in a simultaneous lack of awareness of their cognitive, social and emotional capacities. Consequently, perceived susceptibility and severity of pregnancy risk are often underrated (Herold, 1983). Retention of important information and risk-taking behavior is often a result of this cognitive inability (Marcy, 1983; Miller, 1981). Consequently, these developmental lags provide more opportunity for at-risk behavior for early pregnancy and childbearing in adolescence (Urberg, 1982).

Practitioners and researchers often assume that adolescents are cognitively ready to accept their sexuality to the degree that allows for the premediated
activity of contraceptive problem-solving and contraceptive use (Maskay & Juhasz, 1983; Pestrak & Martin, 1985; Urberg, 1982). Decisions concerning the use of contraceptives is an active process which involves attitudes towards the goal of contraception, the manipulation and application of knowledge (short and long term), learning about birth control, analyzing and evaluating contraceptive methods, anticipating intercourse, the acknowledgment of the risks/consequences of sexual intercourse, and the acquisition and use of contraception (Byrne, 1983; Maskay & Juhasz, 1983; Sachs, 1985; Subcommittee on Census and Population Hearing Report, 1985; Urberg, 1982). Adolescents may not possess or are not always motivated to undertake these cognitive skills.

Research indicates that cognitive abilities and the necessary self-esteem and internal control required to enact contraceptive problem-solving skills is inhibited by the degree or amount of life stress or anxiety, self-esteem and locus of control the individual is experiencing (Urberg, 1982).

The level of cognitive development, generally the ability to process and use information and specifically, the ability to choose between alternatives, consider advantages and disadvantages, and predict consequences,
when making sexual decisions, has been suggested as a contributor to contraceptive use or non-use (Fisher & Williams, 1983; Flaherty, Walsh, Olson & Wilcove, 1985; Fontana, 1984; Janis, 1982; McCubbin & Figley, 1983; Marcy, 1983; Maskay, 1983; Pestrak & Martin, 1985; Sachs, 1985; Siddique & Darcy, 1984; Steinlauf, 1979). In fact, interventions designed to improve problem-solving skills (defined as: planning steps to reach a goal, generating alternatives and consequences) have shown to be effective in modifying sexual attitudes and behaviors (Schnike, 1984).

Thus, the logical relationship between these cognitive dimensions and contraceptive problem-solving is very strong. A positive relationship between cognitive growth, according to Inhelder and Piaget (1958), and contraceptive problem-solving could be argued. And, logically, one would predict substantial positive correlations between cognitive development and contraceptive problem-solving behaviors.

**Problem Statement**

A virtually unaddressed, yet critical, question in all studies of sexually active adolescents is whether or not contraceptives are appropriately and consistently used. The increase or lack of decrease in births to teenagers may well be attributed to change in
contraceptive practice. Studies have found that even when female adolescents are knowledgeable about contraceptive methods, they still fail to use them effectively (Landry, Bertrand, Cherry & Rice, 1986). Consequently, researchers have begun to identify issues or problems affecting consistent contraceptive use.

The primary purpose of this study is to clarify the contribution of cognitive level to the way adolescents make decisions concerning birth control use. The relationships to be examined are threefold: 1) to determine the relationships between cognitive level and contraceptive problem-solving skills and consistent contraceptive behavior, 2) examine the contribution of locus-of-control and self-esteem to contraceptive problem-solving skills and consistent contraceptive behavior, and 3) to determine the relative contributions of consistent peer sexual and contraceptive behavior on birth control consistency behavior.

Systematic research exploring the impact of this combination of variables would add to our knowledge of this phenomenon, stimulate greater empirical study and help others to understand unwanted early pregnancy in our society. Additionally, closer examination of the variables contributing to the problem of teenage pregnancy would point practitioners and parents toward efforts that
must be begun and, in some cases, continued that focus on preventive strategies (e.g., counseling, problem-solving education) for the total adolescent population, especially those at high risk. Then, perhaps clues will be found that will help to lower the nation's adolescent pregnancy rates, as well as develop programs to help teenage mothers, fathers and their children live healthier and fuller lives.

Definitions of Terms

**Cognitive Level** - Logical reasoning skills, including:
- multiplicative compensations, correlations,
- probability, combinations, proportions, forms of conservation beyond direct verification, mechanical equilibrium and coordination of two or more systems of reference.

**Contraceptive Problem-Solving Skills** - the cognitive process by which adolescents reach a solution concerning contraceptive use or non-use, used alternatively with contraceptive decision-making. Contraceptive problem-solving skills include:
1) Ability to plan steps to reach a goal,
2) Ability to generate alternative solutions to a problem; and,
3) Ability to anticipate consequences of an action.
Self-Esteem - emotional confidence and stability in liking and respecting oneself

Locus of Control - powerlessness, meaninglessness

Life Stress - life events that affect emotional stability and anxiety level

Peer Influence Consistency Score - number of friends who are sexually active and consistently use contraception

Summary

Although teenage birth rates are stabilizing, more children are being born to adolescents under the age of 14 and more teens are choosing to raise their children in single parent homes instead of surrendering them for adoption. Early childbearing often curtails education and thus decreases vocational options, which in turn, limits financial and social resources available to this population over their lifetime. This often results in dependence on the already scarce financial, medical and social resources in our society.

Many difficulties arise when trying to determine consistency and regularity in adolescent sexual behavior especially in relation to problem-solving skills and contraceptive behavior. Many have presented explanations such as, inadequate or lack of sexuality education, existence of moral, social, economic and legal barriers,
as well as certain psychosocial characteristics. However, researchers have also shown that these explanations must go beyond that of education and availability. Although research efforts have revealed important findings, much research continues to focus on how a particular variable predicts actual contraceptive use without investigating how these variables may also relate to critical cognitive behaviors that precede and may facilitate planned use of contraceptives. The relationship of contraceptive problem-solving skills and consistent contraceptive behavior in adolescence has only recently faced any systematic research. Factors that have not been sufficiently examined in non-clinic and non-urban samples are the precise links between cognitive level and contraceptive problem-solving skills and consistent contraceptive behavior, as well as the influence of locus-of-control, self-esteem and consistent peer sexual and contraceptive behavior. Locus-of-control, self-esteem and peer influence may enhance or inhibit contraceptive problem-solving skills and consistent contraceptive behavior. The paucity of research utilizing this combination of variables in a multivariate design suggests the desirability of such a study.
CHAPTER II
REVIEW OF RELATED LITERATURE

Introduction

An ever-expanding body of literature suggests that adolescent contraceptive problem-solving skills and consistent contraceptive use may be contingent upon cognitive level. The relationship between locus-of-control and self-esteem and contraceptive problem-solving and contraceptive use have also received attention in the literature. While locus-of-control and self-esteem have been studied extensively in relation to adolescent pregnancy, as well as the influence of peer attitudes, a paucity of research exists that examines the relative influence of consistent peer sexual and contraceptive behavior on contraceptive problem-solving skills and consistent contraceptive behavior (Hayes, 1987).

The purpose of this chapter is to review the theoretical basis for contraceptive problem-solving skills as well as the research which has examined contraceptive problem-solving skills in adolescence. The relationship of cognitive level on contraceptive problem-solving skills and consistent contraceptive behavior will also be
examined. The literature pertaining to the influence of locus-of-control and self-esteem on contraceptive problem-solving skills and consistent contraceptive behavior will be reviewed. Studies focusing on the influence of peer sexual and contraceptive behavior will be examined. Finally, limitations in the literature are examined.

Theoretical Perspectives

Lack of insight into adolescent contraceptive behavior may be the result of an inadequate framework from which to investigate the problem. A theoretical basis is needed to explicate the connections between the psychosocial and cognitive variables and contraceptive problem-solving skills and consistent contraceptive behavior. Adolescent contraceptive problem-solving behavior can result in either use or non-use with contraception which, in turn, affects childbearing rates (Durant, Jay, Linder, Shoffelt & Lett, 1984). Choices concerning contraceptive behavior reflect varying degrees of rational thinking and conscious decision-making are the result of the stage of cognitive and psychosocial development, emotional states, as well as social, economic and cultural circumstances.
The growth of cognitive skills are an integral part of Piaget's stage of formal operations (Ginsburg & Opper, 1979). Piaget (Inhelder & Piaget, 1958) proposed an invariant sequence of four stages of cognitive development which progress in hierarchical fashion with the higher stages subsuming the lower stages forming a universal "structured whole". Piaget (1946) initially focused on the organization of thought processes of infants and children and only late in his career systematically added formal operations in adolescence. Advanced cognitive processes, formal operations, subsume the abilities of the earlier three stages (sensorimotor, preoperational and concrete operations) including associativity and reversibility, classification and relations so that by early adolescence thought processes are very complex and flexible (Burt, 1983; Ginsberg & Opper, 1979; Inhelder & Piaget, 1958; Kaufman & Flaitz, 1987).

During formal operations, individuals gain the ability to reason abstractly, propose hypotheses, use propositional thinking and combinatorial processes (Inhelder & Piaget, 1958; Neimark, 1975). The center of formal operational structure reveals two general cognitive skills: ability to subordinate the real to the possible and the ability to reflect upon one's own thoughts which are key developments at this stage. Underlying these
cognitive structures lie the mental tools necessary to exhibit the following behaviors: 1) construction and manipulation of combinatorials, 2) isolation of variables, 3) reasoning abstractly in the absence of concrete data, and 4) the ability to generate hypotheses.

Propositional logic and hypothetico-deductive thinking are the theoretical foundations for these mental manipulations. Combinatorial (16 binary transformations) and abstract reasoning characterize propositional thinking (Inhelder & Piaget, 1958). Combinatorial ability is viewed as an index of flexible thinking (Inhelder & Piaget, 1958). Furthermore, the development of a combinatorial system allows for better formulation of generalizations and more inclusive laws, which result in systematic proof for assertions. Hypothetical thinking allows the adolescent to reason on the basis of verbally stated hypothesis and logical deduction (Inhelder & Piaget, 1958). This skill frees an individual from reliance on the actual and the concrete.

Possibility is also a major confrontation at this stage. During concrete operations, the child views possibility as an extension of the real (Piaget, 1973). The advent of formal operations produces a reversal in direction of thinking between possibility and reality. Reality is now second to possibility. The adolescent can
now proceed from what is possible to what is empirically real. During this stage, adolescents will insert hypothetical links which, on first instance, they assume are real and in the totality of those which they think are possible. Adolescents are now capable of forming theories about everything. They can 'think about thinking'. The ability to control events through their minds allows for the logical deduction of possibilities and consequences. However, the world of the adolescent is not always rationally ordered; therefore, adolescents still fail to differentiate between many perspectives.

Thus, the individual no longer needs to reason by manipulating concrete objects but can imagine hypothetical circumstances and anticipate possible outcomes given those circumstances (Ginsburg & Opper, 1979). Consequently, propositional logic allows an individual to see all possible alternatives and consequences and work them out systematically. At the same time adolescents advance in their ability to perceive the past, present and future. This expanded time frame allows them to plan steps to reach a goal, generate alternatives and long term consequences of an action. There are several advantages to this new level of thinking: 1) the adolescent can think about their own thinking and other's thoughts, 2) recognize possibilities, as well as actualities, 3) build
theories, and 4) reflect and analyze on one's thoughts (Blasi & Hoeffel, 1974; Cvetovich, Grote, Bjorseth & Sarkissian, 1975).

In summary, attainment of formal operations sometime in the mid to late teen years, allows the adolescent to analyze complex multivariate problems such as contraception in a systematic way (Cvetkovich, Grote, Bjorseth & Sarkissian, 1975; Blasi & Hoeffel, 1974). However, self-reflection, abstract thinking and expanded time frame do not guarantee insight or mature judgement. These advances only mean that adolescents have the basic foundations necessary for the development of these capacities. Motivation and the right kind of practical and interpersonal experiences may also be required (Ginsburg & Opper, 1979).

**Problem-solving Skills and Contraceptive Use**

A cognitive link has been suggested by researchers when adolescents experience difficulty with contraceptive decision-making Cvetkovich & Grote, 1975; Emens, 1983; Flaherty, Walsh, Olson & Wilcove, 1985; Jorgensen, 1981; Pestrak & Martin, 1985; Sachs, 1985; Siddique & Darcy, 1984). Research has also suggested that contraceptive knowledge, although important, can not be adequately utilized without the proper advanced in cognitive development to use that information. Inhelder and Piaget
(1958) have indicated that during adolescence advanced cognitive skills, e.g. formal operations, allows for the understanding of cause and effect, the ability to formulate hypotheses, to think about the past, and present and to predict the future (Erikson, 1968). Piaget's theory of cognitive development would suggest, then, that adolescents should possess the cognitive tools necessary to enact appropriate pregnancy prevention decisions each and every time the dilemma is presented, clearly, statistics cited earlier have shown otherwise (Inhelder & Piaget, 1958). According to researchers, the contraceptive problem-solving process involves several important cognitive mechanisms or skills. The problem-solving process includes these cognitive behaviors: 1) becoming sensitive and/or conscious of the problem, 2) thinking hypothetically, e.g. identifying the difficulty, the deficiencies or missing elements, 3) identifying, analyzing and evaluating the alternative possibilities, e.g. ability to move from the concrete to the possible, 4) reasoning abstractly, synthesizing and applying information, e.g. seek out or retrieve information from memory (or other sources) and combine information into acceptable solutions or actions, 5) anticipate future events and forecast logical consequences, e.g. unknown factors, unpredictability of future events, or other
uncertain issues, of each action to one's behavior, 6) test solution, e.g. discuss hypothetical problem and solution with those involved and 7) follow through with solution (Flahery & Olsen, 1985; Juhasz & Schnieder, 1980; Pitz & Sachs, 1984; Smith, 1981; Urberg, 1982; Wolf & Jaisen, 1981). The application of these cognitive skills to the contraceptive problem-solving (CPS) process is quite clear and crucial (Gruber & Chambers, 1987).

However, adolescents may not be as advanced in their formal reasoning skills as Piaget would suggest in order to consistently trace the consequences of an action, and use abstract thinking or probabilistic thinking in order to predict the consequences of their sexual and contraceptive behaviors, e.g. children, diseases. The individual, in this case the adolescent, must: 1) be aware of the problem, e.g. understanding the relationship between intercourse, ovulation and pregnancy, more specifically, an understanding of the synchronization of the reproductive system in the male and the female, and the affect of unprotected coitus, 2) recognize the problem of early childbearing and/or disease for himself or herself, the family, the child and the community, 3) identify, analyze and evaluate contraceptive options and this includes acquisition of information, 4) synthesis of information, e.g. selection and combination of
contraceptive information into an acceptable solution, 5) anticipate the future and identify the logical consequences to an action for self and others involved, e.g. will the contraceptive method chosen work? How do I get and use it? What will I do if pregnancy occurs? Several of these cognitive skills can be problematic for the adolescent in contraceptive problem-solving especially in the ability to hypothesize intercourse or pregnancy, to anticipate and evaluate or logically reason about options and think about future consequences. These are skills that are addressed by Inhelder and Piaget (1985) in their discussion of advanced cognitive processes as in formal operations. The cognitive skills that develop during adolescence are crucial to successful contraceptive practice because birth control methods require at least a minimal ability to plan for, acquire and utilize them at the appropriate time. Researchers have also supported the conclusion that adolescents are deficient in their ability to anticipate and hypothesize about future events that are connected to present events. Adolescents often fail to anticipate the need for contraception, as well as the consequences of unprotected coitus (Fisher, 1983; Maskay & Juhasz, 1983).

In conclusion, according to Inhelder and Piaget (1958) advanced cognitive operations, e.g. formal operations,
implies the developing ability to conceptualize a set of hypotheses to be confirmed or disconfirmed through logical analysis. The transition from concrete to abstract formal operations reflects how the adolescent perceives and evaluates a situation. Therefore the extension of Piaget's theory (1958) to contraceptive problem-solving use is logical. The concept of a cognitive component to contraceptive problem-solving implies the isolation of variables or factors, analysis and evaluation and synthesis of contraceptive information to options or future events, as well as the ability to reflect on a hypothetical situation.

Spivack and Levine (1963) identified interpersonal problem-solving skills necessary to cope with problems involving other people. They outlined three necessary components of problem-solving skills: ability to engage in means-ends thinking ability, to anticipate consequences and ability to generate alternative solutions to a problem. They state that these generic problem-solving skills, applicable to any interpersonal situation, are learned and deficits in these skills contribute to various forms of behavioral disturbance (Spivack and Levine, 1963). Other investigators have shown that impulsive adolescents were poorer at conceptualizing the means to achieve interpersonal goals and at anticipating
consequences of an action than were normal adolescents
(Altman, Platt & Altman, 1973). Other research has
supported a relationship between problem-solving skills
and various indices of coping with interpersonal problems
in adults (Platt & Spivack, 1972a, 1972b, 1973, 1974) and
in children (Spivack, Platt & Shure, 1976; Spivack &
Shure, 1974; Shure & Spivack, 1978). It is important to
note that:

"These skills are conceptualized as generic thinking processes. An individual's ability to cope with interpersonal problem situations is believed to be similar across diverse situations, e.g. negotiating contraceptive use, or a fight with a sister or brother, or any other problems. Neither the content of the assessment instruments ....are specific to a behavioral domain (in which a person has experienced difficulty). Instead the content is selected for its characteristics of best illustrating the problem-solving process (Flaherty, Marecek, Olsen, Wilcove, 1983, pp 52-53.)."

Therefore, contraceptive problem-solving may be dependent upon certain psychological and behavioral antecedents consciously incorporated into the thought patterns of the adolescent (Juhasz & Schneider, 1980). In contraceptive
problem-solving, the adolescent must conceptualize all possible contraceptive methods and their advantages and disadvantages related to their use.

In conclusion, cognitive development, specifically formal operational thought, may be a prerequisite for the formation of contraceptive problem-solving behavior and consistent contraceptive behavior. In applying this cognitive theory to contraceptive problem-solving, the adolescent must master specific cognitive skills such as: identifying, evaluating and synthesizing variables, e.g. contraceptive methods, and the behavioral outcomes of contraceptive use or non-use (Juhasz & Schneider, 1980). Furthermore, the adolescent must be capable of such skills as hypothetical thinking, abstract reasoning and futuristic/anticipatory thinking before he/she can speculate on the possible outcomes of sexual intercourse and rationally consider contraceptive compliance.

In summary, many have presented explanations for the inadequate use or misuse of contraceptives including: inadequate or lack of sexuality education, existence of moral, social, economic or legal barriers. However, explanations must go beyond that of education and availability. The influence of cognitive level on the critical behaviors, problem-solving skills, that precede contraceptive use may provide important considerations.
The area of contraceptive problem-solving, which is demonstrated by planning steps to reach a goal, generating consequences to an action, has only recently faced any systematic research. This study hopes to contribute to the collection of knowledge on adolescent contraceptive problem-solving skills and contraceptive use already available for theory building.

Responses of Adolescents to Contraceptive Problem-solving Skills and Contraceptive Behavior

Researchers claim adolescents lack the critical skills of self-analysis, futuristic thinking and the ability to operationalize means/end thinking. And, although, a cognitive link has been proposed between CPS and contraceptive use, few have actually measured this with adolescents aged 12-18 years. This cognitive link has been conceptualized, as well as operationalized differently in studies. Cognitive skills have been operationalized as: assertion skills, egocentric thought processes, attitudes and attributions toward contraceptive use, as well as means-ends thinking.

Hynes and Bruch (1985) examined social skills and contraceptive effectiveness of colleged-aged participants role-play responses in contraceptive problem situations. The sample consisted of 87 undergraduate and graduate students who were all active daters. They found that,
when knowledge of birth control was controlled, positive self-expression skills were positively related to effectiveness for both sexes in initiating topics about contraception topics with partners (Hynes & Bruch, 1985). Support for a small positive relationship between social skill variables (defined as rights assertion and expression of positive feelings) and effectiveness of verbal responses in contraceptive problem situations (Hynes & Bruch, 1985).

In a review of the psychology of adolescents' use of contraceptives, Cvetovich, Grote, Bjorseth and Sarkissian (1975) suggest that adolescents are being required to make a decision about contraceptive use and are perhaps unprepared for such analytical thinking about themselves. These researchers stress the cognitive/emotional development of adolescence, specifically that of the egocentric nature of intuitive adolescent thought, in their conceptualization of this cognitive link and that this should be examined in studies.

