



AN ABSTRACT OF THE DISSERTATION OF

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Title: Emergency Contraceptive Pills and College Women: Factors Influencing Intention and Use

Abstract approved:

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Approximately half of the 6.4 million pregnancies occurring each year in the United States are unintended (Finer & Henshaw, 2006). Unintended pregnancies, defined as pregnancies not wanted at the time conception occurs, regardless of contraceptive use (Chandra, Martinez, Mosher, Abma, & Jones, 2005) can have serious repercussions on women, children, and society. For decades, women facing the possibility of an unintended pregnancy following unprotected intercourse, birth control method failure, or sexual assault, have had no choices outside of abortion. Since 1997 however, another option has become available to American women making unintended pregnancy decisions – emergency contraceptive pills (ECPs).

Research has indicated that widespread use of ECPs has the potential to prevent 1.5 million of the approximate 3 million unintended pregnancies occurring each year in the US, including as many as 700,000 pregnancies that now result in abortion (Trussell, Stewart, Guest, & Hatcher, 1992). Although 84% of American women have heard of ECPs, only 6% claim to have ever used them (Hoff, Miller, Barefoot, & Greene, 2003). Despite their effectiveness and the public's awareness of them, ECPs still remain

underutilized in many high-risk populations. Explanations for this discrepancy are not readily available. In particular, young adult women attending college are at risk for unintended pregnancy yet we know little about their relationship with ECPs.

Although extensive ECP use could have a profound effect on unintended pregnancy rates, we have limited information about the factors that influence a woman's decision to use ECPs. Furthermore, with the US Food and Drug Administration's approval of behind the counter status for the emergency contraceptive Plan B on August 24, 2006, one of the last major external hurdles for women accessing emergency contraceptive pills appears to have been removed. However, it is unknown whether prescription-free availability will be the final factor in women's predisposition to use ECPs or if other intrinsic factors, may in fact, override use.

The purpose of this study was to determine the nature and extent of college women's knowledge, self-efficacy, attitudes, perceived social norms, and use related to emergency contraceptive pills. Additional goals included: using a conceptual framework to determine which social and behavioral constructs suggested by the contraceptive literature best predict intention to use ECPs and ECP use.

Data were collected via an online survey designed by the lead author. A sample of 4,219 female students was drawn from a directory list of students enrolled at Oregon State University during the Spring Quarter of 2004. A total of 1718 women returned usable questionnaires. Key findings were that the majority of sexually active participants (68%,  $n = 871$ ) had experienced a pregnancy scare in the past yet only 28.3% ( $n = 362$ ) had ever used ECPs. Further, women had insufficient knowledge about ECPs in order to make informed decisions. Male partners were the most influential social reference in

ECP decision-making. Although prescription-free access to ECPs is an historical milestone for reproductive health in the US, this policy change may not be the final step in ensuring that women access and use ECPs when they need them. Intrinsic factors including: knowledge that ECPs prevent pregnancy by interfering with ovulation, knowledge that ECPs are not a form of abortion, and confidence in accessing ECPs in time if needed seem to influence ECP use. In order for ECPs to impact unintended pregnancy rates to the extent research has demonstrated, strategies addressing these internal factors are warranted and must target both women and men.

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Emergency Contraceptive Pills and College Women:  
Factors Influencing Intention and Use

by  
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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Heather A. Nelson, Author

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## PREFACE

This dissertation was compiled in a format blending the five traditional chapters with completed articles. The chapters are: Introduction, Review of the Literature, Research Design and Methodology, Results, and Discussion, Conclusions and Recommendations. The Results Chapter is comprised of three articles. Article one describes college women's knowledge, self-efficacy, attitude, and perceived social norms regarding emergency contraceptive pills. Article two explores the association of multiple social and behavioral constructs suggested by the literature and intention to use emergency contraceptive pills. Article three examines the nature and extent of ECP use among college women and identifies the factors that best predict ECP use.

# **Emergency Contraceptive Pills and College Women: Factors Influencing Intention and Use**

## **CHAPTER 1**

### **INTRODUCTION**

#### **Background**

Although the ability to control one's fertility is the foundation of reproductive health, nearly half (49%) of the 6.4 million pregnancies occurring each year in the United States are unintended (Finer & Henshaw, 2006). An unintended pregnancy is defined as a pregnancy that is not wanted at the time conception occurs, regardless of contraceptive use (Chandra, Martinez, Mosher, Abma, & Jones, 2005). Although reasons for unintended pregnancies are as unique as individual women, one point is consistently clear; unintended pregnancy has serious repercussions for women, children, and society as a whole.

For decades, women facing the possibility of an unintended pregnancy following unprotected intercourse or birth control method failure have had no choices outside of abortion. Since 1997 however, another option has become available to women making unintended pregnancy decisions – emergency contraceptive pills (ECPs). Emergency contraceptive pills, also referred to as “the morning after pill(s)” (MAPs) are a post coital method of birth control intended to be used in the event of condom breakage, birth control failure, unprotected sex and rape. Emergency contraceptive pills are a higher dose of regular oral contraceptives that have been proven to prevent pregnancy by between 75 and 95 percent if taken within 72 hours of unprotected intercourse (Trussell, Rodriguez, & Ellertson, 1999). Unlike mifepristone (formerly called RU-486) and

methotrexate, drugs used to perform a “medical abortion”, ECPs cannot disrupt an established pregnancy (Bacic, Wesselius de Casparis, & Diczfalusy, 1970; Glasier, 1997). Emergency contraceptive pills prevent pregnancy by either inhibiting or delaying ovulation (Croxatto et al., 2001; Croxatto et al., 2002; Durand et al., 2001; Glasier, 1997; Hapangama, Glasier, & Baird, 2001; Ling, Robichaud, Zayid, Wrixon, & MacLeod, 1979; Marions, Cekan, Bygdeman, & Gemzell-Danielsson, 2004; Marions et al., 2002). There is conflicting research regarding whether or not ECPs have the ability to prohibit the implantation of a fertilized egg in the endometrium (Durand et al., 2001; Kubba, White, Guillebaud, & Elder, 1986; Ling et al., 1979; Ling et al., 1983; Marions et al., 2002; Muller, Lladós, & Croxatto, 2003; Ortiz, Ortiz, Fuentes, Parraquez, & Croxatto, 2004; Raymond et al., 2000; Taskin, Brown, Young, Pointdexter, & Wiehle, 1994; Young, Wiehle, Joshi, & Pointdexter, 1994).

Provided their relatively high pregnancy prevention rates, research has indicated that widespread use of ECPs has the potential to prevent 1.5 million of the approximate 3 million unintended pregnancies occurring each year in the US, including as many as 700,000 pregnancies that now result in abortion (Trussell, Stewart, Guest, & Hatcher, 1992). Although 84% of American women have heard of ECPs, only 6% of women claim to have ever used them (Hoff, Miller, Barefoot, & Greene, 2003). Despite their effectiveness and widespread public awareness of their existence, ECPs still remain underutilized in many high-risk populations.

One high-risk population of particular concern is women attending college. Unintended pregnancy rates in the US are highest among traditional college aged women (18 – 24 years old) (Finer & Henshaw, 2006). Among this group, more than 1

unintended pregnancy occurs for every 10 women; a rate that is double that of women overall (Finer & Henshaw, 2006). Seventy-nine percent of pregnancies in 18 – 19 year old women and 60% in 20 to 24 year olds are unintended (Finer & Henshaw, 2006). Women aged 20 – 24 have the highest abortion rate (45/1000) compared to all other age groups (Finer & Henshaw, 2006). Further, almost half of unintended pregnancies in 18 – 24 year olds end in abortion (Finer & Henshaw, 2006). This age group also has the highest unintended birth rate (53/1000 for 18 –19 year olds and 46/1000 for 20 – 24 year olds) (Henshaw & Finer, 2003).

Interestingly, women who report having “some college” education, meaning they have not yet completed their education or they never completed it, have the highest proportion of unintended pregnancies (52%), the highest percentage of unintended pregnancies ending in abortion (60%) and the highest abortion rate (25/1000) relative to all other education categories (Finer & Henshaw, 2006). Looking specifically at college students, the National College Health Risk Behavior Survey (NCHRBS) shows that over a third (35%) of college students report that they have ever been pregnant or gotten someone pregnant (Douglas & Collins, 1997). Further, the American College Health Association National College Health Assessment (ACHA-NCHA) finds that 3% of female students engaging in vaginal intercourse over the past school year had an unintended pregnancy (ACHA, 2008).

Why are college women at high-risk for unintended pregnancy? For some women, attending college seems to trigger risk taking behaviors such as unprotected sex, sex with multiple partners or heavy alcohol use; behaviors that place them at risk for unintended pregnancy (ACHA, 2008; Douglas & Collins, 1997). Sexual assault on

college campuses further contributes to this risk (ACHA, 2008; Douglas & Collins, 1997).

Given that many college women are engaging in risky behaviors, emergency contraceptive pills offer another option for preventing unintended pregnancy. Mirroring the general public's limited use of ECPs, only 15% of college women report that they have used emergency contraception within the past school year (ACHA, 2008). Provided that widespread ECP use among college women could abate the threat of unintended pregnancy, it is somewhat surprising that there is limited information regarding college women and emergency contraception. In their 1996 article, Sawyer and Fong wrote "Research describing the use of ECPs on college campuses is extremely scarce." Over a decade has passed and it is still the case that information regarding college women's relationship with ECPs is inadequate. What is known about this particular group of women focuses mainly on their knowledge of and attitude toward ECPs and is limited to just a few studies using relatively small convenience samples (Corbett, Mitchell, Taylor, & Kemppainen, 2006; Harper & Ellertson, 1995a, 1995b; Sawyer & Thompson, 2003).

Unfortunately at this time, we also have limited knowledge concerning which factors influence a woman's decision to use emergency contraceptive pills. Furthermore, no studies to date have used a conceptual framework to systematically examine emergency contraceptive pill behavior. The purpose of this study was to examine university women's knowledge, attitudes, perceived social norms, self-efficacy, and past behavior related to emergency contraceptive pills as well as to provide a conceptual framework by which to examine college women's intention to use ECPs using a large random sample. Findings from this research provide a better understanding of

internalized barriers that prevent a population at risk for unintended pregnancy from accessing ECPs and ultimately provide direction for strategies to overcome these barriers.

### **Specific Aims**

1. Describe knowledge, self-efficacy, attitude and social norms related to emergency contraceptive pills among women attending a university.
2. Examine the association of multiple social and behavioral constructs suggested by empirical research and intention to use emergency contraceptive pills.
3. Determine the nature and extent of college women's emergency contraceptive pill use and identify factors associated with use.

### **Assumptions**

1. It is assumed that respondents will complete the questions honestly.
2. It is assumed that some respondents will have some knowledge about emergency contraceptive pills.
3. It is assumed that some respondents will have used emergency contraceptive pills.
4. The assumption is made that college women are aware of how the opinions of others might affect their decision to take emergency contraceptive pills.

### **Delimitations**

Participants in this study were limited to female adult undergraduate and graduate students of reproductive age (18 to 44 years old) currently enrolled at Oregon State University in order to examine knowledge, self-efficacy, attitude, social norms, intention and behavior related to emergency contraceptive pills.

## **Limitations**

1. Although this study used a random sample, the sample is not generalizable to all college women because the sample was drawn from only one university.
2. Women who had signed a restrict directory information authorization form were excluded from the sampling frame.
3. Volunteer bias was present as those who responded to the questionnaire may have been more interested in the topic or may have had more extreme feelings about emergency contraceptive pills than non-responders.
4. Recall bias was introduced into the study as participants were asked to answer questions based on past experiences.
5. As the survey was self-report, respondents may have under-estimated or over-estimated their behaviors.

## **Definitions of Terms**

**abortifacient** a drug or other agent used to cause abortion.

**abortion** the termination of an established pregnancy.

**conception** the process by which a sperm unites with and an egg.

**emergency contraception (EC)** a postcoital method of birth control (either high-dose hormone pills or an intrauterine device).

**emergency contraceptive pills (ECPs)** a hormonal postcoital method of birth control consisting of a combination of estrogen and progestin or progestin alone.

**fertilization** the process by which a sperm unites with and an egg.

**implantation** when a fertilized egg embeds into the endometrial lining of the uterus.

**intrauterine device (IUD)** a birth control method involving the insertion of a small device into the uterus.

**ovulation** release of a mature ovum through the wall of an ovary.

**Plan B** an emergency contraceptive regimen manufactured by Barr Pharmaceuticals consisting of two .75 mg tablets of levonorgestral typically taken within 72 hours of unprotected intercourse 12 hours apart.

**pregnancy** when a fertilized egg completes implantation into the lining of the uterus.

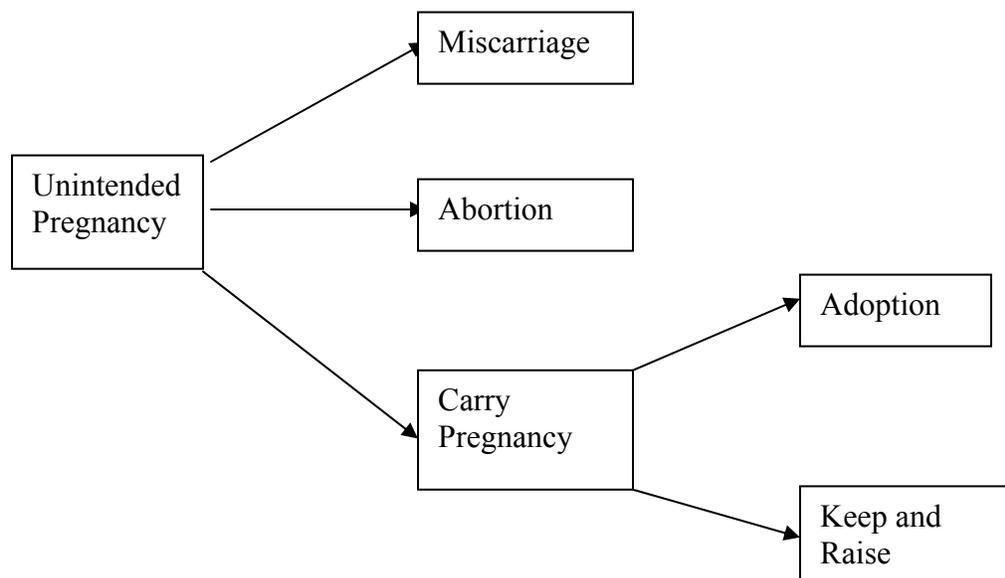
## CHAPTER 2 REVIEW OF THE LITERATURE

### **Unintended Pregnancy in the United States**

Approximately half of the 6.4 million pregnancies occurring annually in the U.S. are unintended (Finer & Henshaw, 2006). In fact, by age 45, more than half of American women have had at least one unintended pregnancy (Jones, Singh, Finer, & Frohworth, 2006). When faced with an unintended pregnancy, women have limited choices (see Figure 0.1). Since 1973 and the Supreme Court's finding in *Roe v. Wade* (*Roe v. Wade*, 1973), women have had an alternative to carrying their unintended pregnancy – abortion. Almost half (42%) of unintended pregnancies end in abortion while 14% end in fetal losses (Finer & Henshaw, 2006). If a woman does not opt for an abortion and chooses to carry her unintended pregnancy she has only two options. Option one is to give the baby up for adoption and the remaining option is keep and raise the baby. Forty-four percent of unintended pregnancies end in an unplanned birth (Finer & Henshaw, 2006) but less than 1% of unintended pregnancies end in adoption (Atwood, Allen, Ravenel, & Callahan, 2007).

Although all fertile women engaging in sexual intercourse with men are at some risk for unintended pregnancy, unintended pregnancies do not occur in equal numbers or proportions across all groups of women. Patterns of unintended pregnancy, abortion and unintended birth are associated with demographic factors such as age, relationship status, income, educational attainment, and race and ethnicity. Young women between the ages of 18 and 24 have the highest rates of unintended pregnancy (expressed per 1000 women

Figure 1 Unintended Pregnancy Decision-Making Tree



aged 15 – 44). The rate for 18 and 19 year olds is 108/1000 and 20 – 24 year olds have a rate of 104/1000. However, women aged 19 and younger are responsible for the highest proportion of pregnancies being unintended among all age groups (100% of pregnancies for girls <15 years are unintended, as are 82% of those for girls 15 – 19 years).

Generally, this proportion has an inverse relationship with age. As women's ages increase, the proportion of pregnancies that are unintended decreases (Finer & Henshaw, 2006).

While the abortion rate (expressed per 1000 women aged 15 – 44) is highest among 20 – 24 year olds (45/1000), the highest percentage of unintended pregnancies ending in abortion occurs among women between the ages of 35 and 39 (60%) (Finer & Henshaw, 2006). Women aged 18 and 19 have the highest unintended birth rate (53/1000) (Finer & Henshaw, 2006). Although adolescent (15 to 19 years old) pregnancies and birth rates have declined since the early 1990's, the National Center for Health Statistics has reported a 3% increase in the teen birthrate (40.5 to 41.9 births per 1000 females aged 15-19) from 2005 to 2006 (Hamilton, Martin, & Ventura, 2007).

Marital and cohabitation status is also associated with unintended pregnancy. Unmarried women's unintended pregnancy rate (67/1000) is more than double that of married women (32/1000). Unintended pregnancies among unmarried women end in abortion 58% of the time compared to only 27% for married women. Cohabiting women however, have the highest unintended pregnancy rate (138/1000), which is more than double unmarried women's rate (67/1000). Cohabiting women also have the highest abortion rate (63/1000) and the highest unintended birth rate (54/1000) (Finer & Henshaw, 2006).

Further, there are disparities in unintended pregnancy by income level. Women living below the poverty line have the highest rate of unintended pregnancy (112/1000), which is almost four times higher than women living at or above 200% of poverty. Women living below 100% of poverty also have the highest percentage of unintended pregnancies (62%), the highest abortion rate (42/1000), and the highest unintended birth rate (58/1000). However, women living at or above 200 of poverty claim the highest proportion (54%) of unintended pregnancies ending in abortion (Finer & Henshaw, 2006).

Level of educational attainment appears to play a role in unintended pregnancy. Women without a high school degree have an unintended pregnancy rate (76/1000) almost triple the rate of college graduates (26/1000) but are less likely than any other sub-category to end an unintended pregnancy in an abortion (36%). Interestingly, women with *some college* have the highest proportion of unintended pregnancies (52%), the highest proportion of those pregnancies ending in abortion (60%), and also have the highest abortion rate (25/1000) (Finer & Henshaw, 2006).

Women of color carry a disproportionate burden of unintended pregnancy as compared to their white counterparts. The unintended pregnancy rate for black women (98/1000) is nearly three times higher than the rate for white women (35/1000) and Hispanic women's unintended pregnancy rate (78/1000) is more than double the rate for white women. Forty percent of pregnancies among white women are unintended, 54% for Hispanic women, and 69% for black women (Finer & Henshaw, 2006). Minority women also have higher abortion and unintended birth rates than white women. Black women have the highest abortion rate at 49/1000 compared to white and Hispanic women

with rates of 13/1000 and 30/1000, respectively. However, Hispanic women have a higher rate of unintended birth (40/1000) than do white women (17/1000) and black women (35/1000). Even when controlling for the intersection of race/ethnicity and income, black and Hispanic women still have higher rates of unintended pregnancy than white women (Finer & Henshaw, 2006).

Although there is no one clear explanation for this high level of unintended pregnancy and the marked disparities among certain groups of women in this country, research does suggest some underlying contributing factors. One such factor is contraception use. Only a small percentage (8%) of women at risk for becoming pregnant actually do not use any form of birth control (Frost, Singh, & Finer, 2007). However, about half (52%) of unintended pregnancies occur among this non-contraceptive-using group (Finer & Henshaw, 2006). As contraceptive methods can be difficult to use effectively and consistently and methods can and do fail, 48% of unintended pregnancies occur in women who were using some contraceptive method during the month they became pregnant (Finer & Henshaw, 2006). Approximately 43% of unintended pregnancies occur among women who use their method inconsistently or incorrectly and 5% of unintended pregnancies occur due to method failure (Finer & Henshaw, 2006; Hatcher et al., 2007; Kost, Singh, Vaughan, Trussell, & Bankhole, 2008). With typical use, the top two most commonly used reversible methods of contraception: birth control pills and male condoms, have failure rates of 8% and 15%, respectively (Hatcher et al., 2007).

Individual reasons for not using contraception or using contraception inconsistently include: concern about unpleasant side effects, misperceptions of

pregnancy risk, ambivalence about becoming pregnant, infrequent sexual activity, lack of knowledge about how and where to access birth control, attitudes and beliefs that are not supportive of use and not wanting to ruin the spontaneity of sex (Ayoola, Nettleman, & Brewer, 2007; Frost, Darroch, & Remez, 2008; Nettleman, Chung, Brewer, Ayoola, & Reed, 2007; Parker, Colasanto, & Kannel, 1997). In some cases, women do not use birth control because their partners, families, or friends discourage its use (Ayoola et al., 2007; Frost et al., 2008; Nettleman et al., 2007). Other women do not use contraception or have gaps in use because it is difficult or inconvenient to access or because the cost is prohibitive (Ayoola et al., 2007; Frost et al., 2008; Nettleman et al., 2007). Birth control pills, the most common method of reversible contraception (Chandra et al., 2005) cost between \$15 and \$50 per month not including the cost of annual exam (Johnsen, 2008a). Other methods such as hormonal injectables cost between \$30 and \$75 every three months (Johnsen, 2008b) and intrauterine devices (IUD) can cost between \$175 and \$500 for the exam, insertion and follow up visit (Johnsen, 2008e).

The monetary costs associated with birth control use are of particular concern as only 66% of women of reproductive age have private insurance and public assistance does not cover the remaining third (Sonfield, 2003). Of all women aged 15 – 44 years, only 11% receive healthcare through Medicaid and the State Children’s Health Insurance Program (SCHIP) (Sonfield, 2003). This translates into only 35% of poor women (women 15 – 44 with incomes below the poverty level) receiving healthcare through government assistance (Sonfield, 2003). Additionally, 40% of women falling below the poverty line have neither private nor public health insurance to cover the cost of birth control (Sonfield, 2003). Having private insurance may help buffer the costs of birth

control for some women; however, insurance companies' coverage of birth control is not absolute. Approximately three quarters (78%) of insured employees have coverage of oral contraceptives but only 41% of employees have coverage for all reversible birth control methods (Hoff, Miller et al., 2003).

Another explanation for lack of contraception use is sexual assault. Obviously in this case, women cannot plan to use birth control when they are not expecting to have sex. Almost a quarter (23%) of women aged 15 – 44 years of age report they have been forced to have intercourse by a man at some point in their lives (Chandra et al., 2005). Moreover, a recent study (Tjaden & Thoennes, 2006) found that over 300,000 women are raped each year in the United States. Of these, approximately 32,000 women become pregnant with approximately half of these pregnancies ending in abortion (Holmes, Resnick, Kilpatrick, & Best, 1996).

Regardless of how a woman comes to have an unintended pregnancy, she has limited choices. In many cases, choosing to keep an unintended pregnancy can be a source of economic strain placing women at increased risk for entering a cycle of poverty. Adolescents in particular, who have unplanned births are less likely to complete high school than their non-childbearing peers (Moore et al., 1993). Further, few teenage mothers attend college and less than 1% complete college by age 27 (Moore et al., 1993). This lack of education limits women's future earning potential and thus, their ability to financially support their family (Brown & Eisenberg, 1995).

It is of particular concern that unintended pregnancies are more likely to occur among single or cohabiting women than among married women (Finer & Henshaw, 2006), as there are a disproportionate number of female-headed households living in

poverty. In fact, over half (62%) of families living in poverty are headed by single mothers (National Women's Law Center, 2008) and one fifth of all homes headed by working single mothers fall below the poverty line (NOW, 2003). This unintended pregnancy/poverty vicious cycle continues as poor women have the highest rate of unintended pregnancy and the highest proportion of unintended pregnancies as compared to women living above the poverty line (Finer & Henshaw, 2006).

In addition to the financial consequences, unintended pregnancies, particularly those considered unwanted, can have negative consequences on the well being of women and children (Brown & Eisenberg, 1995; Gipson, Koenig, & Hindin, 2008). Unintended pregnancies are categorized as either *mistimed* or *unwanted*. This distinction becomes important when looking at the long-term effects of unintended pregnancy. Mistimed pregnancies are those that are wanted by a woman at some point, but which take place sooner than she would have wanted. Unwanted pregnancies occur when a woman does not want to have any more pregnancies at all (Chandra et al., 2005). Research has shown that women faced with an unwanted pregnancy are more likely to delay prenatal care or not seek it all, to smoke or consume alcohol during pregnancy and are less likely to breastfeed than women who face a wanted pregnancy (Brown & Eisenberg, 1995; D'Angelo, Colley Gilbert, Rochat, Santelli, & Herold, 2004; Hellerstedt et al., 1998; Joyce, Kaestner, & Korenman, 2000; Korenman, Kaestner, & Joyce, 2002; Kost, Landry, & Darroch, 1998a, 1998b). There is evidence that women who give birth to unwanted pregnancies are at increased risk for maternal depression and anxiety (Barber, Axinn, & Thornton, 1999; Najman, Morrison, Williams, Andersen, & Keeping, 1991). Additionally, children from unwanted conceptions are at greater risk of being born at a

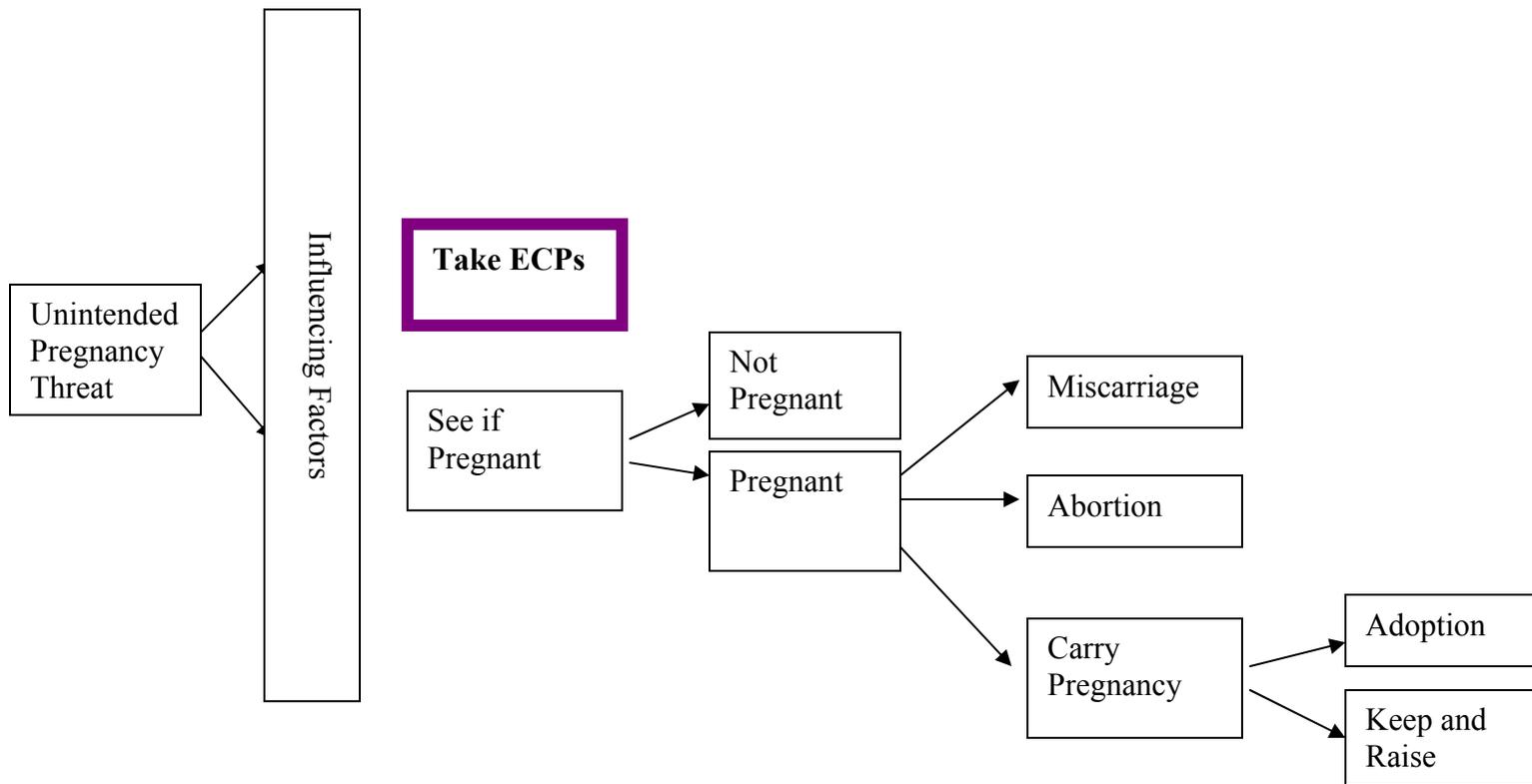
low birthweight, of dying in their first year of life, of being abused, and of not receiving sufficient resources for health development (Brown & Eisenberg, 1995; Bustan & Coker, 1994; D'Angelo et al., 2004; Joyce et al., 2000).

