

CURRENT MEDICAL RESEARCH

SUPPLEMENT

Hanna Klaus, M.D.

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NFP Related Research

Network (Fall 1996): entire issue. This issue is devoted to "fertility awareness." Article titles include, "The Effect of Fertility Awareness on Couples," "Method Use," and "Traditional Beliefs." Descriptions of Natural Family Planning Methods, together with their effectiveness, are accurate and include endorsements of many multi-method advocates, such as World Health Organization and International Planned Parenthood of the Western Hemisphere. The project describes several programs for young people, for instance The Family Life Movement of Zambia which has an in-school and out-of-school program and many other countries. The issue stresses that client training is essential for successful NFP use and cites some costeffectiveness studies. All of the primary studies cited have been quoted in previous issues of *Current Medical Research* but it is good to have them featured in one issue of *Network*. On the other hand, the inclusion of the use of withdrawal or barriers alters the definition of fertility awareness as viewed by Natural Family planners. [The issue can be obtained free of charge from Family Health International, PO Box 13950, Research Triangle Park, NC 27709, Attn: Debbie Crumpler ph.: 919-

544-7261, fax:919-544-7261, home page: <http://www.fhi.org> [I suggest programs send for this. It is a valuable resource inasmuch as it includes many positive endorsements from public sector leaders. Ed.]

Lamprecht, V.M. & Grummer-Strawn, L. **Development of New Formulas to Identify the Fertile Time of the Menstrual Cycle.** *Contraception* 54 (December 1996):339-343.

Building on the literature search of Lamprecht and Kambic reported in the last issue of *Current Medical Research*, Lamprecht and Grummer-Strawn have reviewed the same database and tested the various computations currently in use by calendar rhythm users. They compared these with the days of known fertility as recognized in the World Health Organization's Trial of the Ovulation Method of Natural Family Planning. They utilized cycles with an identified peak day and cycle length to compare with four calendar rhythm formulas.

- 1) Traditional: the shortest cycle minus a certain number of days and the longest cycle minus a certain number of days. (These days would be an educated guess about the length of the luteal phase plus the number of days of sperm survival.)
- 2) Blanket: for instance, abstaining from days 9-19. The first

two formulas are in current use. Two additional formulas were devised.

- 3) Mid-Cycle: Half of the length of the longest and shortest cycle in the past six cycles then various numbers as subtracted from half of the shortest cycle and various numbers are added to half of the longest cycle.
- 4) Average Mid-Cycle: Half the length of the average of the past six cycle lengths is determined. Various numbers are subtracted from and added to the interval. Each formula was used to identify the peak mucus day and then computed with various permutations of shortest and longest days which resulted in an interval of days between 4-7 days in length.

The changes which identified the largest proportion of peak days were selected and days were added to allow for the life-span of the gametes — four days at the beginning and two days at the end of the interval. These numbers were chosen because ovulation is assumed to occur within one or two days of peak day. The oocyte lives less than a day; conception is less likely to occur as a result of intercourse 1-2 days before ovulation and "the likelihood of fertilization is greatly diminished if ejaculation occurs more than 4 days prior

to peak." (Wilcox et al.) The results were tested to discover the length of the interval to identify the peak day, the proportion of peak days identified prior to padding, the best rules and the average number of days of abstinence required. The Traditional formula performed the least well in all of these, while the Average Mid-Cycle and Blanket formulas predicted the fertile phase most accurately. The Mid-Cycle formula was similar but less accurate if the unpadded interval was less than 5 days, as at least 6 days of abstinence prior to peak are required. Having the cycle length gives a better prediction of the mean peak day, compared to subtracting 14 days from total cycle length. Another reason for the poor performance of the Traditional formula which uses the shortest and longest of the past six cycles is not a good enough predictor of future cycle length because the range is too large. The authors based their decision matrix for selecting the best rules on the following criteria: 1) the proportion of peak

days covered; 2) the length of abstinence required; and 3) how easy it is to use the rule. The probability of pregnancy cannot be determined from this data set as the effectiveness of the data set requires clinical testing. The authors chose not to list rules requiring more than 13 days of abstinence. It appears that the amount of necessary abstinence with calendar rhythm in any case, is at least as great as with the ovulation and sympto-thermal methods if one omits the regulation to abstain during menstruation.