The cognitive/emotional relationship has been explored, however, it was conceptualized and assessed as attitudes and attributions toward contraception. Gerrard, McCann and Fortini (1983) examined 43 nullaparous sexually active colleged-aged middle class women at a large midwestern state university. The subjects were assessed
on their attitudes about contraception and their attributions for their previous success at avoiding pregnancy and a test of contraceptive knowledge. Each subject participated in an intensive interview which assessed when and where the subject received contraceptive information and how and when she made her decisions regarding contraceptive use. They were also asked about any factors that contributed to the contraceptive decision-making process. The researchers concluded that cognitive variables, e.g. attributes and beliefs, do differentiate effective and ineffective contraceptors (Gerrard, McCann & Fortini, 1983). The results of the ANOVA's revealed that there were significant differences between effective and ineffective contraceptors on negative attitudes toward contraception. The ineffective contraceptors reported more negative attitudes than did effective contraceptors. Analysis of attribution ratings revealed that ineffective contraceptors were more likely to attribute their success at avoiding pregnancy to a low probability of conception. In addition, it was found that effective contraceptors rated positive attitudes as more influential in their decision-making process than did ineffective contraceptors. Ineffective contraceptors were also more likely to attribute their success at avoiding pregnancy to the idea that "it can't happen to me"
(Gerrard, McCann & Fortini, 1983). Although the authors of this work state that their work was exploratory and they do not conceptualize the cognitive skills the same as I propose, this work does lend support to the cognitive model of contraceptive risk-taking behavior.

Juhasz and Sonnenshein-Schneider (1980), Maskay and Juhasz (1983), Pestrak and Martin (1985) and Green (1985) propose a link between the cognitive skills of analytic competence and the ability to evaluate, select, and combine various aspects or actions into acceptable decisions for behavior and contraceptive decision-making. These researchers argue that adolescents must be capable of formal operational thought and that, according to Inhelder and Piaget (1958), it is a prerequisite for the formation of hypothetical thought patterns, which is necessary before the adolescent can hope to speculate on the possible results of engaging in various sexual behavior. There exists a need for adolescents to master decision-making skills in all areas of life especially in one of the the most demanding and difficult personal decisions, that of one's sexual behavior (McCleary-Juhasz & Kavanaugh, 1978). Recently, research has begun to examine the cognitive skills necessary for these kinds of thought processes.
Stienlauf (1979) examined the relationships between contraceptive effectiveness and cognitive problem-solving skills. Contraceptive effectiveness, defined as the number of unplanned pregnancies, was significantly and negatively related to means-ends problem-solving ability. The number of unplanned pregnancies was negatively related to the number of means generated on Platt and Spivack's (1975) Means-Ends Problem-solving (MEPS) test. The results also support a positive relationship between contraceptive effectiveness and locus of control. The number of unplanned pregnancies were positively related to an external orientation of control and negatively related to an internal orientation of control.

A more comprehensive examination of problem-solving skills was examined by Flaherty, Marecek, Olsen and Wilcove (1983). They examined the relationship between three generic interpersonal problem-solving skills and contraceptive use. Using interviews with 283 black teenage girls in Philadelphia, the researchers assessed the teens ability to 1) plan the steps to reach a goal, 2) ability to generate alternative solutions to a problem, and 3) anticipate the consequences of an action. Scores on the three problem-solving indices for virgins, contraceptive users, non-contraceptive users and pregnant girls were compared. Results showed that girls who act to
prevent pregnancy and virgins have higher means-end problem-solving scores. Girls who did not use contraceptives were intermediate and not significantly different from the other groups. On the alternative solutions test contraceptive users had significantly higher scores than pregnant girls; virgins and girls who did not use contraceptives were intermediate and not significantly different from each other and from the other two groups. Scores on the consequences test did not vary significantly among the four groups. The researchers also found that girls with higher levels of interpersonal problem-solving skills would employ more specific thinking about two issues which mediate decisions about contraceptive use: problems posed by using specific contraceptive methods and reasons underlying their choice of best method (Flaherty, Marecek, Olsen & Wilcove, 1983).

The scores of the non-users were not significantly different from those of either the pregnant girls or the contraceptors and virgins on either the MEPS or Alternative Solution Test. The authors suggest that this may be a result of the heterogeneity of the group of non-users (Flaherty, Marecek, Olsen and Wilcove, 1983). This group encompasses girls that have a long history of unprotected intercourse, as well as those who have only recently become sexually active. They further conclude
that the absence of a clear difference in problem-solving skills may be a function of diversity within the group of current non-users. The problem of heterogeneity may also exist for the group of virgins. The older virgins may have practiced abstinence more deliberately in order to avoid pregnancy, whereas, the younger virgins may have no sexual interests or, as yet, no reason for engaging in sex. Thus, advanced problem-solving skills may only be reflected in the older virgin group. Flaherty et al. (1982) supports this conclusion. A reason was also provided for the lack of a relationship between the ability to anticipate consequences of sexual or contraceptive use. The index of consequential thinking was adapted from a measure used with younger children which may fail to measure these skills adequately in adolescents. These researchers, as well as Urberg (1982) suggest that each step in the problem-solving process is necessary but not in itself sufficient to result in effective contraceptive use.

Sachs (1985) operationalized problem-solving skills similar to Flaherty, Marecek, Olsen and Wilcove (1983) but used them as the dependent variable. Sachs suggested that the cognitive development of adolescents makes contraceptive decision-making difficult. She, subsequently, examined how cognitive development affected
contraceptive decision-making among 86 14-19 year old urban Black female adolescents attending family planning clinics in Detroit. Data was collected from interviews and questionnaires. Contraceptive and non-contraceptive decision-making abilities were measured with two cognitive tasks. Subjects were first asked to identify all possible alternatives to resolve two non-contraceptive and two contraceptive situations. Subjects were then given two contraceptive and two non-contraceptive situations with prescribed ending. Subjects were asked to develop the means to reach the prescribed ends (means/end task). Sachs (1985) found that stage of cognitive development is positively correlated and the best single predictor of decision-making skills in both the non-contraceptive and contraceptive situations using hierarchical regression techniques. Correlations between knowledge and decision-making abilities were moderate, with relevent knowledge making a significant contribution to explaining decision-making variance in contraceptive situations (Sachs, 1985). Partial correlations deomonstrated that relevant knowledge, without the cognitive skills to manipulate the knowledge, is insufficient to explain much variance in contraceptive problem-solving abilities. The intervening variables (self-esteem and locus of control) were not as strongly related to the criterion variables as had been
anticipated. Sachs (1985) suggested several reasons for this finding: motivation, emotional factors (subjects were seeking contraceptives from a family planning clinic), fatigue, anxiety and testing environment (social desirability of responses). She further suggests that the adolescents may have responded with the option (solutions) that were the only ones acceptable to them, or previously successful solutions, or that working class minorities have difficulty in future orientations, which suggests concrete thinking, and thus have more difficulty in generating hypothetical responses (Sachs, 1985). Sachs (1985) concludes that adolescents are often unable to manipulate and apply knowledge, unwilling to provide responses which require more cognitive effort and that anxiety levels of adolescents awaiting medical care may inhibit clear cognition and may need help in utilizing information that they possess.

Although the cognitive link between problem-solving skills and contraceptive use has been conceptualized differently in the past, a new thrust has been aimed at examining cognitive skills as defined as means-end, alternative and consequential thinking as necessary components of contraceptive problem-solving behavior. The problems cited in these studies highlight the need for a study that assesses the relations between cognitive level
and contraceptive problem-solving skills and consistent contraceptive behavior with a non-clinic, more heterogenous sample in regards to race, gender, social class.

**Life Stress and Cognitive Functioning.** Research identifying the conditions under which adolescents are most likely to make sound choices is limited. Even when adolescents know how to make decisions, they often fail to choose constructive behaviors (Elkind, 1984). The ability to process information and make effective decisions may be dependent upon possessing a problem-solving or decision-making process, as well as the support from significant others. The degree and magnitude of life stress, the adolescent is experiencing has an influence upon the cognitive abilities required for effective decision-making. The premise by many is that life stress imposes limitations on the cognitive capabilities required to process information (Golberger, 1982; Janis, 1982; McCubbin, 1983; McCubbin et al., 1985; Peterson & Spiga, 1982). Many studies have emerged without the benefit of theoretical guidance. Stress or anxiety can result in the impairment of skills or performance either by highlighting drive tension or by creating interference or distractions (Janis, 1982; Lazarus & Folkman, 1987). Stress is seen as a salient source of interference in cognitive activity,
however, one must recognize that coping ability and individual differences can make a big difference in the adaptational outcome (Lazarus & Folkman, 1987; Mandler, 1982).

Researchers have indirectly cited stress as a factor in contraceptive problem-solving and consistent contraceptive behavior. Maskay (1983) and Herold (1985) conclude that adolescents often make sexual decisions under times of stress and many times without accurate information and effective decision-making skills. Maskay states,

"...a teenager who is somewhat anxious and ambivalent about sex will also be uneasy in acquiring and using contraception; while, an emotionally more at ease attitude regarding sex should be more relaxed about obtaining and using birth control (Maskay, 1983, p. 208)".

It is possible to conclude, that under severe times of social, emotional or psychological stress an individual's cognitive abilities that produce effective decision-making are diminished (Goldberger, 1982; Mandler, 1972). Processing information occurs best at intermediate levels of stress (Janis, 1982; McCubbin, 1983). Errors in decision-making can be made that result in actions that have uncertain with, perhaps, undesired consequences (Janis, 1982).
Contraceptive Problem-solving Skills and Behavior in Response to Life Stress. The relationship of stress to psychosocial and cognitive adjustment has been well documented in scientific literature (Forman, Eidson & Hagan, 1983; Goldberger, 1982). However, few reports involved adolescents and contraceptive problem-solving skills. Contraceptive problem-solving by adolescents under stress only has received modest attention by researchers.

Kornfield (1985) found that emotional states and social definitions of self, as well as social networks and particular circumstances determined the decision to engage in sexual intercourse without contraception.

Marcy (1983) theorized that erroneous beliefs, lack of information and the nature of the developmental stage in adolescence affects contraceptive use. He explored methods of counseling females in the use of contraceptives. A developmental model which includes aspects of verbalizing, ego strength, personal competence, maturity, responsibility and ability to make decisions influenced contraceptive use. This model seemed to lessen the adolescents level of stress and anxiety thus, allowing time to enact an effective decision-making model.

In their clinic and control group population, DeAmicis, Klorman, Hess and McAnarney (1984) reported no
differences in contraceptive use in response to recent stress inducing events, as defined by a serious illness, death or severance of a close relationship—all which have previously shown a positive relationship to early pregnancy (Chilman, 1983; Coddington, 1979). This could be due to the fact that the interviews were conducted by caucasian females and the population was black. Perhaps the level of stress was not reported due to racial differences. Often there exists an unwritten rule within ethnic groups that personal problems are not the concern of persons outside ones ethnic group. This has been referred to as 'mutual aid' (Sena-Riveria, 1982; Stack, 1982).

Coddington (1979) examined social and cultural events that occurred in the lives of pregnant adolescents as compared to a non-pregnant control group of adolescents. This retrospective study of 121 pregnant and 261 controls revealed that the pregnant group reported the death of a parent, separation of their parents, the death of a grandparent and the illness of a parent significantly more than the control group (Coddington, 1979). However, the results may be misleading in interpretation since the pregnant and control groups were not matched in reference to race and social class variables. The pregnant group was predominately black and of low SES and the control
group was predominately white and drawn from higher SES groups.

Although adolescent contraceptive problem-solving under stress has received sparse attention by researchers some conclusions can be drawn. Researchers have concluded that stress diminishes cognitive functioning; however, the relationship between life stress, contraceptive problem-solving skills and consistent contraceptive use is inconclusive. Therefore, it was deemed necessary to control for life stress in this study.

**Psychosocial Moderators of Contraceptive Problem-Solving Skills**

It is proposed that logical development and decision-making abilities are necessary but insufficient conditions for consistent pregnancy prevention decisions. Without the necessary internal locus of control and self-esteem to make personal decisions, adolescents will not be effective and consistent decision-makers. Locus of control and self-esteem may have a mediating effect upon cognitive abilities and resultant pregnancy prevention decisions. These variables may alternately have a facilitating or constraining effect on contraceptive problem-solving.

**Locus of Control**

The extent to which an individual perceives contiguity relationships between specific actions and their
outcomes is widely referred to as 'locus of control' (Rotter, 1966). Individuals can be classified as either 'internal or external'. Those who believe they have control over their destinies are called 'internals'; that is, they believe that at least some control over their life resides within themselves. In comparison, 'externals' believe that their life or outcomes are determined by agents or factors extrinsic to themselves, for example by fate, luck, chance, powerful others or the unpredictable (Rotter, 1954, 1966).

Research points to the conclusion that people are handicapped by an external locus of control orientation (Rotter, 1966). Furthermore, internals engage in more instrumental, goal directed activities, whereas externals more often manifest emotional, non-goal directed responses (Robinson & Shaver, 1973; Rotter, 1966). The literature on adolescent sexual activity and contraceptive use support the conclusion that locus of control serves as a moderator variable in explaining behavior or behavior change (Alan Guttmacher Institute, 1981; Lipsitz, 1980; Lundy, 1972, MacDonald, 1970; Maskay & Juhasz, 1983; Urberg, 1982), as well as literature on adult couples (Keller, Sims, Henry & Crawford, 1970).

Stienlauf (1979) studied women, aged 15-25 (mean age = 20) on locus of control and contraceptive
problem solving. Subjects in this study were measured on their means-end problem-solving ability (MEPS) (Platt & Spivak, 1975), locus of control and anxiety level. The correlational data support the hypothesized relationship between contraceptive effectiveness and locus of control. The number of unplanned pregnancies was positively related to an external orientation of control and negatively related to an internal orientation of control. The results offer support for the relationship between contraception and problem-solving ability. There is a strong positive relationship between contraceptive use and the number of 'means' generated on the MEPS. The author suggests that a meaningful approach to the study of contraceptive use would be to focus on means-end thinking in contraceptive problem-solving. In that means-end thinking in CPS is the same skill as in many other day to day problems and decisions which an adolescent has to face.

Means-end thinking in CPS has rarely been examined developmentally in adolescence. It is a cognitive skill, and since, most other cognitive skills show growth during the adolescent years; it is probable that older adolescents are better at it than younger adolescents (Urberg, 1982). However, the magnitude of the relationship between internal locus of control and
contraceptive use has been low (Harvey, 1976), This is not surprising since an internal locus of control is seen only as one of several necessary but not sufficient conditions for effective contraceptive use (Urberg, 1982).

MacDonald (1970) found that the use of contraception may be correlated with the belief that one is able to control one's destiny. MacDonald (1970) measured locus of control in 508 undergraduate students at a mid-west university. Only females (212) were selected for study. The data suggests that premarital coitus was not related to locus of control; however, unmarried subjects differed in the practice of birth control. Internals (62%) practiced birth control; whereas, externals (37%) did not practice birth control. Birth control practices were reported by 87% of the internals and 63% of the externals. Feelings of social rejection (alienation) and external locus of control was also found to be positively related to adolescent pregnancy by Meyerowitz and Malev (1975).

Lieberman (1981) investigated the relationship between subjects locus of control and their birth control knowledge, attitudes and practices. The subjects were 104 sexually active, single undergraduate college students in Pennsylvania. The questionnaire consisted of four parts: Rotter's I-E scale and tests of contraceptive knowledge, attitudes and behavior. Lieberman (1981) found a small
statistically significant correlation between locus of control and birth control knowledge. The relationship between locus of control and attitudes and practices were not significantly related. For those with high birth control knowledge, there was a significant correlation found with locus of control and contraceptive effectiveness or with locus of control and contraceptive consistency. The researcher states that truthfulness in responses may have biased the results. The college sample was drawn from a Catholic population of more than 50%, and the subjects religious preference may have been an influencing factor in the truthfulness of responses concerning contraceptive practices. In addition, the author states problems in using Rotter's I-E scale with college-aged samples. College students may already have achieved higher levels of internality or have developed defensive external tendencies which manifest themselves in responses similar to internals.

Bauman and Udry (1972) examined the degree of powerlessness and regularity of contraception in a sample of urban Negro men. Bauman and Udry (1972) found that 88% of the men low in powerlessness (e.g. felt some power over environment) practiced contraception every time intercourse was initiated, compared to 10 percent of the men high in powerlessness. Limitations of this study
include: a Black male urban population and a completion rate of only two-thirds. The sample was weighted to counteract the sampling selection process, to make the sample representative of the population on the middle class and mobile variables. This weighting procedure has an influence on the variance estimates used in the tests of significance. Thus, limiting generalizations to other populations.

Furthermore, it is proposed that sex differentials may exist in the ability to control decisions in contraceptive problem-solving behavior. Linde and Connole (1985) measured sex differences in three components of decision control in a series of studies utilizing 4, 9 and 14 year olds. The components included: actual decision control behavior, the cognitive understanding of the masculine or feminine nature of decision control and the self perception of decision control skills. The results indicate that at the behavioral level boys control more decisions than girls. At the same time, girls at all age levels were less likely to perceive themselves as decision controllers as compared to their male counterparts. This research offers support to the view that females often see themselves as incompetent in the area of decision control. The researchers conclude that females often develop an impaired view of their ability to make
decisions. This impairment may create a self-fulfilling cycle in which female adolescents relinquish control over their decisions which reinforces their negative self-perceptions (Linde & Connole, 1985). This is extremely important since the ability to exercise personal power or control is necessary in contraceptive problem-solving skills and consistent contraceptive use.

Consequently, the research on adolescent sexual activity, contraceptive use and locus of control indicates that effective contraceptors, as measured by fewer unplanned pregnancies, believe that some control over their lives, specifically their sexual lives, resides within themselves.

Self-esteem

Self-esteem is often defined as an emotional confidence and stability in the liking and respecting oneself (Robinson & Shaver, 1973; Coopersmith, 1967). However, research on self-esteem is often plagued with difficulties. Despite the popularity of the construct, no standard theoretical or operational definition exists (Robinson & Shaver, 1973). Often self-esteem and self-concept are used interchangeably. In addition self-esteem is often conceptually, as well as empirically related to self-acceptance (Robinson & Shaver, 1973). Self-acceptance is often viewed as a necessary but not
sufficient basis for high self-esteem and considering the fact that self-esteem is a part of and highly correlated with self-concept ambiquity in the literature exists.

Another problem exists in the fact that during adolescence, instability in self-esteem occurs as the individual continually redefines and accepts abilities. During the transition to adolescence, there is a reorganization of self-esteem. The period between 11 or 13 to age 16 undergoes a period of differentiation, expansion and acceptance of strengths and weakness with much fluctuation from day to day. An attempt has been made to explain this by the increase in cognitive capacity to conceptualize one's impact on others (vice versa) as well as, the ability to internalize social attitudes as a basis for evaluating worth. The self-acceptance of a "good person" often breaks down when comparing self to others (Gesell, Ilg & Ames, 1953); Ellis & Davis, 1982; Stevens, 1975).

The adolescents' ability to accept themselves as a person of worth varies according to the person or situation confronting them. In addition, self-esteem is a part of learning what qualities to be proud of and which are less admirable and this varies from person to person and situation.

Knowledge of a person's perception of himself/herself
and his environment provides a means of understanding and of predicting his/her behavior (Wylie, 1961). As reported elsewhere, American teens often receive ambiguous messages regarding what to admire in relation to one's sexuality. Consequently, self-esteem appears to be an unstable trait during this period. The emotional swings represented in the measure of self-esteem, as defined by self acceptance, interferes with the acceptance of one's sexuality, the first step in CPS. The expansion, reorganization, and crystalization of self-concept and self-esteem during adolescence can explain why there is an inconsistency in the empirical literature on the relationship between self-esteem and contraceptive problem-solving skills (Ellis & Davis, 1983).

In the literature on adolescent sexual activity, self esteem is often the most widely used construct. However, self-esteem has rarely been correlated with contraceptive problem-solving skills (Maskay & Juhasz, 1983). Research suggests that low self-esteem and high social criticism are factors associated with non-marital intercourse among female adolescents (Chilman, 1980; Maskay & Juhasz, 1983; Urberg, 1982). Results from a survey of sexually active middle class males suggests that males who are sexually active also have a lower self-esteem (Offer & Offer, 1974).
Personality characteristics of pregnant adolescents were also found by Zongler (1977). Compared to a control group, adolescent mothers showed lower self-esteem, greater feelings of inadequacy, unworthiness and dissatisfaction with family relationships and body image. Furthermore, Zonkers' study (1979) revealed that the pregnant adolescents had pervasive feelings of being bad, dissatisfaction with their own behavior, intense doubts about their identity, nominal feelings of self-worth, deficient of adequate coping behaviors, high degree of instability and conflict and overwhelmed by feelings of low self-esteem. The pregnant subjects exhibited an inability to consistently view themselves from both positive and negative perspectives but tended to emphasize the negative perspective at the expense of the latter, in comparison with the control group (non-pregnant teens) who revealed a normal balance of self descriptions. However, the discrepancy in self-esteem may be a result of the pregnancy not the cause. Also, one may not be able to interpret and generalize this data, because of the failure to control for socioeconomic status or ethnic group. Miller et al. (1981) supports these findings in a sample of pregnant and formerly pregnant and non-pregnant high school girls in Utah.
Patten (1981) examined unwed mothers' perceptions of themselves (self-concept) and their perceptions of how they are viewed by others (self-esteem). Data was collected from 37 subjects in a residence for unmarried and married adolescents (aged 13-14 years) in Tennessee and compared to norms of the general population. The Tennessee Self Concept scale and Rosenberg Self Esteem scale were used to assess self-concept and self-esteem, respectively. Patten (1981) findings support the conclusion that pregnant adolescents have diminished self-concepts and self-esteem. However, since this has a crossectional design not longitudinal, we do not know if the diminished views were an occurrence of the state of being pregnant or whether this was a psychological trait before pregnancy.