Unintended pregnancy presents serious problems for women and society. For decades, women making unintended pregnancy decisions have been without any new solutions. Since 1997, another choice has become available – emergency contraceptive pills (ECPs). Emergency contraceptive pills provide women facing the threat of unintended pregnancy with a choice other than abortion or carrying the pregnancy and their related consequences (see Figure 0.2).

### **Emergency Contraception**

Whereas conventional contraceptive methods are employed before or during penile-vaginal intercourse, emergency contraception (EC) is a postcoital method of birth control with the intention of being used in the event of contraceptive method failure, unprotected intercourse or sexual assault. Although awareness of emergency contraception has been growing over the past decade (Delbanco, Mauldon, & Smith, 1997; Hoff, Miller et al., 2003; Parker et al., 1997), postcoital methods of birth control have been in use for years (Ellertson, 1996). In fact, the first documented case of emergency contraception use in humans occurred in 1964 in Amsterdam when physicians administered postcoital estrogens, a common practice among veterinarians, to a 13-year-old girl who had been raped by three men mid-cycle (Haspels, 1994).

**Figure 2 Unintended Pregnancy Threat Decision-Making Tree and Emergency Contraceptive Pills**



There are two major types of emergency contraception, intrauterine devices (IUDs) and oral hormonal methods. In the United States, the Food and Drug Administration (FDA) has approved the copper-T intrauterine device, regular birth control pills and two dedicated oral hormonal products for use as emergency contraceptives.

### **Intrauterine Devices**

As a means of emergency contraception, the FDA-approved Copper-T IUD reduces the risk of pregnancy by 99% if inserted within five days following unprotected intercourse (Trussell & Ellertson, 1995). Used as a typical contraceptive device, copper-releasing IUDs prevent pregnancy by preventing fertilization. However, when used as emergency contraception, copper-releasing IUDs seem to prevent pregnancy primarily by interfering with the implantation of a fertilized egg (Hatcher et al., 2007). An advantage of this method of emergency contraception is that once the Copper-T has been inserted into the uterus, it can be left in place for up to 10 years as an ongoing birth control method. However, postcoital insertion of IUDs are contraindicated for women at risk for sexually transmitted infections (Hatcher et al., 2007) as bacteria transferred to the uterus during IUD insertion can cause pelvic infections that left untreated can lead to sterility (Johnsen, 2008e). IUDs cost between \$175 and \$500 and must be inserted by a trained clinician (Johnsen, 2008e).

### **Emergency Contraceptive Pills**

Made of a combination of estrogen and progestin or progestin alone, emergency contraceptive pills (ECPs) are simply higher doses of the medications found in regular birth control pills (Trussell, Koenig, Ellertson, & Stewart, 1997). Despite the fact that emergency contraceptive pills are often referred to as “the morning after pill” or

“morning after pills” (MAPS), these terms are misleading. The name “morning after pill” suggests there is only one pill that must be taken the morning after the episode of unprotected intercourse, when in fact at least two pills are taken typically within three days of unprotected sex. The combined regimen consists of two doses of 100 µg of ethinyl estradiol and 0.5 mg of levonorgestrel taken 12 hours apart. The progestin-only regimen contains a total of 1.5 mg levonorgestrel, typically taken as two 0.75 mg doses 12 hours apart (ACOG, 2005).

The estrogen-progestin combination is often referred to as the “Yuzpe method” named for the Canadian physician Albert Yuzpe who began studying this combined regimen with his colleagues in 1972 (Ellertson, 1996). Although it had been common knowledge for years in the medical community that taking a high dose of regular birth control pills following unprotected intercourse was a highly effective method in preventing pregnancy, the FDA did not approve regular birth control pills for this use until 1997 (FDA, 1997). With this combined method, women take two doses of hormone pills – one dose within 72 hours of unprotected sex followed by the second dose 12 hours later. The number of actual pills used in each dose varies depending upon the brand of birth control pills being used. One package of ECPs costs between \$10 and \$70 (Johnsen, 2008c). In many countries, both the estrogen-progestin and progestin-only regimens are available as products labeled specifically for use as emergency contraception (ACOG, 2005). In the United States however, there is only one dedicated product currently on the market – the progestin-only product Plan B.

In 1998 and 1999, Preven and Plan B, two prepackaged emergency contraceptive kits were released respectively onto the US market. However, the manufacturer of

Preven, Barr Laboratories, discontinued its production in 2004 due to the possibility that Plan B, which was less likely to induce nausea in users would soon be available without a prescription (Stranton & Evans, 2005). The Women's Capital Corporation manufactured Plan B until Barr Pharmaceuticals acquired it in February 2004 (Friedman, 2006). Plan B's package insert instructs patients that in order to obtain optimal efficacy, the first tablet should be taken as soon as possible within 72 hours of intercourse. The second tablet must be taken 12 hours later (ACOG, 2005). According to Planned Parenthood, one package of Plan B costs between \$10 and \$70 (Johnsen, 2008c)

### **Mechanisms of Action**

According to several recent studies (Croxatto et al., 2001; Croxatto, Ortiz, & Muller, 2003; Gemzell-Danielsson & Marions, 2004; Grimes & Raymond, 2002), exactly how ECPs work depends upon at which point in a woman's menstrual cycle she had intercourse and at which point she took ECPs. Numerous studies confirm that emergency contraceptive pills, both the combined estrogen-progestin and the progestin-only regimens, can prevent pregnancy by inhibiting or delaying ovulation (Croxatto et al., 2001; Croxatto et al., 2002; Durand et al., 2001; Glasier, 1997; Hapangama et al., 2001; Ling et al., 1979; Marions et al., 2004; Marions et al., 2002). In addition, some early studies found that the combined hormonal method of ECPs can prevent pregnancy by altering the endometrium in such a way that it inhibits the implantation of a fertilized egg (Kubba et al., 1986; Ling et al., 1979; Ling et al., 1983; Young et al., 1994; Yuzpe, Thurlow, Ramzy, & Leyshon, 1974). More recent studies have found that the endometrial changes caused by ECPs are inadequate to actually prevent implantation (Durand et al., 2001; Marions et al., 2002; Muller et al., 2003; Ortiz et al., 2004;

Raymond et al., 2000; Taskin et al., 1994). Although there is still not consensus among researchers regarding whether or not ECPs have the ability to inhibit implantation, according to Trussell and Raymond, it is highly unlikely that ECPs would be as effective as they are at preventing pregnancy if they only prevented ovulation (Trussell & Raymond, 1999).

### **Emergency Contraceptive Pills v. Medical Abortions**

Provided there is not agreement about all of the possible mechanisms by which ECPs prevent pregnancy, it is important to distinguish the differences between emergency contraceptive pills and medical abortions. According to the definition of pregnancy that has been endorsed by the Association of Reproductive Health Professionals and the American College of Obstetrics and Gynecologists, pregnancy begins when a pre-embryo completes implantation into the lining of the uterus (ACOG, 1998). Research has shown that ECPs cannot disrupt an established pregnancy (Bacic et al., 1970; Glasier, 1997). Whereas ECPs consisting of progestin or a combination of estrogen and progestin work to prevent pregnancy following unprotected intercourse, a non-surgical abortion or medical abortion, terminates an existing pregnancy by using either the drug mifepristone (formerly named RU-486) or the drug methotrexate taken in combination with another drug misoprostol (OBOS, 2005). Emergency contraceptive pills are relatively inexpensive and cost between \$10 and \$70 (Johnsen, 2008c) but medical abortions between \$300 and \$900 (Johnsen, 2008d).

### **Effectiveness**

A study by Trussell, Rodriguez, and Ellertson (1999) found combined estrogen and progestin ECPs to be approximately 75% effective at preventing pregnancy if taken

within 72 hours following unprotected intercourse. Recent research indicates that combined ECPs administered between 72 and 120 hours following unprotected intercourse reduce the likelihood of pregnancy between 72% and 87% (Rodriguez, Grou, & Joly, 2001). This finding, coupled with findings from a 2003 study (Ellertson et al., 2003), suggests that women who request this therapy more than 72 hours following unprotected sex should be allowed to receive it.

Similarly, progestin-only pills have been found to reduce the likelihood of pregnancy by about 89% when taken within 72 hours (von Hertzen, Piaggio, & Van Look, 1998). A recent study (von Hertzen et al., 2002) has found that both doses of progestin pills can be taken at the same time and are effective if taken within five days or 120 hours of unprotected intercourse.

Although ECPs have some level of effectiveness five days following unprotected sex, the earlier ECPs are taken following coitus, the more effective they are (Regulation, 1998; von Hertzen et al., 2002). Pills consisting of both estrogen and progestin are approximately 77% effective in preventing pregnancy if taken within 24 hours or less after unprotected intercourse. Pregnancy prevention rates however, drop to only 36% efficacy at 25 hours and beyond post coitus. Progestin-only pills however, are more effective within 24 hours of coitus. At 24 hours or less, 95% of expected pregnancies are prevented and at 25 hours or later, prevention rates decrease to 58%.

### **Side Effects and Safety**

There is no research linking emergency contraceptive pills to serious complications or death (Vasilakis, Jick, & Jick, 1999). In fact in 2003, a combined panel of the FDA's Advisory Committee on Reproductive Health Drugs and the Advisory

Committee on Nonprescription Drugs concluded unanimously that the levonorgestrel-only regimen (Plan B) was safe and warranted nonprescription status (Wood, 2005). Side effects for both regimens however, have been documented.

A study by the Task Force on Postovulatory Methods of Fertility Regulation found that among women given combined ECPs, 51% experienced nausea and 19% vomited. Fewer women who took progestin-only ECPs experienced side effects, with only 23% of women reporting nausea and 6% vomiting (von Hertzen et al., 1998). Following the use of ECPs, women tend to get their periods at unexpected times – either within one week earlier or within one week later than expected (von Hertzen et al., 1998). The timing and duration of each participant's next period depends upon when in her cycle she takes the pills (Raymond et al., 2006). Additionally, about 16% of women have reported nonmenstrual bleeding following use of progestin-only ECPs (von Hertzen et al., 2002). Yet, in another study (Raymond et al., 2006), the reporting of intermenstrual bleeding was rare. Women having taken the combination regimen have also reported other side effects such as: breast tenderness, abdominal pain, dizziness, headache and fatigue (Van Santen & Haspels, 1985).

Although no studies to date have examined the long-term side effects of taking ECPs once a pregnancy is established, research shows there is no association between first trimester exposure to sex hormones, like those contained in ECPs, and adverse pregnancy outcomes (Ahn et al., 2008) such as fetal external genital malformation (Raman-Wilms, Tseng, Wighardt, Einarson, & Koren, 1995). Research does not suggest that use of ECPs increases the risk of subsequent ectopic pregnancy. Emergency

contraceptive pills actually reduce the risk of ectopic pregnancy by reducing the overall risk of pregnancy (Trussel, Hedley, & Raymond, 2003).

### **Public Awareness and Use**

In addition to focusing on mechanisms of action, effectiveness, and side effects and safety, some researchers have examined the public's awareness and use of ECPs. The first national study to do this was the 1997 *Survey of Women About Their Knowledge, Attitudes, and Practices Regarding Their Reproductive Health* (Parker et al., 1997). According to its findings, only 37% of the American women aged 18-44 surveyed reported that they knew there was something a woman could do to prevent pregnancy following unprotected intercourse. Sixty-six percent of respondents had ever heard of morning after pills, 55% had heard of emergency contraception but did not know it was an option in the United States, and 89% of those surveyed did not know enough about emergency contraception to use it if they needed it. Only 1% of women at this time reported having ever used ECPs. The limited awareness and extremely low usage rate of ECPs this study reported are not all that surprising as neither Preven nor Plan B had yet been released onto the US market at the time this survey was conducted.

By 2003, public awareness of ECPs had nearly doubled. At this time, a nationally representative study found that 67% of women aged 18 – 49 years were aware that there was something they could do to prevent pregnancy within a few days following unprotected sex (Hoff, Miller et al., 2003). And, increasing almost 20 percentage points since the 1997 survey, 84% of women said they had heard of emergency contraceptive pills in 2003 (Hoff, Miller et al., 2003). Despite its ability to avert unintended

pregnancies, ECP usage rates in the United States at this time still remained low with only 6 % of women claiming to have ever taken them (Hoff, Miller et al., 2003).

The same year, findings from another national study about sexual health was released, but this time the sample consisted of young people including young men (Hoff, Greene, & Davis, 2003). *The National Survey of Adolescents and Young Adults: Sexual Health Knowledge, Attitudes and Experiences* found that young adults as a group were less aware of ECPs compared to all women of reproductive age (Hoff, Miller et al., 2003). In this sample of 15 – 24 year olds, only 55% knew there was something a woman who had unprotected sex could do in the next few days to prevent pregnancy and 65% had heard of emergency contraceptive pills or morning after pills.

Although awareness of ECPs has been increasing over the past decade, the differences between ECPs and RU-486 or “the abortion pill” still remain unclear to the general public (Free, Lee, & Ogden, 2002; Harper & Ellertson, 1995a; R. Jackson, Schwarz, Freedman, & Darney, 2000; Salganicoff, Wentworth, & Ranji, 2004; Shoveller, Chabot, Soon, & Levine, 2007; Whittaker, Armstrong, & Adams, 2008). This confusion is not surprising given that the media is a major source of information and sometimes misinformation about issues of reproductive health including emergency contraception (Blanchard, Haskell, Ferden, & et.al., 2002; Breitbart, Castle, Walsh, & Casanova, 1998; Cohall, Dickerson, Vaughan, & Cohall, 1998; Delbanco et al., 1997; Ellertson, Shochet, Blanchard, & Trussel, 2000; Harvey, Beckman, Sherman, & Petitti, 1999; R. Jackson et al., 2000; Jamieson, Hertweck, & Sanfilippo, 1999) . A recent study by Pruitt and Mullen (2005) conducted content analyses on a sample of 1077 articles discussing both emergency contraception and abortion that appeared in 113 newspapers between 1992

and 2002. Nearly half (44.5%) of all the articles had at least one “instance of confusion between EC and medical abortion” and approximately 32% of the articles inaccurately portrayed the mechanism of action of EC as that of a medical abortion. And finally, 13% of articles mistakenly used terms such as “abortifacient postcoital contraceptives” to describe EC (Pruitt & Mullen, 2005).

Although usage rates of ECPs are low, typically around 10% (Aiken, Gold, & Parker, 2005; Hoff, Miller et al., 2003; Salganicoff et al., 2004), research shows that ECPs are an acceptable method of postcoital contraception. In a study examining women’s satisfaction with ECPs in San Diego, 91% of a diverse sample of women reported being “satisfied” and 97% of them said they would recommend them to a friend or family member (Harvey et al., 1999). Another survey found that 92% of a young diverse sample of women in New York said they would use ECPs again if they needed them (Breitbart et al., 1998). A recent study of young women attending family planning clinics in San Francisco also found that women found ECPs acceptable where the majority of participants felt ECPs were safe and effective and they would recommend them to a friend (Rocca et al., 2007).

In addition to the large national surveys, numerous studies with relatively small samples of more specific populations have also examined women’s awareness and use of ECPs over the past decade (Aiken et al., 2005; Baldwin et al., 2008; Chuang & Freund, 2005; Cohall et al., 1998; Gee, Delli-Bovi, & Chuang, 2007; R. Jackson et al., 2000; Jamieson et al., 1999; Mollen et al., 2008; Salganicoff et al., 2004; Spence, Elgen, & Harwell, 2003). Although there has been some variability in awareness and use of ECPs

among these, their findings tend to follow the pattern seen in the national surveys – far more women are aware of ECPs than have ever actually used them.

Among studies that have stratified awareness and knowledge of ECPs by demographic factors, there seems to be variation when looking at awareness by age (Baldwin et al., 2008; Foster, Ralph, Arons, Brindis, & Harper, 2007; R. Jackson et al., 2000; Salganicoff et al., 2004). However, there appears to be a pattern of disparity when examining awareness by race. More white women tend to be aware of ECPs than do minority women (Baldwin et al., 2008; Chuang & Freund, 2005; Foster et al., 2007; Gee et al., 2007; Salganicoff et al., 2004).

### **College Women and ECPs**

When examining specific populations and their knowledge and experiences with ECPs, college women deserve special attention due the many unique factors contributing to their elevated risk for unintended pregnancy. Currently, women comprise 57% of the 17.5 million students attending degree-granting institutions of higher education in the United States (NCES, 2006). Approximately 60% of students enrolled in degree-granting institutions are aged 18 – 24 years old (NCES, 2006).

In the US, the unintended pregnancy rate is highest among traditional college aged women (18 – 24 years old) (Finer & Henshaw, 2006). Among this group, more than 1 unintended pregnancy occurs for every 10 women; this rate is double the rate for women over all (Finer & Henshaw, 2006). Seventy-nine percent of pregnancies in 18 – 19 year old women and 60% in 20 to 24 year olds are unintended (Finer & Henshaw, 2006). With the exception of girls 17 and younger, these proportions are the highest across all age groups. Women aged 20 – 24 have the highest abortion rate (45/1000)

compared to all other age groups. Further, almost half of unintended pregnancies in 18 – 24 year olds end in abortion. This age group also has the highest unintended birth rate (53/1000 for 18 –19 year olds and 46/1000 for 20 – 24 year olds) (Finer & Henshaw, 2006).

Interestingly, women who report having “some college” education, meaning they have not yet completed their education or they never completed it, have the highest proportion of unintended pregnancies (52%), the highest percentage of unintended pregnancies ending in abortion (60%) and the highest abortion rate (25/1000) relative to all other education categories (Finer & Henshaw, 2006). Looking specifically at college students, the National College Health Risk Behavior Survey (NCHRBS) shows that over a third (35%) of college students report that they have ever been pregnant or gotten someone pregnant (Douglas & Collins, 1997). Further, the American College Health Association National College Health Assessment (ACHA-NCHA) finds that 3% of female students engaging in vaginal intercourse over the past school year had an unintended pregnancy (ACHA, 2008).

Why are college women at high-risk for unintended pregnancy? In some women, attending college seems to trigger sexual risk taking or alcohol use; behaviors that place women at risk for unintended pregnancy. Sexual assault on college campuses further contributes to this risk. Eighty-six percent of college students report ever having engaged in sexual intercourse, with 68% of students having had sex in the past three months (Douglas & Collins, 1997). Approximately 50% of students indicate they have had sex in the past 30 days (ACHA, 2008). Among sexually active students, almost 80% claim to have used some form of contraception during their most recent intercourse (Douglas &

Collins, 1997) but only 50% say they had used a condom (ACHA, 2008). In addition to unsafe sex practices, students seem to be putting themselves at risk by having numerous sexual partners. Approximately 35% of college students say they have had six or more sex partners in their lifetime (Douglas & Collins, 1997).

Alcohol consumption has been shown to play a role in unsafe behaviors placing women at increased risk for an unintended pregnancy. Approximately 4% of college students have used alcohol on at least 20 of the past 30 days (Douglas & Collins, 1997). In addition to the frequency of alcohol consumption, the amount of alcohol used is also troubling. Over one third (35%) of all college students report that they have had five or more drinks at least one time in the past 30 days (Douglas & Collins, 1997). Among women, about a quarter (24.8%) say they had five or more drinks the last time they partied (ACHA, 2008).

The consequences of heavy drinking can be serious. A third of women report they “did something that they regretted later” after drinking alcohol in the past school year and another 28% “forgot where they were or what they had done” (ACHA, 2008). Further, 14% of women say that they have had unprotected sex after drinking in the past year (ACHA, 2008). Among frequent binge drinkers (men who have consumed 5 or more drinks in a row and women who had had 4 or more drinks in a row at least once in the past 2 weeks), 45% report engaging in unplanned sexual activity and 24% of them said they did not use protection when having sex (Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998).

Another factor that puts college women at risk for unintended pregnancy is sexual assault. In the U.S., 20% of college women report ever having been forced to have

sexual intercourse against their will at some point during their lifetimes (Douglas & Collins, 1997). In the past year, approximately 9% of female students experienced sexual touching against their will, 4% experienced attempted penetration against their will, and 2% experienced actual penetration against their will (ACHA, 2008). Additionally, 3 out of 4 college men and 55% of college women involved in sexual assault report having used alcohol or other drugs prior to the assault (Douglas & Collins, 1997).

Given that many college women are engaging in risky behaviors, emergency contraceptive pills offer another option for preventing unintended pregnancy. Mirroring the general public's limited use of ECPs, only 15% of college women report that they have used emergency contraception within the past school year (ACHA, 2008). Provided that widespread ECP use among college women could abate the threat of unintended pregnancy, it is somewhat surprising that there is limited information regarding college women and emergency contraception. In their 1996 article, Sawyer and Fong wrote "Research describing the use of ECPs on college campuses is extremely scarce." Over a decade has passed and it is still the case that information regarding college women's relationship with ECPs is inadequate.

Several studies have examined access to ECPs on college campuses by looking at student health centers. Although there has been a steady increase in college health centers prescribing ECPs over time, not all college health centers partake in this practice (Brening, Dalve-Endres, & Patrick, 2003). Currently, approximately 70% of college health centers prescribe ECPs and 58% prescribe as well as dispense ECPs (Brening et al., 2003). The majority, 95% of health centers distribute Plan B (Miller & Sawyer, 2006). Health centers located on campuses with 10,000 or more students are more likely

to make ECPs available to students than schools with smaller populations (McCarthy, 2002). However, being located in the Midwest or the South, being a private institution, and being a school where the majority of students are commuters are predictive of student health centers being less likely to make ECPs available (McCarthy, 2002). Perhaps not surprisingly, only 30% of schools with religious affiliations report prescribing ECPs compared to 82% of schools without such an affiliation (Brening et al., 2003). When asked to explain why their institution does not prescribe ECPs, the majority (57%) cite moral convictions as their reasoning (Brening et al., 2003). Eighty-eight percent of these colleges and universities are religiously affiliated (Brening et al., 2003). Other reasons for not offering student access to ECPs include: ECPs availability elsewhere, administration uncomfortable with the idea, and ECPs' similarity to a medical abortion (Brening et al., 2003).

Although 65% of colleges and universities claim to advertise ECPs on campus via numerous vehicles including: brochures, websites, flyers, school newspapers, hotlines, and peer educators, numerous barriers still exist to student access (Brening et al., 2003). The majority of schools report that ECPs are never available at night (58%), are never available on the weekends (52%) and are never available during holidays (56%); all times when women may engage in unprotected sex (Brening et al., 2003). Advance provision of ECPs would address this limited access problem; however, only 20% of schools with an established written protocol for prescribing ECPs (75%) address advance provision for students at risk (Brening et al., 2003). Other access barriers may include the requirement of a pregnancy test (59% of schools) or physical exam (10% of schools) prior to prescribing ECPs (Brening et al., 2003). Neither of these practices are recognized as best

practices when prescribing ECPs (ACOG, 2005). Cost may also be prohibitive. Less than a quarter (22%) of institutions offer free ECPs and over a quarter (29%) charge students over \$20 for the pills (Brening et al., 2003).

Even among campuses offering optimum access to ECPs, women may not access them due to intrinsic factors. Unfortunately, what is known about this particular group of women and their knowledge, attitude and experiences with ECPs is limited to just a few studies executed in three different universities (Corbett et al., 2006; Harper & Ellertson, 1995a, 1995b; Sawyer & Thompson, 2003).

According to these studies, the vast majority of college students are aware of emergency contraceptive pills (Corbett et al., 2006; Harper & Ellertson, 1995a; Sawyer & Thompson, 2003). Recent research shows that as high as 96% of students have heard of ECPs (Corbett et al., 2006). Awareness among graduate students seems to be lower (86%) than among undergraduates (98%) (Harper & Ellertson, 1995a). The authors of this study attribute the difference to education programs and campaigns on campus specifically targeting undergraduate students (Harper & Ellertson, 1995a).

Although awareness of ECPs is high, some deficits in knowledge seem to exist among this population. Seventy-nine percent of students perceive their knowledge level of ECPs as “little” and another 8% said they knew “nothing” about ECPs (Sawyer & Thompson, 2003). In some cases this lack of knowledge is more than a perception. First and foremost, students seem to lack the appropriate knowledge to access ECPs. In a 2003 study of students on a campus that offered ECP, 57% of students said they did not know whether or not ECPs were available at their school (Sawyer & Thompson, 2003). Sixty percent said they would not know where to obtain ECPs in the local off-campus

community (Sawyer & Beck, 1988). And 80% said they would have no idea where to access ECPs if they were out of town (Sawyer & Beck, 1988). These findings are troublesome considering that knowing where to access ECPs if needed precludes taking the pills. This information demonstrates the need for more publicity about how and where to access ECPs.

Also, being able to discern between what ECPs are and what they are not is problematic for some students. In one survey of Princeton students, only about a quarter (26%) of students knew that ECPs are simply a higher dose of birth control pills and 52% were unable to distinguish ECPs from hormonal therapies such as RU-486 used to induce abortion (Harper & Ellertson, 1995a). More women than men could distinguish between the two (60% v. 35%) (Harper & Ellertson, 1995a). Here again, a limited proportion of graduate students (35%) knew that ECPs were not RU-486 (Harper & Ellertson, 1995a). Even in a recent 2006 study this confusion remained, where 38% of undergraduate students thought ECPs and RU-486 were one in the same and another 50% was uncertain whether or not the two were different (Corbett et al., 2006). When asked to place ECPs on a continuum between abortion and contraception, 29% of students considered it to be contraception, about 8% considered it to be an abortion and approximately 63% categorized ECPs as something in between (Sawyer & Thompson, 2003).

Although the majority (77%) of students in one large east coast public university knew that ECPs do not prevent sexually transmitted infections (Sawyer & Thompson, 2003) and the majority of students from a southern coastal state university knew that emergency contraception is available in the US and that it prevents pregnancy (Corbett et al., 2006), there also appears to be a lack of understanding in usage, functioning, and

effectiveness of ECPs. Only about a third of students know the correct timing for ECPs to effective (Harper & Ellertson, 1995a; Sawyer & Thompson, 2003). Only 18% of students could answer correctly the question of how most experts believe ECPs work (Sawyer & Thompson, 2003). Understanding of effectiveness is quite low. In one study, only 25% of those surveyed knew that ECPs reduce the risk of pregnancy by about 75% (Harper & Ellertson, 1995a) and in another, only 39% picked the correct choice in answering a question about the degree to which ECPs prevent pregnancy (Sawyer & Thompson, 2003). Additionally, more than half of students think that ECPs would produce minor uncomfortable side effects (54%) and that they were concerned about health risks associated with taking the pills (57%) (Harper & Ellertson, 1995a). In a recent study by Sawyer and Thompson (2003), the mean score on a multiple choice cognitive scale about ECPs was 40% (Sawyer & Thompson, 2003). Women and individuals who had ever had sex, who had ever had a pregnancy scare, and who had taken a health course that discussed ECPs had significantly higher ECP knowledge levels than their counterparts (Sawyer & Thompson, 2003).

Generally, students seem to have a positive attitude toward ECPs. In one study, when asked if ECPs should ever be used, 80% responded affirmatively. (Harper & Ellertson, 1995a, 1995b). In particular, 91% of students approved of the use of ECPs in the case of sexual assault (Harper & Ellertson, 1995a). Although the majority of students agreed that ECPs should be easy to obtain when needed (84%) and agreed that the university health center should carry ECPs (85%) (Harper & Ellertson, 1995a), some focus group members voiced concerned about widespread access. Some students felt that ECPs would undermine sexual responsibility and that people might substitute ECPs for

barrier methods and risk contacting sexually transmitted infections (Harper & Ellertson, 1995b). In another study, the sample was in disagreement about whether or not ECPs should be available without a prescription, one third said yes, another third said no, and the last third was unsure (Sawyer & Thompson, 2003).

In terms of acceptability, the majority of Princeton students (76%) said they would recommend ECPs to a friend or use the medication themselves if needed (Harper & Ellertson, 1995a). In this study, students who knew the ingredients and side effects of emergency contraceptive pills, those who had experienced or witnessed a situation in which the use of ECPs might have been appropriate, those who were not religious, and those with Democratic leanings had higher odds of approving ECPs (Harper & Ellertson, 1995a).

In another study, 67% of women said they would be likely to use ECPs in the event of contraceptive failure (Corbett et al., 2006). Among those who were “very likely” to use ECPs, 92% reported an increase likelihood if they already had a prescription for ECPs (Corbett et al., 2006). Even those women who were “very unlikely” to use ECPs, reported a 20% increase in likelihood of taking ECPs if they already had a prescription (Corbett et al., 2006). The women who were not willing to use ECPs said they would feel embarrassed or judged when trying to obtain EC (Corbett et al., 2006). Additionally, ninety percent of those women unlikely to use ECPs said they had moral or religious objections to their use (Corbett et al., 2006). The Princeton study also reported that students 32% had ethical concerns about ECPs (Harper & Ellertson, 1995a). This research found that health concerns about ECPs, religion, political

affiliation, knowledge of ingredients, and being able to distinguish ECPs from RU-486 were associated with ethical concerns about ECPs (Harper & Ellertson, 1995a).

