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Exploring Young Women's Choice to Initiate Use of Long-acting Reversible Contraception: A Mixed Methods Approach

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Exploring Young Women's Choice to Initiate Use of Long-acting Reversible

Contraception: A Mixed Methods Approach

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
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ABSTRACT

Background: The United States has the highest rate of unintended pregnancy compared to any other developed country. Unintended pregnancy is associated with negative health outcomes for both parents and children. It is estimated that government expenditures for unintended pregnancy total $21 billion each year. Women ages 18-25 years old have the highest rate of unintended pregnancy. This age group is categorized as emerging adulthood, and this is a unique developmental period in a person's life. Given the high rate of unintended pregnancies and the associated negative outcomes, increasing the use of more reliable methods of birth control is a public health priority. Long-acting reversible contraception (LARC) are the most effective reversible forms of contraception available. However, the use of LARC among young women is low, with only 5% of those ages 15-24 using this method. Additionally, among women who use LARC, 89% use the IUD and only 11% use the implant. By understanding factors that influence LARC initiation, use of these highly effective methods can be increased and subsequently the rate of unintended pregnancy could be decreased.

Purpose: The purpose of this study was to advance our understanding of key factors in LARC initiation and why women chose one LARC method over another. The objectives were as follows: 1) Determine if interpersonal and intrapersonal differences exist between IUD users and implant users; and 2) Explore how participants chose either the IUD or the implant.

Methods: A mixed method study was conducted among 18-25 year old, nulliparous women who were currently using LARC. Phase I consisted of a quantitative survey administered online to 226 participants. Phase II involved conducting in-depth, semi-structured interviews with a subset of participants (N=30) from Phase I to further explore important factors in LARC initiation. This study was guided by Social Cognitive Theory. Phase I data were analyzed using

MANOVA or chi-square tests, and Phase II interviews were analyzed using the Applied Thematic Analysis approach.

Results: Quantitative results indicated that Hispanic women and participants who were younger were more likely to use the implant compared to the IUD. Women using the IUD more often reported that their friends were influential in their choice compared to implant users. The most common and trusted sources of information for participants was their health care provider or the internet. In the qualitative phase, the majority of women reported that using a previous method of contraception inconsistently (outcome expectations) was an important motivator in considering LARC. They then sought out health information (knowledge) on LARC from their provider and the internet. They also sought — either through their social network and/or social media — to hear the experiences of other women who had used these methods (observational learning). Upon making the decision to use LARC, women then intentionally set a goal of using LARC and used behavioral skills and self-efficacy to overcome barriers and achieve LARC initiation. Most women experienced barriers to LARC insertion, e.g. health insurance issues, health care providers engaging in non-evidence based practice behaviors, and an unusually long delay between the consultation appointment and the insertion appointment. Participants discussed choosing one LARC method over the other due to an aversion to the location of placement, insertion procedure, and/or some other characteristic specific to the implant or IUD.

Conclusion: This study found that key factors in LARC initiation were outcome expectations, reinforcement, knowledge, observational learning, behavioral skills, intentions, self-efficacy, and opportunities and barriers. Targeting these key factors in future interventions can lead to an increase in LARC use among young women, thereby leading to a decrease in unintended pregnancy. Furthermore, addressing policy and practice barriers to LARC initiation will allow women easier access to these highly effective methods, which will also ultimately lead to a decrease in the rate of unintended pregnancy.

CHAPTER 1: INTRODUCTION

Statement of the Problem

Unintended pregnancy is defined as both pregnancies that are mistimed or unwanted (Finer & Zolna, 2016). The United States has the highest rate of unintended pregnancy in the developed world (Peck, 2013). Forty-five percent of all pregnancies in the US are unintended and 42% of these end in abortion (Finer & Zolna, 2016). Unintended pregnancies are associated with negative health outcomes to both the parents and the child. For example, a women who becomes pregnant unintentionally is more likely to engage in high risk behaviors during pregnancy such as smoking and illicit drug use (Gipson, Koenig, & Hindin, 2008). These high risk behaviors in turn can lead to low birth weight and congenital defects in their infants (Gipson et al., 2008). There are also consequences for both parents such as educational hardship, failure to achieve life goals, depression, relationship conflict, and poor relationship quality (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009b). Additionally, there is a societal cost with government expenditures for unintended pregnancy totaling $21 billion each year (Sonfield & Kost, 2015)**.**

Among sexually active women, 18 to 25 year olds have the highest rate of unintended pregnancy (Finer & Zolna, 2016), indicating the need for targeted interventions in this group. This age group is termed emerging adulthood and this is a unique developmental period in a person's life. According to Arnett (2006), emerging adulthood is characterized by the following five features: identity exploration, instability, self-focus, a feeling of being in-between two life stages, and feeling optimistic about the future. Research has shown that emerging adults have many of the same risk factors as adolescents younger than 18 years of age (Arnett, 2000; Society for Adolescent Health and Medicine, 2017), but unlike adolescents they do not have the same level of parental supervision.