Sachs (1985) (discussed elsewhere) has been one of the only studies to examine the relationship between self-esteem and contraceptive problem-solving skills. She found no significant relationship between self-esteem and problem-solving skills. However, her data was confounded by other factors, e.g. motivation, anxiety and the testing environment. Thus, a study is needed that examines the stress factor, as well as self-esteem in a non-clinic sample.
Although an adolescent's ability to accept themselves as person of worth varies according to each adolescent and situation, and that self-esteem has rarely been examined in relation with contraceptive problem-solving behavior, some conclusions can be drawn. Research has shown that non-marital pregnancy in female adolescents and sexual activity in male adolescents increases as their self-esteem decreases (e.g. feelings of being bad, nominal feelings of self-worth). Whereas, non-pregnant adolescents exhibit an ability to consistently view themselves from a positive perspective.

**Peer Influence**

While mass media and popular culture are credited with shaping adolescents values and behavior, there is considerable evidence that social relationships have significant influence on adolescents' attitudes and behavior in general, and sexuality in particular. Peers have a greater impact on social and sexual relationships and parents seem to influence such issues as: socioeconomic status, college, careers and money (Sebald, 1986; Shah & Selnick, 1981). Adolescents' peers seem to influence greater sexual permissiveness, more causal use of contraceptives and larger numbers of sexual partners with a resulting increase in per-marital pregnancies (Christopher & Chambers, 1987). The use of contraception
by teenagers' peers is associated with regular and effective birth control use in young women (Jorgensen, King & Torrey, 1980). This suggests that behavior follows the exchange of information.

Other literature has suggested that peers have more influence on the decision to become sexually active; whereas, parental behavioral norms influence the use of contraception at last intercourse (Baker, Thalberg & Morrison, 1988; Jessor & Jessor, 1974; Nathanson & Becker, 1986). A recent study examined the influence of parental factors on adolescent sexual behavior and contraceptive use. Parental behavioral norms that reflect a more liberal approving attitude are more sexually active and more likely to use contraception (Baker, Thalberg & Morrison, 1988). This supports earlier data by Nathanson and Becker (1986). Contrary findings exist as to whether adolescents shift their orientations from parents to peers depending on the issue(s) being addressed. Previous research has indicated the different issues activate different reference groups: financial, educational and career concerns are parent oriented, whereas social activities are peer-oriented (Sebald, 1986). While other research indicates that parents do influence adolescents contraceptive use but this influence reflects alternative support strategies (Nathanson & Becker, 1986). Those
adolescents who involve parents do not involve peers and vice versa. Nathanson & Becker also indicate that parental involvement is most likely to be reported by Black girls and is least likely among White girls with relatively well educated mothers. Peer influence, as measured by adolescents' perception of peer sexual and contraceptive behavior, will be examined in this study since literature has strongly indicated that peers influence behavior.

Limitations in the Study of Contraceptive Problem-solving

Several methodological issues arise in reviewing these studies. These studies are valuable in providing knowledge about adolescent sexual activity, contraceptive use and problem-solving skills, however, they run into considerable difficulties when generalizing data to other groups. The lack of a theoretical base, study designs and demographic features are the most important issues.

The literature reveals a paucity of well-developed comprehensive theoretical models that explain contraceptive compliance (Strahle, 1983). Much of the previous research on contraceptive risk-taking has been either atheoretical or primarily descriptive in nature (Alan Guttmacher Institute, 1981; Fox & Lazo, 1980; Kantner & Zelnik, 1972, 1973; Sorensen, 1973; Vener & Stewart, 1974; Zelnik & Kantner, 1977; 1978; 1980) or only vaguely connected to a number of loosely constructed
theoretical orientations, which have not undergone much empirical examination, in psychology and sociology (Chilman, 1980; DeLamator, 1983; Maskay & Juhasz, 1983; Pestrak & Martin, 1985; Urberg, 1982). Although, with the number of variables associated with adolescent sexual activity and contraceptive use it has been rather difficult to develop a cumulative and comprehensive body of knowledge extending from only one theoretical base.

Research designs are often the cause of limitations. Retrospective survey research leaves room for recall error and memory lapse (Coddington, 1979; Fox & Inazu, 1980; Inazu & Fox, 1980; Jimerson & Burns, 1984; Miller et al, 1982). Additionally, due to the sensitive nature of the topic under investigation, much research must be in the form of 'self-report' (e.g. past sexual activity, contraceptive use, seriousness of relationship, attitudes). However, this can lead to socially desirable response biases. Also, assessment of contraceptive use is not often measured as adherence over time, but as a one time occurrence.

Some of these studies are only correlational bivariate designs. Only associations between adolescent personality and cognitive characteristics and sexual activity and
contraceptive use can be supported not cause and effect relationships. However, of course, some types of experimental designs in this area are unethical.

Only recently have multivariate analyses (Herold & McNamee, 1982; Sachs, 1985) been employed in the study of adolescent sexual activity. In the early years of research in this area, studies were often descriptive (Alan Guttmacher Institute, 1971, 1985; Chilman, 1979; Furstenberg, Lincoln, Menken, 1982; Miller et al., 1982; Shah, Zelnik & Kantner, 1975; Zelnik & Kantner, 1977, 1980) or less sophisticated bivariate analyses were employed (Jorgensen & Sonstegard, 1984; The interaction among variables have been ignored. Often the main effects were reported, while ignoring or obscuring the potential interaction between factors.

The demographics of samples examined present other methodological concerns. For example, considerable diversity exists, especially in the early literature of the 1960's and 1970's in both the populations studied and subjects selected for research participation. Some concerns can be attributed to the definition of the adolescent time period. The adolescent time period has been described as being between the ages 13-18 and 15-19 or as well as between 19-25. In addition, the private often sensitive nature of the target issues (sexual
activity and contraceptive use) with adolescents requires parental consent. Consequently, subjects were often selected from college-aged populations in the past (Byrne, 1977; Burt & Coughey, 1980; Christopher & Cate, 1984; DeAmicis, Klorman, Hess, McAnarney, 1982; DeLamator & MacCorquodale, 1979; Gerrard, McCann & Fortini, 1983; Herold & Goodwin, 1981; Herold & McNamee, 1982; Hynes & Bruch, 1985; Jorgensen & Sonstegard, 1984; Lieberman, 1981; McCormick, Izzo & Polick, 1985; Sachs, Billingham & Howard, 1987; Thompson & Spanier, 1978). Findings from college-aged populations reduce generalizability to younger adolescents because they often are at different developmental levels of social, cognitive and emotional development. Younger aged adolescents 12-18 may have more heterogeneity in social, cognitive and emotional personality variables and tend to be less stable behaviorally (Blos, 1967; Erikson, 1968; Inhelder & Piaget, 1958). Since most studies have concentrated on older, urban adolescents or adults (Keller, Sims, Henry & Crawford, 1970), we lack information on younger, more rural populations. University populations may not be an adequate reflection of all young high school aged (14-18) adolescents. A synchronization of all developmental variables is often the standard for older adolescents.
The interpretation and generalization of existing studies are hampered by sampling problems. Clinic samples (e.g. family planning and psychiatric clinics) have been common targets for research in this area, but, they also pose limitations in generalizing the findings. These groups have often been utilized as subjects due to ease of accessibility and parental consent is not required only the subjects consent. These samples often lend themselves to potential biases in responses because these populations may exhibit certain psychosocial or developmental characteristics after deciding to initiate coitus not before; or, the characteristics may be to do to psychopathology (Chilman, 1980; Coddington, 1979; De Amicis, Klorman, Hess & McArmaney, 1982; Flaherty, Marecek, Olsen & Wilcove, 1983; Miller, 1982; Minidick, 1977; Patten, 1981; Sachs, 1985; Steinlauf, 1979).

Additionally some studies have reported data from all subjects regardless of gender and some from only females (Alan Guttmacher Institute, 1981; Bell & Coughey, 1980 Coddington, 1979; Flaherty, Marecek, Olsen & Wilcove, 1983; Furstenberg, Herceg-Brown, Shea & Webb, 1984; Gerrard, McCann, & Fortini, 1983; Inazu & Fox, 1980; Jorgensen & Sonstegard, 1984; Marcey, 1983; Newcomer & Udry, 1984, 1985; Olsen & Worobey, 1984; Sachs, 1985; Shah & Zelnik, 1981; Shah, Zelnik & Kantner, 1975; Steinlauf,
1979; Zelnick & Kantner, 1977, 1980; Zonker, 1970) and much less often from just males (Bauman & Udry, 1972; Finkel & Finkel, 1983; Hendricks, 1980; Redmond, 1985; Offer & Offer, 1974). However, no study was found that examined the relationship of the cognitive and psychosocial variables with contraceptive problem-solving in males.

Urban, low SES, and racially homogenous (predominately Black or White) samples are also commonly used since they present the greatest risk for early pregnancy and parenting (Coddington, 1979; Flaherty, Mareck, Olsen & Wilcove, 1983; Sachs, 1985; Zonker, 1977). Authors have highlighted these difficulties and have pointed to the need to collect and report data from both males as well as females with more ethnic and social class representation.

Also, few studies specify relevant, yet confounding, features of the samples, such as, family income, past sexual intercourse experience, contraceptive use or seriousness of present and past relationships with sexually active and sexually non-active adolescents (Christopher & Cate, 1984; Cvetovich, Grote, Bjorseth & Sarkissian, 1975; DeLamater & MacCorquodale, 1979). These
variables have been found to account for variance in sexual activity and contraceptive use; and may contribute to variance in contraceptive problem-solving skills.

While there exists an exhaustive list of independent variables (Alan Guttmacher Institute, 1979, 1981, 1985; Chilman, 1980, 1983; Furstenbery, Lincoln & Menken, 1981; Millr et al., 1983; Zelnik & Kantner, 1983) little is known about how the variables are related to the contraceptive problem-solving skills. What is needed are additional studies that examine the interaction of the psychosocial and cognitive variables and adolescent CPS in more heterogeneous, in regards to race, gender, religious preference and family income, and non-clinic early adolescent samples. The literature provides support for such a study.

Summary and Conclusions

Several conclusions can be drawn from the literature on contraceptive problem-solving skills and cognitive level, locus of control, self-esteem and peer influence.

First, according to Coblinder at al. (1975) and Sachs (1985), effective self-regulation of contraceptive use is possible when adolescents have reached the level of cognitive ability that allows for abstract reasoning and hypothetical thinking, which is a part of Piaget's cognitive developmental theory. Although, cognitive
problem-solving skills have been conceptualized differently and research is sparse, the cognitive skills that are proposed for examination in this study include: 1) ability to plan steps to reach a goal (means-end thinking), 2) generating alternatives to an action and 3) generating consequences to an action. Individuals who are able to generate many solutions to a problem are more successful in finding solutions to contraceptive problems (Flaherty, Marecek, Olsen & Wilcove, 1983; Rogel & Peterson, 1979; Sachs, 1985; Steinlauf, 1979). In addition, contraceptive users are better at generating alternative solutions to a problem than pregnant girls, virgins and non-contraceptive users (Flaherty, Marecek, Olsen & Wilcove, 1983). Relevant knowledge also makes a significant contribution to explaining decision-making variance in contraceptive situations. In addition, relevant knowledge without the cognitive skills to manipulate the knowledge is insufficient to explain much variance in contraceptive problem-solving ability. Researchers also conclude that each of the three steps in the problem-solving process, listed above, is necessary but not in itself sufficient to result in effective contraceptive use.

Conclusions can be drawn concerning stress and cognitive functioning. Under severe times of stress an
individual's cognitive abilities that produce effective decision-making are diminished. Few studies report on life stress and contraceptive problem-solving skills. However, a few studies present ambiguous support for a relationship between life stress and pregnancy. Some researchers believe, though, that severe emotional states or life stress events diminish cognitive abilities related to decision-making. Research has demonstrated that programs that reduce stress and build decision-making skills have a positive effect on contraceptive use. Marcey (1983) implemented a program in a family planning clinic that reduced stress and trained adolescent girls in the use of a decision-making process. These adolescents became more effective contraceptors.

Further conclusions can be drawn concerning locus-of-control and decision-making abilities. The literature supports the conclusion that locus-of-control serves as a moderator in explaining behavior (Rotter, 1967; Urberg, 1982). In reference to unplanned pregnancies, Steinlauf (1979) found that unplanned pregnancies increased when individual's showed evidence of an external orientation. However, the magnitude of the relationship between internal locus-of-control and contraceptive use has been low. It must be remembered, though, that locus-of-control
is seen as only one of several necessary but not sufficient conditions for effective contraceptive use (Urberg, 1982).

Self-esteem can be an unstable trait during adolescence, it has rarely been examined in relation to contraceptive problem-solving skills. Research has also found that a low self-esteem or diminished self-concept has been found to be significantly related to non-marital intercourse, being an adolescent mother and unwed adolescent motherhood. Other research, however, has concluded that self-esteem was not related to problem-solving skills (Sachs, 1985). Sachs' results, though, may have been confounded by motivation, anxiety or test environment (clinic situation). Yet, literature does reveal the importance of self-esteem along with locus-of-control in seeking and processing all types of information (Davis and Phares, 1967) and to pregnancy (Barglow et al., 1968). Peers have also shown to influence sexual behavior and contraceptive use (Sebald, 1986).

In reviewing perspectives on adolescent compliance with contraception, researchers have stated the utility of a study that utilizes a multivariate design exploring the interaction of developmental variables, such as cognition, psychosocial and life stress factors (Beck & Davies, 1987; Coddington, 1979; Committee on Adolescence, 1986;
Urberg (1982) provides theoretical and conceptual support for research that examines the relations between adolescents cognitive level, sufficient internal locus of control to take contraceptive precautions along with cognitive problem-solving skills, e.g. ability to engage in means-end thinking, ability to anticipate consequences to an action and the ability to generate alternative solutions to a problem. She further states that means-ends thinking has not yet been examined developmentally with younger and older adolescents.

This kind of study would be beneficial in expanding the theoretical base (Sachs, 1985; Urberg, 1982). In addition, researchers report that intervention programs that would target teens' problem-solving and communication skills would be maximally effective in reducing the "at-risk population". Although not many studies of these specific interventions have been conducted, it is possible that these strategies are achieving results by helping teens develop greater ability and motivation in planning future events (Flaherty, Marecek, Olsen & Wilcove, 1983; Gerrard, McCann & Fortini, 1983; Maskay & Juhasz, 1983; Sachs, 1985).
This study can help determine the unique contributions that cognitive level, locus of control, self-esteem and peer influence provide in the enactment of contraceptive problem-solving skills and consistent contraceptive behavior.
CHAPTER III
METHODOLOGY

Introduction

This study examined the relationships between the following: 1) cognitive level and contraceptive problem-solving skills and consistent contraceptive behavior, 2) the contribution of locus-of-control and self-esteem to contraceptive problem-solving skills and consistent contraceptive behavior and 3) the relative contribution of consistent peer sexual and contraceptive behavior to subjects' birth control consistency. This chapter includes a description of the methods that were used for sample selection, instrumentation, data collection and data analysis.

Sample

The study focused on a middle school and high school population chosen was from a city of approximately 75,000 people in West Central Ohio. It is cross-sectional analysis of male and female adolescents aged 12-18 years. Adolescents from Home Economics classes in two high schools, eighth grade students in four middle schools, and
female adolescents from an adolescent parent program were the target population. A total of 695 adolescents in all schools were available for study. Of the 695 adolescents, 548 (79%) were from the two high schools; 91 (13%) were from the four middle schools; and 56 (8%) were from an adolescent parent program. Of the 695 adolescents, 422 (61%) returned signed parental and participant permission slips agreeing to volunteer for this study (see Appendix A). Of the 422 participants 371 (88%) completed the survey. Of this total, 301 (81%) were from the two high schools; 44 (12%) were from the four middle schools and 26 (7%) were from the adolescent parent program. If a subject did not want to participate, an attempt was made to find a replacement.

Several conditions affected the size of the population sample. Although the school officials, principals and teachers were very supportive, the school officials decided that because of the sensitive nature of the study the study population should be limited participants in classes, specifically home economics classes, that already had implemented a school board approved curriculum in human sexuality and family life. The assistant superintendent placed further limits on eligible participants at the middle school level. The survey was conducted during the months of April and May in 1989.
Since the survey was conducted at the end of the school year, participants lacked some motivation or had other class responsibilities which limited their participation in the survey. Due to the length of the survey and available school time, the survey had to be conducted over two days in school and this testing format presented retention problems from day one to day two. The sample size and amount of data collected were also affected on day one and two by a number of other events, including:

1) Participants forgot their permission slip,
2) participants lost their permission slip and did not have time to get another one signed, 3) afraid to ask parents for permission, 4) repeaters in classes, 5) other classes' field trips/activities that day, 6) skipped class, 7) end-of-year activities, 8) teachers' did not encourage participation by repeatedly asking for permission slips until the day of the survey, 9) incentives were not provided-subjects volunteered for the survey, 10) absent from school one or both days, 11) general lack of student motivation to participate in any school activity, 12) the participant did not wish to answer a question, and 13) not enough time to complete the survey.
Procedures

The data for this study were collected utilizing various contact procedures. Access to this school age population was attained by first contacting the home economics city supervisor and the assistant superintendent. After receiving approval at this level (see Appendix A), individual school administrators were contacted and presented with information concerning the study (see Appendix A). Home economics teachers were then contacted and asked to participate (see Appendix A). After receiving Human Subjects approval and school system approval, consent forms were distributed to each student two weeks prior to the scheduled testing date. Each consent form was signed by both the student and his/her parent or guardian and returned to their individual home economics teacher (see Appendix A). Two in school sessions were needed to collect data. The data were collected by the researcher in the participants' home economics class. All students in each class each period were brought together in the library in order to facilitate the collection of data. Students were allowed to ask questions concerning directions as well as
definitions of words. Confidentiality was protected by use of a coding system. If a selected sample member refused to participate, an attempt was made to replace that member. Refusals by self-selection were recorded.

**Instrumentation**

The data for this research study were collected by the use of pencil and paper tests. A pilot study was conducted on two adolescents aged 14 and 18 to determine the approximate length of time required to complete the survey. A total of 70 minutes was required. Therefore, the survey was completed over two days in school. Part one consisted of all measures excluding section 8 in the test booklet and the cognitive level measure (see Appendix B). Part two consisted of section eight and the cognitive level measure (see Appendix B). The main adolescent independent variables examined by these methods were: cognitive level, locus of control, self-esteem and peer influence. The dependent variables are non-contraceptive and contraceptive problem-solving skills and contraceptive behavior.

**Demographic Factors**

Demographic information, such as: age, race, gender, religious preference and family income were assessed by a series of pencil-paper questions (see Appendix B). Scores for these variables were determined by the following
methods: age and grade were used as raw scores; gender was coded as 0 for male and 1 for female; religion was coded as 1 = Protestant, 2 = Roman Catholic, 3 = Jewish, 4 = Baptist, 5 = other and 6 = atheist, agnostic or none. Race was coded as 1 = Black, 2 = White and 3 = other. Yearly family income was coded by the highest value in the category, e.g. 5, 10, 15 etc., and above 45,000 was coded as '46' and do not know as '00' and later recoded as missing values.

Religiousity

This factor was measured by the use of a pencil-paper question (see Appendix B). Scores were coded as 2 = very religious, 1 = somewhat religious, 0 = not religious.

Impulsivity

This factor was measured by the use of a pencil-paper question (see Appendix B). A raw score was given from 1 = I make decisions slowly to 7 = I make decisions quickly.

Honesty

This factor was measured by the use of a pencil-paper question (see Appendix B). Subjects' honesty was assessed by a multiple choice question. Scores were coded as follows: 3 = very serious, 2 = mostly serious, 1 = somewhat serious and 0 = not serious at all.
Fit With Friends

This variable was assessed by asking subjects 'How important it is to fit in with friends' and was coded as 1 = not important to 7 = very important.