Considering students who have inadequate knowledge about ECPs and in some cases have formed attitudes based on incomplete or inaccurate information, questions arise as to the sources of their information. One study examining how college students obtain their information about emergency contraception found that the top three sources were: friends (34%), media (25%), and class (16%) (Corbett et al., 2006). Interestingly, in the same study, students said they would prefer to receive information about ECPs from: doctors (41%), community or campus clinics (33%), and the internet (27%) (Corbett et al., 2006).

Clearly college women are an at risk population for unintended pregnancy and could benefit from ECP use. Similar to the general public however, college women's ECP usage rates remain low despite their high level of ECP awareness.

### **Barriers to Emergency Contraceptive Pills**

Given that ECPs are highly effective at preventing pregnancy, are easy to take, are acceptable to women, are relatively inexpensive, and have no serious side effects, why aren't more women using them? To try and answer this question, researchers have focused primarily on external barriers to accessing ECPs including: Catholic hospitals refusing to disseminate ECPs (Polis, Schaffer, & Harrison, 2005; Smugar, Spina, & Metz, 2000), pharmacies and retail stores not stocking or refusing to stock ECPs (Chuang & Shank, 2006; Espey, Ogburn, Howard, Qualls, & Ogburn, 2003; Shacter, Gee, & Long, 2007), and clinicians' limited knowledge about and negative attitude toward ECPs resulting in low prescription rates (Chuang, Waldman, Freund, & Ash, 2004; Delbanco et

al., 1997; Golden et al., 2001; Perrin, Seigel, Sills, Chamberlain, & Teach, 2000; Sherman, Harvey, Beckman, & Petitti, 2001; Veloudis & Murray, 2000). As time passes however, external barriers should actually become less of an issue. Despite Plan B's controversial and circuitous path to widespread availability, the FDA granted it over the counter status on August 24, 2006. There were two caveats to its new status, however. First, Plan B would be stored behind the counter at pharmacies and women trying to access it would have to ask a pharmacist for it. And secondly, girls 17 years old and younger will be required to have a prescription to purchase Plan B. However, following a US District Court decision, the FDA announced on April 22, 2009 that it will permit 17 year olds to purchase Plan B without a prescription (Guttmacher, 2009)

Much of the controversy about ECPs has stemmed from the fear that if women could easily access ECPs, they would engage in increased sexual activity, would abandon more effective methods of birth control and safer sex practices including condom use and therefore, rates of sexually transmitted infections would increase among ECP users. With very few exceptions (Belzer, Sanchez, Olson, Jacobs, & Tucker, 2005; Raine, Harper, Leon, & Darney, 2000), there is overwhelming evidence that these fears have no grounding in the literature. Studies examining outcomes of adult women and adolescents having advance provisions of ECPs or pharmacy access to ECPs illustrate that unencumbered access to ECPs does not compromise contraceptive or sexual behavior (Belzer et al., 2005; Ellertson et al., 2001; Glasier & Baird, 1998; Gold, Wolford, Smith, & Parker, 2004; Harper, Cheong, Rocca, Darney, & Raine, 2005; R. A. Jackson, Schwarz, Freedman, & Darney, 2003; Polis et al., 2007; Raine et al., 2005; Stewart, Gold, & Parker, 2003). Experiences in other countries such as Britain and France where

ECPs have nonprescription status corroborate the findings of American studies that there is no harm in widespread access to ECPs (Marston, Meltzer, & Majeed, 2006; Moreau, Bajos, & Trussel, 2006; Moreau, Trussell, Michelot, & Bajos, 2009).

Now that Plan B is available to girls and women without a prescription, many of the past impediments to obtaining ECPs will not longer be obstacles. Nevertheless, do fewer physical hindrances necessarily ensure that all women who want ECPs will access and take them? Although American women rarely report having an advanced prescription for ECPs (Chuang & Freund, 2005; Hoff, Miller et al., 2003), several studies have shown that women who have an advance prescription for or advance provision of ECPs take them more often when needed than do women without these options (Belzer et al., 2005; Ellertson et al., 2001; Gold et al., 2004; Harper et al., 2005; R. A. Jackson et al., 2003; Raine et al., 2000; Raine et al., 2005). However, other studies have shown that rates of ECP use are surprisingly low among women with advance provision who have experienced incidents putting them at risk for unintended pregnancy (Endres, Beshara, & Sondheimer, 2000; Nelson, 2006; Petersen, Albright, Garrett, & Curtis, 2007; Raine et al., 2005).

One such study examined ECP use among indigent Hispanic women who had indicated condom use as their primary contraceptive method (Nelson, 2006). Approximately 44% of the sexually active members of the sample reported inconsistent condom use during the two weeks prior to being interviewed. Despite the fact that women were provided with an advance supply of Plan B (one package) and a prescription for two refills, only 39% of those who had reported inconsistent condom use used ECPs at least once (Nelson, 2006). In another study, all women attending a publicly funded

clinic serving low-income women were offered ECP packets to take home with them. Women were contacted six to eight months following their clinic visit and only 22% of the woman at risk for unintended pregnancy had taken the ECPs. In fact, 11% of the sample became pregnant (Endres et al., 2000). In yet another study (Raine et al., 2005) English and Spanish speaking women were randomized to an ECP pharmacy access group, ECP advance provision group, or clinic access (control). Only half of the study participants who had had unprotected intercourse used ECPs over the study period (Raine et al., 2005). These findings suggest that there are factors other than external barriers that may influence a woman's decision to take ECPs.

### **Factors Influencing ECP Use**

Although widespread ECP use could have a profound effect on unintended pregnancy rates, we have limited information about the factors that influence a woman's decision to use ECPs. We also have incomplete current information about college women and ECPs. A better of understanding of college women's decision-making processes regarding ECP use would help guide educational programs and campaigns targeting a population at risk for unintended pregnancy. It is plausible that theory-based predictors can provide a systematic approach to understanding the determinants of ECP use. Although no one has used a conceptual framework to examine ECP behavior, the ECP literature, as well as the broader body of contraceptive research suggest the behavioral constructs of knowledge, self-efficacy, attitude, perceived social norms, perceived threat, and past behaviors may affect ECP use and were therefore used in building the framework.

## **Knowledge**

Several knowledge-related factors have been shown to be predictive of willingness to use ECPs or future use of ECPs in the extant literature. In a study by Larsson and colleagues, knowledge of the effectiveness of taking ECPs on the first day after intercourse was predictive of future use of ECPs (Larsson, Eurenus, Westerling, & Tyden, 2004). Sorensen and colleagues found that all users of ECPs could identify the correct timing for taking the pills but there were no ECP-users among women who could not identify the correct timing (Sorensen, Pedersen, & Nyrborg, 2000).

Understanding the side effects and safety of ECPs also seems to play a role in emergency contraceptive behavior. Research has found that knowledge of possible side effects caused by ECPs predicted willingness to use ECPs or future use of ECPs (Harper & Ellertson, 1995a; Larsson et al., 2004). Additionally, in a study by Jackson and colleagues, women who believed ECPs were safe were twice as likely to be willing to take ECPs in the future than women who felt they were unsafe (R. Jackson et al., 2000).

Knowledge of the mechanisms of action by which ECPs prevent pregnancy has also been shown to be important in ECP decision-making (R. Jackson et al., 2000; Larsson et al., 2004; Romo, Berenson, & Wu, 2004). According to Jackson et al. (2000), women having accurate information about ECPs' mechanisms of action and who knew that ECPs cannot cause an abortion were 2 times more likely to be willing to take ECPs in the future than women who believed they cause an abortion (R. Jackson et al., 2000). In another study, unwillingness to use ECPs was higher among women who believed that ECPs prevented pregnancy by interfering with implantation versus ovulation (Romo, Berenson, & Wu, 2004). Additionally, unwillingness was associated with the belief that

if a woman was already pregnant, ECPs could still be effective (Romo, Berenson, & Wu, 2004).

Although knowing how ECPs function to prevent pregnancy is not necessary for ECP use, it is apparent that this information affects women's decision-making. If women erroneously believe that ECPs can cause an abortion, they are basing their decision about whether or not to use ECPs on misinformation. In this case, women who might have otherwise opted to use ECPs, refrained from doing so based on false information resulting in ill-founded moral and ethical decisions.

### **Self-Efficacy**

Self-efficacy, the conviction that one can successfully execute a behavior required to produce a desired outcome, is a primary construct not only in the Social Cognitive Theory (Bandura, 1977, 1986) but similar constructs also appear in the Theory of Reasoned Action (Fishbein, 1967), the Theory of Planned Behavior (Ajzen, 1991), and the Integrative Model (Fishbein, 2000). Only one study to date has examined a dimension of self-efficacy and how it relates to ECP use (Free & Ogden, 2005). In this study, confidence in asking for emergency contraception was found to be a significant predictor of its use. The more confident a woman was in asking for ECPs, the more likely she was to have used ECPs (Free & Ogden, 2005).

Although we have limited information about self-efficacy and its role in ECP behavior, this construct has been shown to be an important factor in contraception use (Heinrich, 1993; Levinson, Wan, & Beamer, 1998; Sieving, Bearinger, Resnick, Pettingell, & Skay, 2007). Heinrich examined the effects of self-efficacy on contraception use among college women and found that highly effective contraception

users (women who always used a highly effective contraceptive method during intercourse) had significantly higher contraceptive self-efficacy scores than did their less effective contraceptive-using counterparts (Heinrich, 1993). Additionally, contraceptive self-efficacy was found to be the most important predictor of contraceptive use where those having high self-efficacy scores were 3.5 times more likely to use contraception than women with low self-efficacy scores (Heinrich, 1993).

Levinson and colleagues also found that contraceptive self-efficacy was predictive of contraception use in four different samples (suburban middle-class teenage women in Sunnyvale, California, low SES teenage women in Chicago, low-income Catholic high school students in Montreal, and college students attending a northeastern university in the U.S.) (Levinson et al., 1998). And a recent analysis of the National Longitudinal Study of Adolescent Health found that high birth control self-efficacy was associated with higher contraceptive use levels among older adolescents (10<sup>th</sup> and 11<sup>th</sup> graders) (Sieving et al., 2007).

Women who intend to use ECPs would likely be more self-efficacious about using them in that they would likely need to be confident that they could obtain and effectively take ECPs in the required timeframe for them to be effective. As partner attitudes seem to play a role in women's contraceptive behaviors (Free & Ogden, 2005), it is possible that having confidence in taking ECPs without a partner knowing may affect a woman's intentions to use ECPs as well.

### **Attitude**

Attitude is a construct common to several of the most widely used health behavior theories (Ajzen, 1991; Fishbein, 1967, 2000; Triandis, 1980) and having a positive

attitude toward ECP availability has been predictive of use (Larsson et al., 2004). In a 2004 Swedish study, positive attitudes about ECPs gaining over the counter status was predictive of future use of ECPs among women (Larsson et al., 2004). Although it is unfortunate that no American studies to date have examined how attitudes about ECP availability predict use, several studies provide insight into trends in ECP attitude that may ultimately affect use (Breitbart et al., 1998; Harper & Ellertson, 1995a, 1995b; Harvey et al., 1999; Sawyer & Thompson, 2003; Wu et al., 2007).

Telephone interviews with ECPs users in San Diego found that the majority felt that ECPs should be given to women in advance in case of an emergency. However, only about a quarter of these women felt ECPs should be dispensed over the counter without a prescription, and only 6% thought this method should be offered through vending machines (Harvey et al., 1999). Similarly, a study of women seeking ECPs from a Planned Parenthood in New York City found that while 85% of participants agreed that women should be given ECP prescriptions for future use, only about a quarter felt that ECPs should be made over the counter, and only 7% believed ECPs should be made available through vending machines (Breitbart et al., 1998).

Research on college students illustrates similar conflicted attitudes regarding the availability of ECPs. In a survey of Princeton students, the majority believed that ECPs should be easy to obtain when needed (84%) (Harper & Ellertson, 1995a). However, they were split about whether or not ECPs should be available without a prescription. Another study found that while a third of the sample felt ECPs should have over the counter status, another third disagreed with this idea, and the last third was uncertain (Sawyer & Thompson, 2003).

In a recent survey of women seeking ECPs online, the majority of women supported advance prescriptions for ECPs but only 43% thought ECPs should be available over the counter without a prescription. Those in disagreement had trepidation as they feared that this widespread availability of ECPs might cause women to abandon their current contraception and safe sex practices (Wu et al., 2007). Data for this study were collected just prior to the FDA granting Plan B over the counter status. As such, we do not know what women's attitudes are currently. However, it is plausible that women's feelings about ECP availability may have some bearing on their own decisions about whether or not to use the pills.

### **Perceived Social Norms**

*Subjective norm*, a construct shared by several health behavior theories, represents what the individual perceives others are doing relative to a particular behavior and how motivated the individual is to comply with the behavior of other groups of people (Ajzen, 1991; Fishbein, 1967, 2000; Triandis, 1980).

A recent study of students aged 16 – 30 in London found that having a positive view of women who used ECPs was predictive of ECP use (Free & Ogden, 2005). This study also found that having partners who were supportive of ECP use was predictive of actual use (Free & Ogden, 2005).

Although no research to date has examined how parental influence affects ECP use, particularly among girls and young women, parents have been found to play a role in contraceptive use. In the National Longitudinal Study of Adolescent Health, perceived parental approval of birth control was associated with higher contraceptive usage rates among adolescent girls (Sieving et al., 2007). For some groups of women presenting for

pregnancy tests at public health clinics in Missouri, parental opposition to birth control use was cited as a barrier (Sable, Libbus, & Chiu, 2000).

The influence of friends also has been shown to affect contraceptive use. In an early application of the Theory of Reasoned Action to family planning behaviors, Jaccard and Davidson (1972) administered questionnaires to college women and examined their normative beliefs and intentions toward taking birth control pills. Women who reported intention to use birth control pills differed significantly from non-intenders in that those with intentions to use the pill perceived that their friends, boyfriends, sisters and fathers wanted them to use the pill (Jaccard & Davidson, 1972). Lowe and Radius (1987) also found that peer norms affect contraceptive behavior. In this study of college students, subjects holding the perception that their friends had “liberal” sexual views and practices was a predictor of contraception use at last coitus (Lowe & Radius, 1987).

Although an individual’s religious community may be another social referent affecting behavior, there has been no research to date examining how this particular group may influence ECP use. Unfortunately, research describing religion’s affect on contraceptive behavior is discrepant. Sangi-Haghpeykar and colleagues found that compared to white women, US-born Hispanic women had more religious objections to using birth control and also had significantly lower rates of contraceptive use (Sangi-Haghpeykar, Ali, Posner, & Pointdexter, 2006). According to the National Survey of Family Growth, current Fundamentalist Protestant young women (ages 15 to 19) and past or present young female Catholics were more likely to exhibit noncontracepting behavior than their Mainstream Protestant counterparts (Kramer, Rowland Hogue, & Gaydos,

2007). Conversely, a study by Romo et al. found that religious affiliation (Catholic or not Catholic) was not associated with contraceptive use (Romo, Berenson, & Segars, 2004).

### **Perceived Threat**

*Perceived threat* is the central construct of the Health Belief Model (Hochbaum, 1958; Rosenstock, 1960, 1974). This construct is composed of *perceived susceptibility*, how likely is it to the individual that they will end up having the condition in question, and *perceived severity*, how bad does the individual perceive it would be to have the condition in question. Perceived susceptibility to becoming pregnant as well as how bad it would be for a woman to become pregnant have been shown to influence ECP use.

Free and Ogden (2005) found that the perception of vulnerability to becoming pregnant was a predictor of using ECPs among female students. Qualitative research examining ECP use has also uncovered the theme of pregnancy susceptibility as well as the severity of becoming pregnant (Free et al., 2002). In this study, users of ECPs shared the strong desire to avoid pregnancy because for many, pregnancy equated “disaster.” Users also tended to have aspirations other than motherhood, such as education, careers and travel. Conversely, interviews with non-users of ECPs seemed to share the belief that they were at less risk than others for becoming pregnant and some felt they were “invulnerable to pregnancy” (Free et al., 2002). In examining women presenting for pregnancy tests at a Montana clinic, Spence and colleagues also found that those who intended to use ECPs in the future were significantly more likely to report that they did not want to be pregnant now or ever (Spence et al., 2003).

### **Past Behavior**

Both the Expanded Theory of Reasoned Action (EXTRA) (Triandis, 1980) and the Integrative Model (Fishbein, 2000) include constructs, *habit* and *past behaviors* respectively, to address the influence past behaviors have on present behaviors.

In the emergency contraception literature, some past contraceptive behaviors seem to be related to intention to use and actual use of ECPs. In one study, previous oral contraceptive (OC) users were nearly 2 times more likely to be willing to take ECPs in the future even though they were found to be unfamiliar with ECPs (R. Jackson et al., 2000). Similarly, in another study, users of ECPs were more likely to have taken ECPs in the past (Sorensen et al., 2000). In fact, in a survey of young women (15 – 24 years of age) presenting at family planning clinics in the San Francisco Bay area, those who had used ECPs in the past were twice as likely to use ECPs again during the study period compared to those with no ECP use history (Rocca et al., 2007).

### **Intention to Use ECPs**

Given that a small proportion of American women have ever used ECPs, it was unlikely there would have been a sufficient number of participants in this study with ECP experience to test all of the constructs in the conceptual framework in order to determine which factors most influence ECP use. Therefore, *intention to use ECPs* was used as a proxy for ECP use. *Intention*, along with *lack of environmental constraints* and *skills necessary to perform the behavior*, has been established as one of the top three determinants of behavior among behavioral experts (Fishbein, Triandis et al., 2001). At present, no research exists examining whether or not intention to use ECPs translates into actual ECP use. Although intention has not proven to be a reliable predictor of behaviors

such as exercise or weight loss (Kerner, Grossman, & Kurrent, 2001; Pai & Edington, 2008), intention has been shown to be predictive of female condom use (Van Devanter et al., 2002) and has consistently been predictive of male condom use (Astone, 1996; Fishbein, Hennessy et al., 2001; Rhodes, Stein, Fishbein, Goldstein, & Rotheram-Borus, 2007). As taking ECPs is also a contraceptive behavior, it is conceivable that intention to use ECPs would translate into actual ECP use if a woman found herself in a situation where she perceived herself to be at risk for becoming pregnant.

## CHAPTER 3

### RESEARCH DESIGN AND METHODOLOGY

#### **Sample**

The sample was drawn randomly from a list of public directory information obtained from Oregon State University (OSU). OSU is located in Corvallis, a town of approximately 50,000 residents. The university is a designated land, sea, sun, and space grant university, making it one of only six universities to have all four titles. During this study, the student health center was actively dispensing emergency contraceptive pills. It continues to dispense ECPs today.

Both federal and state laws permit state universities to release to the public directory information regarding current and former students without students' consent. Directory information includes: name, current mailing address and telephone number, current campus e-mail address, campus office address, class standing, month and day of birth, major field of study, full-time or part-time enrollment status, status as a graduate teaching assistant or graduate research assistant, participation in officially recognized activities and sports, dates of attendance, degrees and awards received, date(s) of degree(s), and most recent previous educational institution attended by student. Students can prohibit the release of directory information to the public by signing a *Restrict Directory Information* authorization form.

The initial directory list of students enrolled (undergraduate and graduate) during the Spring 2004 quarter contained 17,418 names. At this time, 61 students had signed a *Restrict Directory Information* authorization form and were therefore not included in this list. Because they were men, 8,506 students were excluded from this list. Gender-neutral

names and names where the sex of the student was indiscernible remained in the list. Two hundred and thirty-eight students were removed from the list because their email addresses were not listed. The five students who reviewed the survey for readability, face validity and technical difficulties were also removed from the list. The 50 students who were randomly selected for the pilot study were additionally removed from this list. Of the remaining 8,619 possible participants, half of them were randomly selected to be sent the survey. Subjects were arranged in the dataset in alphabetical order and then numbered one through 8,619. Using a random number generator, 4,309 numbers between 1 and 8,619 were produced. Students whose numbers were chosen were sent emails inviting them to participate in the study by completing the survey.

### **Procedure for Data Collection**

This research began upon approval from Oregon State University's Institutional Review Board. Data for this study was collected via web survey. StatPac Survey software was used to conduct the online survey that was hosted by Oregon State University's Survey Research Center. Survey participants entered their answers into secure online forms and responses were stored in a secure SQL database.

Prior to sending the survey to the study sample, 50 students were drawn randomly from the list of women with an email address enrolled at OSU during the Spring 2004 quarter ( $N=8669$ ) and included in a pilot test of the survey to check for any technical difficulties. Eight students responded to the invitation to complete the pilot of the online survey. All students who participated in the pilot test completed the survey without technical difficulty. Women included in the pilot study were excluded from participating in the actual study.

The actual study employed Dillman's Tailored Design Method (Dillman, 2000). A pre-notice briefly explaining the study to potential participants and announcing the opportunity to be entered into a drawing to win a free two-night weekend trip was sent via email on May 20, 2004 (see Appendix B). Several days later, on May 24, 2004, a letter explaining the purpose of the study, providing information about confidentiality and the right to refuse participation, as well as a link to the web survey and a unique pin number was emailed to the sample (Appendix C). Three days later, a follow-up email was sent to members of the sample who had not yet responded encouraging their participation and including a link to the survey (Appendix D). On June 1, 2004, a final email was sent only to those members of the sample who had not yet responded to the survey (Appendix E).

In the invitation emails, students were provided with unique pin numbers (numbers 1001 – 5309) to access the web survey. Using pin number access prohibited individuals outside of the sample from responding to the questionnaire. Pin number access also disallowed respondents to complete the survey more than once and prevented them from receiving future reminder contacts once they had completed the survey.

At the end of the survey, Question 51, participants were asked to indicate whether or not they wanted to be considered to win a free two-night stay on the Oregon Coast. Once the survey had closed, 1,653 respondents had expressed they wanted to be included in the drawing. Before the winner was chosen, those who had reviewed the survey for readability and those who had completed the pilot survey were also put into the drawing. All those in the drawing were assigned a number 1 through 1666. Using a random

number generator, the winning number was chosen. The winner was called and her prize was awarded.

Once an individual finished the online survey, a final page appeared thanking her for completing the survey and confirming receipt of her response. Also on this page was a link (<http://ec.princeton.edu>) providing accurate and up-to-date information about ECPs. Participants were instructed to click on this link if they were “interested in learning more about emergency contraceptive pills.” If students clicked on the link, they were automatically taken to Princeton’s NOT-2-LATE.com website. If they were not interested in this information, they were able to simply exit the survey website.

### **Survey Instrument**

The **Emergency Contraceptive Pill Survey** (see Appendix A) was designed by the author for use in this study in order to assess college women’s knowledge, self-efficacy, attitudes, perceived social norms, behaviors and intentions toward emergency contraceptive pills. The questionnaire took approximately 10 minutes to complete.

Information on 17 demographic and background variables (Q15 – Q22, Q25 – Q27, Q39 – Q40, Q46 – Q50) was collected in order to compare differences between groups. Questions 1 through 3 asked information about awareness of ECPs and knowledge acquisition. Respondents were provided a definition of emergency contraceptive pills before continuing on to question 4 in order that women who reported having no awareness of ECPs in question 1 could complete the rest of the survey. Questions 5a through 5h assessed the respondent’s knowledge about when to take ECPs and their possible side effects and safety, as well as ECPs’ mechanisms of action. The author developed the attitude scale (Q4c – Q4h) based on common themes associated

with emergency contraceptive pills in a comprehensive review of the literature. High composite scores from this scale meant a more liberal attitude toward ECPs. Perceived social norms (Q4a – Q4b, Q6 & Q6a, Q7 & Q7a, Q8 & Q8a, and Q9 & Q9a) were measured by examining what the respondent perceived others thought she should do relative to ECPs and how much she was motivated to comply with their opinions. Questions 22 – 24, and questions 30 – 32 accessed sexual-related behaviors and Questions 33 – 45 looked strictly at emergency contraceptive pill behaviors. Self-efficacy (Q12 – Q14) was measured by the level of confidence a woman had in accessing and taking ECPs on time and correctly and without her partner knowing in an emergency situation. Questions 28 and 29 accessed perceived threat of pregnancy. Question 10 and Question 11 assessed intention to use ECPs.

### **Validity**

Prior to any data collection, and in order to determine face and content validity, experts in public health, reproductive health and survey methodology reviewed the survey. Following the expert review, a group of eleven women (five undergraduates from one of OSU's baccalaureate core classes and six colleagues) completed the survey online using a dummy code. Their responses were not recorded. Participants reviewed the survey for readability, face validity, and any technical difficulties with the website housing the survey. Comments were emailed to the author or discussed with the author in person. Feedback was considered and necessary changes were made. To increase content validity, a definition of "emergency contraceptive pills" was included in the questionnaire to ensure participants' responses were referring to the medication intended.

### **Procedure for Data Analysis**

Once the web survey closed on June 7, 2004, tab delineated data from the SQL server were delivered to the lead author. Data were first examined in Microsoft Excel, Version 11.0. Responses to open-ended questions were placed into predetermined categories when appropriate.

Data were then imported to SPSS (Statistical Package for the Social Sciences), Version 15.0 and univariate descriptive statistics were examined in order to assess the accuracy of the data. Continuous variables were checked to assure that values were within the appropriate range and that means and standard deviations were acceptable. Discrete variables were examined to make certain there were no out-of-range numbers.

As this study focused on decision-making related to unintended pregnancy, participants were limited to women of reproductive age, women 18 to 44 years old. Although the National Centers for Disease Control and Prevention define reproductive age between the ages of 15 and 44, minors, women under the age of 18 years old were not eligible to participate in this study, as they required parental consent. Given this, women younger than 18 years old ( $n = 2$ ) and women older than 44 ( $n = 63$ ) were removed from the data. Additionally, twenty-one surveys were excluded because respondents had not provided their age.

Further, one hundred and fifteen questionnaires were removed from the dataset because they were missing more than 20% of the responses. Cases missing less than 20% of data were used during analysis; however, SPSS, Version 15.0 automatically removes subjects when the variables being analyzed are missing.

In order to find possible univariate outliers among the dichotomous variables, the data were examined for exaggerated uneven splits (90/10) between categories. For continuous variables, histograms, box plots, normal probability plots, and detrended normal probability plots were examined. Continuous data were also transformed into *z-scores* in order to detect possible outliers. Cases with *z-scores* higher than  $\pm 3.29$  were considered possible outliers.

Normality and homogeneity of variance, assumptions for some parametric univariate tests used in this study, were checked among continuous variables. Histograms with a normal distribution overlay, box and whiskers plots, central tendencies, skewness and kurtosis statistics were examined. The Levene test was performed to check for homogeneity of variance.

Although the assumptions of multivariate normality, linearity, and homogeneity of variances are not necessary to perform logistic regression, power may be enhanced if these assumptions are met among the predictors. Therefore, independent variables to be included in the logistic regression models were examined by the two levels of the dependent variable in each of the models – intention to ever use ECPs and no intention to ever use ECPs and ECP use and ECP non-use. Normality of variables was assessed by looking at histograms with a normal distribution overlay, skewness and kurtosis statistics, as well as normal probability plots and detrended normal probability plots. Bivariate scatterplots were then checked to examine linear relationships between variables. To assess homoscedasticity, variances ratios between groups for each variable were calculated and compared.

Each group was then examined for multivariate outliers by examining Mahalanobis  $D^2$  and Cook's Distance Measurement. Cases were considered possible outliers if  $p < .001$  for chi-square values related to Mahalanobis  $D^2$  scores and if Cook's Distance Measurement was greater than 1.

A Pearson's correlation matrix was examined to look for high correlations between variables. Tolerance scores and variance inflations factors (VIF) were examined to help identify multicollinearity among the independent variables.

Univariate tests were used to identify associations between variables. Categorical variables were compared using chi-square tests and ordinal variables that did not meet the assumptions of an independent samples  $t$ -test were compared using the Mann-Whitney U test. The Wilcoxon signed-ranks test was used to evaluate differences within paired scores measured at the ordinal level. Comparisons of groups for continuous variables used two-tailed independent sample  $t$ -tests. Analyses were considered significant at  $\alpha = 0.05$ . Logistic regression was performed to examine predictors of *intention to ever use ECPs* and *no intention to ever use ECP* and *use* and *non-use* of ECPs.