Given the high rate of unintended pregnancies and the associated negative outcomes, increasing the use of more reliable methods of birth control is a public health priority. The most common form of contraception used among all women ages 15-24 is the oral contraceptive pill with a prevalence of 22.4% (Daniels, Daugherty, & Jones, 2014). However, the typical failure rate of the pill is 9% (Guttmacher Institute, 2014). The most effective reversible contraception is long-acting reversible contraception (LARC). The two types of LARC are the intrauterine device (IUD) and the contraceptive implant. The IUD is a small, T-shaped device that a health care provider inserts into a woman's uterus to prevent pregnancy. The five brands of IUDs are: Mirena, approved for 5 years; Liletta, approved for 3 years; Kyleena, approved for 5 years; Skyla, approved for 3 years; and ParaGard, approved for 10 years (U.S. FDA, 2017). ParaGard is a copper IUD and does not release any hormones. Mirena, Liletta, Kyleena, and Skyla are hormonal IUDs that release small amounts of progestin. All IUDs have failure rates ranging from 0.2% to 0.8% (Guttmacher Institute, 2014). The other type of LARC is the contraceptive implant which is sold under the brand name Nexplanon. Nexplanon is a matchstick-sized rod that is inserted subdermally in the upper arm. It prevents pregnancy by releasing the hormone etonogesterel, is effective for up to three years, and has a failure rate of 0.05% (Planned Parenthood, 2014).

LARC are highly effective and the side effects are no more severe than oral contraceptives; however, the use of LARC among young women is low, with only 5% of those ages 15-24 using this method (Daniels et al., 2014). The history of these methods is partly responsible for the current low prevalence rates. During the 1970s, an IUD called the Dalkon Shield was widely distributed (Thiery, 2000). It had a flawed design that increased a user's risk of Pelvic Inflammatory Disease (PID), infertility, and death (Briggs, 1975). The birth control implant also has a controversial history. Shortly after it was introduced, legislation was passed in several states to condition welfare payments on implant use (Davidson & Kalmuss, 1997).

This led to both a public outcry and concern from public health and women's advocate groups (Steinbock, 1995).

By the late 1990s, these controversies led to a LARC use rate of 1% (Hubacher, Finer, & Espey, 2011). However, since then there has been a steady increase in the prevalence of these methods. This is partly due to safer and more effective LARC being made available (U.S. FDA, 2017) and numerous research studies supporting the claim that IUDs are safe and effective as summarized by Hubacher (2002). This research and the perpetually high rate of unintended pregnancy moved the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) to revise their practice guidelines. ACOG and AAP both recommend that LARC should be the first-line recommendation for young and/or nulliparous women (AAP, 2014; ACOG, 2012).

Although use of LARC has increased recently, its prevalence is still low compared to other methods of birth control. Additionally, among women who use LARC, 89% use the IUD and only 11% use the implant (Guttmacher Institute, 2016). It is not completely understood as to why the prevalence of LARC remains low, and it is unknown why there is a disparity in prevalence rates between the IUD and the implant.

A systematic review was conducted to determine the role of the four types of interpersonal influence (i.e. peers, parents/family, partners, and health care providers), on initiating LARC among women ages 18-25, and several gaps in the literature were found (Mahony, Logan, Thompson, & Daley, unpublished). One finding was that no study has examined all four types of interpersonal influence, and no research has studied partner influence. A recent position statement from the Society for Adolescent Health and Medicine (SAHM) recommends that adolescent and young adult males be taken into consideration when conducting sexual and reproductive health research (Society for Adolescent Health and Medicine, 2018). Additionally, interpersonal relationships are important in that they provide opportunities for observational learning and social support (Bandura, 1986). Our interpersonal

relationships may provide opportunities or barriers to achieving a behavior and they shape our normative beliefs (Bandura, 1986). Other gaps identified are that very little is known about women who use the implant and there is a lack of research that focuses specifically on women who use LARC. Finally, only one study has investigated differences between women who use the IUD versus the implant (Cohen, Sheeder, Kane, & Teal, 2017).