Peer Sexual and Contraceptive Consistency Behavior

Peer sexual and contraceptive consistency behavior was assessed by two pencil-paper pencil questions (see Appendix B). The answers to '...best friends sexually active' were coded as 3 = all of them, 2 = some of them, 1 = none of them and 0 = do not know. 'Do your friends use birth control' was coded as 3 = all the time, 2 = some of the time, 1 = not at all and 0 = do not know. A consistency score for peer influence was determined by combining the scores from the questions concerning 'friends are sexually active' and 'friends use birth control'. These scores were combined to indicate the combined influence of increasing number of friends who are sexually active and consistent birth control use. This variable was assigned a new name 'Peer Influence Consistency Score (PICS) and ranged from 1 to 9 (see Appendix C). The ordinal scale was determined by focusing upon number of friends' increasing sexual activity and consistent birth control use. This scale indicates friends who are sexually active and consistent users of birth control.
Serious Dating Relationship

Serious dating relationship was measured by a pencil-paper yes/no question (see Appendix B). Subjects gave either a 'yes' or 'no' answer for this question. Yes answers were coded as '1' and no answers were coded as '0'.

Pregnancy and Children

Questions were asked concerning whether the subject had ever been pregnant or had any children (see Appendix B). These answers were coded as '1' for yes and '0' for no.

Coopersmith Self-Esteem Inventory

Stanley Coopersmith (1967)

The CSEI are brief self-report questionnaires measuring attitudes toward the self in social, academic and personal contexts (Consulting Psychologists Press, Inc, 1988). General assessment of high medium or low self-esteem can be obtained individually or groups. Internal consistency ratings range from .81 to .92 depending on age of subjects and version used. According to Coopersmith (1987) the test has acceptable levels of construct validity and convergent validity. It takes approximately 15 minutes to administer. A total score on the inventory was determined by summing the number of self-esteem items
answered correctly and then multiplying the total raw score by four. This resulted in a total score out of 100. Scores could range from 0 to 100.

Rotter's Internal-External Locus of Control Scale

J.B. Rotter (1966)

The I-E scale consists of 23 question pairs, using a forced choice format, plus six filler questions. Internal statements are paired with external statements. One point is given for each external statement selected. Scores can range from zero (most internal) to 23 (most external) (Robinson & Shaver, 1973). This pencil-paper test is self-administered and can be completed and scored in approximately 15 minutes. An internal consistency coefficient (Kuder-Richardson) of .70 was obtained from a sample of 400 college students (Rotter, 1966). One point was given for each external statement selected. The number of external statements selected were then summed. Scores can range from 0 (most internal) to 23 (most external) and an external score is then assigned to each subject.

Arlin Test of Formal Reasoning (ATFR) - Patricia Kennedy Arlin (1984)

The ATFR is a 32-item paper-pencil multiple-choice test assessing student's cognitive abilities at one of five levels: concrete, high concrete, transitional, low
formal, and high formal reasoning in the application of Piaget's developmental theory (Sweatland, 1986). The interpretation of both the total test score and the subtest scores is based on Inhelder and Piaget's (1958) description of formal operational thought and the eight schemata associated with that thought (multiplicative compensation, probability, correlations, combinational reasoning, proportional reasoning, forms of conservation beyond direct verification, mechanical equilibrium, and coordination of two or more systems or frames of reference) (Sweatland, 1986). Hoyt estimates of reliability have ranged from .71-.89 depending on the age of the subjects and the particular version of the test (Arlin, 1984). Cronbach alphas for the total test composite have ranged from .60 to .73 (Arlin, 1987). Test-retest reliabilities are between .76 to .89 depending on the version of the test and time period between testings. This test took approximately 20 minutes to complete. Each answer is worth one point and a total score on the ATFR is determined by summing the total wrong scores and subtracting this score from the total possible (32). Scores can range between 0 and 32.
Sexual Knowledge Questionnaire (SKQ)

W. Miller and N. M. Fisk

The sexual knowledge questionnaire is a 24-item multiple choice version of the Miller-Fisk Sexual Knowledge Questionnaire (Gough, 1974). The SKQ assesses knowledge of reproductive physiology, effectiveness of different methods of contraception, menstrual functioning and factors influencing sex drive and fertility (Gough, 1974). It has acceptable levels of internal consistency (.67) for college and adult samples (Gough, 1974). This measure takes 10 minutes to administer. Each question is worth one point and a total raw score is determined by summing the correct answers. Scores on the SKQ can range from 0 to 24.

Adolescent Life Change Event Scale (ALCES)


The ALCES is a 31-item questionnaire that assesses personal, social and family changes believed stressful to adolescents (Yeaworth, 1980). The subjects are asked whether they have experienced each event in the last year and indicate their response by circling Yes or No. The ALCES can be administered in large groups in approximately 10 minutes. Reliability and validity was not discussed. Each event on the scale receives a 'life change unit score' (see Yeaworth and York, 1980). A total raw score
is determined by summing the 'life change units' for each event the subject has answered by circling YES. Scores can range from 0 to 2436.

**Non-Contraceptive and Contraceptive Problem-solving Skills Assessments**

A question has been raised by researchers as to whether there are differences in problem-solving abilities between less emotional and personal contraceptive decisions and highly emotionally charged non-contraceptive decisions (Sachs, 1985). Thus, problem-solving abilities were explored in non-contraceptive and contraceptive situations and differences examined. Non-contraceptive problem-solving skills were assessed by means of three standardized instruments. Planning steps to reach a goal is assessed by the means-ends problem-solving (MEPS) instrument developed by Platt and Spivack (1977). The MEPS consists of a series of stories in which a person (protagonist) has a problem at the story's beginning and has to solve the problem by the story's end. The subject is asked to describe what steps the protagonist took to solve the problem. Secondly, the ability to generate alternative solutions to a problem was assessed by a series of stories in which interpersonal problems occur. The subject is asked to provide as many conceptually distinct solutions as possible (Platt, et al., 1974).
Lastly, the ability to anticipate the consequences of an action was assessed by a series of stories in which the subject is asked to assess how the protagonist's actions might affect themself as well as other people and how others might react. The protagonist is exposed to transgressions and the subject is asked to identify and weigh both the pros and cons of a conflicting choice. Subjects answered one contraceptive and one non-contraceptive story in each group.

Reliability coefficients of .80 were reported by Platt and Spivack (1975) using Kuder-Richardson 20 techniques and .82 using odd-even half technique on the first two sets of problem-solving skills. Content and predictive validity was claimed by Platt and Spivack (1975). Flaherty, Marecek, Olsen and Wilcove (1983) used this measure and developed contraceptive problem-solving situations for the means-end and alternative situations tests to analyze the differences in problem-solving skills between contraceptive non-users (n=34), virgins (n=128), pregnant (n=90) and contraceptive users (n=31). The researchers reported significant differences on the means-ends thinking measure between the scores of the pregnant group (M=5.82) and the scores of the virgins (M=8.53) and contraceptive users (M=7.18) (F=5.74, p<.001). On the alternative solutions test, the only significant
difference was between the scores on the pregnant group 
(M=5.40) and the scores of the contraceptive users 
(M=6.65) (F=4.51, p<.01). The four groups did not differ 
significantly on the consequences test. In another study, 
Sachs (1985) reported that the stage of cognitive 
development was found to be the best predictor of problem-
solving abilities (as measured by the means-ends thinking 
and alternative solutions tests) (F(1,84)=9.21, p<.05). 
However, individual means were not reported. This 
researcher had to develop an appropriate contraceptive 
consequences test along the same lines as the non-
contraceptive situations (see Appendix C for Scoring 
Procedures). All these situations take approximately 20 
minutes to complete.

**Contraceptive Behavior**

Contraceptive behavior was measured by a series of 
pencil-paper questions (see Appendix B). Question one 
scores were coded as 2 = everytime, 1 = occasionally and 
0 = never. Question two scores were coded as 1 = less 
than one month, 2 = between one month and six months, 
3 = between seven months and twelve months and 4 = more 
than one year. A new variable, 'Contraceptive Behavior 
Consistency Score (BCCS)', was made for each subject by 
first weighting the scores from question one (if 2 then
score = 4, if 1 then score = 1, if 0 then score = 0) and then adding the weighted score on question one to the score on question two.

**Treatment of Data**

Interrater reliability was determined by two raters evaluating the three non-contraceptive and the three contraceptive problem-solving situations for each of thirty-nine subjects which resulted in 228 separate observations. Pearson-product moment correlations where used to determine reliability. A coefficient of r=.71 was attained.

After the data were collected and coded, a multiple linear regression analysis was utilized to determine which variables were most highly correlated with and predict contraceptive problem-solving skills and contraceptive consistency behavior. Age, race, gender, religious preference and yearly family income were used as covariants. Sexual knowledge, life stress, religiousity, impulsivity and serious dating relationship were also controlled. A simultaneous regression was performed to determine the influence of each of the independent variables (cognitive level, locus of control, self-esteem, peer influence and controls) with the dependent variables contraceptive problem-solving skills and contraceptive consistency behavior. A hierarchical regression was also
performed and the independent variables were ordered heuristically with the stage of cognitive development considered the key variable for predicting contraceptive problem-solving skills and contraceptive behavior holding constant the covariate of age, race, gender, religious preference, family income, and sexual knowledge, life stress, religiosity, seriousness of relationship and impulsivity.

**Limitations**

The topic of birth control may be a particularly sensitive area of inquiry for unmarried adolescent males and females. Whenever sexual attitudes or feelings are assessed, it is never clear to what extent the responses are accurate reflections of the respondent's true feelings. The sexual attitudes and feelings held at this point in the adolescents' lives may be distorted by the impact of unexamined experiences or events and may not be the same attitudes they would experience in the actual contraceptive problem-solving process. Since conducting an experimental study in this area would be unethical, the responses the adolescents provided are considered an indication of their responses in actual situations and a limitation in this study. Furthermore, the problem of access to subjects on this topic may limit the generalizability of the findings. Access to adolescents
participants was limited, upon the request from the assistant superintendent, to home economics classes which may not be representative of the general school population. The sampling of adolescents from home economics classes, who have had courses in human sexuality, also limits the generalization of the findings. This population may be different the general school population because they have been exposed at some point during the year to different amounts of human sexuality education. They may have also been exposed to sexual decision-making skills. However, these decision-making skills, as well as contraceptive decision-making skills may not have been made explicit in the learning process. The mastery and retention of this information is known. The extent to which this research could be generalized to other geographic areas is limited as the result of the differences between mean scores on key variables in comparison to national norms. In addition, subjects' general lack of motivation to participate in any activity and the time of year may have biased the results of the survey. If the survey had been completed at the beginning of the year or scheduled at a time when fewer school activities were taking place, perhaps a larger sample as well as a better response rate on the individual sections of the questionnaire could have been attained.
Hypotheses

1) Adolescents who have higher formal reasoning skills will be more likely than other adolescents to have higher contraceptive problem-solving skills and more consistent contraceptive behavior.

2) If locus-of-control and self-esteem influence contraceptive problem-solving skills and contraceptive behavior, then adolescents who have higher internal control and higher self-esteem will be more likely than other adolescents to have higher contraceptive problem-solving skills and more consistent contraceptive behavior.

3) If an adolescent's consistent contraceptive behavior is influenced by his/her peers consistent sexual and contraceptive behavior, than as peer's sexual and contraceptive behavior increases than the adolescent's consistent contraceptive behavior will also increase.
CHAPTER IV
RESULTS

Introduction

In this study, an examination of the relationships between the following factors was performed: cognitive level, locus-of-control, self-esteem, peer influence and contraceptive problem-solving skills and contraceptive behavior. Furthermore, sexual knowledge, life stress, seriousness of dating relationship, impulsivity, previous pregnancy and previous children were examined to determine their potential influence on the relationships identified above. Finally, the relative contributions of age, gender, family income, religious preference and religiosity were investigated.

The statistical findings of this research are discussed in this chapter. Descriptive and inferential statistics were used to analyze data. Table 1 (see Page 97) shows the abbreviations and variable names used in the tables. Note that the sample size for each correlation and regression model varies as a function of the number of respondents who answered that question. The .05 level of significance was used to reject the hypotheses.
Table 1
Abbreviations and Variable Names Used in Tables

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Variable Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRD</td>
<td>Grade</td>
</tr>
<tr>
<td>RC1</td>
<td>Race 1 = Black</td>
</tr>
<tr>
<td>RC2</td>
<td>Race 2 = White</td>
</tr>
<tr>
<td>RL1</td>
<td>Religion 1 = Protestant</td>
</tr>
<tr>
<td>RL2</td>
<td>Religion 2 = Catholic</td>
</tr>
<tr>
<td>REL</td>
<td>Religiousity</td>
</tr>
<tr>
<td>IMP</td>
<td>Impulsivity</td>
</tr>
<tr>
<td>PRG</td>
<td>Previous Pregnancy</td>
</tr>
<tr>
<td>SDR</td>
<td>Serious Dating Relationship</td>
</tr>
<tr>
<td>FWF</td>
<td>Fit With Friends</td>
</tr>
<tr>
<td>PRG</td>
<td>Previous Pregnancy</td>
</tr>
<tr>
<td>CHD</td>
<td>Previous Children</td>
</tr>
<tr>
<td>LCE</td>
<td>Life Change Event Scale</td>
</tr>
<tr>
<td>SE</td>
<td>Self-esteem</td>
</tr>
<tr>
<td>LOC</td>
<td>Locus-of-control</td>
</tr>
<tr>
<td>COG</td>
<td>Cognitive Level</td>
</tr>
<tr>
<td>SKQ</td>
<td>Sexual Knowledge Questionnaire</td>
</tr>
<tr>
<td>TC</td>
<td>Total Contraceptive Problem-solving Skills</td>
</tr>
<tr>
<td>TNC</td>
<td>Total Non-contraceptive Problem-solving Skills</td>
</tr>
</tbody>
</table>
Demographic Characteristics of the Sample

Adolescents were examined on the relationships indicated above. The mean age was 15.98 (n=366, SD=1.61) ranging from 12-20 years. The frequencies, means and standard deviations for age by gender for the sample are provided in Table 2, see page 99. The mean age for females was 15.97 (n=272, SD=1.53). The range was from 12-20 years. For males, the mean age was 16 (n=94, SD=1.83) and the ages ranged from 12-20.

Frequencies and percentages of age for the sample are shown in Table 3, page 100. Table 4, page 101, shows the frequencies and percentages of subjects. The two high school and adolescent parent program totals are n=327, 88.1% of the total sample; and 12% of the sample are middle school subjects (n=44). Table 5, page 102, shows frequencies and percentages by grade for the sample: eighth, n=46 (12.7%); ninth, n=87 (24.1%); tenth, n=49 (13.6%); eleventh, n=80 (22.2%); twelfth, n=99 (27.4%) and 10 subjects did not indicate grade level.

Race was indicated by 1=Black, 2=White and 0=Other (e.g. Asian, American Indian, Oriental, Biracial, Hispanic and combinations of these). Frequencies and percentages are shown in Table 6, page 103: White, n=249, 67.8%; Black, n=96, 26.2%; other, n=22, 6.0% and four subjects did not respond.
<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Percentages</th>
<th>Age</th>
<th>Range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>272</td>
<td>74</td>
<td>15.97</td>
<td>13.0</td>
<td>20.0</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>94</td>
<td>26</td>
<td>16.0</td>
<td>12.0</td>
<td>20.0</td>
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<td></td>
<td></td>
<td></td>
<td>1.83</td>
<td></td>
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</tr>
<tr>
<td>Total</td>
<td>366</td>
<td></td>
<td>15.98</td>
<td>12.0</td>
<td>20.0</td>
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<td></td>
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<td></td>
<td>1.61</td>
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</table>
Table 3

Frequencies and Percentages of Ages For the Sample

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1</td>
<td>.03</td>
</tr>
<tr>
<td>13</td>
<td>20</td>
<td>5.5</td>
</tr>
<tr>
<td>14</td>
<td>60</td>
<td>16.4</td>
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<td>15</td>
<td>65</td>
<td>17.8</td>
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<td>16</td>
<td>61</td>
<td>16.7</td>
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<td>17</td>
<td>91</td>
<td>24.9</td>
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<td>18</td>
<td>55</td>
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<td>19</td>
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<td>20</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>--</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

*Did not respond*
### Table 4

Frequencies and Percentages of Subjects by School

<table>
<thead>
<tr>
<th>School</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescent Parent Program</td>
<td>26</td>
<td>7.0</td>
</tr>
<tr>
<td>High School HN</td>
<td>149</td>
<td>40.2</td>
</tr>
<tr>
<td>High School HS</td>
<td>152</td>
<td>41.0</td>
</tr>
<tr>
<td>Middle School MC</td>
<td>18</td>
<td>4.9</td>
</tr>
<tr>
<td>Middle School MF</td>
<td>11</td>
<td>3.0</td>
</tr>
<tr>
<td>Middle School MR</td>
<td>8</td>
<td>2.2</td>
</tr>
<tr>
<td>Middle School MS</td>
<td>7</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Table 5

Frequencies and Percentages for Subjects by Grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>46</td>
<td>12.7</td>
</tr>
<tr>
<td>9</td>
<td>87</td>
<td>24.1</td>
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<tr>
<td>10</td>
<td>49</td>
<td>13.6</td>
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<tr>
<td>11</td>
<td>80</td>
<td>22.2</td>
</tr>
<tr>
<td>12</td>
<td>99</td>
<td>27.4</td>
</tr>
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</table>
Table 6
Frequencies and Percentages for Subjects by Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>96</td>
<td>26.2</td>
</tr>
<tr>
<td>White</td>
<td>249</td>
<td>67.8</td>
</tr>
<tr>
<td>Other*</td>
<td>22</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Yearly family income, shown in Table 7, page 105, was indicated by less than half of the sample, \( n = 161 \) (44%). Of those responding a broad range of income levels were found. Income ranged from less than 5,000 per year to over 46,000 per year (\( \mu = 30,360,2 \), \( \sigma = 13,093 \)). Due to the fact that less than half of the sample answered this question, only 44% indicated knowing yearly family income, the variable was not included in the regression equation.

Religious preferences shown in Table 8, page 106, were categorized as Protestant, \( n = 30, 9.5\% \); Catholic, \( n = 33, 9.5\% \); Jewish, \( n = 2, 0.6\% \); Baptist, \( n = 106, 30.5\% \); other, e.g., Methodist, Christian, Morman, Pentacostal, Nazarene, AME, Muslim, Apostalic, Luthuran, Islam, 7th Day Adventist, African Methodist etc., \( n = 120, 34.5\% \); Atheist, Agnostic or none, \( n = 53, 15.2\% \) and 23 subjects didn't indicate religious preference. Not much information can be gained by using this variable in the regression model since 16% of the subjects indicated being atheist, agnostic or none and another 35% indicated "other" as a religious preference and the frequencies in each of the "other" categories were small. In addition, the way the subjects responded to this question doesn't make it very valuable. The regression models were originally run with this variable, but significance tests on the semi-partial correlations coefficients showed that the variable did not Table 7
Table 7  

Frequencies and Percentages of Yearly Family Income for the Sample

<table>
<thead>
<tr>
<th>Yearly Income*</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5,000</td>
<td>10</td>
<td>2.7</td>
</tr>
<tr>
<td>5,000-10,000</td>
<td>7</td>
<td>1.9</td>
</tr>
<tr>
<td>10,000-15,000</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>15,000-20,000</td>
<td>12</td>
<td>3.2</td>
</tr>
<tr>
<td>20,000-25,000</td>
<td>14</td>
<td>3.8</td>
</tr>
<tr>
<td>25,000-30,000</td>
<td>22</td>
<td>5.9</td>
</tr>
<tr>
<td>30,000-35,000</td>
<td>17</td>
<td>4.6</td>
</tr>
<tr>
<td>35,000-40,000</td>
<td>17</td>
<td>4.6</td>
</tr>
<tr>
<td>40,000-45,000</td>
<td>19</td>
<td>5.1</td>
</tr>
<tr>
<td>Above 45,000</td>
<td>24</td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>210</strong></td>
<td><strong>56.6</strong></td>
</tr>
</tbody>
</table>

*In Dollars  
**Did not know
Table 8
Frequencies and Percentages for Religious Preference for the Sample

<table>
<thead>
<tr>
<th>Religious Preference</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protestant</td>
<td>33</td>
<td>9.5</td>
</tr>
<tr>
<td>Catholic</td>
<td>33</td>
<td>9.5</td>
</tr>
<tr>
<td>Jewish</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Baptist</td>
<td>106</td>
<td>30.5</td>
</tr>
<tr>
<td>Athiest, Agnostic, None</td>
<td>53</td>
<td>15.2</td>
</tr>
<tr>
<td>Other*</td>
<td>120</td>
<td>34.5</td>
</tr>
</tbody>
</table>

contribute a significant amount of variance. Consequently, the models were run again without this variable.