## CHAPTER 4

### RESULTS

#### **ARTICLE 1: College Women and Emergency Contraceptive Pills: Knowledge, Self-efficacy, Attitude and Perceived Social Norms**

##### **ABSTRACT**

The author conducted an online survey to examine the knowledge, self-efficacy, attitudes and perceived social norms regarding emergency contraceptive pills (ECPs) of women attending a large public university in the Pacific Northwest. Of the 4,219 female students who were randomly selected to receive an email invitation to participate in the study, 45% ( $n = 1919$ ) completed the survey. Women who left more than 20% of the survey incomplete ( $n = 115$ ), women younger than 18 years of age ( $n = 2$ ), women beyond reproductive age ( $n = 63$ ), and women who did not indicate their age ( $n = 21$ ) were excluded leaving 42% ( $N = 1718$ ) of those who were randomly selected to participate. Half of the women surveyed (50.7%,  $n = 871$ ) had experienced a pregnancy scare at some point in their lives. Although almost all participants had heard of ECPs (95.8%,  $n = 1645$ ), they lacked knowledge about the pills. In particular, approximately half of the sample was unsure about whether or not ECPs cause dangerous long-term side effects (52.2%,  $n = 894$ ) and about whether or not ECPs have the ability to interfere with ovulation (50.2%,  $n = 861$ ). Almost a third of participants (28.7%,  $n = 489$ ) erroneously agreed that ECPs have the ability to destroy a fertilized egg that has implanted in the uterus and another 41% of participants ( $n = 701$ ) were uncertain if ECPs could prevent pregnancy in this manner. Partners were the most influential social reference in ECP decisions with the majority (90.3%,  $n = 1316$ ) of women agreeing that their partners'

opinions would be important in their decision whether or not to take ECPs. Strategies to prevent unintended pregnancies on college campuses should include information about the safety and mechanisms of actions of ECPs and should target men as well as women.

## **INTRODUCTION**

Emergency contraceptive pills, also referred to as “the morning after pill(s)” (MAPs) are a post coital method of birth control intended to be used in the event of condom breakage, birth control failure, unprotected sex and rape. Emergency contraceptive pills are a higher dose of regular oral contraceptives that have been proven to prevent pregnancy between 75 and 95 percent of the time if taken within 72 hours of unprotected intercourse (Trussell et al., 1999). ECPs prevent pregnancy by inhibiting or delaying ovulation (Croxatto et al., 2001; Croxatto et al., 2002; Durand et al., 2001; Glasier, 1997; Hapangama et al., 2001; Ling et al., 1979; Marions et al., 2004; Marions et al., 2002). These pills cannot however, disrupt an established pregnancy (Bacic et al., 1970; Glasier, 1997). There is still not consensus among researchers regarding whether or not ECPs have the ability to inhibit implantation (Muller et al., 2003; Ortiz et al., 2004; Young et al., 1994).

Provided their relatively high pregnancy prevention rates, research has indicated that widespread use of ECPs has the potential to prevent 1.5 million of the approximate 3 million unintended pregnancies occurring each year in the US, including as many as 700,000 pregnancies that now result in abortion (Trussell et al., 1992). Although 84% of American women have heard of ECPs, only 6% claim to have ever used them (Hoff, Miller et al., 2003). Despite their effectiveness and the public’s awareness of them, ECPs still remain underutilized in many high-risk populations.

One such population at risk for unintended pregnancy is female college students. For some women, attending college seems to trigger risk taking behaviors such as unprotected sex, sex with multiple partners or heavy alcohol use; behaviors that place women at risk for unintended pregnancy (ACHA, 2008). In fact, according to the National College Health Risk Behavior Survey (NCHRBS), 42.8% of female college students report that they have ever been pregnant (Douglas & Collins, 1997) and the American College Health Association reports that 3% of female students engaging in vaginal intercourse over the past school year had an unintended pregnancy (ACHA, 2007). In the US, the highest proportion of unintended pregnancies occur among women who are of traditional college age (18 – 24 years old) (Finer & Henshaw, 2006). Seventy-nine percent of pregnancies in 18 – 19 year old women and 60% in 20 to 24 year olds are unintended (Finer & Henshaw, 2006).

Given that many college women are engaging in risky behaviors, emergency contraceptive pills offer another option for preventing unintended pregnancy. Mirroring the general public's limited use of ECPs, only 15% of sexually active college women report that they have used emergency contraception within the past school year (ACHA, 2008). Provided that widespread ECP use among college women could reduce the threat of unintended pregnancy, it is noteworthy that there is limited information about the social and behavioral factors that may be associated with ECP use. In their 1996 article, Sawyer and Fong wrote "Research describing the use of ECPs on college campuses is extremely scarce." Over a decade later, our collective knowledge about ECP use among college women continues to be lacking. Unfortunately, what is known about college women focuses mainly on their knowledge of and attitude toward ECPs and is limited to

just a few studies using relatively small convenience samples (Corbett et al., 2006; Harper & Ellertson, 1995a, 1995b; Sawyer & Thompson, 2003). The aim of this research was to determine college women's knowledge, self-efficacy, attitudes and perceived social norms regarding ECPs.

## **METHODS**

### **Sample**

The sample was drawn randomly from a list of public directory information obtained from a major Pacific Northwest university. After excluding women without email addresses and all men, half of the remaining 8,619 possible participants were randomly selected to receive an email invitation to complete the survey. Using a random number generator, 4,309 numbers between 1 and 8,619 were produced. Students whose numbers were chosen were sent emails inviting them to participate in the study by completing the online survey.

A pre-notice briefly explaining the study to potential participants and announcing the opportunity to be entered into a drawing to win a free two-night weekend trip if they completed the survey, was sent via email. Several days later, a letter explaining the purpose of the study, providing information about confidentiality and the right to refuse participation, as well as a link to the web survey and a secure unique pin number was emailed to the sample. Three days after this information was sent, a follow-up email was sent to members of the sample who had not yet responded encouraging their participation and including a link to the survey. A final email was sent only to those members of the sample who had not yet responded to the survey.

Once each woman finished the online survey, a final page appeared thanking her for participating and confirming receipt of her response. Also on this page was a link (<http://ec.princeton.edu>) providing accurate and up-to-date information for those interested in obtaining more information about ECPs. If they were not interested in this information, they were able to simply exit the survey website.

### **Instrument**

The **Emergency Contraceptive Pill Survey** was designed by the lead author based on a comprehensive review of the literature. The questionnaire, which took approximately 10 minutes to complete assessed knowledge, self-efficacy, attitudes, perceived social norms, and use of ECPs. Questions about demographic and other background information were also included.

Different aspects of participant knowledge were assessed by nine Likert-scale questions with five response alternatives ranging from *strongly agree* to *strongly disagree*. Three Likert-scale questions with five response options ranging from *not at all confident* to *extremely confident* were used to measure ECP self-efficacy. Respondents' attitudes toward the availability of ECPs through different channels were assessed by three Likert-scale questions with five response alternatives ranging from *strongly agree* to *strongly disagree*. Six Likert-scale questions with five response alternatives ranging from *strongly agree* to *strongly disagree* were used to measure perceived social norms relative to ECPs.

## Data analysis

Descriptive statistics and Wilcoxon signed-rank tests were used in data analysis. A  $p$  value of 0.05 or less was considered statistically significant. Analyses were conducted using SPSS, Version 15.0.

## RESULTS

Survey invitations were emailed to 4,219 female students. A total of 1919 women (45%) who were sent an invitation completed the online survey. One hundred and fifteen questionnaires were removed from analysis because they were missing more than 20% of the responses. Although respondents' ages ranged from 17 to 61 years old, only adults of reproductive age, 18 to 44 years old ( $n = 1718$ ,  $M = 23.0$ ,  $SD = 5.0$ ) were examined for the purposes of this study. Sixty-three women aged 45 years and older and two 17 year olds were removed for analysis. An additional twenty-one surveys were excluded because respondents had not listed their age.

**Demographics.** Approximately two thirds of the participants in this study were of traditional college age, between 18 and 24 years old (75.8%,  $n = 1302$ ) and about a quarter (24.2%,  $n = 416$ ) of the participants were aged 25 to 44 (see Table 1.1). Seniors represented the group with the largest proportion of survey responses (30.9%,  $n = 531$ ), followed by juniors (20.4%,  $n = 351$ ), and graduate students who accounted for 18.1% ( $n = 311$ ) of the surveys.

The largest percentage of respondents self-identified as White, not of Hispanic Origin (82.9%,  $n = 1419$ ), reflecting the racial and ethnic composition of the university, as well as the region. In terms of relationship status, over a third (35.5%,  $n = 608$ ) of the sample indicated that they were dating one person exclusively with whom they were not

living and just under a third (28.6%,  $n = 490$ ) said they were living with their primary partner / spouse at the time of the survey. Over half (53.9%,  $n = 922$ ) of women sampled identified as somewhat or extremely liberal and 26.5% ( $n = 454$ ) identified as somewhat or extremely conservative. Almost 20% (19.6%,  $n = 335$ ) identified themselves as neither liberal nor conservative. The majority (61.4%,  $n = 1048$ ) of the respondents said they were pro-choice. Thirty-five percent ( $n = 597$ ) of participants claimed no religious affiliation but almost a quarter (22.7%,  $n = 388$ ) reported they were Conservative Protestant, followed by 17% ( $n = 290$ ) Liberal Protestant, and 16% ( $n = 274$ ) Catholic.

Three quarters (74.9%,  $n = 1281$ ) of participants said they had ever engaged in penile-vaginal intercourse. The majority of respondents to this survey (65.1%,  $n = 1107$ ) indicated that it was extremely important that they keep from getting pregnant given their current life circumstances. Although less than one percent (0.7%,  $n = 12$ ) of participants felt they were extremely at risk for becoming pregnant based on their sexual behavior during the three months prior to completing the survey, the majority (68%,  $n = 871$ ) of sexually active participants indicated that they had experienced a time when they thought they might be pregnant when they did not plan to be. Thirteen percent (13.1%,  $n = 225$ ) of women in this study said they had ever been pregnant. Interestingly, only half of these women (53.1%,  $n = 110$ ) had ever given birth. About one fifth (21.1%,  $n = 362$ ) of all participants had ever taken ECPs.

Table 1.1  
Demographic characteristics ( $n = 1718$ )

Topic	<i>n</i>	%
Age		
18 – 24	1302	75.8
25 – 44	416	24.2
Academic Standing		
Freshman	226	13.2
Sophomore	237	13.8
Junior	350	20.4
Senior	531	30.9
Graduate & Post-baccalaureate	372	21.6
Race/Ethnic Identity		
American Indian or Alaskan Native	27	1.6
Asian or Pacific Islander	150	8.8
Black, not of Hispanic Origin	12	0.7
Hispanic	45	2.6
White, not of Hispanic Origin	1419	82.9
Multi-racial	58	3.4
Relationship Status		
Casual dating	250	14.6
Dating one person exclusively but not living together	608	35.5
Living with primary partner/spouse	490	28.6
Not in a relationship and not dating	367	21.4
Political affiliation		
Extremely liberal	223	13.0
Somewhat liberal	699	40.9
Neither liberal nor conservative	335	19.6
Somewhat conservative	390	22.8
Extremely conservative	64	3.7
Choice stance		
Pro-life	421	24.6
Pro-choice	1048	61.4
Neither	239	14.0
Religious affiliation		
Buddhist	50	2.9
Catholic	274	16.0

Jewish	24	1.4
Mormon	42	2.5
Liberal Protestant	290	17.0
Conservative Protestant	388	22.7
Other	43	2.5
None	597	35.0

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Note. Total may vary slightly due to missing values.

**Sources of ECP Information.** Almost all survey respondents (95.8%,  $n = 1645$ ) said they had ever “heard of emergency contraceptive pills, sometimes called ‘the morning after pill’.” Almost three quarters of women had ever received ECP information from friends (73.2%,  $n = 1203$ ). Half (52.6%,  $n = 865$ ) of participants had ever received information from a class or instructor and half said they had ever gotten information about ECPs from a media source – newspapers or magazines (52.6%,  $n = 864$ ) and television and radio (51.7%,  $n = 850$ ).

Women were asked if they had ever received unsolicited information about ECPs from a healthcare provider and approximately one quarter (25.1%,  $n = 430$ ) of respondents said they had. Of those, 62.6% ( $n = 270$ ) said they had ever been counseled by a nurse practitioner and a little less than half (47.8%,  $n = 206$ ) had ever received unsolicited counseling from a physician.

**Knowledge of ECPs.** Although the majority of college women sampled were generally knowledgeable about the timeframe for taking ECPs, the use of ECPs, and the possible side effects, participants seemed uncertain or misinformed about the long-term consequences of taking ECPs and how ECPs work to prevent pregnancy (see Table 1.2). Approximately a third (34.3%,  $n = 586$ ) mistakenly disagreed that ECPs do not have dangerous long-term side effects and another half (52.2%,  $n = 894$ ) were undecided or

unsure. ECPs can prevent pregnancy by interfering with ovulation and by prohibiting fertilization; however a half (50.2%,  $n = 861$ ) and almost 40% (38.3%,  $n = 657$ ) of respondents respectively, were uncertain if ECPs could prevent pregnancy in these ways. Of particular concern was the confusion about whether or not ECPs can destroy an implanted fertilized egg or in other words, cause an abortion. When given the statement, *ECPs are a form of abortion*, about two thirds (64.4%,  $n = 1106$ ) of women correctly understood that ECPs are not a form of abortion. However, when provided with a statement having the same meaning, *ECPs have the ability to destroy a fertilized egg that has implanted in the uterus*, only about a third (30.4%,  $n = 518$ ) correctly understood that ECPs do not have this ability, 28.7% ( $n = 489$ ) thought ECPs do work in this manner and 41.0% ( $n = 701$ ) were unsure. As these statements have the same meaning although they use different terminology, it would seem that students would have answered both questions in the same manner. However, a Wilcoxon signed-ranks test indicated that women's responses to these two statements were significantly different [ $z = -16.619$ ,  $p = .00$ ].

Table 1.2  
ECP Knowledge (*n* = 1718)

Topic	SA <i>n</i> (%)	MA <i>n</i> (%)	U <i>n</i> (%)	MD <i>n</i> (%)	SD <i>n</i> (%)
1st dose of ECPs must be taken within 72 hrs of unprotected intercourse	1018 (59.3)	368 (21.4)	268 (15.6)	37 (2.2)	25 (1.5)
Taking ECPs today will protect you from pregnancies that might result from future intercourse	--	--	128 (7.5)	229 (13.3)	1359(79.2)
ECPs have NO dangerous long-term effects	67 (3.9)	165 (9.6)	894 (52.2)	388 (22.7)	198 (11.6)
ECPs cause nausea in some people	599 (35.0)	530 (30.9)	542 (31.6)	18 (1.1)	24 (1.4)
ECPs have the ability to prohibit or delay ovulation	201 (11.7)	314 (18.3)	861 (50.2)	185 (10.8)	153 (8.9)
ECPs have the ability to prohibit fertilization	271 (15.8)	413 (24.1)	657 (38.3)	205 (11.9)	170 (9.9)
ECPs have the ability to destroy a fertilized egg that has implanted	170 (10.0)	319 (18.7)	701 (41.0)	240 (14.1)	278 (16.3)
ECPs are a form of abortion	196 (11.4)	218 (12.7)	197 (11.5)	320 (18.6)	786 (45.8)
ECPs have the ability to inhibit the implantation of a fertilized egg in the uterus	531 (30.9)	523 (30.5)	573 (33.4)	49 (2.9)	40 (2.3)

Note. Total may vary slightly due to missing values.

**Self-efficacy and ECPs.** Women were asked three questions designed to determine their self-efficacy about ECP use (see Table 1.3). Despite their lack of knowledge concerning how ECPs work in the body, nearly three quarters (73.0%,  $n = 1241$ ) were confident or extremely confident that they could effectively take ECPs if they needed them. However, only about half of women (50.3%,  $n = 855$ ) indicated they were confident or extremely confident that they could access ECPs in time if they needed them. The majority of women (62.1%,  $n = 1053$ ) were confident or extremely confident that they could take ECPs even if their partner did not want them to use the pills.

Table 1.3  
Self-efficacy ( $n = 1718$ )

Topic	Not at all confident		Neutral		Extremely confident
	$n$ (%)	$n$ (%)	$n$ (%)	$n$ (%)	
How confident are you that you could get ECPs in time if you needed them?	194 (11.4)	284 (16.7)	367 (21.6)	407 (23.9)	448 (26.4)
How confident are you that you could effectively take ECPs if you needed them?	99 (5.8)	133 (7.8)	228 (13.4)	411 (24.2)	830 (48.8)
How confident are you that you could take ECPs even if your partner didn't want you to take them?	165 (9.7)	152 (9.0)	324 (19.1)	380 (22.4)	673 (39.7)

Note. Total may vary slightly due to missing values.

**Attitude toward ECPs.** Survey participants were asked questions about the appropriateness of ECP availability through different means to assess their attitudes

toward ECPs (see Table 1.4). While the majority of those surveyed (65.6%,  $n = 1123$ ) agreed that ECPs should be given to women by their healthcare provider for future use in case of an emergency, and almost half (49.9%,  $n = 857$ ) agreed that ECPs should be available at drug stores without a prescription, they did not have such a positive attitude about ECPs being dispensed through vending machines. Almost three quarters (71.4%,  $n = 1224$ ) of women agreed that ECPs should not be available from vending machines.

Table 1.4  
Attitude toward ECPs ( $n = 1718$ )

Topic	SA <i>n</i> (%)	MA <i>n</i> (%)	U <i>n</i> (%)	MD <i>n</i> (%)	SD <i>n</i> (%)
ECPs should be given to women by their health care provider for future use in case of an emergency	594 (34.7)	529 (30.9)	206 (30.9)	195 (11.4)	190 (11.1)
ECPs should be available at drug stores without a prescription	503 (29.3)	354 (20.6)	221 (12.9)	296 (17.2)	44 (20.0)
ECPs should NOT be available from vending machines	919 (53.6)	305 (17.8)	220 (12.8)	37 (8.0)	135 (7.9)

Note. Total may vary slightly due to missing values.

**Perceived Social Norms about ECPs.** Participants were asked questions about their perceptions of their peers' beliefs and behavior relative to ECPs. Respondents were additionally asked to respond to statements regarding their perceptions of how supportive a variety of social references including: friends, parents, partners and religious community members would be if they used ECPs.

*Peers.* The majority of women (68.9%,  $n = 1182$ ) surveyed agreed with the statement that most women their age think ECPs are morally acceptable (see Table 1.5). However, respondents were divided about whether or not their peers have taken ECPs. A little over a third of participants (38.6%,  $n = 663$ ) agreed that most women their age had not taken ECPs, another third (35.9%,  $n = 616$ ) disagreed and a little under a third (25.5%,  $n = 438$ ) were undecided or unsure.

*Friends.* About three quarters of women (72.3%,  $n = 840$ ) strongly or mildly agreed that their friends would be supportive of them taking ECPs. Although perceived support was quite high, the majority (60.3%,  $n = 1034$ ) said their friends' opinions were not important if they were faced with the decision whether or not to take ECPs.

*Parents.* Respondents were divided about parental support of ECP use. Approximately 44% (44.4%,  $n = 761$ ) agreed that their parents would be supportive of their ECP use but another third (33.5%,  $n = 575$ ) did not think that their parents would support them using the pills. Although parental opinions were not important to 40% (39.2%,  $n = 628$ ) of respondents, another 40% (40.9%,  $n = 656$ ) said their parents' opinions were somewhat important to them in making ECP decisions.

*Religious Community.* While over a third (37.7%,  $n = 642$ ) of respondents did not have a religious community, 62.3% ( $n = 660$ ) of those who did felt they would not be supportive of their taking ECPs. However, women also indicated that this would not affect their decision to use the pills if needed as only 16.8% ( $n = 176$ ) of women said their religious community's opinion would be very important when making ECP decisions.

*Partners.* A majority (60.4%,  $n = 1030$ ) agreed their primary partner / spouse would be supportive of them taking ECPs. Partners' opinions were shown to be extremely important in the decision to take ECPs. Over half of women (58.5%,  $n = 852$ ) felt their partner's opinion would be very important if they were faced with decision to take ECPs and 31.8% ( $n = 464$ ) responded that their partners' opinions would be somewhat important.

Table 1.5  
Perceived Social Norms and ECPs ( $n = 1718$ )

Topic	SA $n$ (%)	MA $n$ (%)	U $n$ (%)	MD $n$ (%)	SD $n$ (%)
Most women my age think ECPs are morally acceptable	359 (20.9)	823 (48.0)	320 (18.6)	166 (9.7)	48 (2.8)
Most women my age have NOT taken ECPs	165 (9.6)	498 (29.0)	438 (25.5)	489 (28.5)	127(7.4)
My friends would be supportive of me taking ECPs	768 (44.8)	72 (27.5)	165 (9.6)	155 (9.0)	154 (9.0)
My parents would be supportive of me taking ECPs	401 (23.4)	360 (21.0)	274 (16.0)	192 (11.2)	383 (22.3)
My primary partner/ spouse would be supportive of me taking ECPs	745 (43.7)	285 (16.7)	200 (11.7)	80 (4.7)	143 (8.4)
Members of my religious community would be supportive of me taking ECPs	55 (3.2)	80 (4.7)	264 (15.5)	186 (10.9)	474 (27.9)

Note. Total may vary slightly due to missing values. Statements regarding parents, partners and religious community had *not applicable* as a response option.

## DISCUSSION

Among the women surveyed in this study, the threat of unintended pregnancy and actual unintended pregnancy were serious issues. Although less than 1% (0.7%,  $n = 12$ ) of women perceived they were extremely susceptible to becoming pregnant based on their behavior during the three months prior to the survey, 65% (65.1%,  $n = 1107$ ) expressed that it was extremely important they avoided becoming pregnant. Further, 68% ( $n = 871$ ) of sexually active participants had experienced a pregnancy scare in the past and almost a fifth (17.6%,  $n = 225$ ) of them had ever been pregnant.

Although respondents were not asked directly if they had ever terminated a pregnancy, only about half (53.1%,  $n = 110$ ) of those who said they had ever been pregnant also indicated that they had ever given birth. Since nationally, far more unintended pregnancies end in abortion (42%) than in fetal losses (14%) (Finer & Henshaw, 2006), it is highly likely that these pregnancies ended in abortion. As it appears that many women who experience an unintended pregnancy opt for abortion, ECPs may offer a viable alternative for those involved in decisions of this nature.

Similar to trends in the general public (Hoff, Miller et al., 2003) and among the college population (Corbett et al., 2006; Harper & Ellertson, 1995a; Sawyer & Thompson, 2003), the vast majority of women surveyed were aware of emergency contraceptive pills. Echoing recent findings among college students (Corbett et al., 2006), women in this study tended to get their information about ECPs from a variety of sources, however, friends, media including radio, television, and print media, and instructors and classes were by far the most popular sources of information. Interestingly, a recent study examining how college students prefer to receive information

about ECPs found that the majority (41%) said they would like to be informed about ECPs from doctors (Corbett et al., 2006). Unfortunately in this study, only 21.1% ( $n = 349$ ) of respondents indicated they had ever received ECP information from a physician. Only 12% ( $n = 206$ ) of women reported ever being educated about ECPs by a physician when they were not soliciting information about the pills. It appears that physicians are missing windows of opportunity to inform their patients about ECPs during office visits.

Women who participated in this survey had significant knowledge gaps with respect to the long-term effects of taking ECPs and the mechanisms by which ECPs prevent pregnancy. Half of the sample (52.2%,  $n = 894$ ) indicated they were unsure whether or not ECPs cause dangerous long-term effects and a third (34.3%,  $n = 586$ ) erroneously believed that taking ECPs could result in dangerous long-term side effects. Although half (50.2%,  $n = 861$ ) and almost 40% (38.3%,  $n = 657$ ) of participants were uncertain if ECPs prevent pregnancy by interfering with ovulation and by prohibiting fertilization, respectively, of particular concern was the confusion about whether or not ECPs can destroy an implanted fertilized egg.

When asked if ECPs were a form of abortion, about two thirds (64.4%,  $n = 1106$ ) of the women sampled appropriately mildly or strongly disagreed. However, when asked virtually the same question, if ECPs can destroy an implanted fertilized egg, interestingly, only about a third (30.4%,  $n = 518$ ) correctly either mildly or strongly disagreed. In fact, the way women answered these two questions was significantly different [ $z = -16.619$ ,  $p = .00$ ]. This inconsistency seems to suggest that although the majority of women in this sample knew that ECPs are not an abortion, they may not have understood technically what constitutes an abortion. This confusion also raises the question of whether or not

the participants knew the medical definition of pregnancy. This ambiguity is not unique to this sample as several studies have cited college students' inability to distinguish the differences between ECPs and abortion (Corbett et al., 2006; Harper & Ellertson, 1995a; Sawyer & Thompson, 2003).

It is interesting that there were certainly knowledge deficits among the women in this study, they tended to have seemingly high levels of self-efficacy. This may be due to the fact that the self-efficacy questions assessed confidence in accessing and actually taking ECPs, whereas the majority of knowledge questions were concerned with how ECPs work in the body to prevent pregnancy. It is not necessary to have an understanding of how ECPs work in order to obtain them or take them. It is unclear whether or not this level of self-efficacy is a common attribute in college women as no other study has examined ECP self-efficacy in this population to date. At the time of this survey, ECPs were prescribed and disseminated through the on-campus health center. As ECPs were easily accessible for students, it is somewhat disconcerting that only about half of women (50.2%,  $n = 855$ ) indicated they were confident or extremely confident that they could access ECPs in time if they needed them. This may be an indication that women were unaware that ECPs were offered through the health center.

Women surveyed held positive attitudes toward the availability of ECPs and this seems to reflect past research indicating that the majority of college students (84%) feel that ECPs should be easy to obtain when needed (Harper & Ellertson, 1995a). However, the women sampled in this study seemed to be more accepting of prescription-free access to ECPs. College students in a 2003 study were in disagreement about whether ECPs should be available without a prescription (Sawyer & Thompson, 2003). One third felt

that ECPs should have prescription-free status, another third believed that ECPs should only be available with a prescription, and the last third was unsure (Sawyer & Thompson, 2003). Even in a 2007 study of women seeking ECPs through a website, over half (57%) had reservations about ECPs being available without a prescription (Wu et al., 2007). Although no studies to date have looked specifically at female college students' attitudes toward making ECPs available through vending machines, two past studies did pose this question to women (Breitbart et al., 1998; Harvey et al., 1999). In both cases, one study of ECP users at an HMO and the other of ECP users attending an inner city clinic, only 7% of those surveyed agreed that the pills should be sold via vending machines (Breitbart et al., 1998; Harvey et al., 1999). Interestingly, 15.9% ( $n = 272$ ) of women in this sample felt that ECPs should be available through vending machines.

Although the majority (68.9%,  $n = 1182$ ) of respondents agreed that their peers thought ECPs were morally acceptable, they seemed to be uncertain about whether or not their peers had ever used ECPs. Among those who had a religious community, 62.3% ( $n = 1059$ ) felt that they would not be supportive of their taking ECPs. However, women also indicated that this would not affect their decision to use the pills if needed. While friends were the number one source of ECP information and the majority of women agreed that their friends would be supportive of them using ECPs, the majority also said that friends' opinions were not important to them when deciding whether or not to take them. The social group that did prove to be influential when making ECP decisions was partners. Most women (60.4%,  $n = 1030$ ) said their partners would be supportive of them taking ECPs which is positive as the majority of women (58.5%,  $n = 852$ ) said their partners' opinion would be very important when deciding whether or not to take ECPs.

It is unclear whether these findings are consistent with other research, as no studies to date have focused substantively on social norms and ECPs. This is quite surprising as over the past several decades, social norms have been a major focus when looking at a variety of health-related issues on campus including safer sex and contraceptive practices (Daughtery & Burger, 1984; Jaccard & Davidson, 1972; Lowe & Radius, 1987; Scholly, Katz, Gascoigne, & Holck, 2005; Strader & Beaman, 1991; Whitley, 1991).

**Limitations.** Strengths of this study include the large random sample of college women surveyed. Additionally, no other study to date has examined college women's perceived social norms regarding ECPs. This study has limitations however. As women from only one university participated, findings are not generalizable to other populations. Although a response rate of 45% ( $n = 1919$ ) is quite high relative to response rates to other online surveys of college students examining sexual behavior (Gullette & Lyons, 2005, 2006), the 55% of women who did not respond to the survey may have had strong feelings against emergency contraceptive pills or they were not comfortable answering questions about their sexual behaviors. Of the 1919 women who entered their pin number to take the online survey, only 1718 surveys were usable. It is possible that those who chose not to complete the survey or who left more than 20% of the questions unanswered had strong feelings against emergency contraceptive pills or they were not comfortable answering personal questions about their sexuality. Also, survey invitations were emailed out at the end of the Spring quarter and it is possible that students who were busy with final projects, papers, and finals were less likely to have taken the survey.

**Conclusion.** College women in this study lacked the knowledge necessary to be fully informed about ECPs, which may also suggest that they lack a basic understanding of reproductive physiology. Although comprehending how ECPs actually work or what kind of side effects they cause is not requisite for using the pills, being thoroughly informed about birth control methods is an integral part of women having ownership of their fertility. As current and accurate information about ECPs is vital for women to make informed contraceptive decisions, colleges and universities should create policies that require mandatory education about reproductive health and contraceptive options including information about ECPs, during freshman orientations, seminars and introductory courses. As male partners seem to be important in women's decisions about ECP use, it is essential they are included in these efforts. Policies should also require mandatory ECP counseling at all routine reproductive health visits by providers in the university health center.