Contraceptive Technology & Use

Santelli, J.S. et al. **Stage of Behavior Change for Condom Use: The Influence of Partner Type, Relationship and Pregnancy Factors.** *Family Planning Perspectives* 26 (May/June 1996): 101-107.

The influence of relationship factors, pregnancy intentions, contraceptive behavior, and other psychosocial characteristics on the stages of behavior change in respect to condom use was examined with a theoretical model. Heterosexual innercity black women who were not contemplating condom use were compared with those who were attempting to use condoms or had used them consistently for short periods of time, and those who had achieved long-term consistent use. The relationship with the main partner was the significant factor in understanding condom use, both with main partners and with other partners. Emotional closeness and partner support were significant predictors that condoms would be used with the main partner, as was cohabitation and the belief that condom use builds stress. If the

women had a regular or main partner, this associated strongly with condom use with other partners. Women who hoped to become pregnant were less likely to intend to use condoms with their main partner, as were women using oral contraceptives. [This study came from various departments of the John Hopkins School of Hygiene and Public Health and the Department of Communication and Journalism, University of New Mexico and was supported by the Centers for Disease Control and Prevention. The total lack of morality is striking, as is the definition of "self-efficacy" as refusing sex in the past year when no condom was available, and that it is easy to talk about condoms with the main partner. Ed.]

WHO Collaborative Study of Cardiovascular Disease and Steroid Hormone Contraception. Ischemic stroke and combined oral contraceptives: results of an international, multicentre, case-control study. *Lancet* 348 (August 24, 1996): 498-504.

This hospital-based, case-control study assessed the risk of ischemic stroke among women aged 20-44 currently using combined OCs in 697 cases, and 1,962 aged-matched hospital controls in 32 centers in Africa, Asia, Europe, and Latin America. Findings: The odds ratio was lower among young women and among non-smokers and non-hypertensive women. A history of hypertension detected before or during OC use was associated with high odds ratios in both Europe (10.7), and in developing countries (14.5). In Europe, the odds ratio for ischemic stroke among low-dose (under 50 OC users was 1.53 compared to 5.30 for higher-dose OC users. Since there was no signifi-

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cant risk, difference was found among users of low (3.26) or high (2.71) dose OC in developing countries, the authors suggest the difference is probably due to other risk factors. Odds ratios for ischemic stroke associated with OC use were greater in women over 35 in both Europe and developing countries. There was no significant increase in odds ratios with duration of OC nor after cessation of OC use. The authors claim the risk of ischemic stroke associated with current OC use can be reduced if used preferentially by non-smoking, non-hypertensive younger women using low-dose OCs.

WHO Collaborative Study of Cardiovascular Disease and steroid hormone contraception: Haemorrhagic stroke, overall stroke risk, and combined oral contraceptives: results of an international, multicentre case-control study. *Lancet* 348 (August 24, 1996): 505-510.

The association between the risk of hemorrhagic stroke and current use of combined OC's was assessed in 1,068 OC users, ages 20-44 and 2,910 non-users (past or never users) in Asia, Europe, and Latin American countries. Similar comparisons were made between 2,198 (total) stroke cases (haemorrhagic, ischemic, and unclassified) and 6,086 controls. Results: Assuming that the OC-associated odds ratios among women with stroke admitted to hospitals also applies to women who died or were not admitted to hospitals and that the patterns of OC use among controls can be generalized, the estimated proportion of first-time OC-associated stroke in women 20-44 was 13% in Europe and 8% in developing countries in Asia, Africa, and Latin America. There was

no difference in the risks associated with low dose and high dose OCs or with the type of progestogen use. An increasing risk of hemorrhagic stroke with increasing age was found in Europe ($p=.08$) and in developing countries ($p=0.02$). This risk was substantially increased in women aged 35 and older. Smoking did not affect risk estimates in this age group. Past use of OC did not affect risk estimates in any age group. Neither was there an association between time since last use of OCs and risk of haemorrhagic stroke. The authors suggest that "the use of OCs for more than six years, particularly in older women may be associated with increased risk of haemorrhagic stroke." The odds ratios for overall strokes of any type adjusted for history of hypertension and smoking associated with low-oestrogen and higher oestrogen dose OCs among European women 1.41 to 2.71 respectively and 1.86 to 1.91 among women in developing countries. The authors conclude that young women without risk factors have a low incidence of stroke and any estimated risk of OC use should be considered in the context of risks and benefits associated with other forms of contraception and protection against certain tumors as well as quality of life, overall morbidity and mortality.