Religiousity, Table 9 page 108, ranged from 0=not religious at all, n=114, 31.4%; 1=somewhat religious, n=221, 60.9%; 2=very religious, n=28, 7.7%; and eight subjects did not answer this question.

Table 10, page 108, shows the frequencies, means and standard deviations for the independent and dependent variables for the sample.

Subjects were also asked how serious they were in answering the survey questions. Answers ranged from 0 = not serious at all to 3 = very serious (n=341) and 65% of the subjects responded that they were somewhat to very serious in answering the survey questions.
Table 9
Frequencies and Percentages for Religiousity for the Sample

<table>
<thead>
<tr>
<th>Religiousity</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Religious</td>
<td>28</td>
<td>7.7</td>
</tr>
<tr>
<td>Somewhat Religious</td>
<td>221</td>
<td>60.9</td>
</tr>
<tr>
<td>Not Religious at all</td>
<td>114</td>
<td>31.4</td>
</tr>
</tbody>
</table>

Table 10
Frequencies, Means and Standard Deviations for Independent and Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>COG</td>
<td>326</td>
<td>11.58</td>
<td>3.93</td>
</tr>
<tr>
<td>LOC</td>
<td>371</td>
<td>10.99</td>
<td>3.36</td>
</tr>
<tr>
<td>SE</td>
<td>371</td>
<td>54.96</td>
<td>20.86</td>
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<tr>
<td>PICS</td>
<td>261</td>
<td>3.72</td>
<td>2.32</td>
</tr>
<tr>
<td>BCCS</td>
<td>216</td>
<td>3.40</td>
<td>3.13</td>
</tr>
<tr>
<td>TC</td>
<td>319</td>
<td>4.80</td>
<td>2.57</td>
</tr>
<tr>
<td>TNC</td>
<td>323</td>
<td>4.45</td>
<td>2.10</td>
</tr>
</tbody>
</table>

Note: COG=Cognitive Level, LOC=Locus-of-Control, SE=Self-esteem, PICS=Peer Influence Consistency Score, BCCS=Birth Control Consistency Score
Correlations between Selected Demographic Variables and Dependent Variables.

The correlation matrix and descriptive statistics for selected demographic variables and cognitive level (COG), locus-of-control (LOC), self-esteem (SE), peer influence consistency score (PICS), total contraceptive problem-solving score (TC) and birth control consistency score (BCCS) are shown in Table 11, page 112.

At the bivariate level, the correlations between age and grade level ($r = .88, p < .001$) are very strong as would be expected. The correlations between age and religiousity ($r = .13, p < .01$), cognitive level ($r = .16, p < .01$), self-esteem ($r = .16, p < .01$), birth control consistency score ($r = .20, p < .01$) and total contraceptive problem-solving score ($r = .17, p < .01$) indicate significant but weak relationships. Weak relationships between grade and cognitive level ($r = .18, p < .01$), locus-of-control ($r = .12, p < .01$), self-esteem ($r = .18, p < .01$), birth control consistency score ($r = .22, p < .001$), and total contraceptive problem-solving score ($r = .24, p < .001$) were also found. A weak relationship between income and birth control consistency score ($r = .15, p < .05$) was also found. An interesting, yet weak, negative relationship was found between locus-of-control and religiousity ($r = -.18, p < .01$). This relationship indicates that the more religious the
subject indicated he/she was the more external in orientation which would follow Rotter's (1966) theory that those who believe in outside forces (e.g., God) shaping one's actions would also exhibit an external orientation. A moderate negative relationship was found between self-esteem and locus-of-control ($r = -0.31$, $p < 0.001$). This would indicate that subjects low on self-esteem are more external in their orientation to locus-of-control. A moderate positive relationship was found between self-esteem and birth control consistency score ($r = 0.26$, $p < 0.001$). Which indicates that the higher the self-esteem the higher the subjects scored on birth control consistency. However, the relationship was not strong enough to indicate multicollinearity. In addition, a positive relationship was found between age and peer influence ($r = 0.20$, $p < 0.001$), grade and peer influence ($r = 0.20$, $p < 0.001$) and self-esteem and peer influence ($r = 0.14$, $p < 0.05$).

The zero-order correlations between the other variables are comparatively weak. Since only one pair of variables has a correlation (age and grade) that could raise a question about multicollinearity, it was deemed appropriate to exclude one of them (grade) in the regression models.
The relatively weak relationships between the other variables in Table 11; however, indicate a need to control for age, religiousity, cognitive level, race, religion, and sex in the regression models.
Table 11  
Correlation Matrix, Means and Standard Deviations for Selected Demographic  
Variables and Dependent Variables  

<table>
<thead>
<tr>
<th>VARIABLE</th>
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<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<td></td>
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<td></td>
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<tr>
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<td>.13**</td>
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<td>-</td>
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<td>-.18***</td>
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<td>.18***</td>
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<td>-</td>
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<td>(n=351)</td>
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<td>.02</td>
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<td>.05</td>
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</tr>
<tr>
<td>9. BCCS</td>
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<td>.22***</td>
<td>.001</td>
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<td>.04</td>
<td>.26***</td>
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<td>-</td>
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<td></td>
</tr>
<tr>
<td>10. TC</td>
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<td>.24***</td>
<td>.04</td>
<td>.02</td>
<td>.10</td>
<td>-.10</td>
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<td>.06</td>
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<td>(n=186)</td>
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</tr>
<tr>
<td>Means</td>
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<td>10.27</td>
<td>.76</td>
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<td>5.56</td>
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<tr>
<td>SD</td>
<td>1.61</td>
<td>1.41</td>
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<td>13.09</td>
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<td>3.36</td>
<td>20.86</td>
<td>2.19</td>
<td>5.13</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Note: GRD=Grade, REL=Religiousity, INC=Income, COG=Cognitive Level,  
LOC=Locus- of-Control, SE=Self-esteem, PICS=Peer Influence Consistency Score, BCCS=Birth  
Control Consistency Score, TC=Total Contraceptive Problem-Solving Score  
*p<.05, **p<.01, ***p<.001
Correlations For Social Variables and Dependent Variables.

Table 12, page 114, provides the correlations for social variables including: serious dating relationships (SDR), previous pregnancy (PRG), and previous children (CHD) and the dependent variables: total contraceptive problem-solving (TC) and birth control consistency score (BCCS).

As indicated in Table 12, page 114, serious dating relationship shows a significant positive but weak relationship to previous pregnancy \((r=.19, p<.001)\), and children \((r=.23, p<.001)\). Previous pregnancy shows a significant and positive relationship to contraceptive problem-solving skills \((r=.17, p<.01)\). However, these relationships are very weak and do not indicate multicollinearity. The only significantly positive and strong relationship was between previous pregnancy and children \((r=.60, p<.001)\). The multicollinearity between these two variables was expected. Consequently, only previous pregnancy was controlled for in the regression models. All other relationships are very weak and insignificant and were entered into the regression models.
Table 12
Correlation Matrix, Means and Standard Deviations for Social Variables and Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SDR</td>
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<td>(n=275)</td>
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</tr>
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<td>.60***</td>
<td>-</td>
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<td>(n=252)</td>
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<td>4. BCCS</td>
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<td>.08</td>
<td>-</td>
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</tr>
<tr>
<td></td>
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<td>(n=215)</td>
<td>(n=215)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. TC</td>
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<td>.17**</td>
<td>.04</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n=316)</td>
<td>(n=235)</td>
<td>(n=216)</td>
<td>(n=186)</td>
<td></td>
</tr>
<tr>
<td>MEANS</td>
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<td>.20</td>
<td>.14</td>
<td>3.40</td>
<td>4.80</td>
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<td>SD</td>
<td>.49</td>
<td>.40</td>
<td>.35</td>
<td>3.13</td>
<td>2.50</td>
</tr>
</tbody>
</table>

NOTE: SDR=Seriousness of Dating Relationship, PRG=Previous Pregnancy, CHD=Previous Children, BCCS=Birth Control Consistency Score, TC=Total Contraceptive Consistency Score.

***p<.01, **p<.001
Correlations for Psychological Variables and Dependent Variables.

The correlations for the psychological variables: fit with friends (FWF), impulsivity (IMP), life change event scale (LCE) sexual knowledge (SKQ) and the dependent variables: total contraceptive problem-solving skills (TC), and birth control consistency score (BCCS) are given in Table 13, page 116.

Significant but weak relationships between fit with friends and impulsivity ($r=.17$, $p<.001$), and a negative relationship between fit with friends and sexual knowledge ($r=-.10$, $p<.05$) as well as for impulsivity and contraceptive problem-solving skills ($r=-.11$, $p<.05$) and birth control consistency and life change events ($r=1.13$, $p<.05$) are shown. A positive relationship between birth control consistency and sexual knowledge ($r=.14$, $p<.05$) exists. A moderate but positive relationship between contraceptive problem-solving skills and sexual knowledge ($r=.33$, $p<.001$) was found. This indicates that an increase in sexual knowledge is related to an increase in total contraceptive problem-solving ability which is not surprising and supportive of previous research. These relationships are not strong enough to indicate multicollinearity; therefore, they were included in the regression models.
Table 13

Correlation Matrix, Means and Standard Deviations for
Psychological Variables and Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. FWF</td>
<td>-</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. IMP</td>
<td>.17***</td>
<td>-</td>
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<td></td>
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<tr>
<td>3. LCE</td>
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<td>.08</td>
<td>-</td>
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<td>(n=367)</td>
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</tr>
<tr>
<td>4. SKQ</td>
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<td>.004</td>
<td>-.04</td>
<td>-</td>
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<td>(n=369)</td>
<td>(n=367)</td>
<td>(n=370)</td>
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</tr>
<tr>
<td>5. BCCS</td>
<td>-.04</td>
<td>.08</td>
<td>-.13&quot;</td>
<td>.14&quot;</td>
<td>-</td>
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<tr>
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<td>(n=214)</td>
<td>(n=216)</td>
<td>(n=216)</td>
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</tr>
<tr>
<td>6. TC</td>
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<td>-.11&quot;</td>
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<td>.33***</td>
<td>.06-</td>
<td>-</td>
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<td>(n=315)</td>
<td>(n=319)</td>
<td>(n=319)</td>
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<tr>
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<td>615.53</td>
<td>11.47</td>
<td>3.40</td>
<td>4.80</td>
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<td>1.14</td>
<td>263.17</td>
<td>3.41</td>
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<td>2.57</td>
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</table>

Note: FWF=Fit with Friends, IMP=Impulsivity, LCE=Life Change Event Scale, SKQ=Sexual Knowledge Questionnaire, BCCS=Birth Control Consistency Score, TC=Total Contraceptive Problem-Solving Score.

*p<.05, ***p<.001
Decisions Related to Data Analysis

After the data were collected and coded, a multiple linear regression analysis was utilized to determine which variables were most highly correlated with and predict contraceptive problem-solving skills and consistent contraceptive behavior. A simultaneous regression was performed to determine the influence of each of the independent variables with the dependent variables. A hierarchichal regression was also performed and the independent variables were ordered hierarchically with the stage of cognitive development considered the key variable for predicting contraceptive problem-solving skills and consistent contraceptive behavior.

School Differences. During the initial examination of data, a question was raised as to the homegeneity of data on the dependent variables birth control consistency and contraceptive problem-solving skills between the seven schools. It was assumed that the four middle and three high schools would exhibit heterogeneity of variance primarily due to age. However, it was questioned as to whether the three high schools would exhibit homogeneity of variance. Consequently, an ANOVA, shown in Table 14, page 120, was used to analyze the relationship between the three high school samples and the four middle school samples.
No school differences were found between the four middle schools on either contraceptive problem-solving skills or birth control consistency. High school differences on contraceptive problem-solving skills were not found ($F(2,202) = 1.36$). However, school differences were found on birth control consistency ($F(2,202) = 3.68$, $p < .05$). Birth control consistency scores are composite scores of subjects' responses to whether they use birth control and for length of use. A posthoc analysis was performed to determine which of the high schools differed on birth control consistency. The Least Squares Difference (LSD) procedure was used for this analysis. The samples exhibited great variance in number of subjects: AP, $n=26$; HN, $n=149$ and HS $n=152$. However, school differences were found between HN and HS and between HN and AP responses. The means and standard deviations for the samples on birth control consistency scores were: HN, $(n=89)$ $M=4.03$, $SD=3.09$; HS, $(n=91)$ $M=3.10$, $SD=3.12$ and AP, $(n=25)$ $M=2.4$, $SD=2.68$.

This indicates that subjects in HN used birth control more often and for a longer length of time than subjects at HS or AP. This could account for the school differences found by the LSD procedure.

This analysis would indicate that the regression model should be run on each of the high school samples and the
total middle school sample. High school differences were not expected for several reasons: 1) the high schools are located within two to three miles of each other and 2) the midwestern towns' population is 80,000 and doesn't include much diversity. Such diversity on scores was not anticipated. The differences between the middle schools and high schools was expected to be due to age. Differences on birth control consistency for AP and HN could be explained by the fact that AP subjects were all either already pregnant or parenting. In addition, when HN and HS were divided into two subgroups, the n's were too small to run a regression model with thirteen variables. Thus, due to the few number of subjects in AP, HN, HS and middle school samples and the fact that the study design's goal was to look at the general behavior of the whole group, it was decided that regression models would be run on the total sample, all high schools and middle schools included.
Table 14

School Differences ANOVA Results

<table>
<thead>
<tr>
<th>School</th>
<th>TC</th>
<th></th>
<th></th>
<th>BCCS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>F (d.f.)</td>
<td>M</td>
<td>SD</td>
<td>F (d.f.)</td>
</tr>
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<td>High School</td>
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<td>1.36 (2,277)</td>
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<td>3.06</td>
<td>3.68 (2,202)*</td>
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<td>Middle School</td>
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<td>1.32 (3,35)</td>
<td>3.09</td>
<td>3.64</td>
<td>1.46 (2,8)</td>
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</table>

*p<.05
Differences Between TNC and TC Skills. Before testing the hypotheses, means/end, alternative and consequential task in non-contraceptive and contraceptive problem situations were examined to determine whether there were differences between decision-making tasks in the two situations—total non-contraceptive (TNC) and total contraceptive (TC) situations. Preliminary results indicated that problem-solving tasks in the two situations were strongly related ($r = .60, p < .001, n = 344$). This relationship indicated that the two situations were measuring the same decision-making abilities. Further analyses were performed to determine whether the means of the means/end, alternative and consequential tasks were different from each other. A t-test, shown in Table 15, page 123, between non-contraceptive problem-solving skills and contraceptive problem-solving skills situations indicated that the means were significantly different ($t_{(313)} = -2.70, p < .01$). This would indicate that the mean for contraceptive problem-solving skills was different than for the mean on non-contraceptive problem-solving skills. Since the initial t-test was significant, it was deemed necessary to look further at the means of the three individual tasks in each of the two situations. The t-test, shown in Table 15, page 123, between the means/end tasks for the two situations (non-contraceptive and
contraceptive) was not significant \(t(342)=-1.37, \ p>.05\) nor was it significant for the alternative tasks \(t(337)=.18, \ p>.05\). However, the t-test between the consequential tasks for the two situations was significant, \(t(331)=-3.37, \ p<.001\). The differences between these means could have been the result of subjects not providing answers as frequently to contraceptive problem-solving situations as to non-contraceptive problem-solving situations because they do not have the experience with providing consequences to contraceptive situations.

Even though the ability to engage in consequential thinking was shown to be more significant than means/end or alternative thinking, it was not considered sufficient by itself to influence behavior. Researchers have indicated that each step in the problem-solving process is necessary but not in itself sufficient to result in effective contraceptive use (Flaherty, Marecek, Olsen & Wilcove, 1983; Urberg, 1982). Unless the anticipation of consequences is accompanied by the ability to generate solutions and to plan steps to implement them, then, actual behavior may not be influenced. Thus, it was decided to use the summative score of all three problem-solving tasks in the contraceptive problem-solving situation as the dependent variable.
Table 15

T-Tests for Means/end, Alternatives, and Consequences

Non-contraceptive and Contraceptive Problem-solving Tasks

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>T-Test</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNC and TC</td>
<td>314</td>
<td>-2.70**</td>
<td>-.32</td>
<td>.12</td>
</tr>
<tr>
<td>Means/end</td>
<td>343</td>
<td>-1.37</td>
<td>-.06</td>
<td>.05</td>
</tr>
<tr>
<td>Alternatives</td>
<td>328</td>
<td>.18</td>
<td>.01</td>
<td>.06</td>
</tr>
<tr>
<td>Consequences</td>
<td>332</td>
<td>-3.37***</td>
<td>-.25</td>
<td>.08</td>
</tr>
</tbody>
</table>

**p<.01, ***p<.001

NOTE: TNC=total non-contraceptive problem-solving skills, TC=total contraceptive problem-solving skills
Race and Religious Preference. Regression analyses were performed to test the hypotheses of this study. For the three hypotheses, the significance of race and religious preference were calculated by determining the semi-partial correlation coefficient and testing for statistical significance. Race and Religious preference did not contribute a significant amount of variance to the total $R^2$ in either hypothesis. For hypothesis one, race was left in the model since it initially showed to be significant in the output; however, the significance test showed otherwise. Consequently, the model was run again without religion but with race for hypothesis one.

**HYPOTHESIS ONE:** Adolescents who have higher formal reasoning skills will be more likely than other adolescents to have higher contraceptive problem-solving skills and more consistent contraceptive behavior.

Multiple regression analyses were performed to test the hypotheses of this study. The regression of the independent variables, as shown in Table 16, page 125, on total contraceptive problem-solving skills indicates that the model accounts for a significant amount of the variance in total contraceptive problem-solving score, $R^2 = .28$, $F(12,186) = 6.12$, $p < .001$. 
Table 16

Simultaneous Regression of Cognitive Level, with Controls, on Total Contraceptive Problem-solving Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>sr²</th>
<th>F(12,186)</th>
<th>R²</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total F</td>
<td></td>
<td></td>
<td>6.12***</td>
<td>.28</td>
<td>199</td>
</tr>
<tr>
<td>COG</td>
<td>.014</td>
<td>.004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKQ</td>
<td>.243***</td>
<td>.08</td>
<td>20.11***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCE</td>
<td>.001</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>.118</td>
<td>.004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX</td>
<td>1.35***</td>
<td>.04***</td>
<td>10.39***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMP</td>
<td>-.247</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRG</td>
<td>.248</td>
<td>.001</td>
<td></td>
<td>.31</td>
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<tr>
<td>REL</td>
<td>.163</td>
<td>.001</td>
<td></td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>RC1,RC2</td>
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<td>.002</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDR</td>
<td>.130</td>
<td>.001</td>
<td></td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>FWF</td>
<td>-.049</td>
<td>.001</td>
<td></td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.33</td>
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</tr>
</tbody>
</table>

NOTE: COG=Cognitive Level, SKQ=Sexual Knowledge Questionnaire, LCE=Life Change Events, IMP=Impulsivity, PRG=Previous Pregnancy, REL=Religiosity, RC²=Protestant, RC²=Catholic, SDR=Serious Dating Relationship, FWF=Fit With Friends

²Dummy Coding
*p<.05, ***p<.001
However, only 28% of the variance in contraceptive problem-solving is accounted for by the linear relationships of the independent variables and contraceptive problem-solving. The simultaneous regression indicates, see Table 16, page 125, that sexual knowledge is a significant predictor of contraceptive problem-solving, $F(12,186)=20.11$, $p<.001$, as is sex $F(12,186)=10.39$, $p<.001$. A hierarchical regression, shown in Table 17, page 128, with cognitive level entered first indicates that cognitive level was not a predictor at the $p<.05$ level but was at the $p<.10$ level. Sexual knowledge $F(12,186)=45.48$ $p<.001$ and sex, $F(12,186)=15.87$, $p<.001$ are still the only significant predictors of contraceptive problem-solving. The variance ($sr^2$) of each independent variable is also shown in Tables 16 and 17, pages 125 and 128, respectively.