Statement of Need

This dissertation is novel in the following ways. One prior study examined differences between women who use the IUD compared to those who use the implant (Cohen, et al., 2017); however, in that study limited interpersonal level data were collected. In this dissertation, data was collected on all four types of interpersonal influence. This dissertation study focused exclusively on women who have experience with LARC and answered important research questions. One of the most significant contributions to the literature is that much needed information was gathered regarding women who use the implant.

Public Health Significance

This study increased our understanding of why women use LARC and forms the foundation for future research and interventions to improve rates of LARC use. Additionally, this research is significant to public health because it addressed several national research priorities. A goal of Healthy People 2020 is to "Improve pregnancy planning and spacing, and prevent unintended pregnancy," and several objectives within this goal are in regards to increasing LARC use and decreasing unintended pregnancy among young women and adolescents (U.S. Department of Health and Human Services, 2017b). Specifically, the Healthy People 2020 Objectives that this research addressed are as follows:

1. Increase the proportion of pregnancies that are intended.
   a. This study was related to this objective because when women use a highly effective method of contraception they are less likely to have an unintended pregnancy.

2. Reduce the proportion of females experiencing pregnancy despite use of a reversible contraceptive method.

    a. This study was related to this objective because LARC are the most effective form of reversible contraception. Therefore, the likelihood a woman would become pregnant while using LARC is minimal.

3. Reduce pregnancies among adolescent females aged 18 to 19 years old.

    a. This study included women ages 18-25 years old. Understanding barriers and facilitators to LARC use can lead to a reduction in pregnancies within this age group.

4. Increase the percentage of women aged 15-44 years that adopt or continue use of the most effective or moderately effective methods of contraception.

    a. LARC are the most effective methods of reversible contraception. The goal of this study was to understand why women adopt LARC.

Furthermore, a recent position statement from SAHM highlighted the importance of those age 18-25 which it refers to as young adulthood. It states, "Young adulthood is a unique and critical time of development where unmet health needs and health disparities are high" (Society for Adolescent Health and Medicine, 2017, p. 759). The position statement also recommends, "Research to inform specific policies and recommendations for promoting the health and well-being of young adults should be a priority" (Society for Adolescent Health and Medicine, 2017, p. 759). Another SAHM position statement recommends considering adolescent and young adult males in sexual and reproductive health research (Society for Adolescent Health and Medicine, 2018). This study answered these SAHM calls to action by including women ages 18 to 25 and examining the role of their male partner in choosing LARC. In another position statement from SAHM, they echo recommendations made by ACOG and AAP that LARC should be the first-line method for pregnancy prevention among adolescents and young adults (Society for Adolescent Health and Medicine, 2014). Finally, this research

supports the National Institutes of Health, Office of Women's Health Strategic Plan 2020 by providing information on ways to promote effective methods of pregnancy prevention among adolescents (National Institutes of Health Office of Research on Women's Health, 2010) .

Purpose

This study explored how participants chose LARC and what led participants to choose one LARC method over the other. The intermediate-goal of this research is to use the findings reported here to develop a LARC-specific survey instrument and as a basis for future research on expanding access to LARC. A LARC-specific survey instrument would be a valuable addition to the field of public health. The long-term goal of this research is to increase the number of young adult women using LARC thereby decreasing the number of unintended pregnancies.

Specific Aims and Research Questions

The short-term goal was achieved through the following specific aims and research questions (See Table 1).

Aim 1 Significance. Among all women who use LARC, 89% use the IUD and 11% use the implant (Guttmacher Institute, 2016; Kavanaugh, Jerman, & Finer, 2015). It is unknown why this disparity exists. One approach to increase LARC use — and consequently decrease unintended pregnancy — would be to increase the prevalence of both LARC methods. It was hypothesized that some women many not desire the IUD. For this group, the implant may be the better option. By understanding what differences exist between women who use the IUD compared to the implant, we can use these modifiable factors to inform future interventions.

Table 1. Specific Aims and Research Questions

Specific Aims	Research Questions	Study Phase
1. Determine if interpersonal and intrapersonal differences exist between IUD users and implant users	1. Do interpersonal level factors such as observational learning, social support, normative beliefs, and opportunities and barriers differ between IUD users and implant users? 2. Do intrapersonal level factors such as self-efficacy, outcome expectations, and knowledge differ between IUD users and implant users?	Phase I: Quantitative, Primary Data Collection[a]
2. Explore how participants chose either the IUD or the implant.	3. What do women perceive as the key factors that contributed to their LARC initiation? 4. In what ways do interpersonal level factors such as observational learning, social support, and opportunities and barriers differ between IUD users and implant users? 5. In what ways do intrapersonal level factors such as intentions, knowledge, outcome expectations, behavioral skills, and self-efficacy differ between IUD users and implant users?	Phase II: Qualitative Interviews[b]

[a] See Table 6 for a description of survey items and related Social Cognitive Theory constructs.
[b] See Appendix D for a description of interview questions and related Social Cognitive Theory constructs.