Biswas, A. et al. **Menstrual Bleeding Patterns in Norplant-2 Implant Users.** *Contraception* 54 (August 1996):91-95.

The 2-rod Norplant-2 system is the second generation of implants about to be introduced. Instead of the original six capsules which contain steroid crystals placed into silastic tubing, in Norplant-2 the steroid is mixed with the polymer,

forming a homologous solid rod covered with a thin silastic tubing. The covered rod permits higher release rate than the capsules and makes a reduction in the number of implants possible. Release rate can be modulated by changing the thickness of the silastic wall, or increasing or decreasing the total surface area of the implants. Norplant-2 releases steroid at the rate of 40-50 g/day, with an effective lifetime of five years, and contains the same amount of Levonorgestrel as Norplant. Of 100 women recruited, 62 were still using the implant at the end of 5 years; only 9 had discontinued for menstrual reasons. During the first three months of use, there was abnormal bleeding which tended to be slightly less than with Norplant, allowing from one to five days of bleeding and spotting free intervals between bleeding episodes. Seventy percent of the 62 women who persevered until the end of the study period had normal menstruation at the end of five years. No other complications were reported.

Bourinbaiar, A.S. and Lee, C.H. **Synergistic Effect of Gramicidin and EDTA in Inhibiting Sperm Motility and Cervical Mucus Penetration in Vitro.** *Contraception* 54 (December 1996): 367-372.

When compared with Nonoxynol-9, gramicidin, a linear polypeptide anti-bacterial and antiviral agent was 50-300 times more potent. When EDTA, a chelating agent, was added to Nonoxynol-9 the results were only additive while they were synergistic with gramicidin. Gramicidin is a potent irreversible inhibitor of sperm motility. Evaluation included tetrazolium dye reduction assay and lac-

tate dehydrogenase (LDH) assays. Tetrazolium dye reduction is a test for viability of sperm while LDH and isoenzymes specific to spermatozoa is detected only when there is leakage from the sperm heads indicating destruction of sperm.

Sharma, S.K. et al. **Mechanism of Action of NIM-76: A Novel Vaginal Contraceptive from Neem Oil.** *Contraception* 54 (December 1996): 373-378.

The oil of the neem plant, native to India, has been studied as a contraceptive for some time. It also possesses anti-implantation and abortifacient effects in animals. The authors attempted to isolate the spermicidal fraction (NIM-76) which consists predominantly of sulphur-containing compounds and higher chain fatty acids and their esters. This kills all sperm in vitro in less than 20 seconds at a concentration of 5-25 mg/ml for rat and human

sperm respectively. DMN-5 and DMN-7 are the anti-implantation and abortifacient fractions in rats. The current experiment was conducted with human sperm at a concentration of 100 g/ml and found considerable reduction in motility within 10 minutes of contact with the agent. There was significant increase in extracellular LDH. Addition of calcium, which is necessary for normal sperm motility, did not alter the outcome. Prior testing in rabbits found no cellular irritation. Electron microscopic studies showed pores and vesicles over the spermhead indicating damage to the vaginal cell membrane. The authors suggest NIM-76 may be a potent vaginal contraceptive without local side effects. No in vivo studies are reported.

Grady, W.R. et al. **Men's Perceptions of Their Roles and Responsibilities Regarding Sex, Contraception and Childrearing.** *Family Planning Perspectives* 28 (September/October 1996):221-226.