When the regression was performed on birth control consistency score, the model accounted for a significant amount of variance, $R^2=11$, $F(12,169)=1.80$, $p<.05$, as shown in Table 18, page 129. The simultaneous regression in Table 18, 129, shows that none of the variables significantly predict birth control consistency.
The hierarchical regression in Table 19, page 130, shows that cognitive level does significantly predict birth control consistency, $F(12,169)=4.71, p<.05$. No other variables significantly predict birth control consistency. Tables 18, 19, pages 129 and 130, respectively, also show the variance ($sr^2$) each variable contributes to the total $R^2$ in both analyses.
Table 17

Hierarchical Regression of Cognitive Level, with Controls, on Total Contraceptive Problem-solving Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>s</th>
<th>F(12,186)</th>
<th>R²</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total F</td>
<td></td>
<td></td>
<td>6.12***</td>
<td>.28</td>
<td>199</td>
</tr>
<tr>
<td>COG</td>
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<td>.01</td>
<td>3.42</td>
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<td></td>
</tr>
<tr>
<td>SKQ</td>
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<td>.16***</td>
<td>45.48***</td>
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<td></td>
</tr>
<tr>
<td>LCE</td>
<td>.04</td>
<td>.01</td>
<td>2.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>.118</td>
<td>.01</td>
<td>1.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX</td>
<td>1.35***</td>
<td>.06***</td>
<td>15.87***</td>
<td></td>
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</tr>
<tr>
<td>IMP</td>
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<td>.01</td>
<td>2.75</td>
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</tr>
<tr>
<td>PRG</td>
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<td>.00</td>
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<td></td>
</tr>
<tr>
<td>REL</td>
<td>.163</td>
<td>.00</td>
<td>.34</td>
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<tr>
<td>RC1,RC2²</td>
<td>.440,.465</td>
<td>.00</td>
<td>.26</td>
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<td></td>
</tr>
<tr>
<td>SDR</td>
<td>.130</td>
<td>.00</td>
<td>.14</td>
<td></td>
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<tr>
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</tr>
<tr>
<td>Constant</td>
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</tr>
</tbody>
</table>

NOTE: COG=Cognitive Level, SKQ=Sexual Knowledge Questionnaire, LCE=Life Change Events, IMP=Impulsivity, PRG=Previous Pregnancy, REL=Religiousity, RC¹=Protestant, RC²=Catholic, SDR=Serious Dating Relationship, FWF=Fit With Friends
³Dummy Coded
*p<.05, **p<.01, ***p<.001
Table 18

Simultaneous Regression of Cognitive Level, with Controls, on Birth Control Consistency Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>sr²</th>
<th>F(12,169)</th>
<th>R²</th>
<th>n</th>
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<tbody>
<tr>
<td>Total F</td>
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<td>1.80&quot;</td>
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<td>182</td>
</tr>
<tr>
<td>COG</td>
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<td>.01</td>
<td>1.50</td>
<td></td>
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</tr>
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<td>SKQ</td>
<td>.040</td>
<td>.00</td>
<td>.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCE</td>
<td>-.001</td>
<td>.01</td>
<td>1.66</td>
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<td></td>
</tr>
<tr>
<td>AGE</td>
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<td>.00</td>
<td>2.55</td>
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<td></td>
</tr>
<tr>
<td>SEX</td>
<td>.121</td>
<td>.00</td>
<td>.03</td>
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<td></td>
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<td>.88</td>
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</tr>
<tr>
<td>REL</td>
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<td>.00</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC1,RC2</td>
<td>-1.281,-.192</td>
<td>.02</td>
<td>2.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDR</td>
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<td>.004</td>
<td>.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FWF</td>
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<td>.01</td>
<td>2.03</td>
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</tr>
<tr>
<td>Constant</td>
<td>-1.66</td>
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</tbody>
</table>

NOTE: COG=Cognitive Level, SKQ=Sexual Knowledge Questionnaire, LCE=Life Change Events, IMP=Impulsivity, PRG=Previous Pregnancy, REL=Religiousity, RC¹=Protestant, RC²=Catholic, SDR=Serious Dating Relationship, FWF=Fit With Friends

¹Dummy Coded
"p<.05
<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>$s_{R}^2$</th>
<th>$F(12, 169)$</th>
<th>$R^2$</th>
<th>n</th>
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<tbody>
<tr>
<td>Total F</td>
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<td></td>
<td>1.80</td>
<td>.11</td>
<td>182</td>
</tr>
<tr>
<td>COG</td>
<td>.079</td>
<td>.03</td>
<td>4.71</td>
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<td></td>
</tr>
<tr>
<td>SKQ</td>
<td>.040</td>
<td>.01</td>
<td>3.50</td>
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<tr>
<td>LCE</td>
<td>-.001</td>
<td>.02</td>
<td>3.09</td>
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<tr>
<td>AGE</td>
<td>.288</td>
<td>.01</td>
<td>2.02</td>
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<tr>
<td>SEX</td>
<td>.121</td>
<td>.00</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMP</td>
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<td>.00</td>
<td>.40</td>
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<td>.82</td>
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<td>REL</td>
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<td>.00</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC¹,RC²</td>
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<td>.00</td>
<td>2.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDR</td>
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<td>.64</td>
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<td>FWF</td>
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</tr>
</tbody>
</table>

**NOTE:** COG=Cognitive Level, SKQ=Sexual Knowledge Questionnaire, LCE=Life Change Events, IMP=Impulsivity, PRG=Previous Pregnancy, REL=Religiousity, RC²=Protestant, RC²=Catholic, SDR=Serious Dating Relationship, FWF=Fit With Friends

¹Dummy Coded
²p<.05
Regression of Cognitive Level on Total Non-contraceptive Problem-solving Score

In addition, to testing the relationships above, the relationships between cognitive level with controls on non-contraceptive problem-solving skills were examined. A regression analysis was also performed on total non-contraceptive problem-solving scores (TNC). Table 20, page 133, shows the results of this analysis. The model accounted for a significant amount of variance in non-contraceptive problem-solving skills, $R^2 = .23$, $F(12,190) = 4.75, p < .001$. The simultaneous regression shown in Table 20, page 133, indicates that cognitive level is a significant predictor of non-contraceptive problem-solving skills, $F(12,190) = 8.98, p < .01$. Sex also significantly predicts non-contraceptive problem-solving skills, $F(12,190) = 11.39, p < .001$, as does religiousity $F(12,190) = 5.24, p < .05$.

When the heirarchical regression was performed, Table 21, page 134, with cognitive level entered first, it was still a significant predictor of non-contraceptive problem-solving skills, $F(12,190) = 15.23, p < .001$. Sexual knowledge was also a significant predictor, $F(12,190) = 11.25, p < .001$, when entered second in the equation as was age $F(12,190) = 5.89, p < .05$ when entered fourth and sex, $F(12,190) = 14.19, p < .001$ when entered fifth.
in the equation. Religiousity, even when entered eighth, was also a significant predictor of birth control consistency, $F(12,190)=5.01, p<.05$. The variance of each independent variable is also provided in Tables 20 and 21, pages 133 and 134, respectively.
Table 20

Simultaneous Regression of Cognitive Level, with Controls, on Total Non-contraceptive Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>sr²</th>
<th>F(12,190)</th>
<th>R²</th>
<th>n</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>4.75***</td>
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<td>203</td>
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<tr>
<td>COG</td>
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<td>.01&quot;&quot;</td>
<td>8.98&quot;&quot;</td>
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<td></td>
</tr>
<tr>
<td>SKQ</td>
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<td>.05</td>
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</tr>
<tr>
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<tr>
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<td>.05***</td>
<td>11.39***</td>
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<tr>
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<td>.02&quot;&quot;</td>
<td>5.24&quot;&quot;</td>
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<tr>
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<tr>
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<tr>
<td>FWF</td>
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<td>Constant</td>
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</table>

NOTE: COG=Cognitive Level, SKQ=Sexual Knowledge Questionnaire, LCE=Life Change Events, IMP=Impulsivity, PRG=Previous Pregnancy, REL=Religiousity, RC²=Protestant, RC²=Catholic, SDR=Serious Dating Relationship, FWF=Fit With Friends
²Dummy Coded
*p<.05, """"p<.001
Table 21

Hierarchical Regression of Cognitive Level, with Controls, on Total Non-contraceptive Score

<table>
<thead>
<tr>
<th>Variable</th>
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<th>sr²</th>
<th>F(12,190)</th>
<th>R²</th>
<th>n</th>
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<td>203</td>
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<tr>
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<td>.110''</td>
<td>.06''</td>
<td>15.23***</td>
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<tr>
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<td>.05</td>
<td>11.25***</td>
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<td></td>
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<tr>
<td>LCE</td>
<td>.000</td>
<td>.01</td>
<td>1.92</td>
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<td></td>
</tr>
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<td>.06***</td>
<td>14.19***</td>
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<tr>
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</tbody>
</table>

NOTE: COG=Cognitive Level, SKQ=Sexual Knowledge Questionnaire, LCE=Life Change Events, IMP=Impulsivity, PRG=Previous Pregnancy, REL=Religiousity, RC¹=Protestant, RC²=Catholic, SDR=Serious Dating Relationship, FWFR=Fit With Friends
²Dummy Coded
*p<.05, **p<.01, ***p<.001
Regression of Cognitive Level, Locus-of-control and Self-esteem on Contraceptive Problem-solving Skills and Birth Control Consistency

Table 22, page 137, shows the results of the regression of cognitive level with locus-of-control and self-esteem as moderators on contraceptive problem-solving skills. The model accounts for a significant amount of variance in $R^2 = .28$, $F(9,193) = 8.50$, $p < .001$. The simultaneous regression of cognitive level with locus-of-control and self-esteem as controls on contraceptive problem-solving skills, see Table 22 page 137, shows that cognitive level is not a significant predictor of contraceptive problem-solving skills. However, locus-of-control $F(9,193) = 3.64$, $p < .05$ is a significant predictor as is sexual knowledge, $F(9,193) = 16.40$, $p < .001$ and sex, $F(9,193) = 16.27$, $p < .001$ are significant predictors of contraceptive problem-solving skills.

In the hierarchical regression, see Table 23 page 138, data show that cognitive level is not a significant predictor of contraceptive problem-solving skills, $F(9,193) = 3.60$, $p > .05$ level but is significant at the $p < .10$ level. Locus-of-control, $F(9,193) = 4.92$, $p < .05$; sexual knowledge, $F(9,193) = 42.89$, $p < .001$ and sex, $F(9,193) = 20.51$, $p < .001$ are also significant predictors of contraceptive problem-solving skills. The variance ($sr^2$) for each
Independent variable is also provided in Tables 22 and 23 pages 137 and 138, respectively.

This regression model was next performed on birth control consistency scores. The model accounted for a significant amount of variance in birth control consistency, $R^2=.13$, $F(9,174)=2.90$, $p<.01$ as shown in Table 24, see page 139. The simultaneous regression in Table 24, see page 139, shows that locus-of-control, $F(9,174)=3.80$, $p<.05$ is a significant predictor of birth control consistency as is self-esteem, $F(9,174)=8.57$, $p<.01$. However, cognitive level is not a predictor of birth control consistency in this regression.

In the hierarchical regression in Table 25 page 140, the data show that cognitive level is a significant predictor of birth control consistency, $F(9,174)=5.29$, $p<.05$. Self-esteem also predicts birth control consistency, $F(9,174)=13.22$, $p<.001$. No other variables predict birth control consistency in the hierarchical regression. The variance ($sr^2$) of each variable in the simultaneous and hierarchical regression are shown in Tables 24 and 25, pages 139 and 140, respectively.
Table 22

Simultaneous Regression of Cognitive Level, LOC and SE on Total Contraceptive Problem-solving Score

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NOTE: COG=Cognitive Level, LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge, REL=Religiosity, PRG=Previous Pregnancy, LCE=Life Change Events

***p<.001
### Table 23

**Hierarchical Regression of Cognitive Level, LOC and SE on Total Contraceptive Problem-solving Score**

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**NOTE:** COG=Cognitive Level, LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge, REL=Religiousity, PRG=Previous Pregnancy, LCE=Life Change Events

***p<.001
Table 24

Simultaneous Regression of Cognitive Level, LOC and SE on Birth Control Consistency Score

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NOTE: COG=Cognitive Level, LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge, REL=Religiousity, PRG=Previous Pregnancy, LCE=Life Change Events
*p<.05, **p<.01
Table 25

Hierarchical Regression of Cognitive Level, LOC and SE on Birth Control Consistency Score

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<th>n</th>
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NOTE: COG=Cognitive Level, LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge, REL=Religiousity, PRG=Previous Pregnancy, LCE=Life Change Events
"p<.05, ""p<.01, "***p<.001
Summary

In summary, the model, shown in Tables 16 and 17 contributed a significant amount of variance in total contraceptive problem-solving skill behavior. For hypothesis one, cognitive level was not a significant predictor of contraceptive problem-solving skills in the hierarchical regression; however, sexual knowledge and sex were shown to be significant predictors of contraceptive problem-solving skills. The same model, shown in Tables 18 and 19, accounts for a significant amount of variance in birth control consistency behavior; and cognitive level does significantly predict birth control consistency. Lastly, sexual knowledge and sex are the best predictors of contraceptive problem-solving skills.

When the simultaneous regression, with the same combination of variables was run on non-contraceptive problem-solving skills, it was found that cognitive level, age, sex and religiousity are all significant predictors of non-contraceptive problem-solving skills. The hierarchical regression showed that cognitive level, sex, age, religiousity, as well as sexual knowledge are the best predictors of non-contraceptive problem-solving skills.
When the model was run with cognitive level, locus-of-control, self-esteem and controls, cognitive level was still not a significant predictor of contraceptive problem-solving skills, only sexual knowledge and sex were found to be predictors of contraceptive problem-solving skills. The hierarchical regression showed that sexual knowledge, sex as well as locus-of-control were significant predictors of contraceptive problem-solving skills. When the same model was run on birth control consistency scores, only locus-of-control and self-esteem in the simultaneous regression and cognitive level and self-esteem in the hierarchical regression were significant predictors.
HYPOTHESIS TWO: If locus-of-control and self-esteem influence contraceptive problem-solving skills and consistent contraceptive behavior, then adolescents who have higher internal control and higher self-esteem will be more likely than other adolescents to have higher contraceptive problem-solving skills and more consistent contraceptive behavior.

Regression analyses were performed on contraceptive problem-solving skills and birth control consistency scores with locus-of-control and self-esteem as the significant predictor variables without cognitive level. Locus-of-control and self-esteem were related to the criterion variables in various degrees. Table 26, page 144, shows that the model significantly accounted for $R^2 = .28$ of the variance in contraceptive problem-solving skills, $F(8, 214) = 10.51, p < .001$. Table 26, 144, shows the results of the simultaneous regression on contraceptive problem-solving skills. Locus-of-control significantly predicts contraceptive problem-solving skills, $F(8, 214) = 4.08, p < .05$, as does sexual knowledge, $F(8, 214) = 21.29, p < .001$ and sex, $F(8, 214) = 20.39, p < .001$. 
Table 26

Simultaneous Regression of LOC and SE, with Controls, on TC

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</table>

NOTE: LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge Questionnaire, REL=Religiousity, IMP=Impulsivity, PRG=Previous Pregnancy.
"p<.05, "***p<.001
No other variables predict contraceptive problem-solving skills.

When locus-of-control is entered first in the hierarchical equation, shown in Table 27 page 146, it is a significant predictor of contraceptive problem-solving skills, $F(8,214)=5.40$, $p<.05$ as is sexual knowledge, when entered third $F(8,214)=51.37$, $p<.001$ and sex, entered fifth, $F(8,214)=23.58$, $p<.001$. The amount of variance each independent variable contributes to the total $R^2$ is shown in Tables 26 and 27, pages 144 and 146, respectively.

When the regression was performed on birth control consistency scores, with the same controls, as shown in Table 28 page 147, the model accounts for a significant amount of the variance in birth control consistency scores, $R^2=\cdot13$ $F(8,195)=3.61$, $p<.001$. Table 28, page 147, also shows the results of the simultaneous regression of locus-of-control and self-esteem with controls on birth control consistency. Both locus-of-control, $F(8,195)=4.63$, $p<.05$ and self-esteem, $F(8,195)=16.85$, $p<.001$ significantly predict birth control consistency. No other variables predicted birth control consistency.

When the hierarchical equation was performed, shown in Table 29, page 148, with locus-of-control entered first
Table 27
Hierarchical Regression of LOC and SE, with Controls, on TC

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NOTE: LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge Questionnaire, REL=Religiosity, IMP=Impulsivity, PRG=Previous Pregnancy.
*p<.01, ***p<.001
**Table 28**

Simultaneous Regression of LOC and SE, with Controls, on BCCS

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**NOTE:** LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge Questionnaire, REL=Religiosity, IMP=Impulsivity, PRG=Previous Pregnancy.

*p<.05, ***p<.001
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<tr>
<td>REL</td>
<td>-.121</td>
<td>.00</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMP</td>
<td>.073</td>
<td>.00</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRG</td>
<td>-.454</td>
<td>.00</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-6.194</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

NOTE: LOC=Locus-of-Control, SE=Self-Esteem, SKQ=Sexual Knowledge Questionnaire, REL=Religiosity, IMP=Impulsivity, PRG=Previous Pregnancy.

*p<.05, **p<.001
and self-esteem second, locus-of-control was not a significant predictor of birth control consistency $F(8,195) = .46, p > .05)$. However, self-esteem was found to be a significant predictor of birth control consistency $F(8,195) = 21.12, p < .001$. No other variables significantly predicted birth control consistency in the hierarchical equation. The variance ($sr^2$) for each variable in the regression analyses are shown in Tables 28 and 29, pages 147 and 148, respectively.

**Summary**

In summary, the results in the simultaneous and hierarchical regressions that indicate that locus-of-control is a significant predictor of contraceptive problem-solving, as well as sexual knowledge and sex but not self-esteem.

The simultaneous regression of the same combination of variables on birth control consistency scores shows that locus-of-control and self-esteem are significant predictors of birth control consistency, with self-esteem the best predictor of birth control consistency. In the hierarchical regression of locus-of-control and self-esteem on birth control consistency, the data show that self-esteem and sexual knowledge are significant predictors of birth control consistency but locus-of-control was not.
HYPOTHESIS THREE: If an adolescent's consistent contraceptive behavior is influenced by his/her peers' consistent sexual and contraceptive behavior, then as peers' consistent sexual and contraceptive behavior increases than the adolescent's contraceptive consistency behavior will also increase.

A multiple regression analysis was performed on birth control consistency scores with peer influence as the key predictor variable, shown in Table 30, page 151. The complete model does not accounted for a significant amount of variance in birth control consistency, $R^2=.08$, $F(5,147)=1.37$, $p>.05$. In the simultaneous regression, as shown in Table 30, page 151, sex, $F(8,147)=4.59$, $p<.05$ is the only significant predictor of birth control consistency. The only significant predictor of birth control consistency in the hierarchical equation was age $F(8,147)=6.00$, $p<.05$ (see Table 31, page 152). No other variables were significant predictors in either equation.
Table 30

Simultaneous Regression Analysis of PICS, with Controls, on BCCS

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>(sr^2)</th>
<th>F(7,98)</th>
<th>(R^2)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1.37</td>
<td>.09</td>
<td>156</td>
</tr>
<tr>
<td>PICS</td>
<td>.130</td>
<td>.01</td>
<td>1.24</td>
<td></td>
<td></td>
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<tr>
<td>AGE</td>
<td>.402</td>
<td>.03</td>
<td>4.59*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX</td>
<td>.683</td>
<td>.01</td>
<td>1.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKQ</td>
<td>.022</td>
<td>.00</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FWF</td>
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<td>.00</td>
<td>.32</td>
<td></td>
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</tr>
<tr>
<td>LCE</td>
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<td>.01</td>
<td>2.06</td>
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</tr>
<tr>
<td>PRG</td>
<td>-1.148</td>
<td>.02</td>
<td>2.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMP</td>
<td>.058</td>
<td>.00</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.488</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

NOTE: PICS=Peer Influence Consistency Score, SKQ=Sexual Knowledge Questionnaire, FWF=Fit With Friends, LCE=Life Change Events, PRG=Previous Pregnancy, IMP=Impulsivity.

*p.05
Table 31

Hierarchical Regression Analysis of PICS, with Controls, on BCCS

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>sr²</th>
<th>F(7, 98)</th>
<th>R²</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total F</td>
<td></td>
<td></td>
<td>1.37</td>
<td>.09</td>
<td>156</td>
</tr>
<tr>
<td>PICS</td>
<td>-.130</td>
<td>.01</td>
<td>2.12</td>
<td></td>
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</tr>
<tr>
<td>AGE</td>
<td>.402</td>
<td>.04</td>
<td>6.00*</td>
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<td></td>
</tr>
<tr>
<td>SEX</td>
<td>.683</td>
<td>.00</td>
<td>.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKQ</td>
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<td>.00</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FWF</td>
<td>-.095</td>
<td>.00</td>
<td>.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCE</td>
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<td>.01</td>
<td>1.75</td>
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</tr>
<tr>
<td>PRG</td>
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<td>.02</td>
<td>2.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMP</td>
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</tr>
<tr>
<td>Constant</td>
<td>2.488</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

NOTE: PICS=Peer Influence Consistency Score, SKQ=Sexual Knowledge Questionnaire, FWF=Fit With Friends, LCE=Life Change Events, PRG=Previous Pregnancy, IMP=Impulsivity.