## **ARTICLE 2: Intentions to use Emergency Contraceptive Pills: The Role of Social and Behavioral Factors in Decision-Making**

### **ABSTRACT**

With the US Food and Drug Administration's approval of behind the counter status for the emergency contraceptive Plan B on August 24, 2006, one of the last major external hurdles for women accessing emergency contraceptive pills appears to have been removed. It is unknown however, whether prescription-free availability will be the final factor in women's predisposition to use ECPs or if other intrinsic factors, may in fact, override use. The purpose of this study was to examine social and behavioral factors that have been suggested in the literature as possible influences on intention to use ECPs among college women. The author performed logistic regression to test how well the constructs: knowledge, self-efficacy, attitude, perceived social norms, perceived threat of pregnancy, and past behaviors explain intention to use ECPs. This study was conducted among a population at risk for unintended pregnancy – American college students. Of the 4,219 randomly selected female students who received an invitation email to participate in the study, 1,718 completed surveys were included for analysis. The full logistic regression model including: demographic and background factors, knowledge, self-efficacy, attitude, one dimension of perceived social norms, pregnancy severity, and past behaviors significantly predicted intention to use ECPs. Of these factors, the strongest predictors of intention to use ECPs were: knowledge that ECPs are not a form of abortion and knowledge that ECPs have the ability to prohibit or delay ovulation, a high level of self-efficacy, a positive attitude toward ECP availability, a strong desire to

avoid becoming pregnant and past ECP use. Strategies to address social and behavioral factors as barriers to ECP use should target these factors.

## **INTRODUCTION**

Emergency contraceptive pills (ECPs) are a post coital method of birth control that have been proven to prevent pregnancy between 75 and 95 percent of the time if taken within 72 hours of unprotected intercourse (Trussell et al., 1999). These pills containing higher doses of the hormones found in regular birth control pills are typically taken in two doses 12 hours apart (ACOG, 2005). One package of pills costs between \$10 and \$50 (Johnsen, 2008c).

Unlike mifepristone (formerly called RU-486) and methotrexate, drugs used to perform a “medical abortion”, ECPs cannot disrupt an established pregnancy (Bacic et al., 1970; Glasier, 1997). Instead, ECPs prevent pregnancy by inhibiting or delaying ovulation (Croxatto et al., 2001; Croxatto et al., 2002; Durand et al., 2001; Glasier, 1997; Hapangama et al., 2001; Ling et al., 1979; Marions et al., 2004; Marions et al., 2002). Although there is still not consensus among researchers regarding whether or not ECPs have the ability to inhibit implantation (Muller et al., 2003; Ortiz et al., 2004; Young et al., 1994), it is highly unlikely that ECPs would be as effective as they are at preventing pregnancy if they only prevented ovulation (Trussell & Raymond, 1999).

Although some women experience nausea, vomiting and nonmenstrual bleeding when using ECPs, this medication is not associated with any serious side effects (Van Santen & Haspels, 1985; von Hertzen et al., 2002; von Hertzen et al., 1998). ECPs are relatively inexpensive.

Research has indicated that widespread use of ECPs has the potential to prevent 1.5 million of the approximate 3 million unintended pregnancies occurring each year in the US, including as many as 700,000 pregnancies that now result in abortion (Trussell et al., 1992). While 84% of American women have heard of ECPs, only 6% claim to have ever used them (Hoff, Miller et al., 2003).

Given that ECPs are effective at preventing pregnancy, are easy to take, are relatively inexpensive, and have no serious side effects, why aren't more women using them? In an attempt to answer this question, researchers have focused primarily on potential extrinsic factors that may serve as barriers. Most commonly cited barriers include: Catholic hospitals refusing to disseminate ECPs (Polis et al., 2005; Smugar et al., 2000), pharmacies and retail stores not stocking or refusing to stock ECPs (Chuang & Shank, 2006; Espey et al., 2003; Shacter et al., 2007), and clinicians' limited knowledge about and negative attitude toward ECPs resulting in low prescription rates (Chuang et al., 2004; Delbanco et al., 1997; Golden et al., 2001; Perrin et al., 2000; Sherman et al., 2001; Veloudis & Murray, 2000).

Since the FDA granted the emergency contraceptive Plan B prescription-free behind the counter status for women 18 years and older on August 24, 2006 and prescription-free status for 17 year olds on April 22, 2009, many of the external barriers to obtaining ECPs should no longer pose significant obstacles for women. However, questions arise as to whether fewer physical hindrances and changes in legal distribution necessarily translate into more women using ECPs. Past research of women with readily available access to ECPs shows inconsistencies in ECP usage rates.

Although American women rarely report having an advance prescription for ECPs (Chuang & Freund, 2005; Hoff, Miller et al., 2003), several studies have shown that women who have an advance prescription for or advance provision of ECPs take them more often when needed than do women without these options (Belzer et al., 2005; Ellertson et al., 2001; Gold et al., 2004; Harper et al., 2005; R. A. Jackson et al., 2003; Polis et al., 2005; Raine et al., 2000; Raine et al., 2005; Raymond, Trussel, & Polis, 2007; Rocca et al., 2007). However, other studies have shown that usage rates of ECPs are surprisingly low among women with advance provision who have experienced incidents putting them at risk for unintended pregnancy (Endres et al., 2000; Marston et al., 2006; Nelson, 2006; Raine et al., 2005). In fact, in one study, 8% of women who were educated about ECPs and were given ECPs to take home did not use the pills and experienced an unplanned pregnancy during the study period (Endres et al., 2000).

These discrepancies in ECP usage rates among women who have unencumbered access to ECPs suggest there are factors other than external barriers that may influence women's decisions to use or to not use these pills. To date, our knowledge about the role these factors may play in ECP usage behaviors is limited. Knowing which intrinsic factors influence women when deciding whether or not to take ECPs may lend some understanding to the low ECP usage rates. This information could also help direct educational efforts to address knowledge gaps and dispel commonly held myths to ensure that women are basing their decisions on accurate and current information.

It is plausible that examining ECP decision-making behavior using a conceptual framework could provide a systematic approach to understanding the determinants of ECP use. Although no conceptual framework of this nature has been used to examine

American women, the ECP literature, as well as the broader body of contraceptive research suggest that the social and behavioral constructs of knowledge, self-efficacy, attitude, perceived social norms, perceived threat, and past behaviors may influence decisions whether or not to use ECP (Breitbart et al., 1998; Daughtery & Burger, 1984; Harper & Ellertson, 1995a; Harvey et al., 1999; Heinrich, 1993; Jaccard & Davidson, 1972; R. Jackson et al., 2000; Larsson et al., 2004; Levinson et al., 1998; Lowe & Radius, 1987; Nelson, 2006; Romo, Berenson, & Wu, 2004; Sawyer & Thompson, 2003; Sorensen et al., 2000; Spence et al., 2003; Wu et al., 2007). Gaining an understanding of the importance of these social and behavioral constructs in ECP decision-making could serve as a preliminary step in building a theoretical model to predict likelihood of ECP use. The following sections provide a brief overview of the social and behavioral constructs included in the conceptual framework.

### **Intention**

Given that a small proportion of American women have ever used ECPs, it was unlikely there would have been a sufficient number of participants in this study with ECP experience to determine which factors most influence ECP use. Therefore, *intention to use ECPs* was used as a proxy for ECP use. At present, no research exists examining whether or not intention to use ECPs translates into actual use. Intention has not proven to be a reliable predictor of behaviors such as exercise or weight loss (Kerner et al., 2001; Pai & Edington, 2008). However, intention has been shown to be predictive of female condom use (Van Devanter et al., 2002) and has consistently been predictive of male condom use (Astone, 1996; Fishbein, Hennessy et al., 2001; Rhodes et al., 2007). As taking ECPs is also a contraceptive behavior, it is conceivable that intention to use ECPs

would translate into actual ECP use if a woman found herself in a situation where she perceived herself to be at risk for becoming pregnant.

### **Knowledge**

Several knowledge-related factors have been shown to be predictive of willingness to use ECPs or future use of ECPs in the extant literature. Knowledge of the appropriate timing for taking ECPs in order for them to be effective (Larsson et al., 2004), knowledge of possible side effects caused by ECPs and the understanding that ECPs are safe have been found to be predictive of future use of ECPs or of willingness to use ECPs (Harper & Ellertson, 1995a; R. Jackson et al., 2000; Larsson et al., 2004). Additionally, understanding the mechanisms of action by which ECPs prevent pregnancy, particularly the understanding that ECPs work by preventing ovulation and not by causing an abortion has been associated with willingness to use ECPs (R. Jackson et al., 2000; Larsson et al., 2004; Romo, Berenson, & Wu, 2004).

### **Self-Efficacy**

Only one study to date has examined a dimension of self-efficacy and how it relates to ECP use (Free & Ogden, 2005). In this study, the more confident a woman was in asking for ECPs, the more likely she was to have used ECPs (Free & Ogden, 2005). Although we have limited information about self-efficacy and its role in ECP behavior specifically, high levels of self-efficacy in using a birth control method have been shown to be predictive of use in general (Heinrich, 1993; Levinson et al., 1998; Sieving et al., 2007). As partner support of ECP use has been predictive of actual use (Free & Ogden, 2005), it is plausible that for women whose partners may not be supportive of ECP use,

feeling self-efficacious in taking ECPs without a partner knowing may also affect their intentions to use ECPs.

### **Attitude**

The only study to date that has shown that positive attitudes toward ECP availability are predictive of ECP use comes from Sweden (Larsson et al., 2004). Although it is unfortunate that no American studies have examined how attitudes about ECP availability affect decisions about ECP use, several studies provide insight into trends in ECP attitude that may ultimately affect decision-making (Breitbart et al., 1998; Harper & Ellertson, 1995a, 1995b; Harvey et al., 1999; Sawyer & Thompson, 2003; Wu et al., 2007). Research has shown that the majority of women feel that ECPs should be provided for women in case of a future emergency (Breitbart et al., 1998; Harper & Ellertson, 1995a; Harvey et al., 1999). However, most women do not favor making ECPs available to the public through vending machines (Breitbart et al., 1998; Harvey et al., 1999). Research regarding whether or not ECPs should be available over the counter has been discrepant (Breitbart et al., 1998; Harper & Ellertson, 1995a; Harvey et al., 1999; Sawyer & Thompson, 2003; Wu et al., 2007). It is reasonable that women's feelings about ECP availability may have some bearing on their own decisions about whether or not to use the pills.

### **Perceived Social Norms**

A recent study of students aged 16 – 30 in London found that having a positive view of women who used ECPs and having partners who were supportive of ECP use was predictive of actual ECP use (Free & Ogden, 2005). Although the research examining perceived social norms and ECPs is limited, the broader body of birth control

literature suggests that in addition to peers and partners, friends and parents may be other social referents that play a role in ECP decision-making. Research has found that perceived parental approval of birth control is associated with higher contraceptive usage rates among adolescent girls and women (Jaccard & Davidson, 1972; Sieving et al., 2007) and that parental opposition to birth control can be a barrier to use (Sable et al., 2000). Additionally, the perception that friends are supportive of birth control pills has been associated with intention to use the pills (Jaccard & Davidson, 1972) and the perception of friends having “liberal” sexual views and practices has been a predictor of contraception use at last coitus (Lowe & Radius, 1987).

As having religious objections to birth control use has been associated with significantly lower rates of contraceptive use (Sangi-Haghpeykar et al., 2006) and certain religious affiliations (Fundamentalist Protestant and Catholic) have been associated with noncontracepting behaviors (Kramer et al., 2007), it is plausible that an individual’s religious community – the people in their religious social circles, not the religion’s doctrine itself – may be another social referent affecting ECP use. There has not been however, any research to date examining how religious communities may influence ECP use or even more generally birth control use.

### **Perceived Threat**

Perceived susceptibility to pregnancy as well as the importance of avoiding pregnancy have been shown to influence ECP use. Free and Ogden (2005) found that the perception of vulnerability to becoming pregnant was a strong predictor of ECP use among female students and that non-ECP-users share the belief that they are “invulnerable to pregnancy” (Free et al., 2002). Additionally, women who intend to use

ECPs in the future are significantly more likely to report that they do not want to be pregnant now or ever (Spence et al., 2003). Qualitative research has found that ECP users share a strong desire to avoid pregnancy because for many, pregnancy equates “disaster” (Free et al., 2002). Users also tend to have aspirations other than motherhood, such as education, careers and travel (Free et al., 2002).

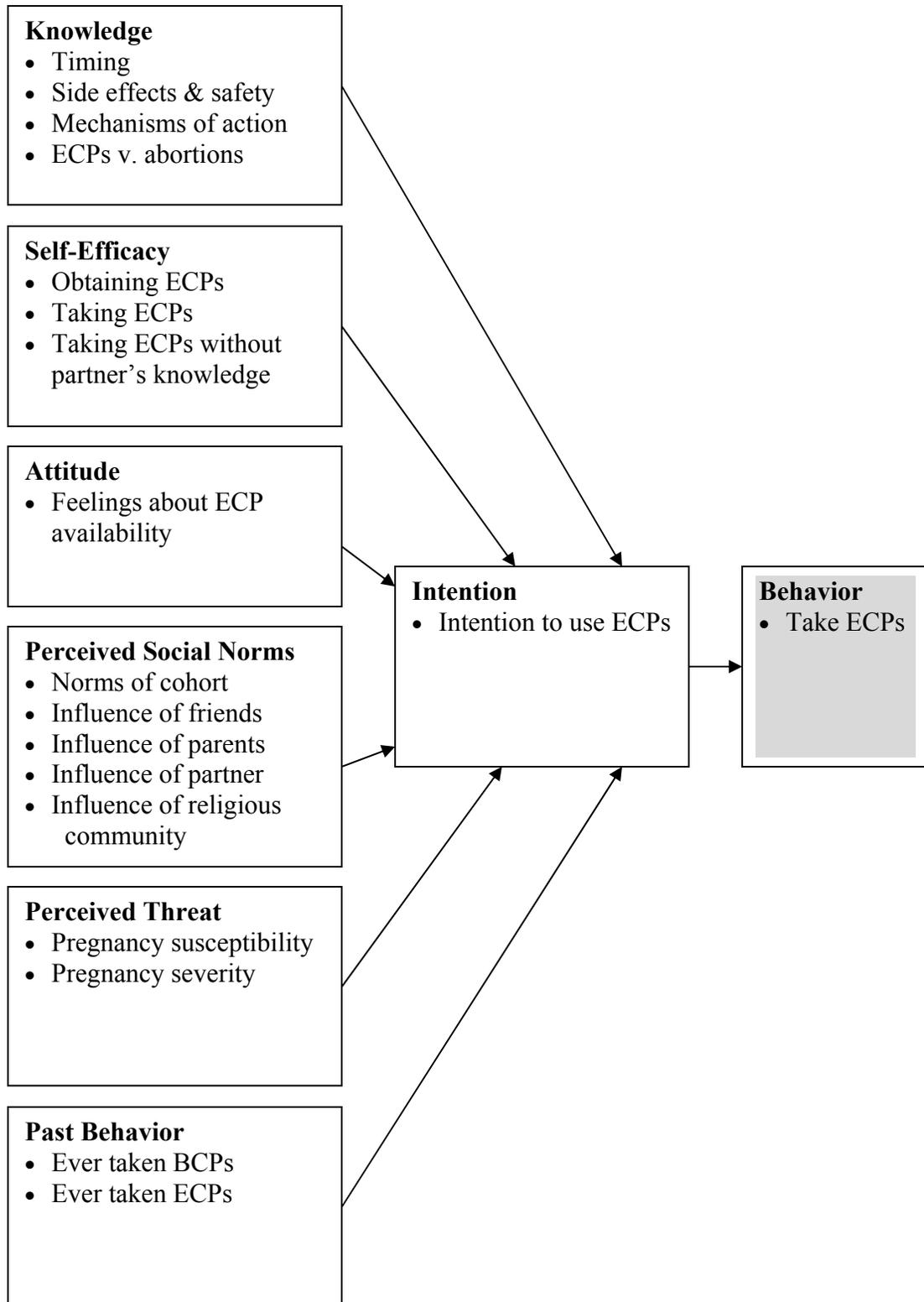
### **Past Behavior**

In the emergency contraception literature, some past contraceptive behaviors seem to be related to intention to use and actual use of ECPs. Research has shown that women who have used oral contraceptives in the past were twice as likely to be willing to take ECPs in the future as compared to women without previous birth control pill experience (R. Jackson et al., 2000). Additionally, women who have used ECPs in the past are more likely to use the pills again in the future (Rocca et al., 2007; Sorensen et al., 2000).

### **Conceptual Framework**

Based on the findings from the ECP and contraceptive literature, several social and behavioral factors appear to be likely influences on women’s intention to engage in ECP usage behaviors. As such, we propose testing this conceptual framework to determine which factors predict intention to use ECPs (Figure 2.1).

Figure 3 Intention to use emergency contraceptive pills conceptual framework



## **METHODS**

### **Sample**

The sample was drawn randomly from a list of public directory information obtained from a state university in the Pacific Northwest. Using a random number generator, 4,309 numbers with associated names from a possible 8,619 eligible women were produced. Women who were randomly selected were sent emails inviting them to participate in the study by completing an online, anonymous survey.

A pre-notice briefly explaining the study to potential participants and announcing the opportunity to be entered into a drawing to win a free two-night weekend trip was sent via email. Several days later, a letter explaining the purpose of the study, providing information about confidentiality and the right to refuse participation, as well as a link to the web survey and a secure unique pin number was emailed to the sample. Three days later, a follow-up email was sent to members of the sample who had not yet responded encouraging their participation and including a link to the survey. A final email was sent only to those members of the sample who had not yet responded to the survey.

Once each woman finished the online survey, a final page appeared thanking her for participating and confirming receipt of her response. Also on this page was a link (<http://ec.princeton.edu>) providing accurate and up-to-date information for those interested in obtaining more information about ECPs. If they were not interested in this information, they were able to simply exit the survey website.

### **Instrument**

The **Emergency Contraceptive Pill Survey** was designed by the lead author based on a comprehensive review of the literature. The questionnaire, which took

approximately 10 minutes to complete, assessed knowledge, self-efficacy, attitudes, perceived social norms, behaviors and intentions toward emergency contraceptive pills. Information about demographic and background factors was also assessed.

### ***Outcome measures***

In order to measure *intention to use ECPs*, participants were asked how likely it was that they would ever take emergency contraceptive pills if their contraceptive method failed or they had unprotected sex and they thought they might become pregnant. This question was answered using a 5-option Likert-scale ranging from 1 = *not at all likely* to 5 = *extremely likely*. For the outcome variable of the logistic regression, responses were dichotomized. Responses of 1, 2 and 3 were combined to form the *no intention* category and response of 4 and 5 formed the *intention* category.

### ***Social and behavioral factors***

The construct of *ECP knowledge* was measured by seven Likert-scale questions with five response alternatives ranging from 1 = *strongly agree* to 5 = *strongly disagree*. Answers to these questions were added together to form a composite score. Unfortunately, the knowledge scale did not have internal reliability ( $\alpha = .39$ ). Therefore, each individual knowledge question was considered separately during analysis. Answers of *strongly agree* and *mildly agree* were collapsed together to create the new category *agree*. *Strongly disagree* and *mildly disagree* were combined to form *disagree* and the *undecided* or *unsure* category remained the same.

*ECP self-efficacy* was measured by three Likert-scale questions with five response options ranging from 1 = *not at all confident* to 5 = *extremely confident*. We created a scale score by adding the three items together ( $\alpha = .66$ ).

***Attitude toward ECP availability*** was assessed with three Likert-scale questions from 1 = *strongly agree* to 5 = *strongly disagree*. Questions assessed respondents' feelings about the availability of ECPs through different channels including from health care providers for future use, at drug stores without a prescription, and from vending machines. By adding each of the three responses together, we created a scale score ( $\alpha = .67$ ).

***ECP perceived social norms*** were measured using six Likert-scale questions with five response alternatives ranging from 1 = *strongly agree* to 5 = *strongly disagree*. We summed the responses to create a scale score ( $\alpha = .75$ ). Although internal consistency was acceptable, two items, the statements "Most women my age have not taken emergency contraceptive pills" and "Most women my age think emergency contraceptive pills are morally acceptable" were removed due to extremely low item-total correlations (.19 and .29, respectively). Therefore, the perceived social norms construct used in analysis, consisted of 4 items ( $\alpha = .82$ ). The two statements removed from the composite score were assessed individually during analysis. Answers of *strongly agree* and *mildly agree* were collapsed together to create the new category *agree*. *Strongly disagree* and *mildly disagree* were combined to form *disagree* and the *undecided* or *unsure* category remained the same.

***Perceived pregnancy threat*** was ascertained by asking questions about pregnancy susceptibility and severity. Respondents were asked to rate their risk for pregnancy given their behavior over the past three months using a five response Likert-scale ranging from 1 = *no risk at all* to 5 = *extremely at risk*. Pregnancy severity, or how important it was to

keep from becoming pregnant, was measured using a five point Likert-scale ranging from 1 = *not at all important* to 5 = *extremely important*.

In order to assess *past behavior*, participants were asked whether or not they had ever taken birth control pills and whether or not they had ever taken emergency contraceptive pills.

### **Procedure for Data Analysis**

Once the web survey closed, tab delineated data from the SQL server was delivered to the lead author. Data were first examined in Microsoft Excel, Version 11.0. Responses to open-ended questions were placed into predetermined categories when appropriate.

Data were then imported to SPSS (Statistical Package for the Social Sciences) Version 15.0 and univariate descriptive statistical analyses were conducted to assess the accuracy of the data. Continuous variables were checked to assure that values were within the appropriate range and that means and standard deviations were plausible. Discrete variables were examined to make certain responses were coded appropriately.

As this study focused on decision-making related to unintended pregnancy, participants were limited to women of reproductive age, women 18 to 44 years old. Although the National Centers for Disease Control and Prevention define reproductive age between the ages of 15 and 44, minors – women under the age of 18 years old – were not eligible to participate in this study, as they required parental consent. Women younger than 18 years old and women older than 44 were therefore, removed from the data. Additionally, twenty-one surveys were excluded because respondents had not provided their age.

One hundred and fifteen questionnaires were removed from the dataset because they were missing more than 20% of the responses. Cases missing less than 20% of data however, were used during analysis, as SPSS, Version 15.0 automatically removes subjects when the variables being analyzed are missing.

In order to find possible univariate outliers among the dichotomous variables, the data was examined for exaggerated uneven splits (90/10) between categories. For continuous variables, histograms, box plots, normal probability plots, and detrended normal probability plots were examined. Continuous data were also transformed into *z-scores* in order to detect possible outliers. Cases with *z-scores* higher than +/- 3.29 were considered possible outliers.

Normality and homogeneity of variance, assumptions for some parametric univariate tests used in this study, were checked among continuous variables. Histograms with a normal distribution overlay, box and whiskers plots, central tendencies, and skewness statistics were examined. The Levene test was used to compare variances between groups.

Although the assumptions of multivariate normality, linearity, and homogeneity of variances are not required for logistic regression, the solution can be stronger if these assumptions are met. Therefore, independent variables to be included in the model were examined by the two levels of the dependent variable in the model – intention to ever use ECPs and no intention to ever use ECPs. Normality of variables was assessed by looking at histograms with a normal distribution overlay, skewness and kurtosis statistics, as well as normal probability plots and detrended normal probability plots. Bivariate scatterplots were then checked to examine linear relationships between variables. To assess

homoscedasticity, variances ratios between groups for each variable were calculated and compared.

Each group was then assessed for multivariate outliers by examining Mahalanobis  $D^2$  and Cook's Distance Measurement. Cases were considered possible outliers if  $p < .001$  for chi-square values related to Mahalanobis  $D^2$  scores and if Cook's Distance Measurement was greater than 1.

A Pearson's correlation matrix was utilized to look for high correlations between variables. Tolerance scores and variance inflations factors (VIF) were examined to help identify multicollinearity among the independent variables.

Univariate tests were used to identify associations between variables. Categorical variables were compared using chi-square tests and ordinal variables that did not meet the assumptions of an independent samples  $t$ -test were compared using the Mann-Whitney U test. Comparisons of groups of continuous variables used two-tailed independent sample  $t$ -tests. Analyses were considered significant at  $\alpha = 0.05$ . Logistic regression was performed to examine predictors of *intention to ever use ECPs* and *no intention to ever use ECPs*.

## **RESULTS**

Survey invitations were emailed to 4,219 female students. A total of 1919 women (45%) who were sent an invitation completed the online survey. One hundred and fifteen questionnaires were removed from analysis because they were missing more than 20% of the responses. Twenty-one surveys were excluded because respondents had not listed their age. Although respondents' ages ranged from 17 to 61 years old, only adults of

reproductive age, 18 to 44 years old ( $n = 1718$ ,  $M = 23.0$ ,  $SD = 5.0$ ) were examined for the purposes of this study.

**Demographics.** Approximately three fourths of the participants in this study were of traditional college age, between 18 and 24 years old (75.8%,  $n = 1302$ ) and about a quarter (24.2%,  $n = 416$ ) of the participants were aged 25 to 44. In terms of academic standing, seniors represented the group with the largest proportion of survey responses (30.9%,  $n = 531$ ), followed by juniors (20.4%,  $n = 351$ ), and graduate students who accounted for 18.1% ( $n = 311$ ) of the surveys.

The majority of respondents were White, not of Hispanic Origin (82.9%,  $n = 1419$ ). Over a third (35.5%,  $n = 608$ ) of the sample indicated that they were dating one person exclusively with whom they were not living and just under a third (28.6%,  $n = 490$ ) said they were living with their primary partner / spouse at the time of the survey. About 40% (40.9%,  $n = 699$ ) of women sampled identified as somewhat liberal and 22.8% ( $n = 390$ ) identified as somewhat conservative. The majority (61.4%,  $n = 1048$ ) of the respondents said they were pro-choice. Thirty-five percent ( $n = 597$ ) of participants claimed no religious affiliation but almost a quarter (22.7%,  $n = 388$ ) reported they were Conservative Protestant, followed by 17% ( $n = 290$ ) Liberal Protestant, and 16% ( $n = 274$ ) Catholic.

**Social and Behavioral Constructs.** In order to determine which social and behavioral factors were entered into the logistic regression model, univariate statistics were used to compare women who intended to use ECPs with those who had no intention to ever use ECPs. As the knowledge scale did not have internal consistency, each individual knowledge question was considered separately. Women with intention to use

ECPs had significantly higher mean ranks for each knowledge question than did women without intention, including questions concerning: timing of ECPs [ $z = -3.469, p = .00$ ], side effects [ $z = -3.759, p = .00$ ], safety [ $z = -5.248, p = .00$ ], and the mechanisms of action including prohibiting ovulation [ $z = -4.702, p = .00$ ], prohibiting fertilization [ $z = -2.005, p = .00$ ], and causing an abortion [ $z = -12.060, p = .00$ ].

Although self-efficacy composite scores ranged from 3 to 15, the women sampled tended to perceive themselves as self-efficacious with a mean score of 11 ( $M = 11.14, SD = 2.98$ ). Women who had ECP intention had significantly higher self-efficacy composite scores than did non-intenders [ $t(1028.66) = -18.60, p = .00$ ].

Attitude scores also ranged from 3 to 15. Women in this sample had an average score of almost 9 ( $M = 8.87, SD = 3.24$ ). Higher or more positive attitude scores were found among women with ECP intention [ $t(1702) = -22.64, p = .00$ ].

For the social norms score, a composite of responses to four statements, the lowest possible score was 4 denoting the perception that the respondent's social groups would not be supportive of her taking ECPs. The highest score possible was 20 ( $M = 12.44, SD = 4.44$ ). Women who intended to ever take ECPs had higher or more positive perceived social norms composite scores than did women without intention [ $t(711.36) = -24.42, p = .00$ ]. Additionally, ECP-intenders were more likely to disagree with the statement: *most women my age have not taken ECPs* [ $z = -4.721, p = .00$ ] and to agree with the statement: *most women my age think ECPs are morally acceptable* [ $z = -9.330, p = .00$ ].

ECP-intenders versus non-intenders were more likely to report being at risk for pregnancy [ $z = -5.389, p = .00$ ] and to report that it was important that they keep from

becoming pregnant [ $z = -10.109, p = .00$ ]. Women who had ever taken birth control pills were more likely than expected to have intention to use ECPs [ $X^2(1, N = 1707) = 80.78, p = .00$ ] as were women who had used ECPs in the past [ $X^2(1, N = 1277) = 135.47, p = .00$ ].

**Conceptual Framework.** Before the logistic regression model testing the social and behavioral variables suggested by the univariate statistics was run, the variables were screened for multivariate normality, linearity, homoscedasticity, and for outliers and multicollinearity. Bivariate scatterplots were examined for linearity between variables. When age was compared to other variables there was some level of skewness. However, there was no suggestion of nonlinearity between combinations of variables. Homoscedasticity was assessed by looking at homogeneity of variance for grouped data. There was no concern about violations of homogeneity of variance or homogeneity of variance-covariance matrices as  $F_{\max}$  ratios were all low and well below 10.