Data from the 1991 National Survey of Men examined men's perceptions about their roles in relation to those of women in a couple's decision-making about sex, contraception, and the rearing of children. Sixty-one percent (61%) of men perceive that there is gender equality in sexual decision-making, 78% believe that men and women share equal responsibility for decisions about contraception. Among those who did not perceive that there was egalitarian sharing, men were three times as likely to believe that the woman controlled the decision than the man. This disparity was greater among black males than whites. The ethnically balanced sample included

blacks, whites, and Hispanics studied equal groups of males aged 20-35; 66% were married; 11% were cohabitating; 22% had sexual partners irregularly; 91% were not previously married. Only 10% had less than a high school education; 44% were high school graduates; 23% had some college, while 22% were college graduates. One-third were Catholic; 16% conservative Protestant; 36% other Protestant; 15% had Other Religion or none. Partners tended to be slightly younger. Decisions about children were even more often seen as a shared effort — nearly 90%. *[Some of this perception about men may be the result of the woman-only approach to family planning by groups such as Planned Parenthood. This may have become a self-fulfilling prophecy, especially among young and unmarried males. It's a question which needs to be raised. The second question is whether this biased approach is at least partly responsible for the rise in premarital sex and its attendant negative consequences. Ed.]*



Sterilization

Lin, L. et al. **Psychological Long-Term Effects of Sterilization on Anxiety and Depression.** *Contraception* 54 (December 1996): 345-357.

In 1990, 170 million couples of child-bearing age in developing countries relied on sterilization; female sterilization was more common than male. Two thousand (2,000) cases were examined in two counties and two cities in Sichuan, China: 500 women each with and without sterilization and 500 men with and without sterilization. Their demographics - age, parity, marriage, contraceptive use, social behavior, and present psychological characteristics - were compared and

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psychological profiles ascertained according to three scales. The Center for Epidemiologic Studies Depression Scale (CES-D Scale); the Self-rating Anxiety Scale (SAS) and the Eysenck Personality Questionnaire (EPQ). Sterilized subjects were also given special questionnaires to evaluate baseline conditions and side effects of sterilization. Tubectomy and vasectomy rates were considerably higher in urban than in the rural areas. The most common reason for selecting sterilization was suggestion by family planning staff. The subjects' feeling after operation was predominantly "good." However, 9.35% of subjects reported restless sleep after the operation while between 3.5-4% were sad, bothered by things, not happy, poor appetite; 3.5% enjoyed life and were hopeful of the future. Altogether, depressive symptoms and anxiety emerged more frequently in sterilized than in the non-sterilized population despite reward policies offered by the Government. The distress felt by sterilized subjects affected potential acceptors and "gave them a bad impression of sterilization." "Some sterilized persons in doubt about the reversibility of sterilization will also have mental pressure because they fear the inability to have another child in case of an accident to the children they have." Persons of low educational level "misunderstand 'male sterilization is similar to castrating a cock'" and therefore believe the operation will affect their body strength. While the authors recommend giving publicity to education in Family Planning, prioritizing contraception and birth control which must be reinforced regularly. *[It is clear that very few people in China would choose sterilization were it not offered so insistently and misrepre-*

ented as easily reversible. For that reason, the psychological affects should not be compared with those subjects who selected sterilization under different circumstances. Ed.]



Menopause

Tang, M.X. et al. **Effect of oestrogen during menopause on risk and age at onset of Alzheimer's disease.** *Lancet* 348 (August 17, 1996): 429-33.

Since oestrogen promotes the growth and survival of cholinergic neurons, the authors studied oestrogen use among 1,124 postmenopausal Medicare women from senior centers (31%) and housing sites (66%) in New York City who were initially free from Alzheimers to assess whether oestrogens might delay or prevent onset of the disease.

Oestrogen use was significantly less common among women who developed Alzheimer's diseases (16.3%) than those who remained free of the disease (5/8%) even after education, ethnic origin and genotype differences were considered. Also, age of onset of Alzheimer's disease was significantly later among estrogen users. Duration of estrogen use over one year also appeared important in risk reduction. Average length of oestrogen use in the study was 6.8 years. The estimated annual incidence rate of Alzheimer's disease was 2.7% among oestrogen users compared to 8.4% among non-users. The authors suggest that oestrogen use during and after menopause does not prevent but significantly delays onset of Alzheimer's disease (log rank test $p=0.01$).