*p.05
Summary

In summary, consistent peers sexual and contraceptive behavior (PICS) is not a significant predictor of birth control consistency. The simultaneous and hierarchical regressions show that age is the best predictor of birth control consistency.

Conclusions

This study tested three issues: 1) the relationship between cognitive level and total contraceptive problem-solving skills and birth control behavior, 2) the relationship of locus-of-control and self-esteem to total contraceptive problem-solving skills and birth control behavior and 3) the contribution of peer sexual and contraceptive behavior to birth control behavior.

The data documented the association stated in hypothesis one that cognitive level is related to consistent birth control behavior; however, cognitive level does not predict contraceptive problem-solving skills even when locus-of-control and self-esteem are removed from the equation.

Hypothesis two was partially supported by the data, also. The results show that contraceptive problem-solving skills are related to locus-of-control but not to self-
esteem. The data also show that in the hierarchical regression that self-esteem and not locus-of-control is a predictor of birth control behavior.

Hypothesis three was not supported by the data. Consistent peer sexual and contraceptive behavior does not predict subjects' birth control consistency. Subjects birth control behavior was not related to peers' sexual and contraceptive behavior.
CHAPTER V
DISCUSSION AND IMPLICATIONS

Introduction

In the past decade, increasing adolescent sexual activity and pregnancy have paralleled a growing research interest in contraceptive problem-solving skills and consistent contraceptive use. Adolescents have long been known for their behavioral inconsistencies and unpredictability in contraception (Chilman, 1979; Delameter & MacCorquodale, 1979). It has been suggested that developmental variables may have an integral function in consistent contraceptive behavior (Jorgensen & Sonstegard, 1984; Urberg, 1982). A cognitive link has been suggested as an important consideration in determining the connections between contraceptive information, the anticipation of the consequences of unprotected sexual intercourse and consistent contraceptive use.

This study examined three issues: 1) the relationship between cognitive level, contraceptive problem-solving skills and consistent contraceptive behavior, 2) the
relationship between locus-of-control, self-esteem and contraceptive problem-solving skills and consistent contraceptive behavior; 3) the relative contribution of peer sexual and contraceptive influence on subjects' birth control behavior.

This chapter focuses on the discussion of the findings, implications and suggestions for future research and education.

Discussion of the Findings

The study of the factors which influence adolescent contraceptive problem-solving skills and consistent contraceptive use provide us with rich data for understanding early, unintended pregnancies. Cognitive level, gender, age, sex, locus-of-control, self-esteem and sexual knowledge all influence the different criterion variables in varying degrees. Cognitive differences emerged on consistent contraceptive use; while, sexual knowledge and gender differences emerged as significant on contraceptive problem-solving skills.

Demographic Characteristics

One of the strengths of this study is the inclusion of 14-18 years olds who were drawn from a public school system. The study included subjects who were not sexually active (38%); adolescents who are sexually active (68%); a non-clinic sample of adolescents who have been pregnant
(20%); male subjects (27%), as well as adolescents who were 14 years of age or younger (22%). The sample population was composed of primarily White, non-clinic, suburban/rural subjects (68%) in comparison to other studies examining contraceptive problem-solving skills and consistent contraceptive behavior which have primarily targeted Black, inner city females (Flaherty, Marecek, Olsen & Wilcove, 1983; Sachs, 1985). Furthermore, even though fifty-seven percent of the sample could not indicate yearly family income, the sample reflects a working class population with a mean yearly family income of $30,000. The low mean yearly family income along with the mean level of cognitive development, $M=11.58$, $SD=3.9$, is reflective of other research that has shown that children of low economic status are later in developing advanced cognitive skills (Kohlberg, 1969; Kohlberg & Zigler, 1967).

**Dependent Variables**

Total contraceptive problem-solving scores were a composite score of planning steps to reach a goal, generating alternatives to an action and generating consequences to a problem. On the average subjects could only identify one step to reach a goal, 1.7 alternatives to an action and 1.8 consequences to a problem. These are very low scores in comparison to Flaherty, Marecek, Olsen
and Wilcove's data (1983) that indicates subjects average scores were 5.82 on the MEPS, 5.4 on generating alternatives and 8.85 on anticipating consequences. The difference could be explained by the fact that their study incorporated several stories in each of the three problem-solving tasks, and they used generic problem-solving situations in which students may have had more interest and experience.

These subjects were typical in their inconsistent use of contraception. Subjects infrequently used birth control for the last 7-12 months exhibited by a mean BCCS score of 3.4 (SD=3.1). Only thirty-five percent of the sample reported using consistent contraception. This is comparable to past research. Through the years, research that has examined consistency in contraceptive use has shown that 60-70% of teenagers who have had intercourse do not use birth control consistently (Cvetkovick, Grote, Bjorseth & Sarkissian, 1975; McDonald, 1970; Kantner & Zelnik, 1971; Scales, 1977; Scholfeld, 1965; Smith, 1984; Sonnenstein, 1987; Sorensen, 1973; Zelnik & Kantner, 1977).

Cognitive Level

Inhelder and Piaget (1958) have hypothesized that as one moves through adolescence, cognitive level progresses from concrete operations to formal operations. The data
presented in Table 8 support this conclusion. A significant but weak relationship is shown between cognitive level and age. However, the mean for cognitive level (11.58) falls well within the high concrete stage (8-14 points) on the Arlin Test of Formal Reasoning (Arlin, 1984). This indicates that subjects generally can perform formal tasks with some evidence of a systematic approach to problems but are not able to form a general rule or abstraction from these problems. Subjects show ability to classify and organize information but little ability to make inferences (Arlin, 1984). In comparison, the mean of this study is lower than means for the suburban middle school (n=1480, M=13.59) and high school (n=2,7555, M=16.86) samples provided by Arlin (1984). Arlin's samples were drawn from California, Maine, Massachusetts, New York, Oregon and Washington. Mid-west samples were not included in the final revision of the measure. The national norms provided by Arlin (1984) may not be representative of youth across the United States. Thus, the scores from this study may be indicative of working class mid-west samples.

An interesting preliminary finding is the weak yet significant relationship between cognitive level and birth control consistency (r=.15, p<.05). This indicates that as cognitive level increases, birth control
consistency also increases. This supports previous research that states that a higher stage of cognitive development indicates increased ability to foresee the future and anticipate consequences. The practical application of this theory is seen in the relationship between COG and BCCS. Subjects with higher levels of COG have higher levels of BCCS and, therefore, are more likely to anticipate and foresee the consequences of unprotected intercourse.

**Self-esteem and Locus-of-Control**

The moderate negative relationship between self-esteem and locus-of-control ($r = -0.31, p < 0.001$) is supported by research which indicates that subjects who feel that they are worthwhile are more likely to take control of their lives (Chilman, 1980; Maskay & Juhasz, 1985; Wylie, 1961). It is also interesting to note that SE increased with age and grade level. This is supported by other research that indicates that older adolescents are more likely to feel worthwhile due to increased participation in activities that would build good feelings about oneself as happens when one grows older and begins to participate in activities that are self-choosen (Donaldson, 1974; Coopersmith, 1987). However, the mean (55) is lower and the standard deviation (20.86) is higher than reported national norms ($M = 70-80$, $SD = 11-13$) (Coopersmith, 1987).
However, it is difficult to compare national norms to a small mid-western suburban/rural town. Perhaps the national norms had experienced more activities that affected self-esteem and locus-of-control.

**Previous Pregnancy**

As can be expected, previous pregnancy is strongly related to previous children \((r=.60)\). This, is of course easily understood and needs no further discussion.

**Serious Dating Relationship**

Research has noted that the more serious the dating relationship, the more likely the couple is to engage in sexual intercourse (Delameter & MacCorquodale, 1979). Forty percent of the subjects indicated being in a serious dating relationship. Serious dating relationship does show a significant moderate relationship to PRG \((r=.20, p<.001)\) and children \((r=.23, p<.001)\). This, too, is logical and needs no further explanation.

**Hypotheses**

Focusing on a high school sample of adolescents, this research shows that cognitive level does influence birth control consistency, but different psychosocial variables serve to moderate this effect. Total contraceptive problem-solving skills scores ranged from 0-14, \(M=4.80, SD=2.57\) and total non-contraceptive problem-solving scores ranged from 0-11, \(M=4.45, SD=2.10\). Contraceptive problem-
solving skills increase with an internal orientation as was hypothesized. A person's contraceptive problem-solving skills are influenced more by locus-of-control than self-esteem. However, birth control consistency is influenced by cognitive level and more by self-esteem than locus-of-control. As self-esteem increases from low (12) to high (100), birth control increases. Peer influence did not influence birth control consistency.

**Hypothesis One.** The data did not support the hypothesis which stated that cognitive level is a significant predictor of contraceptive problem-solving skills at the p<.05 level. This is a finding contrary to previous research. There were not enough subjects that scored high enough on cognitive level to show a significant relationship to contraceptive problem-solving skills. Ninety-five percent of the subjects scored 17 or lower on the measure of cognitive development. Scores on the measure ranged from 1-26; these scores indicate a high concrete and transitional cognitive levels. Only five percent of the scores fell into the low formal-high formal stages. Scores on the ATFR that fall below 17 do not yet indicate consistency of performance of formal reasoning skills.

This finding can also be explained in part by the fact that the contraceptive problem solving skills measure
higher level formal thinking skills, such as anticipating consequences and futuristic thinking, that this particular sample did not exhibit in this measure of cognitive level. The mean score (M=11.58) indicates the ability to classify and organize information but provides little evidence of the ability to make inferences, to anticipate the future and predict consequences; the kind of performance required in the contraceptive problems in this study.

Methodological concerns may provide further clues to this finding. Flaherty, Marecek, Olsen and Wilcove (1983) examined problem-solving skills by using problem-solving situations that reflected topics that would engage the interests of adolescent girls and not situations that directly reflect thinking about contraceptive use. Their assumption was that problem-solving skills are "generic and applicable not only to the domain of particular interest but to all domains involving interpersonal interactions (Flaherty, Marecek, Olsen & Wilcove, 1983, p.55)." Clearly, the present research does not support this assumption. Only .01 percent of the variance in total contraceptive problem-solving skills was contributed by cognitive level. Wheras, cognitive level contributed .06 percent of the variance in total non-contraceptive problem-solving skill scores; this suggests other factors are contributing to contraceptive problem-solving skills.
Emotionally sensitive issues may also have interfered with the problem-solving process. In addition, the scoring of the problem-solving tasks may have been performed differently. Little direction was provided by Flaherty, Marecek, Olsen and Wilcove (1983) on the specific scoring procedures that they used. Differences in scoring may inflate scores and indicate an effect when there is actually none. They also did not measure cognitive level in their study.

Furthermore, Sachs' (1985) study examined cognitive level using a different measure by Leskow and Smock (1970). She also only examined means/end thinking and alternative task situations and did not include consequential tasks in the summative score. Both Flaherty, Marecek, Olsen and Wilcove (1983) and Sachs (1985) also had subjects answer more than one problem in each of the problem-solving tasks presented in their respective studies. Sachs found that problem-solving abilities were different for alternative thinking tasks on the non-contraceptive and contraceptive situations. The present research does not support Sachs (1985) data on the differences on alternative tasks. Differences were found in this study on consequential tasks in the two situations. Although Sachs indicated that cognitive level was the best single predictor of problem-solving skills,
stage of cognitive level was not described by Sachs nor were range of scores provided. Rogel and Peterson (1979) also only examined consequences to contraceptive problems and Stienlauf (1979) operationalized problem-solving skills as only generating options (alternatives) and did not include means/end or consequential tasks.

Consequently, consideration must be given to the fact that these cognitive skills, e.g. planning steps to reach a goal, generating alternative to a problem and generating consequences to an action, may not be universally applied to all domains of thinking. Perhaps what is shown by this data is an aspect of Inhelder & Piaget's (1958) concept of horizontal decalage: the application of cognitive structure to one content area but not to others. Researchers have also cited that the age at which formal operations begins and stabilizes varies according to intelligence level, socioeconomic status, cultural background, amount of schooling and experience (Inhelder & Piaget, 1958; Manaster, 1977). According to Piaget, the formal structure necessary to allow the level of thinking, e.g. thinking about the possible as well as the actual, required in these contraceptive problem-solving tasks, may not yet be attained, evidenced by the low scores on the cognitive level measure.
Inhelder and Piaget (1958) stress that it is only in the face of appropriate data and experience and not outside these conditions that these skills or levels of abstraction will develop. Sexuality is usually a hidden, undiscussed aspect of American culture. Contraceptive problem-solving tasks, especially consequences, that teens need to fully understand most are not often discussed in rational situations thus, adolescents are unprepared for such personal, emotional and analytical thinking about themselves. This is supported by research by Cvetkovich, Grote, Bjorseth and Sarkissian (1975) who found that adolescents were unprepared for unemotional analytical thinking about themselves.

Other factors may have affected these results. Accurate measurement of cognitive level and problem-solving skills may have been affected by motivation, emotional factors, fatigue, anxiety and the testing environment (Flavell, 1977). The cognitive measure was administered the second day of testing and by then subjects may have lost interest and motivation to participate. The problem-solving situations were also administered during the last part of the first day. Fatigue and emotional stress over the sensitive nature of the questions could have affected accurate and complete responses.
However, cognitive level was found to be a significant predictor of birth control consistency as was hypothesized. Actually using birth control, not deciding to use it, is a very concrete action and does not require the ability to make inferences or foresee the future to the same degree as does contraceptive problem-solving skills.

Gender contributes significantly to prediction of contraceptive problem-solving skills and provides .06 percent of the variance in the total $R^2$. Females are better at problem-solving in emotionally sensitive situations than are males. Gender specific cultural expectations, as well as more females in the sample may have influenced this finding.

Regression analysis of cognitive level on total non-contraceptive problem-solving skills must be discussed at this point because they provide results which are contrary to results on contraceptive problem-solving skill situations. Cognitive level, as well as sex, age, sexual knowledge and religiousity do significantly influence total non-contraceptive problem-solving skills. Cognitive level and sex each provide .06 percent of the variance in total non-contraceptive problem-solving skills; sexual knowledge provides .05 percent of the variance; religiousity .02 percent of the variance. Total non-
contraceptive problem-solving situations, as seen in Appendix B, are situations that adolescents normally confront and address via moralistic teachings in our society. Adolescents are directed to address and to manage these situations with socially acceptable behaviors; whereas, the contraceptive situations are not addressed overtly or explicitly in our society or educational system. The adolescents surveyed in this study have not progressed in their formal operational skills to suggest a relationship between cognitive level and contraceptive problem-solving skills as far as Piaget would have suggested. In addition, it would seem that cognitive level and contraceptive problem-solving skills and contraceptive behavior cannot be examined without a simultaneous examination of important psycho-social variables. Locus-of-control and self-esteem appear to intervene in contraceptive problem-solving. The best level of reasoning about contraception as well as contraceptive behavior depends on important psychological variables, e.g. locus-of-control and self-esteem, respectively, that individuals experience. Perhaps, with more hypothetical experience, as suggested by Inhelder and Piaget (1958), problem-solving skills in this sensitive area would increase.
The immature adolescent may desire sexual intercourse, be cognizant of forces which oppose it, but at this same time not be intellectually capable of autonomous reasoning. Adolescents who are more informed concerning their sexuality may lack the cognitive skills to engage in independent sexual decision-making. Adolescents may need help in learning to make decisions about sex wisely, especially with respect to contraception. Examining problem-solving approaches seem particularly applicable to understanding adolescents' response to contraceptive problems (Committee on Adolescence, 1986). Cobliner (1974), Cobliner et al. (1975) noted that effective contraceptive use by adolescent girls was possible only when they had reached the stage of formal operational thinking as described by Inhelder and Piaget (1958). Following Piaget's developmental theory, the ability to reason abstractly and to anticipate consequences without having to experience the outcome is more difficult for sexually active early adolescents. Consequently, the full impact of their sexual behavior and contraceptive use is harder for them to comprehend. Most teens are not good at planning or thinking ahead and making the connections between present actions and the real consequences of these actions. Children of low socioeconomic status are on the average even later in
developing this capacity (Kohlber, 1969; Kohlberg & Zigler, 1967). Evidence of this difficulty is demonstrated by an earlier study that compared a group of trained adolescents and a controlled group of adolescents on effective contraceptive use. The group of trained adolescents were provided with contraceptive information, steps for problem-solving and practice in communicating about decisions concerning their sexuality. At the six month follow-up, the group of trained teenagers had better attitudes toward family planning and were practicing more effective contraception than were the young people in the controlled condition (Schnike, Blythe, Gilchrist, 1981). Vincent, Clearie and Schuchter (1987) show similar findings in a study of intervention and education efforts in South Carolina. These efforts targeted public school children, parents, teachers, ministers and community leaders and focused on decision-making and communication skills, self-esteem enhancement and sexual knowledge. The estimated rate of pregnancy declined over a five year period (Vincent, Clearie & Schuchter, 1987). Contraceptive problem-solving and consistent contraceptive use requires a combination of knowledge and cognitive problem-solving skills appropriate to the cognitive developmental capacities and needs of the adolescent. The adolescents in this study apparently do not have the necessary
cognitive skills or experience in contraceptive problem-solving to use the sexual information that they have acquired to problem-solve in contraceptive situations. The general inability of this sample to plan and foresee behavioral implications leads to greater risk taking and thus greater vulnerability to the consequences.

**Hypothesis Two.** This hypothesis was supported, in part, by the results. Locus-of-control, but not self-esteem was found to be a significant predictor of contraceptive problem-solving skills; however, locus-of-control and self-esteem are significant predictors of birth control consistency.

Subjects who believe that they have control over their lives manifested more goal directed contraceptive problem-solving behavior. The results indicate that those who are more internal are more likely to plan steps to reach a goal, and to generate alternatives and consequences related to contraceptive situations. These subjects can see a relationship between their actions—using contraception—and outcomes—preventing conception. Self-esteem, however, is not a significant predictor of total contraceptive problem-solving skills. Sachs (1985) reports similar findings even when she used an index of sex determination composed of self-esteem and locus-of-control. This is hard to explain. Perhaps this finding
may be accounted for by the fact that subjects who exhibit greater feelings of inadequacy or unworthiness, exhibited by low self-esteem, may not perceive themselves in a positive perspective and thus do not possess the emotional self-confidence in themselves to provide or consistently access viable information in contraceptive problem-solving situations. Again, it must be noted that self-esteem is relatively instable at this age (Gesell, Ilg & Ames, 1953; Ellis & Davis, 1982; Stevens, 1975) and this fact may help explain this finding.

Locus-of-control and self-esteem were found to be significant predictors of birth control consistency. Subjects who exhibit an internal orientation are more frequent users of birth control. This is similar to findings by Stienlauf (1979) and Fox (1975). Lack of control over one's life indicates decreasing ability to use contraception. Adolescents adopt an attitude that they cannot control what happens to them in their lives. The magnitude of the relationship between locus-of-control and consistent contraceptive use is lower than between self-esteem and consistent contraceptive use and is similar to other research (Harvey, 1976).

The variable that emerged as an important predictor of consistent contraceptive use, though, is self-esteem. Adolescents who view themselves as worthwhile and in
control of their lives exhibit high self-esteem and are more likely to take appropriate actions to prevent conception. This may indicate a general acceptance of one's own sexuality. This is supported by previous research by Riess (1975) and Kantner and Zelnik (1973). This finding along with the finding that birth control consistency improves with age suggests that younger teenagers may be poorer users of contraception because of a lower sexual self-concept. Strategies that would increase sexual self-esteem would also be more likely to increase consistent birth control. The adolescents who view themselves as valued and are also exposed to cultural perceptions of those who conceive during adolescence as less valued may decide to take action to prevent pregnancy. Subjects may equate unprotected intercourse as harmful to the self. Not wishing to harm the self, birth control is practiced more consistently. Thus, maintaining worthwhile self-perceptions. This finding is consistent with Zongler's data (1977).

**Hypothesis Three.** The results did not support the hypothesis that BCCS is influenced by peers' consistent sexual and contraceptive behavior. PICS was also measured by subjects' perceptions of friends behavior and measured differently than BCCS. PICS is a combination of subjects' perception that their friends are sexually active and use
birth control. However, BCCS is a composite score of one's own birth control use and length of time using birth control. Length of time using birth control was not a component in peer influence. Erroneous beliefs about friends' behavior and the wish to embellish one's own behavior may have influenced these results.