Each group was then examined for multivariate outliers by examining Mahalanobis  $D^2$ . Nine cases were found to be multivariate outliers as the probability of their Mahalanobis  $D^2$  scores were less than .001 and were therefore removed from the dataset.

A Pearson's correlation matrix was then examined to look for correlations between variables. The composite score for perceived social norms was not added into the logistic regression model as it was highly correlated with several of the other independent variables and as it had a tolerance score of .399, which was lower than  $1 - R^2$ , suggesting multicollinearity. Further, the variance inflation factor was 2.505, which

was high in general and was markedly higher than the other variables that did not depart greatly from 1.

Logistic regression was conducted to assess whether the predictor variables informed by the literature: knowledge, self-efficacy, attitude, social norms, pregnancy threat, past birth control pill, past ECP use and demographic and background factors significantly predicted whether or not a woman has intention to use ECPs (Table 2.1). When all predictor variables were considered together, they significantly predicted whether or not a woman ever intends to use ECPs,  $\chi^2 = 6377.935$ ,  $df = 36$ ,  $N = 1200$ ,  $p < .000$ . In fact, this model was able to correctly place 84.9% of participants in their observed categories of intention to ever use ECPs or no intention ever. Table 2.1 presents the odds ratios.

Only two of the six knowledge questions were significant predictors of ECP intention in the logistic regression. Respondents who correctly agreed with the statement *ECPs have the ability to prohibit or delay ovulation* were a little over 2.5 times (OR = 2.586, 95% CI [1.501-4.454]) more likely to have intention to ever use ECPs as compared to those who mistakenly disagreed with the statement. Also, women who knew that ECPs were not a form of abortion were almost 3 times more likely (OR = 2.703, 95% CI [1.695-4.311]) to have intention to ever use ECPs compared to women who erroneously equated ECPs with abortions.

The odds of ECP intention increased as self-efficacy scores increased. Although a 1-point difference in self-efficacy scores was not that profound, a 5-point difference in a score for example, would increase the odds of someone having intention to use ECPs

almost 3 times. The same was true of attitude scores. As attitude scores increased and attitudes about ECP availability improved, so did the likelihood of ever taking ECPs.

Intention to use ECPs also increased as the desire to avoid becoming pregnant increased. Compared to women who said it was *not at all important* that they keep from becoming pregnant, women reporting that it was *very important* that they keep from becoming pregnant were almost 4 times more likely (OR = 3.293, 95% CI [1.205-9.000]) to have intention to ever use ECPs. And those who responded that it was *extremely important* that they keep from becoming pregnant were 7 times more likely (OR = 7.016, 95% CI [2.630-18.718]) to have ECP intention.

It is also notable that women who had used ECPs in the past were about 6.5 times more likely (OR = 6.576, 95% CI [3.685-11.736]) to indicate that they would ever take ECPs in the future compared to woman who had never used ECPs.

Table 2.1  
Logistic Regression Predicting Intention to Use ECPs ( $n = 1195$ )

Variable	$\beta$	SE	OR	p	95% CI for Exp(B)	
					Lower	Upper
ECP timing						
Agree	-.551	.630	.577	.382	.168	1.983
Undecided or Unsure	-.697	.678	.498	.304	.132	1.881
Disagree (reference)	--	--	--	.584	--	--
ECPs cause nausea						
Agree	-.910	.807	.403	.259	.083	1.957
Undecided or Unsure	-.986	.816	.373	.227	.075	1.846
Disagree (reference)	--	--	--	.476	--	--
ECPs have no dangerous long-term effects						
Agree	.281	.314	1.324	.372	.715	2.453
Undecided or Unsure	.151	.207	1.163	.467	.775	1.744
Disagree (reference)	--	--	--	.620	--	--

Variable	$\beta$	SE	OR	p	95% CI for Exp(B)	
					Lower	Upper
ECPs have the ability to prohibit or delay ovulation						
Agree	.950	.278	2.656	.001	1.501	4.454
Undecided or Unsure	.504	.259	1.656	.052	.996	2.753
Disagree (reference)	--	--	--	.003	--	--
ECPs have the ability to prohibit fertilization						
Agree	-.091	.256	.913	.723	.553	1.509
Undecided or Unsure	-.093	.270	.911	.731	.537	1.547
Disagree (reference)	--	--	--	.928	--	--
ECPs are a form of abortion						
Agree (reference)	--	--	--	.000	--	--
Undecided or Unsure	.749	.323	2.116	.020	1.124	3.983
Disagree	.994	.238	2.703	.000	1.695	4.311
Self-efficacy	.201	.037	1.222	.000	1.137	1.314
Attitude	.223	.033	1.249	.000	1.170	1.334
Most women my age have not taken ECPs						
Agree (reference)	--	--	--	.613	--	--
Undecided or Unsure	-.086	.232	.918	.712	.583	1.446
Disagree	.155	.218	1.168	.476	.762	1.791
Most women my age think ECPs are morally acceptable						
Agree	.447	.283	1.563	.114	.898	2.719
Undecided or Unsure	-.081	.328	.922	.804	.485	1.752
Disagree (reference)	--	--	--	.036	--	--
Pg susceptibility						
No risk at all (reference)	--	--	--	.618	--	--
Slightly at risk	.104	.204	1.109	.611	.744	1.653
Somewhat at risk	.442	.331	1.556	.181	.814	2.975
A good deal at risk	-.3643	.718	.695	.612	.170	2.839
Extremely at risk	.775	1.100	2.170	.481	.251	18.763

Variable	$\beta$	SE	OR	p	95% CI for Exp(B)	
					Lower	Upper
Importance of avoiding pg						
Not at all important (reference)	--	--	--	.000	--	--
A little important	-.543	.617	.581	.379	.173	1.948
Moderately important	.292	.550	1.338	.596	.455	3.935
Very important	1.192	.513	3.293	.020	1.205	9.000
Extremely important	1.948	.501	7.016	.000	2.630	18.718
Past BCP use	-.024	.261	.976	.926	.585	1.628
Past ECP use	1.883	.296	6.576	.001	3.685	11.736

Note: This model was tested with the following demographic and background variables not shown in the above table: age, relationship status, political affiliation, choice status, and religiosity.

## DISCUSSION

When the social and behavioral constructs: knowledge, self-efficacy, attitude, perceived social norms, pregnancy threat, past birth control pill use and past ECP use, were considered together, they significantly predicted whether or not a woman ever intended to use ECPs. However, only six of the variables were significant individual predictors of intention to use ECPs.

While several dimensions of ECP knowledge were included in the logistic regression model, only two statements related to ECPs' mechanisms of action were significant predictors of ECP intention. In both cases, women who knew that ECPs have the ability to prohibit or delay ovulation (OR = 2.586 95% CI [1.501-4.454]) or who knew that ECPs are not a form of abortion (OR = 2.703, 95% CI [1.695-4.311]) were almost 3 times more likely to intend to use ECPs in the future than those who did not know this information. Although knowledge of ECP side effects and safety, as well as

knowledge of the correct timing for taking the pills have been predictive of ECP use or willingness to use ECPs in the future (Harper & Ellertson, 1995a; R. Jackson et al., 2000; Larsson et al., 2004; Sorensen et al., 2000), these factors were not predictive in this study. It is difficult to explain exactly why these variables did not play a significant role in ECP decision-making in our sample of college women. We do know that mirroring other research (Campbell, Busby, & Steyer, 2008; Corbett et al., 2006; Harper & Ellertson, 1995a; Sawyer & Thompson, 2003; Schwarz, Reeves, Gerbert, & Gonzales, 2007), women in this study were generally confused about the safety of ECPs and the side-effects associated with its use. Over a half (52.2%,  $n = 894$ ) of women were uncertain if ECPs have dangerous long-term side effects and almost a third (31.6%,  $n = 542$ ) were unsure if ECPs cause nausea.

The fact that the only knowledge variables that were predictive of future ECP intention were related to how ECPs prevent pregnancy, namely that ECPs can interfere with ovulation but cannot cause an abortion suggest that how women perceive that ECPs prevent pregnancy has bearing on their decisions. It is therefore noteworthy that so many women in this study had misinformation regarding how ECPs actually work. About half of participants (50.2%,  $n = 861$ ) were uncertain about whether or not ECPs have the ability to prohibit or delay ovulation and another fifth (19.7%,  $n = 338$ ) thought that ECPs did not work in this manner. More disturbing was the finding that almost a quarter of women believed that ECPs are a form of abortion (24.1%,  $n = 414$ ).

This confusion over how ECPs work in the prevention of pregnancy seems to be a fairly common thread in the research literature. Several studies have documented similar findings (Campbell et al., 2008; Corbett et al., 2006; Harper & Ellertson, 1995a; Sawyer

& Thompson, 2003; Schwarz et al., 2007). Clearly, educating women about the mechanisms by which ECPs prevent pregnancy should be an important part of the future of public health campaigns focused on reproductive health. Women must have accurate information about how ECPs work to prevent pregnancy even though knowledge of this information is not requisite for using the pills. Without this knowledge, women may erroneously believe that ECPs act as a form of abortion and may be reluctant to use this option due to information inaccuracy.

In addition to knowledge factors, self-efficacy was also a significant predictor of intention to use ECPs (OR = 1.222, 95% CI [1.137-1.314]). This construct was comprised of women having confidence in being able to access ECPs, take them in time, and take them without a partner knowing. It is not surprising that the odds of having ECP intention increased as levels of self-efficacy increased. Having past experience performing a behavior is key to self-efficacy in general and high levels of self-efficacy have been predictive of ECP use (Free & Ogden, 2005) and have been an influential factor in contraceptive use as well (Heinrich, 1993; Levinson et al., 1998; Sieving et al., 2007). As the different aspects of self-efficacy were collapsed together in a composite score, it was difficult to tease out which of these is the most important. In order to better understand which facets of self-efficacy may be the most predictive, future research examining each dimension of this construct uniquely is warranted.

Similar to self-efficacy, attitude about the availability of ECPs was a significant predictor of ECP intention. Women with more positive attitudes towards ECP availability also had higher odds of intending to take ECPs in the future (OR = 1.249, 95% CI [1.170-1.334]). As no American studies to date have examined attitude about

ECP availability as a predictor of ECP use, we cannot make comparisons between this group of college women and other women. It is probable that women with more positive attitudes about ECP availability feel that it is generally acceptable for people to use these pills. Perhaps if it is acceptable for others to use ECPs then it is also admissible for women themselves to take ECPs if needed. This might suggest that women in our sample were motivated to comply with behaviors in which they perceive others are partaking or that they perceive others would find acceptable. Although women having positive views of ECP users has been predictive of ECP use (Free & Ogden, 2005), in this study however, the two perceived social norms variables – whether or not their peers had taken ECPs and whether or not their peers felt ECPs were morally acceptable were not significant predictors of intention to use ECPs.

Due to multicollinearity, we were unable to include in the logistic regression model the perceived social norms composite score representing how women think their social references would feel about them taking ECPs. This was unfortunate as social references such as friends, partners, and parents have been shown to affect contraceptive use in general (Jaccard & Davidson, 1972; Lowe & Radius, 1987; Sable et al., 2000; Sieving et al., 2007) and the examination of social norms has shed light on many health-related issues on college campuses including safer sex and contraceptive practices (Daughtery & Burger, 1984; Jaccard & Davidson, 1972; Lowe & Radius, 1987; Scholly et al., 2005; Strader & Beaman, 1991; Whitley, 1991). Future research should examine the influence perceived social norms have on ECP use.

The construct of pregnancy severity – how important it is for a woman to keep from becoming pregnant was more predictive of ECP intentions than any other variable

in this logistic regression model. Women who said it was extremely important that they keep from becoming pregnant were 7 times more likely to have intention to use ECPs (OR = 7.016, 95% CI [2.630-18.718]). This coincides with Free and colleagues' finding that ECP users share a strong desire to avoid pregnancy because they equate it with "disaster" and that users of ECPs have goals such as education, careers, and travel with which pregnancy could interfere (Free et al., 2002). The one commonality among all women who responded to this survey was that they were currently attending college. It is likely that the need to avoid becoming pregnant so heavily influenced the odds of having intentions to use ECPs because this group of women was motivated to make certain nothing, including a pregnancy, interfered with their education. This then raises the question of whether or not pregnancy avoidance would be such an important predictor for women who were currently not following academic or other pursuits.

It is interesting that although the threat of becoming pregnant had a profound effect on intention, susceptibility to pregnancy was not a significant predictor. This is somewhat surprising as the perception of vulnerability to becoming pregnant has been shown to be predictive of ECP use in other studies (Free et al., 2002; Free & Ogden, 2005). This discrepancy may be in part due to the somewhat temporal disconnect between pregnancy risk assessment and intention to use ECPs in this study. Women were asked what their risk of becoming pregnant was based on their behavior during the three months prior to the survey, whereas they were asked to consider if they would ever intend to use ECPs in the future. It is possible that around the time of the survey, women were not engaging in sex and this was reflected in the way they answered questions about future ECP use. Another possibility is that participants underestimated their pregnancy

risk as has been the case in other studies (Moreau et al., 2006; Sorensen et al., 2000) and it therefore did not appear to be a compelling reason to ever use ECPs.

Past use of ECPs may be a predictor of future ECP use for several reasons. Women with ECP experience may simply have been satisfied with this medication and therefore would be willing to use it again. Or, it is possible that regardless of how satisfied or not women were with using ECPs in the past, they would use whatever means necessary to prevent an unintended pregnancy if the consequences were serious enough to them. Yet another possibility is that women who have taken ECPs in the past have more accurate information about them. They could have been educated by the prescribing-provider or they could have done their own research about ECPs prior to taking them. It is noteworthy that ECP users in this study were significantly more likely to answer all but one of the knowledge questions correctly (ECPs have the ability to inhibit the implantation of a fertilized egg in the uterus) compared to non-ECP users. Also, ECP users had significantly higher self-efficacy scores regarding using ECPs [ $t(938.61) = 14.73, p = .00$ ] and more positive attitudes toward ECPs [ $t(864.00) = 8.45, p = .00$ ] than did women who had never used ECPs. As certain aspects of knowledge, self-efficacy, and attitude were all significant predictors of intention to use ECPs, this may explain why past ECP use is a predictor of future ECP use.

Although the analysis of the social and behavioral constructs from the conceptual framework does provide the best predictors of ECP intention among this group of college women, it does not show us exactly how these factors mediate one another. We can speculate that past ECP use affects knowledge, self-efficacy, and attitude. It is also likely that attitude and perceived social norms are related. As we were unable to include

perceived social norms in the model, further research about the effect different social reference groups have on ECP intention is warranted. Although the findings in this study served to provide initial factors that influence ECP decision-making, future research should consider developing theoretical models to better understand the relationship between the intrinsic factors that influence intention to use ECPs in the future.

**Limitations.** Strengths of this study include the large random sample of women surveyed. Additionally, no other study to date has tested a theoretical framework among American women to explain ECP intention. This study has limitations however, as intention was used as a proxy for actual ECP use. Although past contraceptive research has shown that intention to perform a behavior is predictive of actual behavior (Astone, 1996; Fishbein, Hennessy et al., 2001; Rhodes et al., 2007; Van Devanter et al., 2002), it is uncertain at this time whether or not intention to use ECPs equates actual ECP use. Additionally, college women were sampled and therefore findings are not generalizable to all American women. Although a response rate of 45% ( $n = 1919$ ) is quite high relative to response rates to other online surveys of college students examining sexual behavior (Gullette & Lyons, 2005, 2006), the 55% of women who did not respond to the survey may have had strong feelings against emergency contraceptive pills or they were not comfortable answering questions about their sexual behaviors. Of the 1919 women who entered their pin number to take the online survey, only 1718 surveys were usable. Again, it is possible that those who chose not to complete the survey or who left more than 20% of the questions unanswered were uncomfortable answering questions of such a personal nature or had particular feelings about ECPs. As this study was based on self-reported information, it is possible that respondents over-reported or under-reported their

behaviors. Also, survey invitations were emailed out at the end of the Spring quarter and it is possible that students who were busy with final projects, papers, and finals were less likely to have taken the survey.

**Conclusion.** In this sample of college women, the social and behavioral factors suggested by empirical research significantly predicted intention to use emergency contraceptive pills. The strongest predictors of intention to use ECPs were: knowledge that ECPs are not a form of abortion and knowledge that ECPs have the ability to prohibit or delay ovulation, high self-efficacy, positive attitude, a strong desire to avoid pregnancy, and past ECP use. Although adult women now have prescription-free access to ECPs, these internal factors may impede ECP use. Any efforts to address barriers to ECP use should incorporate information about the mechanisms of action used to prevent pregnancy, as women seem to weigh this information when making decisions and confusion between ECPs and abortion may be a barrier to using the pills. As the importance of avoiding pregnancy was the single most predictive factor of intention to use ECPs, helping women to recognize they have options outside of motherhood such as education if they desire, should be an integral part of programs designed to prevent unintended pregnancy and a part of general education and counseling about birth control options including ECPs.

### **ARTICLE 3: Emergency Contraceptive Pill Use Among College Women**

#### **ABSTRACT**

Emergency contraceptive pills have been FDA-approved for over a decade in the US and now Plan B, a dedicated emergency contraceptive product, is available without a prescription. Yet, ECPs are underutilized in many populations at risk for unintended pregnancy, such as American college women. Despite their risk for unintended pregnancy, little is known about the nature and extent of their emergency contraceptive pill use. The author conducted an online survey of women attending a large public university to determine how many women have used ECPs, to explore the situations that surround use, and to establish which factors are most predictive of use. Of the 4,219 female students who were randomly selected to receive an invitation email to partake in the study, 45% ( $n = 1919$ ) completed the survey. Women who left more than 20% of the survey incomplete and women who were not of reproductive age (18 – 44) were excluded leaving 42% ( $n = 1718$ ) of those who were randomly selected to participate. Approximately one fifth (21.1%,  $n = 362$ ) of all women surveyed had ever taken ECPs. The most common reasons for ECP use were not using contraception (43.5%,  $n = 157$ ) and condom breakage or slippage (42.1%,  $n = 152$ ). The University health center (38.8%,  $n = 138$ ) and Family Planning / Contraceptive Clinics (30.1%  $n = 107$ ) were the two most cited sources for obtaining ECPs. The majority of ECP users (62.9%,  $n = 227$ ) had only used the pills once. Among the students who had ever experienced a pregnancy scare, knowledge that ECPs prevent pregnancy by interfering with ovulation and knowledge that ECPs are not a form of abortion, and the confidence that one could access ECPs in time if needed were the only significant predictors of ECP use.

## INTRODUCTION

Emergency contraceptive pills, also referred to as “the morning after pill(s)”, are a post coital method of birth control consisting of a high dose of regular oral contraceptives. ECPs have been proven to prevent pregnancy between 75 and 95 percent of the time if taken within 72 hours of unprotected intercourse (Trussell et al., 1999). Unlike mifepristone (formerly called RU-486) and methotrexate, drugs used to perform a “medical abortion”, ECPs cannot disrupt an established pregnancy (Bacic et al., 1970; Glasier, 1997). ECPs prevent pregnancy by inhibiting or delaying ovulation (Croxatto et al., 2001; Croxatto et al., 2002; Durand et al., 2001; Glasier, 1997; Hapangama et al., 2001; Ling et al., 1979; Marions et al., 2004; Marions et al., 2002). In the US, regular birth control pills have been FDA-approved for post coital “emergency” use since 1997 and the dedicated emergency contraceptive, Plan B has been available to adults without a prescription since August 2006.

Although research has indicated that widespread use of ECPs has the potential to prevent half of the approximate 3 million unintended pregnancies occurring each year in the US including as many as 700,000 pregnancies that end in abortion (Trussell et al., 1992), ECPs have not yet had any effect on pregnancy or abortion rates at the population level (Raymond et al., 2007). Although a simple explanation for this is not readily available, it may be partially accounted for by the fact that only 6% of American women have ever used ECPs despite widespread awareness of the pills (Hoff, Miller et al., 2003).

The US has over a decade of experience with emergency contraceptive pills, yet ECPs remain underutilized in many at-risk populations. One such population is American college women. Only 15% of sexually active female college students report

that they have used emergency contraception within the past school year (ACHA, 2008). This low usage rate is unfortunate as for some, college attendance marks the onset of risk-taking behaviors such as unprotected sex, sex with multiple partners or heavy alcohol use (ACHA, 2008). In the US, the highest proportion of unintended pregnancies occur among women who are of traditional college age (18 – 24 years old) (Finer & Henshaw, 2006). According to the American College Health Association, 3% of female students engaging in vaginal intercourse over the past school year had an unintended pregnancy (ACHA, 2008).

Although ECPs could offer a viable option to prevent pregnancy for college women, little is known about their ECP use as research about this population has been limited to just a few studies (Corbett et al., 2006; Harper & Ellertson, 1995a, 1995b; Sawyer & Thompson, 2003). The aim of this research was to determine the nature and extent of college women's ECP use and to determine the factors that predict use among women who have ever had a pregnancy scare.

## **METHODS**

### **Sample**

The sample was drawn randomly from a list of public directory information obtained from the university. After excluding women without email addresses and all men, half of the remaining 8,619 possible participants were randomly selected to receive an email invitation to complete the survey. Using a random number generator, 4,309 numbers between 1 and 8,619 were produced. Students whose numbers were chosen were sent emails inviting them to participate in the study by completing the survey.

Potential participants were sent a pre-notice email briefly explaining the study and announcing the opportunity to be entered into a drawing to win a free two-night weekend trip. Several days later, a letter explaining the purpose of the study, providing information about confidentiality and the right to refuse participation, as well as a link to the web survey and a secure unique pin number was emailed to the sample. Three days later, a follow-up email was sent to members of the sample who had not yet responded encouraging their participation and including a link to the survey. A final email was sent only to those who had not yet responded to the survey.

Once each woman finished the online survey, a final page appeared thanking her for her participation and confirming receipt of her responses. For those interested in obtaining more information about ECPs, a link (<http://ec.princeton.edu>) providing accurate and up-to-date information also appeared on this page. If they were not interested in this information, they were able to simply exit the survey website.

### **Instrument**

The **Emergency Contraceptive Pill Survey** was designed by the lead author based on a comprehensive review of the literature. The survey, which took approximately 10 minutes to complete, included questions about knowledge, self-efficacy, attitudes, perceived social norms, and behaviors related to emergency contraceptive pills. Demographic and other background factors were also assessed.

### ***Outcome measures***

In order to assess ***ECP use***, participants were asked whether or not they had ever taken emergency contraceptive pills.

### ***Social and behavioral factors***

The construct of ***ECP knowledge*** was measured by seven Likert-scale questions with five response alternatives ranging from 1 = *strongly agree* to 5 = *strongly disagree*. Answers to these questions were added together to form a composite score. Unfortunately, the knowledge scale did not have internal reliability ( $\alpha = .39$ ). Therefore, each individual knowledge question was considered separately during analysis. Answers of *strongly agree* and *mildly agree* were collapsed together to create the new category *agree*. *Strongly disagree* and *mildly disagree* were combined to form *disagree* and the *undecided* or *unsure* category remained the same.

***ECP self-efficacy*** was measured by three Likert-scale questions with five response options ranging from 1 = *not at all confident* to 5 = *extremely confident*. We created a scale score by adding the three items together ( $\alpha = .58$ ). However, there was not sufficient internal consistency; therefore each of the three individual questions were considered separately during analysis.

***Attitude toward ECP availability*** was assessed with three Likert-scale questions from 1 = *strongly agree* to 5 = *strongly disagree*. Questions assessed respondents' feelings about the availability of ECPs through different channels. By adding each of the three responses together, we created a scale score ( $\alpha = .65$ ).

***ECP perceived social norms*** were measured using six Likert-scale questions with five response alternatives ranging from 1 = *strongly agree* to 5 = *strongly disagree*. We summed the responses to create a scale score ( $\alpha = .73$ ).

A scale score for ***religiosity*** was created by adding together three Likert-scale questions with three response options ranging from 1 = *very important* to 3 = *not*

*important* (alpha = .82). Questions evaluated how important religion was to participants in their daily lives and in their reproductive health decisions.

### **Procedure for Data Analysis**

The university's Survey Research Center delivered tab delineated data from the SQL server to the lead author once the survey closed. Microsoft Excel, Version 11.0 was used for a preliminary review of the data. Cases in which the data had shifted and no longer corresponded to the appropriate questions were fixed. When appropriate, responses to open-ended questions were placed into predetermined categories.

Data were then imported to SPSS (Statistical Package for the Social Sciences), Version 15.0 and univariate descriptive statistics were examined in order to assess the accuracy of the data. Continuous variables were checked to assure that values were within the appropriate range and that means and standard deviations were plausible. Discrete variables were examined to make certain there were no out-of-range numbers.

Participants were limited to women of reproductive age, 18 to 44 years old, due to this study's focus on pregnancy decision-making. Although the National Centers for Disease Control and Prevention define reproductive age between the ages of 15 and 44, minors, women under the age of 18 years old were not eligible to participate in this study, as they required parental consent. Given this, women younger than 18 years old and women older than 44 were removed from the data. Twenty-one surveys were also excluded because respondents had not provided their age.

One hundred and fifteen questionnaires were removed from the dataset because they were missing more than 20% of the responses. Cases missing less than 20% of data

were used during analysis; however, SPSS, Version 15.0 automatically removes subjects when the variables being analyzed are missing.

Dichotomous variables were examined for exaggerated uneven splits (90/10) between categories in order to detect possible univariate outliers. To find possible outliers among continuous variables, histograms, box plots, normal probability plots, and detrended normal probability plots were examined. Additionally, continuous data were transformed into *z-scores* and cases with *z-scores* higher than  $\pm 3.29$  were considered possible outliers.

Normality and homogeneity of variance, assumptions for some parametric univariate tests used in this study, were checked among continuous variables. Histograms with a normal distribution overlay, box and whiskers plots, central tendencies, skewness statistics, and the Levene test were examined.

Although logistic regression does not require the assumptions of multivariate normality, linearity, and homogeneity of variances, the solution can be stronger if these assumptions are met. Therefore, independent variables to be included in the model were examined by the two levels of the dependent variable in the model – intention to ever use ECPs and no intention to ever use ECPs. Histograms with a normal distribution overlay, skewness and kurtosis statistics, as well as normal probability plots and detrended normal probability plots were examined to assess normality of variables. Bivariate scatterplots were then checked to examine linear relationships between variables. To assess homoscedasticity, variances ratios between groups for each variable were calculated and compared.

Mahalanobis  $D^2$  and Cook's Distance Measurement were examined to detect multivariate outliers. Cases were considered possible outliers if  $p < .001$  for chi-square values related to Mahalanobis  $D^2$  scores and if Cook's Distance Measurement was greater than 1.

A Pearson's correlation matrix was examined to look for high correlations between variables. Tolerance scores and variance inflations factors (VIF) were examined to help identify multicollinearity among the independent variables.

Chi-square tests were used to compare categorical variables and ordinal variables that did not meet the assumptions of an independent samples  $t$ -test were compared using the Mann-Whitney U test. Comparisons of groups for continuous variables used two-tailed independent sample  $t$ -tests. Analyses were considered significant at  $\alpha = 0.05$ . Logistic regression was performed to examine predictors of *ECP use* and *ECP non-use* among women in the sample who had ever experienced a pregnancy scare.

## **RESULTS**

Survey invitations were emailed to 4,219 female students. Forty-five percent ( $n = 1919$ ) of women who were sent an invitation completed the online survey. Questionnaires missing more than 20% of the responses ( $n = 115$ ) were removed from analysis. Although respondents' ages ranged from 17 to 61 years old, only adults of reproductive age, 18 to 44 years old ( $n = 1718$ ,  $M = 23.0$ ,  $SD = 5.0$ ) were examined for the purposes of this study. Twenty-one surveys were excluded because respondents had not listed their age.

**Demographics.** The majority of participants in this study was of traditional college age, between 18 and 24 years old (75.8%,  $n = 1302$ ) and about a quarter (24.2%,  $n = 416$ ) of the participants were aged 25 to 44. Seniors represented the group with the largest proportion of survey responses (30.9%,  $n = 531$ ), followed by juniors (20.4%,  $n = 351$ ), and graduate students who accounted for 18.1% ( $n = 311$ ) of the surveys.

The largest percentage of respondents self-identified as White, not of Hispanic Origin (82.9%,  $n = 1419$ ); reflecting the racial and ethnic composition of the university, as well as the region. In terms of relationship status, over a third (35.5%,  $n = 608$ ) of the sample indicated that they were dating one person exclusively with whom they were not cohabitating, just under a third (28.6%,  $n = 490$ ) said they were living with their primary partner / spouse at the time of the survey, about a fifth (21.4%,  $n = 367$ ) were neither dating nor in a relationship, and the remaining fifteen percent (14.6%,  $n = 250$ ) were dating casually. The majority (40.9%,  $n = 699$ ) of women sampled identified as somewhat liberal and 22.8% ( $n = 390$ ) identified as somewhat conservative. Almost twenty percent (19.6%,  $n = 335$ ) claimed to be neither liberal nor conservative. The majority (61.4%,  $n = 1048$ ) of the respondents said they were pro-choice. Thirty-five percent ( $n = 597$ ) of participants claimed no religious affiliation but almost a quarter (22.7%,  $n = 388$ ) reported they were Conservative Protestant, followed by 17% ( $n = 290$ ) Liberal Protestant, and 16% ( $n = 274$ ) Catholic.