Aim 2 Significance. Many gaps exist in our understanding of why women choose LARC. This is a nascent topic in public health research. Therefore, a mixed methods study was deemed the best approach to fully explore this topic and answer important research questions. The findings from Phase II provide a more complete picture as to what factors are important to a woman's choice to use LARC. Additionally, very little is known about women who use the implant and what factors contribute to their choice. In conjunction with the findings from Phase I, the results from Phase II further inform future interventions.

Overview of the Study

To answer the proposed research questions, a cross-sectional, mixed methods sequential explanatory design was conducted (Creswell & Plano Clark, 2007). In Phase I, a

quantitative survey was administered followed by semi-structured, in-depth interviews (Phase II). By using this study design, Phase II was used to elaborate and build upon the findings from Phase I.

Definition of Key Terms

LARC – Long-acting reversible contraception

Unintended Pregnancy – A pregnancy that is mistimed or unwanted at the time of conception.

Emerging Adulthood – A developmental period spanning from 18 years old to 25 years old that possess unique characteristics.

IUD – Intrauterine Device

Implant – A single, match-stick sized rod that is inserted into the upper arm to prevent pregnancy.

ACOG – American College of Obstetricians and Gynecologists

AAP – American Academy of Pediatrics

SAHM – Society for Adolescent Health and Medicine

SCT – Social Cognitive Theory

Health Care Provider – Referring to any person who prescribed LARC to a woman. This includes, but is not limited to the following: OB/GYN, Nurse Practitioner, Family Physician, Primary Care Doctor, etc.

CHAPTER 2: LITERATURE REVIEW

Unintended Pregnancy

The incidence of unintended pregnancy is one of the most important health status

indicators in the field of sexual and reproductive health (Finer & Henshaw, 2006). Every year in

the U.S., 45% of pregnancies are unintended (Finer & Zolna, 2016). Although there has been a

recent decrease from 51% in 2008 (Finer & Zolna, 2016), rates in the U.S. continue to be much

higher compared to other developed countries such as those in Western Europe (Sedgh, Singh,

& Hussain, 2014). Unintended pregnancy is defined as both pregnancies that are mistimed (i.e.

the woman wants to become pregnant in the future, but not when she conceived) or unwanted

(i.e. a woman does not want to become pregnant at the time of conception or in the future)

(Finer & Zolna, 2016). This rate of unintended pregnancy varies by state from a low of 36% in

Utah to a high of 62% in Mississippi (Kost, 2015). Overall, unintended pregnancy rates are

higher in the South, the Southwest, and in densely populated states such as Delaware,

Maryland, New Jersey, and New York (Kost, 2015). Florida's unintended pregnancy rate is

higher than the national average at 59% (Kost, 2015).

Disparities in the rate of unintended pregnancy exist across demographic groups.

Among all women ages 15-44, 45 pregnancies per 1000 women are unintended (Finer & Zolna,

2016). When looking at the rate of unintended pregnancy by race and ethnicity, non-Hispanic

white women have the lowest rate of unintended pregnancy (33 per 1000) followed by Hispanic

women (58 per 1000) (Finer & Zolna, 2016). Non-Hispanic black women have the highest rate

of unintended pregnancy with 79 pregnancies per 1000 women (Finer & Zolna, 2016).

Differences in unintended pregnancy rates also exist by income. For women below the poverty

threshold, the rate of unintended pregnancy is 112 per 1000 compared to women 200% above

the poverty threshold at 26 per 1000 (Finer & Zolna, 2016). There are also disparities by

relationship status with women who are cohabitating — but not married — having the highest rate of unintended pregnancy at 141 per 1000 (Finer & Zolna, 2016). In comparison, women who are not married and not cohabitating have an unintended pregnancy rate of 36 per 1000 (Finer & Zolna, 2016). Stark disparities exist by age. Women 18-19 years of age have an unintended pregnancy rate of 71 per 1000, and women ages 20-24 have an unintended pregnancy rate of 81 per 1000 (Finer & Zolna, 2016). Additionally, women ages 25-29 have a rate of 66 per 1000 (Finer & Zolna, 2016). These three age groups have the highest rates of unintended pregnancy compared to any other age group including those 15-17 years of age (20 per 1000) (Finer & Zolner, 2016).