Research has indicated that teens are more influenced by peers' attitudes concerning issues surrounding sexual behavior than parental or other adults attitudes (Herold & Goodwin, 1981; Sebald, 1986). However, when measuring actual behavior, the results in this study do not support the findings from other research that teens' sexual behavior is influenced by peers' sexual and contraceptive behavior. A recent study of undergraduates by Sachs, Billingham and Howard (1987) did find evidence that peers' contraceptive behavior does influence subjects' contraceptive behavior; but, as the evidence in this study suggests, this relationship does not hold in a younger adolescent population. This supports research by White (1987) who found that there was no relationship between best friends using contraception and subjects' birth control use. Other research has found that adolescents attach a lesser amount of influence to peers than to parents when obtaining and using contraception (Nathanson and Becker, 1986). Although
Baker, Thalber and Morrison (1988) examined only parental behavioral norms and adolescents contraceptive use, they found that parental behavioral norms (expectations that contraception would be used) accounted for 33% of the variance in adolescent contraceptive use. Other research suggests that if parents are unavailable to a teen then they rely upon peers' attitudes and support regarding contraceptive use (Nathanson and Becker, 1986).

The insignificant relationship between peer influence and subjects' birth control consistency has important implications. Those parents who fear peer sexual and contraceptive behavior impacts greatly upon adolescents' contraceptive behavior might be relieved to know that, at least in this sample, adolescents aged 14-18, are not as influenced by perceptions' of peers' behavior as we have been led to believe. The evidence suggests that other variables such as psychological, emotional and knowledge contribute to consistent contraceptive behavior.

Looking at this finding along with the evidence concerning locus-of-control and self-esteem, adolescents who feel in control of their lives and feel worthwhile may not be as likely to be influenced by perceptions' of peers' behavior. This is a question to be examined in another study.
Implications

Research

The paucity of research on the relationship of cognitive level and contraceptive problem-solving skills and consistent contraceptive use allows for more opportunity to explore this question. Future investigations might bridge gaps left by the present research. Further studies of larger samples with high levels of SES, training, cognitive development and assessed under more favorable testing conditions would help to isolate the contribution of problem-solving skills and the benefits of specific sexual information. While numerous studies examine females sense of responsibility in contraceptive decision-making (Scales, 1977) fewer studies focusing on just male responsibility in sexual and contraceptive decision-making exist (Cvetkovich, Grote, Bjorseth & Sarkissian, 1975). This suggest studies with larger samples of males. In addition, a closer look at gender differences is needed. There appears to be differences on self-esteem and birth control consistency for males and females. Females scored higher on these measures. An examination of factors which influence females and males sexual self-esteem and birth control consistency is needed. Research utilizing longitudinal designs would help to assess the degree of influence
cognitive level has on these outcome variables. Assessing the level of cognitive development and problem-solving skills over time may help to indicate an optimum time for the introduction of contraceptive information and contraceptive problem-solving skills which are associated with consistent contraceptive use. There is also a need to examine these variables in subjects who are exposed to contraceptive problem-solving tasks and sexual information as is done with other less sensitive social issues, e.g. friendship, dating, sharing, or stealing. Refining the problem-solving situations may also help to explore the question this study set out to examine. A closer examination of a subset of older adolescents in this study may show that cognitive level is a powerful predictor of contraceptive problem-solving skills.

Study of adolescents' interactions, communication patterns, problem-solving strategies, and decision-making styles need to be examined to determine how responsible sexual attitudes and behaviors are transmitted and internalized.

The difficulties of obtaining data on very young teenagers (14 and younger) still provides problems in answering the questions on age specific or developmental differences on contraceptive problem-solving skills. It is unlikely that a clear understanding of the effect of
cognitive level can be generated in the absence of this type of research.

The wide variety of family and peer influences that may show a relationship to adolescent sexual and contraceptive behavior suggests that it is a complex multidetermined issue. Some research has examined the relative influence of parental and peer sexual and contraceptive attitudes on subjects' sexual and contraceptive attitudes and behavior; however, comparative designs which examine the influence of actual parental and peer contraceptive behavior on subjects' consistent contraceptive behavior is warranted.

Further research on the components of family which influence sexual socialization and contraceptive use may impact greatly on understanding the characteristics that distinguish adolescents who exhibit responsible sexual behavior and those who do not. Study of how and when knowledge and problem-solving skills are transmitted and under what conditions internalization occurs is needed. The entire family unit and peer group interactions, communication and problem-solving skills and governance styles need to be examined. Subsequent investigations should identify and operationalize the emotional components, e.g. lovelessness, guilt and anxiety, that precede
and influence contraceptive use. Investigation of other affective variables besides self-esteem need to be examined along with cognitive level and knowledge and the relationship to contraceptive problem-solving. This would provide insight into further understanding of contraceptive use.

Research must also seek out additional variables that might influence contraceptive problem-solving skills and consistent contraceptive behavior. The designation of focus groups that would examine, through qualitative designs, additional variables is needed.

Education

There is a need to call upon all those deeply concerned about young adolescents' futures and the future of our communities, to begin now to create learning atmospheres that prepare adolescents for their emerging sexuality. A climate of acceptance towards this preparation must be created in our communities.

The consequences of early pregnancy are best avoided through primary prevention (Gilchrist, Schnike, Blythe, 1979). Educators dealing with these questions should have training in problem-solving processes and knowledge of the cognitive levels of their students. In addition, focusing on educational strategies that only address generic problem-solving situations may not potentiate effective
pregnancy prevention efforts. This suggests training educators and adolescents in the identification and utilization of contraceptive problem-solving skills.

Educational programs and counseling groups that focus on sexual knowledge, problem-solving skills, enhancement of self-esteem and improving internal control have several advantages. When social, cognitive and psychological issues are addressed by these groups they can provide more opportunity to help improve adolescent contraceptive practice by addressing teens' views of their emerging sexuality (Vincent, Clearie & Schuchter, 1987). Also, group contexts in schools or human services can help reach a greater number of adolescents by utilizing peer knowledge and support. Cognitive, communication and self-esteem improvement strategies can tap synergetic skills for competently handling adolescent sexuality.

Ideally, sexual and contraceptive problem-solving should be an educational process in which programs offer information congruent with stage of cognitive development. A variety of cognitive, cultural, self-esteem and age related strategies should be considered in curriculum content. Discussion groups and other explicit educational strategies for helping adolescents acquire important sexual and contraceptive decision-making skills is needed. Research has shown that judgements aided by
previous exploration of the impact of a set of actions are less subject to error (Pitz & Sachs, 1984). The key to an effective educational program is the extent to which adolescents are helped to understand the basis for their decisions, why they do what they do, the consequences of their actions and to empower them with the confidence and self-esteem to follow through with their decisions.

**Summary**

A multitude of variables combine to predispose or precipitate effective contraceptive problem-solving skills and consistent contraceptive behavior. Much of the variance was left unaccounted for by the combination of the variables considered in this study. However, adolescent contraceptive problem-solving behavior is not totally random. Sexual knowledge and gender contribute 16% and 6%, respectively, of the variance in contraceptive problem-solving skill. Cognitive level contributes 3% of the variance in consistent birth control behavior. Locus-of-control, sexual knowledge and gender contribute 2%, 17% and 8%, respectively, of the variance in contraceptive problem-solving skill. Self-esteem and sexual knowledge contribute 8% and 2% of the variance in consistent birth control behavior. And, peer sexual and consistent contraceptive behavior does not contribute to consistent birth control behavior.
APPENDIX A

COMMUNICATIONS
Sue Saravalli  
301 Hampshire Road  
Plainsboro, NJ 08036

Dear Sue:

Please consider the attached stipulations, as outlined by Mike Crumley, concerning your dissertation research. When you have developed a disclosure form and have the survey instruments, please give me a call and we will set up a meeting with Mike and the principals.

Hope things are going well. Look forward to hearing from you.

Sincerely,

Heather

Heather Boggs  
Supervisor

HB:dlc  
cenc.
October 11, 1988

To: Heather Boggs  
From: Mike Crumley  
Subj: Sue Saravall’s dissertation research

I have reviewed the abstract and review of literature which you sent me. I am willing to consider the request with the following stipulations:

1. All principals involved must approve of the survey to be conducted within their buildings. Since they are responsible for their buildings, I will not presume to impose this type of activity upon them.

2. Teachers must approve of the survey to be administered to their students.

3. There must be a disclosure form produced which will advise parents of the purpose of the research, the nature of the questions and including parent permission for participation. No student will be forced to participate. I am aware that this creates a sampling problem for the research, but I see no alternative for a project of this kind.

4. The disclosure form and the actual survey instrument must be reviewed by me and the principals prior to approval of the project.

I will await further word from you after you have contacted Sue.

cc: Homer Evans  
    Gerald Gochenour
Dear Administrator,

Economic and social disadvantages of teenage pregnancy have convinced parents, educators and researchers that young people should postpone sexual activity until it is appropriate for them in their lives. We are working on a study at The Ohio State University on factors that are associated with responsible sexual decision-making, including contraceptive problem-solving.

Planned research exploring the impact of contraceptive problem-solving skills could add to our knowledge of the occurrence of adolescent pregnancy. Benefits of such research include: helping parents, teens, schools and agencies understand and design programs that focus on preventive strategies. In fact, researchers, who have designed and implemented programs to improve contraceptive problem-solving skills, have shown that these skills are effective in modifying sexual attitudes and behaviors.

We would like to have your students participate in this study. On one-third of the questionnaire your students will be asked to answer the questions on how your child feels about him/herself. Another third will deal with how your students reason. The last part will deal with how your students might solve hypothetical contraceptive and non-contraceptive situations. These situations have been made up to reflect the kinds of problems teens are likely to face today. The questionnaire will take approximately 70 minutes to complete over two days in-school.

All information obtained through this questionnaire will be strictly confidential. Neither your student's name or address will be connected with their answers to the questions.
If you wish to have your student's participate in this study, please read and complete the attached form and return it to the researchers.

Your Cooperation is greatly appreciated.

Sincerely,

Barbara Newman Ph.D.
Professor
Principal Investigator

Susan K. Saravalli
Graduate Student
THE OHIO STATE UNIVERSITY

PERMISSION FORM

I give my permission (for my child) to participate in research entitled:

Adolescent Problem-solving Skills

Dr. Barbara Newman or her authorized representative has (Principal Investigator)
explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described.

I realize that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child).

I have read and fully understand the permission form. I sign it freely and voluntarily. A copy has been given to me.

Date: ___________________ Signed: __________________ (Participant)

Signed: ___________________ Signed: __________________ (Principal Investigator or her authorized representative)

Signed: ___________________ Signed: __________________ (Parent or Guardian)

If you wish to receive results of this study please sign your name and address below, and the results will be sent to you at the conclusion of the study.

I wish to receive results of this study.

NAME ______________________

ADDRESS ______________________

CITY, STATE, ZIP ______________________
Dear Teacher,

Economic and social disadvantages of teenage pregnancy have convinced parents, educators and researchers that young people should postpone sexual activity until it is appropriate for them in their lives. We are working on a study at The Ohio State University on factors associated with responsible sexual decision-making, including contraceptive problem-solving.

Planned research exploring the impact of contraceptive problem-solving skills could add to our knowledge of the occurrence of adolescent pregnancy. Benefits of such research include: helping parents, teens, schools and agencies understand and design programs that focus on preventive strategies. In fact, researchers, who have designed and implemented programs to improve contraceptive problem-solving skills, have shown that these skills are effective in modifying sexual attitudes and behaviors.

We would like to have your students participate in this study. On one-third of the questionnaire your students will be asked to answer the questions on how your child feels about him/herself. Another third will deal with how your students think/reason. The last part will deal with how your students might solve contraceptive and noncontraceptive problem situations. These situations have been made up to reflect the kinds of problems teens are likely to face today. The questionnaire will take approximately 70 minutes to complete over two days in school.

All information obtained through this questionnaire will be strictly confidential. Neither your student's name or address will be connected with their answers to the questions.

If you wish to have your student's participate in this study, please read and complete the attached form and return it to the researchers.
If you wish to receive results of this study please sign your name and address below, and the results will be sent to you at the conclusion of the study.

Your cooperation is greatly appreciated.

Sincerely,

Barbara Newman Ph.D.
Professor
Principal Investigator

Susan K. Saravalli
Graduate Student

I wish to receive results of this study.

NAME______________________________________

ADDRESS____________________________________

CITY, STATE, ZIP__________________________________
THE OHIO STATE UNIVERSITY

PERMISSION FORM

I give my permission (for my child) to participate in research entitled:

Adolescent Problem-solving Skills

Dr. Barbara Newman or her authorized representative has explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described.

I realize that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child).

I have read and fully understand the permission form. I sign it freely and voluntarily. A copy has been given to me.

Date:______________Signed:_____________________

(Participant)

Signed: ______________________ Signed: ______________________
(Principal Investigator or her authorized representative)

If you wish to receive results of this study please sign your name and address below, and the results will be sent to you at the conclusion of the study.

I wish to receive results of this study.

NAME ______________________________________

ADDRESS ______________________________________

CITY, STATE, ZIP ________________________________
The Springfield City School system developed a human sexuality curriculum several years ago. Every few years this curriculum needs to be reviewed for its effectiveness and quality. We are doing a major study at The Ohio State University that will review and evaluate this program. This study will help the school in planning better programs for your child.

We would like to have your child participate in this study at Ohio State. Your child will be asked to answer questions in a survey. On one-third of the questionnaire your child will be asked to answer the questions on how your child feels about him/herself. Another third will deal with how your child solves problems. The last part will deal with how your child might solve make-believe contraceptive and noncontraceptive problem situations. These situations have been made up to reflect the kinds of problems teens are likely to face today. The questionnaire will take approximately 70 minutes to complete over two days in school.

All information obtained through this questionnaire will be strictly confidential. Neither your child's name or address will be connected with their answers to the questions. Your child's teacher will not know how your child answered any of these questions.

If you wish to have your child participate in this study, please read and complete the attached form and return it with your child to their teacher.

Your cooperation is greatly appreciated.

Sincerely,

Barbara Newman Ph.D.
Professor
Principal
Investigator

Susan K. Saravalli
Graduate Student
THE OHIO STATE UNIVERSITY

PERMISSION FORM

I give my permission (for my child) to participate in research entitled:

Adolescent Problem-solving Skills

Dr. Barbara Newman or her authorized representative has explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described.

I realize that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child).

I have read and fully understand the permission form. I sign it freely and voluntarily. A copy has been given to me.

Date: ___________________ Signed: ___________________

(Participant)

Signed: ___________________ Signed: ___________________

(Principal Investigator or her authorized representative)

If you wish to receive results of this study please sign your name and address below, and the results will be sent to you at the conclusion of the study.

I wish to receive results of this study.

NAME___________________________________________

ADDRESS_________________________________________

CITY, STATE, ZIP_________________________________
APPENDIX B

INSTRUMENTS
A Study of Adolescent Problem-solving Skills
Department of Family Relations and Human Development  
The College of Home Economics  
The Ohio State University  

Dear Study Participant,

Thank you for your willingness to participate in a study of adolescent problem-solving skills.

Please answer the questions on the following pages honestly and openly. Remember there are no "right" or "wrong" answers -- respond as you feel, believe or have experienced. Your school grades are not tied to your responses on this questionnaire. You are not required to answer any question(s).

Approximately one-third of your questions will deal with how you feel about yourself. Another third will deal with how you think. The last part will deal with how you might solve make-believe contraceptive and non-contraceptive problem situations. The questionnaire will take approximately 70 minutes to complete over two days.

All information obtained through this questionnaire will be strictly confidential. Neither your name or address will be connected with your answers to the questions.

Your cooperation is greatly appreciated.

Sincerely,

Barbara Newman, Ph.D.  
Professor  
Principal Investigator

Susan K. Saravalli  
Graduate Student
A Study of Adolescent Problem-solving Skills

Section 1: Directions - Please answer the following questions as honestly and as carefully possible. Answer them in the blanks provided. Please give only 1 (one) answer to each question. You do not have to answer a question, if you do not want to.

1. How old were you on your last birthday?____________

2. What is your sex?______Male ______Female

3. What grade in school are you now?____________

4. What is your religion? (check one)
   
   Protestant
   Jewish
   Baptist
   Other (specify)
   Atheist, Agnostic, None

5. How religious are you? (circle 1 answer)
   
   A. Very religious
   B. Somewhat religious
   C. Not religious

6. Your race: (check one)
   
   Black
   White
   Hispanic
   Other (specify)
   American Indian
   Asian-American
   Oriental

7. What is your family’s income? (check one)
   
   less than 5,000______ 25,000 to 30,000
   5,000 to 10,000______ 30,000 to 35,000
   10,000 to 15,000______ 35,000 to 40,000
   15,000 to 20,000______ 40,000 to 45,000
   20,000 to 25,000______ above 45,000

8. Are you in a serious dating relationship now? (circle 1 answer)
   
   A. Yes
   B. No

GO TO NEXT PAGE
9. Some students make decisions quickly, sometimes without thinking things through. Others take a very long time to make decisions; they like to consider all their options. Please circle the number below that shows which of these styles is most like you.

I make decisions slowly  I make decisions quickly

1  2  3  4  5  6  7

The following set of questions concern your opinions about your friends. Please answer as honestly as you can.

1) How important is it to fit in with what your friends are doing? (circle 1 answer)

Not Important  Very Important

1  2  3  4  5  6  7

2) Are your best friends sexually active? (circle 1 answer)

A. All of them
B. Some of them
C. None of them
D. Do not know

3) IF your friends are sexually active, do they use birth control? (circle 1 answer)

A. All the time
B. Some of the time
C. Not at all
D. Do not know

Please answer the following questions ONLY if you are sexually active (if you have had sexual intercourse). Otherwise, go on to Section 2 (two).

1. Do you use birth control each time you have sexual intercourse? (circle 1 answer)

A. Every time
B. Occasionally
C. Never

2. How long have you been using birth control? (circle 1 answer)

A. Less than one month
B. Between one (1) month and six (6) months
D. Between seven (7) months and twelve (12) months
E. More than one year
3. Have you ever been pregnant?
   A. No
   B. Yes

4. Do you have any children?
   A. No
   B. Yes
PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

199-213, Questionnaires
214-230, ATFR Test Booklet
APPENDIX C

SCORING PROCEDURES
Scoring Procedures for Problem-solving Situations

The three problem-solving indices were scored independently of one another by two trained evaluators who were blind to the subjects responses on the other portions of the survey. Means-end problem-solving situations were read through to evaluate the logic and consistency displayed in connecting the beginning and the end of the story. The stories were scored for number of relevant means (Platt & Spivack, 1977). A relevant 'means' is given one point. Each discrete step which is effective in enabling the hero of the story to reach the resolutions stage of the story or to overcome obstacles preventing the hero from reaching the goal in the story (Platt & Spivack, 1977).

Non-contraceptive and contraceptive alternative generating problem situations were scored according to the same criteria as the scoring of means-end problems. Each different alternative listed was given one point. A total score for each story is determined by summing the total alternatives provided in that story.

Scoring of the consequences problem situations varies from the previous two situations. If a disadvantage or disadvantage was identified then each discrete answer, which was logical to the problem, was given one point. If an outcome was also identified a point was given. If an
outcome was listed and no disadvantage or advantage was listed no point was given for the outcome. A raw score was determined by totaling all points given.

A total non-contraceptive and a total contraceptive score was determined by totaling the three separate scores in each category.
Peer Influence Consistency Score

A consistency score for peer influence was determined by combining the scores from the questions concerning 'friends are sexually active' and 'friends use birth control'. These scores were combined to indicate the combined influence of the increasing number of friends who are sexually active and using birth control. This variable was assigned a new name 'Peer Influence Consistency Score (PICS)'.

The ordinal scale was determined by focusing upon subjects' perception of number of their friends who are sexually active and who are consistent birth control users. This scale indicates the increasing number of friends who are sexually active and consistent birth control users. The scale was determined by combining the scores on FSA and FBC and assigning the following values to each level: if FSA = 1 and FBC = 1 then PICS = 9, if FSA = 3 and FBC = 3 then PICS = 8, if FSA = 2 and FBC = 3 then PICS = 7, if FSA = 3 and FBC = 2 then PICS = 6, if FSA = 2 and FBC = 2 then PICS = 5, if FSA = 3 and FBC = 1 then PICS = 4, if FSA = 2 and FBC = 1 then PICS = 3, if FSA = 3 and FBC = 0 then PICS = 2 and if FSA = 2 and FBC = 0 then PICS = 1. Subjects who indicated that they did not know if their friends were sexually active and used birth control were not included in the formulation of the PICS index.
LIST OF REFERENCES
LIST OF REFERENCES