Adolescent Sexuality

Speier, P.L. et al. **Predicting Contraceptive Vigilance in Adolescent Females: A Projective Method for Assessing Ego Development.** *Journal of Adolescent Health* 20 (January 1997):14-19.

Investigators from the Department of Psychiatry, the Center for Reproductive Health Policy Research, Institute for Health Policy Studies, Departments of Pediatrics, and the Center for Social and Behavioral Sciences at the University of California, San Francisco theorized that more mature ego development would be a predictor of "contraceptive vigilance" in adolescent females. To test ego development, they used open-ended storytelling rather than written tests and evaluated the stories on realism, complexity, and continuity. The story stem was an unmarried teenage couple who had been dating and began having sex. She found that her period was several weeks late and had a positive pregnancy test. The interviewee is asked to finish the story. Two observers rated the story and had 90% overall inter-rator reliability. The subjects were teenagers aged 14-19 recruited from teen health clinics, not necessarily contraceptive or STD clinics. Two hundred thirty-three (233) were available for follow-up interview one year later at which time they reported their level of sexual activity and contraceptive use in the previous year. A pilot sample of forty-one 14-17 year old participants consisted of 21 randomly selected from the sub-group of effective contraceptors, and 20 from the ineffective contraceptors as reported at 12-month follow-up. Nine were

Caucasian; 21 African-American; 11 from other ethnic groups. All were sexually active.

The responders were rated by frequency of use, efficacy of the method, and contraceptive vigilance. The investigators rated the pill and the condom as very effective; the diaphragm as moderately effective; and withdrawal and rhythm as ineffective. Contraceptive vigilance was defined as almost or almost always using at least one moderately or very effective method. There were no racial differences between effective and ineffective users. Neither age nor mother's education level were significant, but ego maturity (EM) as defined in this paper was. High EM was attributed to 25 (61%) of the adolescents. Of these, 18 were effective contraceptors, while only 2 of the participants classified as having low EM used contraceptives effectively while they were sexually active. The authors based their theory of ego development on the work of Loevinger and Hart and Hilton who found that "contraceptively protected adolescents have higher levels of ego development." The present study shows prospectively that immature ego development (an external locus of control) correlated with poor contraceptive use. The study is a pilot and limited, but the authors suggest that the measurement for ego development — a story — would be easier to handle than tests which rely on high literacy. [Our first study of teenagers, Klaus et al., International Journal of Adolescent Medicine & Health, (1987) included the Loevinger ego-strength scale and Draw a Person tests. Despite promising sample outcomes, the entire data set of 200 teen women did not support the earlier findings. One-third tested more mature; one-third less mature, one-third

stayed the same. Nevertheless, their sexual behavior was not equivocal. Only three virgins transitioned while 50% of the non-virgins discontinued intercourse. The above paper fails to consider the possible developmental retardation effect of contraception, which arrests users at the level of maturity they have attained. Another difficulty is the severe limitation of any measure of ego maturity in adolescence because it is a time of trying everything out in rapid succession. Hence a test taken one day may give completely different results from that taken perhaps later in the cycle under different hormonal influences. The biases of the researchers are obvious, particularly in focusing only on contraceptive behavior, while ignoring the sexual relationship or its meaning. At a time when abstinence education is enjoying high favor, this seems a particularly narrow approach. Ed.]

Card, J.J. et al. **The Program Archive on Sexuality, Health & Adolescence[PASHA]: Promising "Prevention Programs in a Box."** *Family Planning Perspectives* 28 (September/October 1996):210-220.

PASHA is a resource library for program packages which contain all the materials required to replicate or adapt an intervention. They also provide a users' guide and two evaluation instruments, as well as a roster of evaluators willing to provide assistance. While the archive selected 15 pregnancy prevention and 15 STD prevention programs initially, additional programs will be listed. Many primary prevention programs are designed for contraceptive education while some include abstinence. Most link abstinence with contraceptive education. Secondary prevention programs include a number of "safe sex" and

AIDS prevention programs, as well as one program designed to assure freedom from AIDS for gay, lesbian, and bi-sexual adolescents. Short abstracts of the content of each program are listed in the Appendix. [Since inclusion in the Archives was limited to packages which excluded program-training of teachers, the selection bias is obvious. By linking abstinence with "safe sex" the tautology is also self-defeating. See below Ed.]