Since the 1970s, the following changes have occurred in regards to behavior that impacts a woman's sexual and reproductive health: a decrease in the age of first sex from 19 to 17.8 years old; an increase in age of first marriage to 26.5 years old; the number of cohabitating adults has increased; and the age of first birth has increased to 27 years (Finer & Philbin, 2014). The time between first sex and first childbearing has lengthened over the last 50 years (Finer & Philbin, 2014). Additionally, the majority of women consider two children to be the optimal family size which translates to women, on average, spending 3 years either pregnant, postpartum, or trying to become pregnant (Sonfield, Hasstedt, & Gold, 2014). This leaves nearly three decades of a woman's life where she is trying to avoid an unintended pregnancy (Sonfield et al., 2014). Although LARC use has increased recently, it has not kept pace with these recent major shifts.

Consequences of unintended pregnancy. There are many potential negative outcomes of unintended pregnancy for both the parents and the child. Compared to women with planned pregnancies, those with unplanned pregnancies are more likely to consume inadequate folic acid before and during pregnancy (Cheng, Schwarz, Douglas, & Horon, 2009; K. D. Rosenberg, Gelow, & Sandoval, 2003); to smoke during pregnancy and postpartum (Cheng et al., 2009; Joyce, Kaestner, & Korenman, 2000; Kost, Landry, & Darroch, 1998b); and to develop postpartum depression (Cheng et al., 2009). Postpartum depression may result in decreased

interaction between mother and infant (Murray, Fiori-Cowley, Hooper, & Cooper, 1996).

Women with unintended pregnancies are less likely to initiate prenatal care during their first

trimester and less likely to breastfeed for more than 8 weeks (Cheng et al., 2009; Kost, Landry,

& Darroch, 1998a). These findings persisted after controlling for sociodemographic factors.

Such high risk behaviors can lead to low birth weight, preterm birth, and congenital defects that

can impact cognitive and behavioral outcomes across the lifespan (The National Campaign to

Prevent Teen and Unplanned Pregnancy, 2009b). Specifically, children born as a result of an

unintended pregnancy score lower on tests of verbal and cognitive development compared to

children resulting from a planned pregnancy (The National Campaign to Prevent Teen and

Unplanned Pregnancy, 2009b). Additionally, they are at a greater risk for child abuse and

neglect (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2008).

Consequences of unplanned pregnancy for both mothers and fathers includes educational

hardship, failure to achieve education and career goals, depression, relationship conflict, and

poor relationship quality (Sonfield, Hasstedt, Kavanaugh, & Anderson, 2013; The National

Campaign to Prevent Teen and Unplanned Pregnancy, 2009b). Furthermore, 42% of all

unintended pregnancies end in abortion (Finer & Zolna, 2016).

There is also a societal cost to unintended pregnancy. Sixty-eight percent of unintended

births are funded by public insurance programs compared to 38% of planned births (Sonfield &

Kost, 2015). Taking into account prenatal care, labor and delivery, postpartum care, and 12

months of infant care, a publicly funded birth costs on average $12,770 (Sonfield & Kost, 2015).

Using data from 2010, Sonfield and Kost (2015), estimated that government expenditures

nationwide on unintended pregnancies was $21 billion. If all unintended pregnancies were

avoided, it is estimated that there would a potential savings of $15.5 billion per year (Sonfield &

Kost, 2015). This is less than the total annual cost of unintended pregnancies due to the fact

that some births would be publicly funded even if every woman is able to time her pregnancy

perfectly (Sonfield & Kost, 2015). These consequences disproportionately affect those age 18-

25 who have the highest rate of unintended pregnancy. This period of life has been termed

"emerging adulthood," and it is a unique and understudied developmental period in a person's

life.

Emerging Adulthood

Over the last 50 years, population-level shifts in cultural attitudes and behaviors, such as

an increase in postsecondary education and delays in marriage and childbearing, have caused

the late teens and early twenties to become more than just a short period of transition into

adulthood (Arnett, 2000; Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Emerging

adulthood is characterized by an opportunity to explore a variety of different possibilities in love,

work, and worldviews (Arnett, 2000). For those emerging adults who want to have a variety of

romantic and sexual experiences, this time period is optimal because parental surveillance is

greatly diminished, but there is little societal pressure to become married (Arnett, 2000).