**Sexual behaviors.** The majority of women surveyed (96.4%,  $n = 1644$ ) indicated that *heterosexual* best described their sexual orientation at the time of the survey. Approximately three quarters (74.9%,  $n = 1281$ ) of participants said they had ever engaged in penile-vaginal intercourse and the majority of them (72%,  $n = 922$ ) said they

had had only one sexual partner in the past year. A little over half (55.4%,  $n = 705$ ) of sexually active participants said their current primary method of contraception was birth control pills and almost three fourths (72.6%,  $n = 1245$ ) of all respondents said they had ever used birth control pills. Male condoms were the second most common (19.1%,  $n = 243$ ) primary method of contraception.

The majority of survey respondents (65.1%,  $n = 1107$ ) indicated that it was extremely important that they keep from getting pregnant given their current life circumstances. Although less than one percent (0.7%,  $n = 12$ ) of participants felt they were extremely at risk for becoming pregnant based on their sexual behavior during the three months prior to completing the survey, 68% ( $n = 871$ ) of sexually active participants indicated that they had experienced a time when they thought they might be pregnant when they did not plan to be. Thirteen percent (13.1%,  $n = 225$ ) of women in this study said they had ever been pregnant. It is noteworthy that only half of these women (53.1%,  $n = 110$ ) had ever given birth.

**ECP behaviors.** Approximately 21% (21.1%,  $n = 362$ ) of all women surveyed had ever taken ECPs. Of the women who indicated that they had ever used ECPs, the majority of them (62.9%,  $n = 227$ ) had only taken the pills once (see table 3.1). The last time they took ECPs, nearly 40% (38.8%,  $n = 138$ ) of women said they had obtained the prescription from the University health center and a little under a third (30.1%  $n = 107$ ) had gotten the prescription from a Family Planning / Contraceptive Clinic.

Not using contraception (43.5%,  $n = 157$ ) and condom breakage or slippage (42.1%,  $n = 152$ ) were the most common reasons why women thought they might be pregnant the last time they took ECPs. Although alcohol use was relatively common

during the most recent intercourse that led women to take ECPs, drug use was not common. Over a quarter (26.3%,  $n = 95$ ) of ECP users and their partners (27.1%,  $n = 98$ ) had been drinking alcohol during the intercourse that led her to take ECPs. The last time they took ECPs, the majority of women (52.4%,  $n = 189$ ) were having sex with the person they were dating exclusively and another fifth (19.7%,  $n = 71$ ) were having sex with their primary partner / spouse. Fourteen women said the intercourse was not consensual the last time they took ECPs.

Table 3.1  
ECP behaviors ( $n = 362$ )

Topic	n	%
On how many different occasions have you taken ECPs?		
Once	227	62.9
Twice	79	21.9
Three times	38	10.5
More than 4 times	17	4.7
The LAST time you took ECPs, where did you get the prescription?		
Private Doctor's Office	36	10.1
University Health Center	138	38.8
Public Health Center	68	19.1
Family Planning / Contraceptive Clinic	107	30.1
Hospital ER	7	2.0
The LAST TIME you took ECPs, which situations led you to think you might be pregnant?		
Because we didn't use contraception		
Yes	157	43.5
No	204	56.5
Because we used withdrawal		
Yes	81	22.4
No	280	77.6

Because the condom broke / slipped		
Yes	152	42.1
No	209	57.9
Because I missed taking a birth control pill		
Yes	74	20.5
No	287	79.5
Because I missed an injection (Depo or Lunelle)		
Yes	3	0.8
No	358	99.2
Because I changed the patch a the wrong time		
Yes	2	0.6
No	359	99.4
Thinking about the most recent intercourse that led you to take ECPs, please indicate whether or not you or your partner had engaged in the following activities		
I had been drinking alcohol		
Yes	95	26.3
No	266	73.7
My partner had been drinking alcohol		
Yes	98	27.1
No	263	72.9
I was under the influence of drugs		
Yes	8	2.2
No	353	97.8
My partner was under the influence of drugs		
Yes	12	3.3
No	349	96.7
The LAST TIME you took ECPs, which of the following best describes who you were having sex with?		
A stranger	7	1.9
An acquaintance	35	9.7
A friend	59	16.3
The person you're dating exclusively	189	52.4
Your primary partner / spouse	71	19.7

The last time you took ECPs, was the intercourse consensual?

Yes	346	96.1
No	14	3.9

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Note. Total may vary slightly due to missing values.

**ECP users.** The majority (68%  $n = 871$ ) of sexually active participants indicated that they had experienced a time when they thought they might be pregnant when they had not planned on becoming pregnant. Among this group, ECP users were more likely to be young (18 – 24 versus 25 – 44) [ $\chi^2(1, N = 870) = 19.88, p = .00$ ]. Analysis of ECP use by race / ethnicity and religion was not possible as several cells contained too few cases. ECP users and non-users did not differ significantly on their level of religiosity [ $t(858) = -.933, p = .35$ ]. Women who were dating casually, women dating one person exclusively with whom they were not living, and women who were not in a relationship and not dating at the time of the survey were more likely than expected to have ever taken ECPs [ $\chi^2(3, N = 869) = 17.69, p = .00$ ]. Neither liberals nor conservatives were more likely to have used ECPs [ $\chi^2(4, N = 868) = 2.68, p = .61$ ]. Additionally, there was no difference in ECP use among women who considered themselves pro-choice or women who identified with being pro-life [ $\chi^2(2, N = 866) = 4.09, p = .13$ ]. Women who had ever used oral contraceptives were more likely than expected to have ever used ECPs [ $\chi^2(1, N = 870) = 6.20, p = .01$ ].

Past ECP users were significantly more knowledgeable about ECPs than non-users. Mann-Whitney U tests demonstrated that ECP users were more likely to know that the first dose of ECPs must be taken within 72 hours of unprotected intercourse in order to be effective [ $z = -3.936, p = .00$ ]; that ECPs have no dangerous long-term effects [ $z =$

-6.146,  $p = .00$ ); that ECPs cause nausea in some people [ $z = -3.057, p = .00$ ]; that ECPs have the ability to prohibit or delay ovulation [ $z = -4.787, p = .00$ ]; and that ECPs are not a form of abortion [ $z = -5.908, p = .00$ ]. ECP users and non-users did not differ significantly on whether or not ECPs have the ability to inhibit the implantation of a fertilized egg in the uterus [ $z = -.364, p = .72$ ] and whether or not ECPs can prohibit fertilization [ $z = -1.904, p = .06$ ].

Not surprisingly, women who had ever taken ECPs were significantly more likely than non-users to be confident about several aspects of ECP use including: obtaining ECPs in time [ $z = -8.843, p = .00$ ]; taking ECPs effectively [ $z = -8.663, p = .00$ ]; and taking ECPs even if their partners didn't want them to use the pills [ $z = -5.486, p = .00$ ]. Participants who had experience using the pills also had better attitudes about the availability of ECPs [ $t(867) = -3.79, p = .00$ ] and had higher perceived social norms composite scores than did ECP non-users [ $t(417) = -8.13, p = .00$ ] indicating that they were more likely to think that their social referents would find their ECP use acceptable.

**Logistic Regression Predicting ECP Use.** Each group, ECP users and ECP non-users, was examined for multivariate outliers. One case was found to be a multivariate outlier as the probability of their Mahalanobis  $D^2$  scores were less than .001 and they were therefore removed from the dataset.

A Pearson's correlation matrix was then examined to look for correlations between variables. The composite score for perceived social norms was not added into the logistic regression model as it was highly correlated with several other independent variables and as it had a tolerance score of .491, which was lower than  $1 - R^2$ , suggesting multicollinearity. Further, the variance inflation factor was 2.024, which was high in

general and was markedly higher than the other variables that did not depart greatly from 1.

Twelve variables when considered together correctly predicted whether women with a past pregnancy scare had ever used ECPs 73.6% of the time,  $\chi^2 = 212.744$ ,  $df = 28$ ,  $N = 870$ ,  $p < .000$ . Table 3.2 presents the odds ratios. Women who knew that ECPs prevented pregnancy by delaying or prohibiting ovulation and women who understood that ECPs are not a form of abortion were about 2.5 times more likely than women who did not have this knowledge to have ever taken ECPs (OR = 2.656, 95% CI [1.186 - 2.953]) and (OR = 2.429, 95% CI [1.389 - 4.247]), respectively. Women who were extremely confident in their ability to access ECPs in time if needed were nearly 4 times more likely to have used ECPs than women who indicated that they were not at all confident (OR = 3.882, 95% CI [1.775 - 8.487]).

Table 3.2  
Logistic Regression Predicting ECP Use ( $n = 871$ )

Variable	$\beta$	SE	OR	p	95% CI for Exp(B)	
					Lower	Upper
Age	.399	.211	1.490	.058	.986	2.251
Relationship Status						
Not in a relationship or not dating (reference)	--	--	--	.668	--	--
Casual dating	-.209	.284	.812	.462	.465	1.146
Dating exclusively	.052	.276	1.053	.851	.613	1.808
Living w/ partner	.008	.323	1.008	.981	.535	1.900
Past BCP use	.343	.289	1.410	.234	.801	2.482
ECP timing						
Agree	-.519	.475	.595	.275	.235	1.511
Undecided or Unsure	-1.763	.653	.172	.007	.048	.616
Disagree (reference)	--	--	--	.014	--	--

Variable	$\beta$	SE	OR	p	95% CI for Exp(B)	
					Lower	Upper
ECPs cause nausea						
Agree	-.255	.646	.775	.693	.405	4.599
Undecided or Unsure	-.591	.765	.554	.440	.219	2.748
Disagree (reference)	--	--	--	.044	--	--
ECPs have no dangerous long-term effects						
Agree	.236	.254	1.266	.353	.769	2.083
Undecided or Unsure	.222	.204	1.248	.276	.838	1.861
Disagree (reference)	--	--	--	.506	--	--
ECPs have the ability to prohibit or delay ovulation						
Agree	.627	.233	2.656	.007	1.186	2.953
Undecided or Unsure	.030	.229	1.872	.895	.659	1.613
Disagree (reference)	--	--	--	.003	--	--
ECPs are a form of abortion						
Agree (reference)	--	--	--	.008	--	--
Undecided or Unsure	.706	.401	2.025	.078	.923	4.444
Disagree	.888	.285	2.429	.002	1.389	4.247
Confidence in getting ECPs in time						
Not at all confident (reference)	--	--	--	.000	--	--
Slightly confident	.001	.432	1.001	.999	.429	2.335
Neutral	.829	.413	2.290	.045	1.020	5.144
Somewhat confident	1.121	.398	3.068	.005	1.406	6.695
Extremely confident	1.356	.399	3.882	.001	1.775	8.487
Confidence in effectively taking ECPs						
Not at all confident (reference)	--	--	--	.003	--	--
Slightly confident	.343	1.164	1.410	.768	.144	13.799
Neutral	.334	1.120	1.397	.765	.156	12.541
Somewhat confident	.295	1.093	1.343	.787	.158	11.448
Extremely confident	1.129	1.085	3.092	.298	.369	25.913

Variable	$\beta$	SE	OR	p	95% CI for Exp(B)	
					Lower	Upper
Confidence in taking ECPs without partner knowing						
Not at all confident (reference)	--	--	--	.768	--	--
Slightly confident	-.155	.567	.856	.785	.282	2.604
Neutral	.220	.501	1.246	.660	.467	3.324
Somewhat confident	-.067	.496	.935	.892	.354	2.471
Extremely confident	.156	.476	1.169	.743	.460	2.969
Attitude	.058	.031	1.059	.067	.996	1.127

## DISCUSSION

Approximately 1 in 5 (21.1%,  $n = 362$ ) of all women surveyed and over a quarter (28.3%,  $n = 362$ ) of sexually active women surveyed had ever used ECPs. This proportion is very high relative to the 6% of the general population who has ever taken ECPs (Hoff, Miller et al., 2003) and it is almost double the percentage of ECP users found in other studies examining college students (Corbett et al., 2006; Sawyer & Thompson, 2003). It is difficult to understand exactly how this sample compares to other college women in the US as the National College Health Assessment (NCHA) asks women if they have used emergency contraception in the past school year as opposed to whether or not they have ever used ECPs. In the NCHA, 15% of college women reported that they have used emergency contraception within the past school year (ACHA, 2008).

Due to the limited research examining ECP behaviors among college women, an explanation for the relatively high ECP use in this study is not readily available. It is plausible that ECP access through the university health center is a contributing factor, as the school's health center was the most commonly referenced source for ECP acquisition.

However, the university sampled in Sawyer and Thompson's 2003 article did dispense ECPs on campus, yet only 13.7% of students reported having experiences with the pills.

Contrary to some beliefs that women having unencumbered access to ECPs would engage in reckless sex and would use the pills repeatedly, results from this study found that in many cases, women who had used ECPs were first-time users who were having sex with a partner with whom they were in a relationship and used condoms as their method of birth control. Although it is recognized that alcohol use has been implicated in putting women at risk for unintended pregnancy (ACHA, 2008; Wechsler et al., 1998), and about a quarter of study participants and their partners had been drinking during the intercourse that caused them to need ECPs, this survey did not inquire about the amount of alcohol consumed during these situations. Therefore, the distinction between having a single cocktail or binge drinking cannot be made.

Although it is troubling that 14 ECP users said the last time they took ECPs the sex was not consensual, it unfortunately is not surprising. According to the American College Health Assessment, approximately 8% of female students experienced sexual touching against their will, 4% experienced attempted penetration against their will, and 2% experienced actual penetration against their will in the past year (ACHA, 2008).

In order to identify factors that best predict ECP use, we chose to compare ECP users to non-users among women who have actually had the need to use ECPs – women who have ever experienced a pregnancy scare. The majority (68%  $n = 871$ ) of sexually active participants indicated that they had experienced a pregnancy scare in the past.

It is important to note that contrary to what was anticipated, all ECP users ( $n = 362$ ) did not fall into the category of women who had ever experienced a scare. In fact,

22% ( $n = 80$ ) of ECP users indicated that they had never had a pregnancy scare. This discrepancy may be explained by the manner in which the pregnancy scare question was asked. Women were asked, “Have you ever thought you might be pregnant when you did not plan to be?” It is possible that some women who took ECPs were afraid they might become pregnant but did not in fact think they were already pregnant when they took the pills. This nuance may explain why some ECP users fell outside of our pregnancy scare category.

Coinciding with past research, ECP-users in this study were significantly more likely to be younger (18 – 24 years of age versus 25 - 44 years old) and dating casually, dating one person exclusively with whom they were not cohabitating, or not dating at the time of the survey (Ahonen & Buchman, 2008; Hoff, Miller et al., 2003; Rocca et al., 2007; Spence et al., 2003). Interestingly, ECP users and non-users did not differ significantly on their level of religiosity, politics, or stance on the abortion issue.

These findings were surprising as past studies have established that a woman’s religion and / or her level of religiosity can influence her sexual behaviors (Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998; Wann, 1993; Zaleski & Schiaffino, 2000) as well as her contraceptive use (Kramer et al., 2007; Studer & Thorton, 1987; Zaleski & Schiaffino, 2000). It is possible however, that a woman’s need to avoid an unintended pregnancy may outweigh her religious beliefs. It was also somewhat unexpected that there were not political differences between users and non-users as a study examining Princeton students found that Republicans had an odds 48% lower than Democrats of recommending ECPs (Harper & Ellertson, 1995a). Certainly though, it must be noted that the act of recommending ECPs to someone is far different from actually taking the

pills yourself in order avoid an unintended pregnancy. Additionally, how an individual defines herself politically may not solely be dictated by her reproductive health beliefs but by many other issues such as education, economics, and defense. Although there has not been any research examining the relationship between women's positions on the abortion issue and ECP use, it was possible this issue might play a role in use as ECPs are commonly confused with abortion (Corbett et al., 2006; Harper & Ellertson, 1995a; Pruitt & Mullen, 2005; Sawyer & Thompson, 2003).

In addition to comparing ECP users and non-users on demographic and background factors, we made comparisons on social and behavioral factors as well. For all but two of the questions assessing ECP-related knowledge, ECP-users were significantly more likely than non-users to answer the questions correctly. Our findings support past research that has shown that knowledge of the appropriate timing for taking ECPs in order for them to be effective (Larsson et al., 2004), knowledge of possible side effects caused by ECPs and the understanding that ECPs are safe are predictive of future use of ECPs or of willingness to use ECPs (Harper & Ellertson, 1995a; R. Jackson et al., 2000; Larsson et al., 2004). Additionally, other research has found that understanding the mechanisms of action by which ECPs prevent pregnancy, particularly the understanding that ECPs work by preventing ovulation and not by causing an abortion is associated with willingness to use ECPs (R. Jackson et al., 2000; Larsson et al., 2004; Romo, Berenson, & Wu, 2004).

Not surprisingly, women who had ever taken ECPs were significantly more likely than non-users to be confident about several aspects of ECP use including: obtaining ECPs in time, taking ECPs effectively, and taking ECPs even if their partners didn't want

them to use the pills. There is limited information about self-efficacy and its role in ECP use; however, high levels of self-efficacy in using a birth control method have been shown to be predictive of use in general (Heinrich, 1993; Levinson et al., 1998; Sieving et al., 2007). It is uncertain though whether or not high levels of self-efficacy contributed to women using ECPs in the first place or if women gained self-efficacy relative to ECP use after having used the pills.

Participants who had experience using the pills also had better attitudes about the availability of ECPs and had higher perceived social norms composite scores than did ECP non-users indicating that they were more likely to think that their social referents would find their ECP use acceptable. It is not surprising that ECP users in our study had positive attitudes about ECP availability as other research has shown positive attitudes toward ECP availability to be predictive of ECP use (Larsson et al., 2004). It was also expected that women who had used ECPs would have higher perceived social norms composite scores. A recent study of students aged 16 – 30 in London found that having a positive view of women who used ECPs and having partners who were supportive of ECP use was predictive of ECP use (Free & Ogden, 2005). Although the research examining perceived social norms and ECPs is limited, the birth control literature has shown that the perception that friends and parents are supportive of a woman's birth control use has been associated with higher usage rates (Jaccard & Davidson, 1972; Sieving et al., 2007).

Past research has shown that women who have used oral contraceptives in the past were twice as likely to be willing to take ECPs in the future as compared to women without previous birth control pill experience (R. Jackson et al., 2000). We found that

women who had ever used birth control pills were more likely than expected to have ever used. It is possible that women who have experience with oral contraceptives are somewhat predisposed to using ECPs because they feel comfortable using hormonal methods of birth control. The other explanation for this relationship is that women who presented for an ECP prescription were also given a prescription for birth control pills from their provider.

Despite all of the statistically significant differences between ECP users and non-users at the univariate level, only a few of these factors proved to be significant predictors in the logistic regression. Women who knew that ECPs prevented pregnancy by delaying or prohibiting ovulation and that ECPs are not a form of abortion were about 2.5 times more likely than women who did not have this knowledge to have ever taken ECPs. Women who were extremely confident in their ability to access ECPs in time if needed were nearly 4 times more likely to have used ECPs than women who indicated that they were not at all confident. It is unclear however, whether knowing that ECP work by interfering with ovulation and not by causing an abortion and being self-efficacious about accessing the pills in time predisposes women to use ECPs or if ECP use itself causes increased knowledge and self-efficacy. As these two key points regarding how ECPs function to prevent pregnancy and having confidence in being able to get ECPs in time for them to be effective were the only significant predictors of use in our sample, it is important that information about how ECPs work and where and how to access the pills is common knowledge on college campuses.

**Limitations.** Strengths of this study include the large random sample of women surveyed. Additionally, no other study to date has tested a model among American

women to explain ECP intention. This study has limitations however, as only college women were sampled and therefore findings are not generalizable to other populations. Although a response rate of 45% ( $n = 1919$ ) is quite high relative to response rates to other online surveys of college students examining sexual behavior (Gullette & Lyons, 2005, 2006), the 55% of women who did not respond to the survey may have had strong feelings against emergency contraceptive pills or they were not comfortable answering questions about their sexual behaviors. Of the 1919 women who entered their pin number to take the online survey, only 1718 surveys were usable. It is possible that those who chose not to complete the survey or who left more than 20% of the questions unanswered had strong feelings against emergency contraceptive pills or they were not comfortable answering personal questions about their sexuality. As this study was based on self-reported information, it is possible that respondents over-reported or under-reported their behaviors. Also, survey invitations were emailed out at the end of the Spring quarter and it is possible that students who were busy with final projects, papers, and finals were less likely to have taken the survey.

**Conclusion.** Contrary to some beliefs that women having barrier-free access to ECPs would engage in reckless sexual behaviors and would use the pills repeatedly, results from this study found that in many cases, women who had used ECPs were first-time users who were having sex within a relationship and used condoms as their method of birth control. Although there were a relatively large number of ECP users among the female students in this study, the majority of those who had experienced a pregnancy scare had not ever used ECPs. This suggests that even in the best of circumstances – attending a university that dispenses ECPs at the on-campus health center – many women

are not taking advantage of ECPs in emergency situations. As having self-efficacy in being able to access ECPs in time for the pills to be effective was one of the few predictors of ECP use and provided that the university health center was the most popular place to access ECPs, it's important for universities to have ECPs available for their students and to advertise this option widely. Educational efforts to increase awareness and use of ECPs must include information regarding ECPs' mechanisms of action, particularly that ECPs prevent pregnancy by interfering with ovulation and that ECPs are not a form of abortion.

## CHAPTER 5

### DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

#### Discussion

Although the United States has over a decade of experience with emergency contraceptive pills, ECPs have not had any effect on pregnancy or abortion rates at the population level (Raymond et al., 2007) and remain underutilized in many high-risk populations. In 2006, a dedicated ECP product became available without a prescription; however, it is unlikely that this measure alone will have a significant impact on ECP use and unintended pregnancy and abortion rates. Evidence indicates that even when women have had barrier-free access to ECPs in the past, they have displayed low usage rates (Endres et al., 2000; Marston et al., 2006; Nelson, 2006; Raine et al., 2005). Past research has primarily focused on extrinsic barriers to explain limited ECP use (Chuang & Shank, 2006; Chuang et al., 2004; Delbanco et al., 1997; Espey et al., 2003; Golden et al., 2001; Perrin et al., 2000; Polis et al., 2005; Shacter et al., 2007; Sherman et al., 2001; Smugar et al., 2000; Veloudis & Murray, 2000). However, there has been no in depth exploration of intrinsic factors that may predispose women to use or not use ECPs. In order to better understand why more women are not using ECPs, this research focused on intrinsic factors affecting women's decision-making regarding ECP use in a population at risk for unintended pregnancy with ECP access – American college women. The purpose of this study was to describe knowledge, self-efficacy, attitude and social norms related to ECPs among women attending a university. Additional goals included determining the nature and extent of college women's ECP use and identifying factors associated with intention to use ECPs and actual ECP use.

Mirroring trends in the general public and among the college population (Corbett et al., 2006; Harper & Ellertson, 1995a; Hoff, Miller et al., 2003; Sawyer & Thompson, 2003), the vast majority of women surveyed in this study (95.8%) had heard of emergency contraceptive pills. Participants reported receiving information about ECPs from a variety of sources but the most popular were: friends, media, and instructors and classes. Although previous research indicates that college women prefer to be informed about ECPs from physicians (Corbett et al., 2006), few respondents in this study indicated that physicians had provided this information to them (21.1,  $n = 349$ ) or initiated any conversation about ECPs (12%,  $n = 206$ ) during their visits. Whether due to the fact that otherwise healthy women's visits to doctors are infrequent during the college years, or other reasons, the fact that these women appeared to have had little or no communication about ECPs during their reproductive years, is noteworthy. These findings may suggest that providers are missing a window of opportunity to educate their patients about this back-up method of birth control.

Although the majority of study participants were aware of ECPs, they had significant knowledge gaps with respect to the mechanisms by which ECPs prevent pregnancy. Only thirty percent of respondents understood that ECPs prevent pregnancy by interfering with ovulation. Of particular concern was their apparent confusion in being able to distinguish between ECPs and abortion. Over a quarter of participants (28.7%,  $n = 489$ ) believed that ECPs were a form of abortion and another forty percent (41.0%,  $n = 701$ ) were uncertain. This ambiguity is not unique to this sample as several studies have reported college students' inability to distinguish the differences between ECPs and abortion (Corbett et al., 2006; Harper & Ellertson, 1995a; Sawyer &

Thompson, 2003). This study also found that participants were unclear that abortion is synonymous with terminating an implanted fertilized egg. This may suggest that women in this sample lacked a basic understanding of reproductive biology. Importantly, questions arise as to whether this confusion about how ECPs work and their erroneous association with abortion is a factor in decisions to not use them based on moral or religious grounds. Although it is not necessary to understand how ECPs work to prevent pregnancy in order to use the pills, this knowledge is required for women to make informed decisions about whether or not to take ECPs.

It is interesting that Although there were clear knowledge deficits about ECP use among the women in this study, they tended to report high levels of self-efficacy regarding ECP use. This disconnect may be due in part to the fact that the questions assessing self-efficacy were focused on confidence in accessing and taking ECPs, whereas the majority of knowledge questions were concerned with how ECPs work to prevent pregnancy. At the time of this survey, ECPs were prescribed and disseminated through the on-campus health center. As students had ECP access on campus, it is somewhat disconcerting that only about half of women (50.3%,  $n = 855$ ) indicated they were confident that they could access ECPs in time if they needed them. This may be an indication that women were unaware that ECPs were offered through the health center and may suggest that the university implement strategies to increase awareness of ECP availability on campus.

Consistent with past research, the women surveyed in this study generally held positive attitudes toward the availability of ECPs to the public (Breitbart et al., 1998; Harper & Ellertson, 1995a; Harvey et al., 1999; Sawyer & Thompson, 2003; Wu et al.,

2007). In that same vein, the majority (68.9%,  $n = 1182$ ) of respondents perceived that their peers thought ECPs were morally acceptable although they were uncertain about how pervasive ECP use was among their peers. It is uncertain whether these findings are consistent with other research, as no studies to date have focused substantively on the relationship between social norms and ECP intention and use. This is quite surprising as over the past several decades, social norms have been a major focus when looking at a variety of health-related issues on campus including safer sex and contraceptive practices (Daughtery & Burger, 1984; Jaccard & Davidson, 1972; Lowe & Radius, 1987; Scholly et al., 2005; Strader & Beaman, 1991; Whitley, 1991).

Although women's perceptions of how numerous social references would be supportive of their hypothetical ECP use varied, the group that proved to be the most important to their ECP decision-making was primary partners / spouses. The role men play in ECP use has largely been neglected. This finding suggests that women consider their partners' opinions when weighing whether or not to take ECPs and therefore, the role men play should not be a forgotten factor in efforts to increase ECP use.

In addition to describing female students' knowledge, self-efficacy, attitudes and social norms related to ECPs, this study examined women's reasons for unprotected sex and their need for ECPs. The majority of sexually active participants (68%,  $n = 871$ ) indicated they had ever experienced a pregnancy scare and almost a fifth (17.6%,  $n = 225$ ) of them had ever been pregnant. Interestingly, although respondents were not asked directly if they had ever had an abortion, only about half (53.1%,  $n = 110$ ) of those who said they had ever been pregnant also indicated that they had ever given birth. As far more unintended pregnancies end in abortion than in fetal losses (Finer & Henshaw,

2006), it is probable that these pregnancies were terminated. It is apparent from these findings that the threat of unintended pregnancy was a serious issue for women in this study.

For some women, attending college seems to trigger risk taking behaviors such as unprotected sex, sex with multiple partners or heavy alcohol use; behaviors that place women at risk for unintended pregnancy (ACHA, 2008). Despite this threat of unintended pregnancy, ECP usage rates remain relatively low in college women. Some research has reported that between 12% and 13% of women have ever used ECPs (ACHA, 2008; Corbett et al., 2006; Sawyer & Thompson, 2003). According to the National College Health Assessment (NCHA), 15% of women have used ECPs in the past year (ACHA, 2008). In this study, approximately 1 in 5 women surveyed (21.1%,  $n = 362$ ) indicated they had ever taken ECPs. There is no clear explanation for why such a relatively high percentage of female students at the university in this study had experience with ECPs as compared to women attending other American universities. As was the case with this study, other research that has examined students' ECP behaviors took place at ECP-dispensing institutions (ACHA, 2006, 2008; Corbett et al., 2006; Sawyer & Thompson, 2003). Therefore, variations in on-campus ECP access do not explain usage differences. When comparing our sample to the participants in The National College Health Assessment (NCHA) however, the discrepancy in ECP usage rates may be accounted for by the difference in the questions asked regarding ECP use. NCHA asks women if they have used emergency contraception in the past school year, whereas we asked women whether or not they have ever used ECPs (ACHA, 2008).