Brown, R.T. et al, Ed. **Opinions in Pediatric and Adolescent Gynecology.** *Journal of Pediatric & Adolescent Gynecology* 9 (August 1996): 165-168.

The Journal sought opinions on abstinence programs for adolescents. Stan E. Weed, Ph.D. addressed the pro position showing clearly and lucidly that there is no compelling evidence that contraceptive programs have altered the state of teen pregnancy or STDs since contraceptive methods are never 100% effective even when perfectly used and that there is little reason to think they will be used consistently and properly by teenagers as shown by the rising teen abortion rates since 1970, doubling of out-of-wedlock births, as well as skyrocketing STD rates. Weed recognizes that abstinence means different things to different people. Some believe that it means no sexual relations before marriage, but others have redefined it to include everything short of sexual intercourse: undressing together, petting, mutual masturbation. Weed does not accept the new definitions as he believes that one behavior naturally leads to another. On the other hand, there are those who believe teens will not possess sexual information if it is not taught

specifically. Weed's data show that less than 3% of teens are "uninformed." Hence most abstinence programs do address the contraception issue in some way, often with recognition of their technical limitations and failure rates. Hence there is no such thing as "abstinence only" programs. Weed believes that there are significant factors and dynamics operating in a teen's life which are directly and strongly related to teen pregnancy. They include social value, personality, and information systems with related risk behaviors. When prevention programs incorporate these factors in a consistent and effective way by involving parents and using teachers who are committed to this philosophy, initiation of sexual intercourse drops significantly, typically 45% in a 12-month period. Several studies have shown that students at risk are least likely to use contraception. Thus, imposing a solution on the total teen population based on a failed strategy for the at-risk student defies simple logic. Weed also refutes the presumption that one can teach abstinence combined with the safe sex message and that these two messages do not interfere with each other. The dual message approach reports reduced initiation rates of 20-25% while the condom distribution programs have zero reduction. Weed bases his opinions on analyzing data for more than 30,000 teens in the U.S.

The anti abstinence-only paper was written by Leslie M. Kantor and Deborah W. Haffner, the latter the Executive Director of SIECUS. Regrettably their article denies the effectiveness of abstinence-only programs claiming that only three studies have appeared in the scientific literature and that they have not been effective. Apart from spec-

tacular ignorance of the scientific literature, the authors display considerable bias, labeling the few programs they know as fear-ridden and sloganeering, while exaggerating the consequences of sexual behavior in an attempt to scare young people into abstinence. They do acknowledge the effectiveness of the Postponing Sexual Involvement (PSI) program when "combined with broader information." [*Very weak research. Ed.*]



Of interest . . .

Zoler, M.L. **Folic Acid Increases Spontaneous Abortions.** *Ob.Gyn. News* 31 (December 15, 1996):1.

Dr. Ernest Hook, Professor of Public Health at the University of California, Berkeley reported that while folic acid taken pre-conceptually prevents neural tube defects and other fetal malformations, there is an increased associated risk of spontaneous abortion. The study, reported at the Meeting of the American Society of Human Genetics, found that pre-natal folic acid supplementation increases women's fertility rate by 3.4% and augments the live birth rate by 1.7% similar to the Hungarian study which established the supplement's efficacy. Hook's data show that the spontaneous abortion rate was 16% higher in the 2800 study subjects compared with 2650 who took no supplement. A smaller study from England found a 15% increase in the abortion rate among more than 900 folic acid users, compared with non-users. Hook calculated that for every 1000 pregnancies, folic acid causes 8 fewer malformations and 18 more abortions. Perhaps the relative risk of abortion numerically accounts for the entire protective effect. He dis-

counted the possibility that this could be a chance happening and concludes that folic acid may act by inducing abortions in malformed embryos.