Important milestones occur such as leaving home and there is a greater autonomy in decision-

making (Nelson et al., 2008). Many adult commitments and responsibilities are delayed, yet the

experimentation that began in adolescence continues and may intensify (Arnett, 2000). During

this time, emerging adults continue to separate from their family and to form even closer

relationships with their peers (Arnett, 2000; Helgeson et al., 2014). Parents may no longer be a

constant in their lives if they move away from home; however, parents, still have some influence

on behavior during this time (Helgeson et al., 2014). This leads to a change in an emerging

adult's support system and a shift in interpersonal influences (Nelson et al., 2008). As the

emerging adult becomes more independent, social network influences begin to evolve and may

have different roles compared to those younger than 18 (Nelson et al., 2008).

Another aspect unique to this age group is the biological development of the brain.

Studies have shown that brain development is not complete until the mid to late 20s (Bennett &

Baird, 2006; Luna, Padmanabhan, & O'Hearn, 2010; Mills, Goddings, Clasen, Giedd, &

Blakemore, 2014). For example, the connections between the emotional and motor areas of the

prefrontal cortex are not complete until the late 20s (Luna et al., 2010; Mills et al., 2014). Bennett and Baird (2006) concluded from brain scans of those 18 to 20 years old that significant age-related changes in brain structure continue after 18 years of age. These changes can also be affected by new environmental challenges such as moving away from home or starting a new job or school. This research indicates that as a person moves from adolescence into emerging adulthood they may still have a deficit when it comes to decision making and complex cognitive behavior. But, unlike adolescents, they now have little to no parental supervision.

Although emerging adults are at greater risk for several different negative health outcomes compared to those immediately younger or older, there is an absence of research on this age group (Arnett, 2000; Society for Adolescent Health and Medicine, 2017). Due to the high risk of unintended pregnancy and the potential societal and individual consequences, it is important that young adult women have access to the most effective forms of contraception.

LARC Definition

Long-acting reversible contraception (LARC), such as the intrauterine device (IUD) and the birth control implant, are highly effective at preventing pregnancy with fewer than 1 in 100 women becoming pregnant during the first year (Trussell, 2011). This effectiveness rate is similar to sterilization. LARC are the most effective methods of reversible contraception available.

The IUD is a small, T-shaped device and there are two types: hormonal and copper. Both IUDs prevent fertilization of the egg by sperm. Additionally, the hormonal IUD releases progestin which thickens cervical mucus thereby making it more difficult for sperm to enter the uterus (ACOG, 2016). Hormonal IUDs are marketed under five different brands with varying length of effectiveness: Mirena, approved for 5 years; Liletta, approved for 3 years; Kyleena, approved for 5 years; and Skyla, approved for 3 years (U.S. FDA, 2017). The most common side effects are changes in menstrual bleeding pattern, amenorrhea, pelvic pain, and ovarian cysts (U.S. FDA, 2017). The copper IUD is marketed under the brand name ParaGard and is

approved for 10 years of use (U.S. FDA, 2017). ParaGard prevents pregnancy by interfering

with sperm mobility and preventing implantation (U.S. FDA, 2017). The most common side

effects are heavier and longer periods (U.S. FDA, 2017). The other type of LARC method is the

birth control implant which is marketed under the brand name Nexplanon. Nexplanon consist of

a single, match-stick sized rod that is inserted in the upper arm. It works by preventing ovulation

and it thickens the cervical mucus (U.S. FDA, 2017). Nexplanon is effective for up to 3 years,

and the most common side effects are changes in menstrual bleeding pattern, headache,

vaginitis, weight gain, acne, breast pain, abdominal pain, and pharyngitis (U.S. FDA, 2017).

History of LARC

These LARC methods that are currently available on the market are very different from

past LARC methods. The first IUD was invented in 1920 and consisted of metal rings (Thiery,

2000); however, the modern day plastic IUDs were developed in 1960 (Thiery, 2000). These

first plastic IUDs had various shapes including spiral and trapezoid. The infamous Dalkon Shield

was among these new plastic IUDs, and it became available in the U.S. in 1971 (Thiery, 2000).