Among the ECP users in this study, the majority of women (72.1%,  $n = 260$ ) were having sex with the person they were dating exclusively or their primary partner / spouse the last time they took ECPs. About a quarter of ECP users and their partners had been drinking alcohol during the intercourse that ended in ECP use. The two most common situations that led women to use the pills echoed the findings of other research; no contraception was used or there was a problem with the condom (Breitbart et al., 1998; Harvey et al., 1999; Wu et al., 2007). The majority of ECP users in this sample had only used ECPs once (62.9%,  $n = 227$ ). Although it is recognized that alcohol use has been implicated in putting women at risk for unintended pregnancy (ACHA, 2008; Wechsler et al., 1998), this survey did not inquire about the amount of alcohol consumed during these situations so the distinction between having a single cocktail or binge drinking cannot be made. Contrary to some beliefs that women having unencumbered access to ECPs would engage in reckless sex and would use the pills repeatedly, results from this study found that in many cases, women who had used ECPs were first-time users who were having sex with a partner with whom they were in a relationship and used condoms as their method of birth control.

In addition to shedding light on the nature and extent of ECP use among college women, another aim of this research was to examine the association of multiple factors and intention to use ECPs and actual ECP use as a preliminary step in building a theoretical model of ECP decision-making. Several social and behavioral factors including: knowledge, self-efficacy, attitude, perceived social norms, pregnancy threat, and past birth control behaviors consistently appear in the literature as influences in contraceptive decision-making. Of these, the construct of pregnancy severity – how

important it is for a woman to keep from becoming pregnant was more predictive of ECP intentions than any other factor. The one commonality among all women who responded to this survey was that they were currently attending college. It is plausible that the need to avoid becoming pregnant heavily influenced the odds of having intentions to use ECPs because this group of women was motivated to make certain things, including a pregnancy, interfered with their education. It is possible that pregnancy avoidance would not be such an important predictor for women who are currently not pursuing academic or other interests.

Other factors associated with intention to use ECPs were knowledge and self-efficacy. Although several dimensions of ECP knowledge were included in the logistic regression, only two – knowledge that ECPs have the ability to prohibit or delay ovulation and the knowledge that ECPs are not a form of abortion were significant predictors of ECP intention. The fact that the only knowledge variables that were predictive of future ECP intention were related to mechanisms of action suggest that how women perceive that ECPs prevent pregnancy has bearing on their decisions.

It is not surprising that the odds of having ECP intention increased as levels of self-efficacy increased as high levels of self-efficacy have been an influential factor in contraceptive use (Heinrich, 1993; Levinson et al., 1998; Sieving et al., 2007) and have been predictive of ECP use specifically (Free & Ogden, 2005). As the different aspects of self-efficacy were collapsed together in a composite score, it is difficult to decipher which facet of self-efficacy is the most important.

Having a positive attitude about the availability of ECPs was also a significant predictor of ECP intention. As no American studies to date have examined attitude about

ECP availability as a predictor of ECP intention, we cannot make comparisons between this group of college women and other women. Among women who feel comfortable about widespread access to ECPs, it is probable that they generally find it acceptable for women to use these pills. Perhaps if it is acceptable for others to use ECPs then it is also admissible for women themselves to take ECPs if needed.

Previous ECP experience was a significant influence on future ECP intentions. Women who had used ECPs in the past were more likely to indicate that they would ever take ECPs in the future compared to woman who had never used ECPs. It is notable that ECP users in this study had better knowledge about ECPs, higher self-efficacy scores, more positive attitudes toward ECP availability than did women who had never used ECPs. As certain aspects of knowledge, self-efficacy, and attitude were all significant predictors of intention to use ECPs, this may explain why past ECP use is a predictor of future ECP use.

Although the behavioral constructs: knowledge of ECP mechanisms of action, self-efficacy, attitude, pregnancy severity, and past ECP use are the best predictors of ECP intention among this group of college women, subsequent research should explore these factors more thoroughly and examine potential mediating effects on ECP decision-making.

Although there were not enough ECP users to test the complete conceptual framework among our entire sample, we were able to identify factors that best predict actual ECP use among a subset of our sample – women who had ever had a pregnancy scare. Although the manner in which we had assessed several behavioral factors was suitable for predicting intention to use ECPs in the theoretical future, these questions

were not appropriate for trying to predict past ECP use due to the temporal nature of the questions. For this reason we were unable to test pregnancy susceptibility and severity and past ECP as predictors of ECP use. There were only three significant predictors of actual ECP use – the knowledge that ECPs prevent pregnancy by delaying or prohibiting ovulation, knowledge that ECPs are not a form of abortion, and being self-efficacious about accessing ECPs in time if needed.

Although we cannot draw direct comparisons between the results of the logistic regression to predict intention to ever take ECPs and the one to predict actual ECP use, it is notable that far fewer factors were predictive of actual use than were predictive of intention. This may suggest that Although there may be many contributors to an individual's intention to perform a behavior in a hypothetical situation, only some of them may be directly predictive of behavior. In this research, the most influential factors on women's decisions about whether or not to use ECPs were knowing how the pills work to prevent pregnancy and having confidence in accessing the pills in time.

As research has shown that friends, partners, and parents affect contraceptive use in general (Jaccard & Davidson, 1972; Lowe & Radius, 1987; Sable et al., 2000; Sieving et al., 2007), it was unfortunate that due to issues of the multicollinearity the construct of perceived social norms was unable to be tested as a possible predictor of neither ECP intention nor ECP use. Among the cohort of women in this study, it is probable that the influence of partners may have been predictive of ECP intentions and use as participants indicated that their partners' opinions would be important in decisions about ECP use.

## **Conclusions**

Although awareness of the existence of ECPs was high among our sample of college women, accurate knowledge about ECPs as well as general knowledge about reproductive biology was limited. Provided that the knowledge that ECPs are not an abortifacient but prevent pregnancy through ovulation were two of the three significant predictors of ECP use, it is paramount that women can make the distinction between ECPs and abortion. Without this information, women may be making decisions based on erroneous moral and ethical grounds.

As self-efficacy in being able to access ECPs in time was the third predictor of ECP use, it is vital that women have information about how and where to access ECPs within the limited window of the time for them to be effective. If women attending college, an educated privileged group, have insufficient knowledge about ECPs, this may suggest that the general public may be severely lacking in accurate and current information about ECPs.

Although over the counter access to ECPs is an historical milestone for reproductive health in the US, this policy change may not be the final step in assuring women's access to ECPs. Intrinsic factors such as knowledge and self-efficacy seem to play a role in women's decision-making about ECP use. Strategies to increase use of ECPs should address these potential barriers.

## **Recommendations**

As knowledge of how ECPs prevent pregnancy and self-efficacy about accessing ECPs in time were the only significant predictors of ECP use, colleges and universities should make ECPs available on campus and should create policies that require mandatory

reproductive health education including information about how to access ECPs and how the pills work to prevent pregnancy. This education should be included during freshman orientations, seminars and appropriate introductory courses.

Universities should consider implementing social marketing campaigns to increase knowledge, self-efficacy, and ultimately ECP use. Key points to include in campaigns are: ECPs prevent pregnancy in the same manner that birth control pills do, ECPs are not an abortion, and ECPs are the most effective if taken immediately following unprotected sex but can be taken up to five days after unprotected sex. Additionally, it is important that where and when ECPs are available on campus be advertised.

As clinicians at the university health center can play a key role in educating students about birth control methods including ECPs, the university should assess clinician knowledge, attitude, and counseling and dispensing behaviors relative to ECPs. A mandatory ECP training that addresses issues raised in the assessment should be held for all health center providers. Policies and protocols should be created and implemented to ensure that ECP counseling occurs at all annual and routine reproductive health visits. As students may not seek regular preventive health visits, a reminder system for annual visits should be implemented.

Findings of this research show that male partners seem to be important in women's decisions about ECP use, and therefore it is crucial they are included in these efforts. As we were unable to include perceived social norms in our analysis of factors that predict ECP use, further research about the effect different social reference groups has on ECP use is warranted.

This study can serve as a preliminary step in building a theoretical model to explain ECP decision-making. Follow-up research should consider using a large random sample to test all of the constructs in the conceptual framework to better understand how the intrinsic factors mediate one another and ultimately to understand the role intrinsic factors have on ECP use.

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APPENDICES

APPENDIX A

Questionnaire

## Welcome To The Emergency Contraceptive Pill Survey

We want to assure you that all answers you provide will remain confidential. If there is a question you choose not to answer, you may skip it. Thank you for your help!

If you have any questions about the purpose of this study, please contact Heather Nelson at [nelsohea@onid.orst.edu](mailto:nellohea@onid.orst.edu). Should you have any technical problems responding, please email Lydia Newton at [Newton@stat.orst.edu](mailto:Newton@stat.orst.edu).

Please enter your 4-digit PIN number to begin:

We would like to start this survey by first asking your gender. Are you male or female?

- Male  
 Female

If male was chosen: Our apologies, but this study is intended for women only. We thank you for your time. If you are interested in learning more about emergency contraceptive pills, visit <http://ec.princeton.edu>

1. Prior to receiving the request to fill out this survey, have you ever heard of emergency contraceptive pills, sometimes called “the morning after pill?”

- Yes  
 No (skips to Q4)  
 Not Sure (skips to Q4)

2. Approximately, when did you first find out about emergency contraceptive pills?

- After January 1, 2004  
 January 1, 2003 through December 31, 2003  
 Before January 1, 2003  
 Not sure

3. Please indicate whether or not you have ever found out information about emergency contraceptive pills in each of the following ways. (Click on YES or NO for each way listed)

- |                            | YES                      | NO                       |
|----------------------------|--------------------------|--------------------------|
| a. Brochures or postures   | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Newspapers or magazines | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Television or radio     | <input type="checkbox"/> | <input type="checkbox"/> |
| d. The Internet            | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Friend(s)               | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Sibling(s)              | <input type="checkbox"/> | <input type="checkbox"/> |

- |   |                          |                          |
|---|--------------------------|--------------------------|
| g. Parents  | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Other family member  | <input type="checkbox"/> | <input type="checkbox"/> |
| i. Class or instructor  | <input type="checkbox"/> | <input type="checkbox"/> |
| j. Counselor or health educator   | <input type="checkbox"/> | <input type="checkbox"/> |
| k. Nurse (nurse practitioner)   | <input type="checkbox"/> | <input type="checkbox"/> |
| l. Physician  | <input type="checkbox"/> | <input type="checkbox"/> |
| m. Pharmacist   | <input type="checkbox"/> | <input type="checkbox"/> |
| n. If there was some other way in which you learned about emergency contraceptive pills, please describe it here. _____ |                          |                          |

PLEASE READ THE DEFINITION BELOW BEFORE ANSWERING THE FOLLOWING QUESTIONS.

Emergency contraceptive pills, also referred to as “the morning after pill” or “Plan B” are a method of birth control that can be used after unprotected penile-vaginal intercourse to prevent pregnancy.

4. Please indicate the extent to which you agree or disagree with each of the following statements.

SA – STRONGLY AGREE  
 MA – MILDLY AGREE  
 U – UNDECIDED OR UNSURE  
 MD – MILDLY DISAGREE  
 SD – STRONGLY DISAGREE

- |  |    |    |   |    |    |
|--|----|----|---|----|----|
| a. Most women my age have NOT taken emergency contraceptive pills.....                             | SA | MA | U | MD | SD |
| b. Most women my age think emergency contraceptive pills are morally acceptable.....               | SA | MA | U | MD | SD |
| c. I worry about taking medications that contain hormones .....                                    | SA | MA | U | MD | SD |
| d. Emergency contraceptive pills are a form of abortion.....                                       | SA | MA | U | MD | SD |
| e. Emergency contraceptive pills should be available at drug stores without a prescription...      | SA | MA | U | MD | SD |
| f. Emergency contraceptive pills should NOT be available from vending machines.....                | SA | MA | U | MD | SD |
| g. Emergency contraceptive pills should be given to women by their health care provider for future |    |    |   |    |    |

use in case of an emergency.....SA MA U MD SD

h. Responsible adults don't have unplanned pregnancies..... SA MA U MD SD

5. Please indicate the extent to which you agree or disagree with each of the following statements.

a. The first dose of emergency contraceptive pills must be taken within 72 hours of unprotected sex in order to be effective..... SA MA U MD SD

b. Taking emergency contraceptive pills today will protect you from pregnancies that result from future intercourse..... SA MA U MD SD

c. Emergency contraceptive pills have NO dangerous long-term effects..... SA MA U MD SD

d. Emergency contraceptive pills cause nausea in some people ..... SA MA U MD SD

e. Emergency contraceptive pills have the ability to prohibit or delay ovulation .....SA MA U MD SD

f. Emergency contraceptive pills have the ability to prohibit fertilization. .... SA MA U MD SD

g. Emergency contraceptive pills have the ability to destroy a fertilized egg that has implanted in the uterus.....SA MA U MD SD

h. Emergency contraceptive pills have the ability to inhibit the implantation of a fertilized egg in the uterus. .... SA MA U MD SD

6. Please indicate your level of agreement or disagreement with this statement: "My friends would be supportive of me taking emergency contraceptive pills".

- Strongly Agree
- Mildly Agree
- Undecided or Unsure
- Mildly Disagree
- Strongly Disagree

6a. Hypothetically, if you were faced with the decision whether or not to take emergency contraceptive pills, how important would your friends' opinions be in making your decision?

- Very important
- Somewhat important
- Not important

7. Please indicate your level of agreement or disagreement with this statement "My parent(s) would be supportive of me taking emergency contraceptive pills".

- Strongly Agree
- Mildly Agree
- Undecided or Unsure
- Mildly Disagree
- Strongly Disagree (skips to Q8)

7a. Hypothetically, if you were faced with the decision whether or not to take emergency contraceptive pills, how important would your parents' opinions be in making your decision?

- Very important
- Somewhat important
- Not important

8. Please indicate your level of agreement or disagreement with this statement: "My primary partner/spouse would be supportive of me taking emergency contraceptive pills."

- Strongly Agree
- Mildly Agree
- Undecided or Unsure
- Mildly Disagree
- Strongly Disagree (skips to Q9)

8a. Hypothetically, if you were faced with the decision whether or not to take emergency contraceptive pills, how important would your primary partner/spouse's opinions be in making your decision?

- Very important
- Somewhat important

Not important

9. Please indicate your level of agreement or disagreement with this statement:  
 “Members of my religious community would be supportive of me taking emergency contraceptive pills.”

- Strongly Agree  
 Mildly Agree  
 Undecided or Unsure  
 Mildly Disagree  
 Strongly Disagree (skips to Q10)

- 9a. Hypothetically, if you were faced with the decision whether or not to take emergency contraceptive pills, how important would your religious community’s opinions be in making your decision?

- Very important  
 Somewhat important  
 Not important

10. Given your current life circumstances, if your contraceptive method failed or you had unprotected sex and you thought you might become pregnant, how likely is it that you would take emergency contraceptive pills?

Not at all likely					Extremely Likely
1	2	3	4	5	
<input type="checkbox"/>					

11. How likely is it that you would EVER take emergency contraceptive pills if your contraceptive method failed or you had unprotected sex and you thought you might become pregnant?

Not at all likely					Extremely Likely
1	2	3	4	5	
<input type="checkbox"/>					

12. How confident are you that you COULD GET emergency contraceptive pills in time if you needed them?

Not at all confident					Extremely Confident
1	2	3	4	5	
<input type="checkbox"/>					

13. How confident are you that you could EFFECTIVELY take emergency contraceptive pills if you needed them?

Not at all confident

Extremely Confident

- 1                      2                      3                      4                      5

14. How confident are you that you could take emergency contraceptive pills if your partner didn't want you to take them?

Not at all confident

Extremely Confident

- 1                      2                      3                      4                      5

The next set of questions will ask you about religion and some things about your sexual behavior. Please remember, all answers you provide will remain confidential. Neither your name nor email address will be attached to this data.

15. What is your religious affiliation?

- None
- Buddhist
- Catholic
- Jewish
- Mormon
- Muslim
- Mainline Liberal Protestant
- Conservative Protestant
- If you have some other religious affiliation, please describe it here \_\_\_\_\_

16. How often do you typically attend religious services?

- Never
- Only for holidays and special events (excluding funerals and weddings)
- At least once a month
- Once a week
- More than once a week

17. In your daily life, how important is your religion to you?
- Very important
  - Somewhat important
  - Not important
18. How important is your religion to you in guiding your decisions about your reproductive health?
- Very important
  - Somewhat important
  - Not important
19. How do you describe yourself politically?
- Extremely Liberal
  - Somewhat Liberal
  - Neither Liberal nor Conservative
  - Somewhat Conservative
  - Extremely Conservative
20. Which of the following do you consider yourself?
- Pro-life
  - Pro-choice
  - Neither
21. Which one of the following categories best describes your sexual preference at this time?
- Heterosexual
  - Lesbian / Gay
  - Bisexual
22. Which of the following best describes your current relationship status?
- Casually dating
  - Dating one person exclusively but not living together
  - Living with primary partner/spouse
  - Not in a relationship and not dating
23. Have you ever taken birth control pills?
- Yes
  - No

24. Have you ever had penile-vaginal intercourse?

- Yes (skips to Q25)
- No

24a. Based on your sexual behavior in the past three months, what do you think your risk is for getting pregnant?

- No risk at all
- Slightly at risk
- Somewhat at risk
- Good deal at risk
- Extremely at risk

24b. Given your current life circumstances, how important is it to you to keep from getting pregnant now?

1. Not at all important
  2. A little important
  3. Moderately important
  4. Very important
  5. Extremely important
- (skips to Q41)

25. Have you ever been pregnant?

- Yes
- No (skips to Q28)
- Not Sure (skips to Q28)

26. Have you ever given birth?

- Yes
- No

27. Are you pregnant now?

- Yes (skips to Q30)
- No

28. Based on your sexual behavior in the past three months, what do you think your risk is for getting pregnant?

- No risk at all
- Slightly at risk

- Somewhat at risk
- Good deal at risk
- Extremely at risk

29. Given your current life circumstances, how important is it to you to keep from getting pregnant now?

- Not at all important
- A little important
- Moderately important
- Very important
- Extremely important

30. Have you ever thought that you might be pregnant when you did not plan to be?

- Yes
- No

31. How many sexual partners have you had in the last year?

- None
- 1
- 2-6
- 7-11
- More than 11

32. Currently, which is your primary method of contraception?

(drop down menu)

- Withdrawl
- Rhythm method
- Diaphragm/
- Cervical cap
- Male condoms
- Female condoms
- Intra Uterine Device (IUD)
- Birth control pills
- Norplant
- Foam/jelly/vaginal contraceptive film
- Depro Provera or Lunelle (injectables)
- Ortho Evra (birth control patch)
- None

If there is some other form of birth control you are currently using that was not listed, please describe it here \_\_\_\_\_

33. Have you ever taken emergency contraceptive pills?

- Yes
- No (skip to Q39)

34. On how many different occasions have you taken emergency contraceptive pills?

- Once
- Twice
- Three times
- More than 4 times

34a. The LAST TIME you took emergency contraceptive pills, where did you get the prescription?

- Private Doctor's office
- University health center
- Public health center (i.e., county or state)
- Community family planning / contraceptive clinic
- Hospital Emergency Department

35. Thinking about the most recent intercourse that led you to take emergency contraceptive pills, please indicate whether or not you or your partner had engaged in each of the following activities.

- |   | YES                      | NO                       |
|---|--------------------------|--------------------------|
| a. I had been drinking alcohol                      | <input type="checkbox"/> | <input type="checkbox"/> |
| b. My partner had been drinking alcohol             | <input type="checkbox"/> | <input type="checkbox"/> |
| c. I was under the influence of drugs               | <input type="checkbox"/> | <input type="checkbox"/> |
| d. My partner had been under the influence of drugs | <input type="checkbox"/> | <input type="checkbox"/> |

36. The LAST TIME you took emergency contraceptive pills, which situations led you to think you might be pregnant?

- |   | YES                      | NO                       |
|---|--------------------------|--------------------------|
| a. Because we didn't use contraception                    | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Because we used withdrawal                             | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Because the condom broke/slipped                       | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Because the diaphragm/cervical cap was out of position | <input type="checkbox"/> | <input type="checkbox"/> |

- e. Because the Intra Uterine Device (IUD) was out of place
- f. Because I missed taking a birth control pill
- g. Because I missed an injection (Depo or Lunelle)
- h. Because I changed the patch at the wrong time
- i. If there is some other reason that led you to believe you were pregnant, please describe it here \_\_\_\_\_

37. The LAST TIME you took emergency contraceptive pills, which of the following best describes who you were having sex with?

- A stranger
- An acquaintance
- A friend
- The person you're dating exclusively
- Your primary partner/spouse

38. The last time you took emergency contraceptive pills, was the intercourse consensual?

- Yes
- No

39. Do you have any children (biological or adopted)? Please do not include an unborn child or children if you are currently pregnant.

- Yes
- No (skips to 41)

40. How many children do you currently have? Please do not include an unborn child/children if pregnant now. \_\_\_\_\_

41. Has a health professional ever discussed emergency contraceptive pills with you even when you WERE NOT seeking information about them?

- Yes
- No (skip to Q44)

42. Given the situation described in the previous question, please indicate whether or not you have been counseled about emergency contraceptive pills from each of the following professionals.

	YES	NO
<input type="checkbox"/> Physician	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Physician's Assistant	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Nurse practitioner	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Nurse	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Counselor / Health Educator	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Pharmacist	<input type="checkbox"/>	<input type="checkbox"/>

43. If someone other than those listed above counseled you, please describe his/her profession here \_\_\_\_\_

44. Do you have an advance prescription for emergency contraceptive pills or package of emergency contraceptive pills?

- Yes
- No (skip to Q46)

45. Where did you get the prescription?

- Private Doctor's office
- University health center
- Public health center (i.e. county or state)
- Community family planning / contraceptive clinic
- Hospital Emergency Department

If you received the prescription from some other source besides those listed, please describe it here \_\_\_\_\_

Now we will ask you some general demographic questions. This data will be used for statistical purposes so that we may group your answers with other of similar background.

46. Please type in your current age. \_\_\_\_\_

47. Which best describes your racial/ethnic identity?

- American Indian or Alaskan Native
- Asian or Pacific Islander
- Black, not of Hispanic Origin
- Hispanic

White, not of Hispanic Origin

Multiracial

If you identify yourself with some other race or ethnicity, please describe it here

\_\_\_\_\_

48. What is your current academic standing?

Freshman

Sophomore

Junior

Senior

Graduate Student

Post-baccalaureate

Other

49. Which best describes your current employment status?

Full-time employed

Part-time employed

I'm not currently employed

50. What is the approximate population of your hometown (the place where you grew up)?

Less than 1,000

1,000 – 4,999

5,000 – 9,999

10,000 – 24,999

25,000 – 49,999

50,000 – 99,999

100,000 – 249,999

250,000 – 499,999

500,000 – 999,999

1 million or greater

don't know

APPENDIX B

Email #1 – Prenotice

Dear (Respondent's First Name):

My name is Heather Nelson and I am a doctoral student from the Department of Public Health at Oregon State University. I am currently conducting research to learn more about specific health issues of importance to university women. Within the next couple of days, you will receive an email from the Oregon State University Survey Research Center with a link to a short Internet survey about women's health. I would greatly appreciate your taking a few minutes to complete the online survey to help me learn more about the status of the health of college women.

In appreciation for completing the survey, you will have the opportunity to enter a drawing to win a **free two-night weekend trip to Cannon Beach** on the Oregon Coast to be awarded at the end of spring term.

Thank you in advance for your help.

Sincerely,

Heather Nelson, MPH  
PhD Student  
Department of Public Health

APPENDIX C

Email #2 with survey URL

Dear (Respondent's First Name):

A couple of days ago, Heather Nelson (PhD candidate from the OSU Public Health Department) contacted you regarding a survey she is conducting about specific health issues of concern to college/university women. Heather has contracted us, the Oregon State University Survey Research Center, to manage this survey in order to ensure confidentiality of the data and survey respondents.

Specifically, we are writing to ask your help in a study concerning emergency contraception and university women. Although emergency contraception has received a great deal of press recently; surprisingly, little is currently known about college women and their opinions about emergency contraception.

Because you are one of several women whose response will represent opinions and knowledge of a much larger cohort of women, your response is vitally important to us. We ask that you go online and fill out a 10-12 minute questionnaire. We are interested in the opinions of **all** women attending universities in Oregon, regardless of whether or not you are sexually active. Your responses, together with others, will be combined and used for statistical summaries only. Your participation in this study is voluntary and you may refuse to answer any question.

Special precautions have been established to protect the confidentiality of your responses. Below you will find your unique PIN number, which will enable you to access the survey. Once you have completed the survey, your PIN number will be checked off the email list and you will receive no further contacts.

In appreciation for completing the survey, you will have the opportunity to enter a drawing to win a **free two-night weekend trip to Cannon Beach** on the Oregon coast to be awarded at the end of spring term.

Please either click on <http://oregonstate.edu/dept/statistics/ecpi> or copy and paste the URL to your Web browser to complete the survey.

Your PIN number is: (PIN)

If you have any questions about the survey, please contact Heather Nelson at [nelsohea@onid.orst.edu](mailto:nellohea@onid.orst.edu) or by phone at (541) 737-3828. If she is not available when you call, please leave a message and she will call back.

Thank you for your help.

Sincerely,

Lydia Newton  
Project Manager

P.S. If you need technical assistance with the survey, please contact Lydia Newton at the Survey Research Center at (541) 737-1993 or by email at [Newton@stat.orst.edu](mailto:Newton@stat.orst.edu). If you have questions about your rights as a research subject, please contact the Institutional Review Board (IRB) Human Protections Administrator, (541) 737-3437 or contact by email at [IRB@oregonstate.edu](mailto:IRB@oregonstate.edu). For counseling services, please call (541) 737-2131.

APPENDIX D

Email #3 with survey URL

Dear (Respondent's First Name):

About a week ago I sent you an email with a link to a brief Internet survey about emergency contraception. We are asking women attending universities in Oregon their opinions about emergency contraception because surprisingly, there is very little information known about the opinions and / or experiences of college women.

I realize this is a busy time of year in the quarter. However, I have contacted you and others in hopes of obtaining the insights that only college women like you can provide. As mentioned before, answers to the survey are **confidential** and will be combined with others and used for statistical summaries only.

In appreciation for completing the survey, you will have the opportunity to enter a drawing to win a **free two-night weekend trip to Cannon Beach** on the Oregon Coast to be awarded at the end of spring term.

Please either click on <http://oregonstate.edu/dept/statistics/ecpi> or copy and paste the URL to your Web browser to complete the survey.

Your PIN number is: (PIN)

Should you have any questions or concerns, feel free to contact Heather Nelson at [nelshea@onid.orst.edu](mailto:nelshea@onid.orst.edu) or at (541) 737-3828. If she is not available when you call, please leave a message and she will call back.

Thank you for your help. I genuinely appreciate your participation.

Sincerely,

Lydia Newton  
Project Manager

P.S. For technical assistance with the survey, please contact Lydia Newton at the Survey Research Center at (541) 737-1993 or by email at [Newton@stat.orst.edu](mailto:Newton@stat.orst.edu). If you have questions about your rights as a research subject, please contact the Institutional Review Board (IRB) Human Protections Administrator, (541) 737-3437 or contact by email at [IRB@oregonstate.edu](mailto:IRB@oregonstate.edu). For counseling services, please call (541) 737-2131.

APPENDIX E

Email #4 with survey URL

Dear (Respondent's First Name):

Over the past couple of weeks I have sent you emails containing a link to an Internet survey seeking information about your opinions regarding emergency contraception. I am writing to you again because of the importance your questionnaire has for helping me get an accurate representation of diverse college women's attitudes and experiences. You are one of a small sample of female students chosen at random from a current list of students attending Oregon universities. Although many women have responded and provided their opinions, their answers cannot substitute for your attitudes and experiences.

In appreciation for completing the survey, you will have the opportunity to enter a drawing to win a **free two-night weekend trip to Cannon Beach** on the Oregon Coast to be awarded at the end of spring term.

Be assured that your survey responses will remain **confidential**. Your name and email address will not be connected to the data in any way.

Please either click on <http://oregonstate.edu/dept/statistics/ecpi> or copy and paste the URL to your Web browser to complete the survey.

Your PIN number is: (PIN)

Should you have any questions about the survey, feel free to contact Heather Nelson at [nelshea@onid.orst.edu](mailto:nelshea@onid.orst.edu) or at (541) 737-3828. If she is not available when you call, please leave a message and she will call back.

Thank you for your help. I appreciate your cooperation.

Sincerely,

Lydia Newton  
Project Manager

P.S. If you have technical questions about the survey, please contact Lydia Newton at the Survey Research Center at (541) 737-1993 or by email at [Newton@stat.orst.edu](mailto:Newton@stat.orst.edu). If you have questions about your rights as a research subject, please contact the Institutional Review Board (IRB) Human Protections Administrator, (541) 737-3437 or contact by email at [IRB@oregonstate.edu](mailto:IRB@oregonstate.edu). For counseling services, please call (541) 737-2131.