Udry, J.R. et al. **Early Predictors of Nonmarital First Pregnancy and Abortion.** *Family Planning Perspectives* 26 (May/June 1996):113-116.

Building on prior research, the authors attempt to find predictors for non-marital first pregnancy and predictors of abortion in such a pregnancy. The study focused on family characteristics and psycho-social traits during childhood and adolescence. A longitudinal study of 351 white women from California aged 27-30 in 1990-1991 was conducted to discover such predictors. Bivariate analysis found that psycho-social characteristics which indicated a strong sense of autonomy such as feeling it is important not to be tied down and engaging in socially undesirable behavior correlated with non-marital pregnancy and abortion. Family characteristics studied were siblings at home, birth order, Ravine (a standard non-verbal test of cognitive ability), mother's score on the Peabody Picture Vocabulary Test - PPVT, (a standardized verbal test of cognitive ability when daughter was age 9-11,) mother's assessment of how good a student her daughter was at age 9-11, mother's and father's education, father's age, daughter's PPVT score at age 15-17, whether parent's marriage was intact when she was 9-11 years old and when she was 15-17. Psycho-social attributes: How strongly she believed at each age bracket that it was important to be married, to have children, not to be tied down, to obey the law, and to be dependable;

whether she was "boyish" at age 9-11, temperamental, had problems with parents at age 15-17.

Psychosocial attributes reflect daughters' attitudes, personality and behavior which are not directly associated with family status: daughter's reports of how well she got along with each parent, how important she was to each, whether she respected each parent, felt free to disagree with her father at age 15-17 (Likert scale) felt close to her mother, and whether she could stand being around her mother; whether it was important to obey the law, or to be dependable, and whether she had nightmares or wet her bed at age 5. The questionnaire also asked about current undesirable behavior — smoking cigarettes, drinking, using illegal wet drugs, committing minor infractions of the law such as traffic violations and shoplifting, and her age at first intercourse.

Sixty-two percent (62%) of the 351 women in the study had their first pregnancy out-of-wedlock while 38% became pregnant within wedlock. Six percent (6%) of marital first pregnancies ended in abortion, compared with 77% of non-marital first pregnancies. Only one woman was a virgin at marriage. The median age of first intercourse was 17.5, 94% of never married

women were sexually experienced. Only the measures for feeling that it was important not to be tied down, boyishness, and not obeying the law were highly significant. The sole valid predictors for the age of first nonmarital pregnancy in a multivariate proportional hazards model was believing it important to obey the law. There was little overlap between the significant predictors of non-marital first pregnancy with predictors of abortion of the first non-marital pregnancy. Family characteristics which did not predict who would have a non-marital first pregnancy were significant predictors of abortion. Women who were more likely than others to have been rated good students at age 9 and 11 and to have well educated mothers, had fewer siblings at home when they were young, scored higher on standardized tests, and had better educated fathers, were more likely to have an abortion. A multivariate logistic regression model predicting an abortion in the event of a non-marital first pregnancy found that among these family characteristics only the number of siblings and mother's education retained statistical significance. The two psychosocial characteristics which retained significance were placing much less importance on obeying the law dur-

ing teenage years and not considering being dependable to be important during adolescence. Because the study group is still young and their reproductive histories are incomplete, their reproductive behavior could still change. [*The essential selfcenteredness brought out in this study correlates well with Carol Gilligan's paradigm for abortion, In a Different Voice. Ed.*] The authors compare their outcomes with a study of Costa, Jessor, and Donovan which concluded that women who had an abortion were characterized by psycho-social unconventionality as measured nearly a decade earlier while the present study found that the family characteristics were the main dimensions on which groups who had a non-marital pregnancy vs. pregnancy plus abortion differed. Costa's analysis did not distinguish aborters by marital or reproductive status. When this status is ignored, abortion appeared to be a consequence of psycho-social unconventionality whereas the present study found that the distinguishing characteristic is being pregnant while not married. Comparison with another study by Cooksey found that low level of parental education correlated positively with lower abortion rates. [*What is the value of education? Ed.*]

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