The year before the Dalkon Shield became available, U.S. Senate hearings on the safety of oral

contraceptive pills caused many women to switch from the pill to the Dalkon Shield (Hubacher

et al., 2011). However, the fact that IUDs can increase the risk of pelvic inflammatory disease

(PID) among women with a sexually transmitted infection was not emphasized in

advertisements and publications for the Dalkon Shield (Hubacher, 2002). Additionally, the

Dalkon Shield had a flawed design that increased the risk of PID, infertility, and in some cases

death (Briggs, 1975). Its most serious design flaw was the "strings". Unlike other IUDs, the

strings on the Dalkon Shield were a multifilament composed of hundreds of small nylon strands

encased in a nylon sheath (Sobol, 1991). These strings would hang into the vagina. The nylon

sheath was not sealed at the ends and this allowed bacteria-filled fluid from the vagina to wick

up the nylon strand into the uterus (Sobol, 1991). After intense pressure from the U.S. Food and

Drug Administration (FDA), the manufacturer (A.H. Robins Company) stopped the sale of the

Dalkon Shield in 1974 after 4 million had been used (Thiery, 2000). Also in 1974, the first T-shaped, copper-bearing device (Gravigard) became available, and a hormonal, T-shaped IUD (Progestasert System) soon followed (Thiery, 2000).

Although these new T-Shaped devices did not cause high rates of PID, the damage to the IUD's reputation had been done. Following the discontinuation of the Dalkon Shield, thousands of lawsuits were filed against the manufacturer (Sobol, 1991). Litigation continued into the 1980s and eventually caused the manufacturer to become bankrupt (Sobol, 1991). Due to these events, gynecologists and the general public developed strong negative opinions about the IUD and use plummeted from 10% of women in the 1970s to less than 1% by the late 1990s (Hubacher, 2002).

The other type of LARC, the birth control implant, has its own checkered history. Norplant was the first implant to receive FDA approval in 1990, and it was quickly added to Medicaid programs (Steinbock, 1995). Unlike the modern day birth control implant (Nexplanon), Norplant consisted of six matchstick-sized silicon capsules. Similar to Nexplanon, Norplant was inserted in a woman's upper arm. Two days after FDA approval, an editorial in the Philadelphia Inquirer proposed the idea that Norplant be offered to poor women in exchange for increased welfare benefits (Davidson & Kalmuss, 1997). Additionally, legislators in more than a dozen states introduced bills that would have conditioned welfare payments on Norplant use or encouraged welfare recipients to use Norplant through financial incentives (Davidson & Kalmuss, 1997; Steinbock, 1995). Finally, there were reports that women convicted of child abuse were given a choice of either jail time or Norplant insertion (Davidson & Kalmuss, 1997). These events led to negative public opinion and concern from public health groups and women's advocates that Norplant was being used as a form of social control over low income women (Steinbock, 1995).

Furthermore, inserting and removing the six silicon rods was often difficult for health care providers and painful for users. Hundreds of lawsuits were filed against the manufacturer of

Norplant beginning in 1994 alleging that the plaintiffs were victims of botched insertion or removal and that they had not been properly informed of side effects (Johansson, 2000; Roan, 2002). Although the manufacturer was not found liable, the damage to Norplant's image had been done and use plummeted (Johansson, 2000). Norplant was discontinued in 2002 (Roan, 2002) and no implant was commercially available in the U.S. until 2006. The new birth control implant, Implanon, consisted of an easier to insert and remove single rod system that was effective for up to 3 years (U.S. FDA, 2017). A rare adverse event was reported where the implant would migrate to another part of the body (Vidin, Garbin, Rodriguez, Favre, & Bettahar-Lebugle, 2007). The manufacturer, Organon (owned by Merck), addressed this problem by developing Nexplanon in 2011 (U.S. FDA, 2017). Nexplanon is radiopaque, which allows it to be easily located within a woman's body, and the insertion applicator is easier to use.

New LARC Methods and Changing Opinions

These aforementioned events involving the IUD and the birth control implant were heavily publicized by the media, and subsequently affected government policy, health care provider's recommendations and opinions, and attitudes and beliefs of the general public. By the end of the 1990s, use of LARC by women in the U.S. was at 1% (Hubacher et al., 2011; Johansson, 2000). There has been a steady increase is use since the early 2000s. This has been due to a safer and more effective IUD, Mirena, becoming commercially available in 2000 (U.S. FDA, 2017). Specifically, there have been numerous studies published in the late 1980s through the early 2000s that dispelled misperceptions about modern IUD-related risks of PID and infertility (Alvarez et al., 1988; Andersson, Odlind, & Rybo, 1994; Farley, Rosenberg, Rowe, Chen, & Meirik, 1992; Hubacher, Lara-Ricalde, Taylor, Guerra-Infante, & Guzman-Rodriguez, 2001; Kadanali, Varoglu, Komec, & Uslu, 2001; Meirik, Farley, & Sivin, 2001; Shelton, 2001; Sinei, Morrison, Sekadde-Kigondu, Allen, & Kokonya, 1998; Sivin et al., 1991; UNDP, UNFPA, & WHO, 1997; Walsh et al., 1998; WHO, 1987; Wilcox, Weinberg, Armstrong, & Canfield, 1987; Wilson, 1989). In summary, these studies proved the following:

- the IUD is safe and effective at preventing pregnancy;

- copper IUDs are as safe as hormonal IUDs;

- IUDs do not increase the risk of tubal infertility;

- careful screening practices can eliminate insertion-related PID;

- the risk of PID is only increased during the first 20 days after insertion and then returns to baseline risk;

- the risk of PID is more associated with the insertion process rather than the IUD itself; and

- the hormonal IUD may even lower the risk of PID by thickening the cervical mucus and thinning the endometrium.

Further evidence that IUDs are safe comes from a recent systematic review and meta-analysis that found women who use an IUD experienced a statistically significant reduced likelihood of developing cervical cancer (Cortessis et al., 2017). The study authors state this finding remained after accounting for confounding and publication bias.

Another reason IUD prevalence has increased is the use of the copper IUD as emergency contraception. The copper IUD is the most effective method of emergency contraception with only 1 out of 1000 women becoming pregnant using this method (U.S. Department of Health and Human Services, 2017a). It can be inserted up to 5 days after unprotected intercourse to prevent pregnancy and lasts for 10 years (Cleland, Raymond, Westley, & Trussell, 2014). The exact mechanism of action is unknown, but the copper IUD is believed to inhibit sperm function, impair the transport of a fertilized egg, and to inhibit implantation (Cleland et al., 2014).

In regards to the birth control implant, increase in use has been partly due to the availability of an easier to insert/remove birth control implant with an improved side effects profile, Nexplanon (U.S. FDA, 2017). As stated previously, the controversy surrounding Norplant

was that legislators tried to force low-income women to use this method. The safety of the

implant was never found to be a problem. Accordingly, there was not the same burden of proof

on the scientific community to demonstrate that the implant is safe. This makes the disparity in

prevalence rates between the IUD (89%) versus the implant (11%) all the more puzzling.

This scientific evidence plus the persistently high unintended pregnancy rate among

adolescents and young adults created the momentum for ACOG to update their guidelines in

October 2012. The updated guidelines state that the IUD and the implant are safe and effective

for adolescents and/or nulliparous women and should be first-line recommendations (ACOG,

2012). In 2014, AAP updated their guidelines to take a similar position as ACOG (AAP, 2014).

The effect of these revised guidelines was seen very quickly as pharmaceutical companies have

brought to market three new IUDs approved for use in young and/or nulliparous women since

2013: Skyla (approved in 2013), Liletta (approved in 2015), and Kyleena (approved in 2016).

Acceptance and Use of LARC

Although there has been a steady increase in the prevalence of LARC use among U.S.

women, it is still low in comparison to other developed countries. For example, in France, 15%

of women use a LARC method and, in the United Kingdom, 10% of women use LARC (Cibula,

2008). In comparison, among all women in the U.S., only 7.2% use a LARC method (Branum &

Jones, 2015). This is a five-fold increase from 2002 when just 1.5% of women used LARC

(Branum & Jones, 2015). Data from 2006-2010 indicate that there was an 83% increase in IUD

use (3.5% to 6.4%) and a 300% increase in implant use (0.3% to 0.8%) (Branum & Jones,

2015). Among women who use LARC, 89% use the IUD and 11% use the implant (Guttmacher,

2016). It is not understood why there is a disparity in prevalence rates between the IUD and the

implant.

Demographic differences in contraceptive use. Use of LARC differ among various

demographic groups. Using data from the 2011-2013 National Survey of Family Growth

(NSFG), Daniels et al. (2014) found that Hispanic women use LARC the most at 9%, followed

by non-Hispanic white women (7%), and non-Hispanic black women (5%). Compared to the 2006-2010 NSFG, this is an increase of 129% among Hispanic women, 128% among non-Hispanic white women, and 30% for non-Hispanic black women (Daniels et al., 2014). There is not a significant variation in LARC use by education with prevalence rates from 7.9% (no high school diploma) to 9.5% (some college, no bachelor's degree) (Daniels et al., 2014). Among sexually active women who are currently in college, 6% reported using the birth control implant and 13% used the IUD at last intercourse (American College Health Association, 2017). It should be noted that this sample includes women older than age 25 (American College Health Association, 2017).

Significant disparities exist by age. Younger women, who are most at risk for unintended pregnancy, have the lowest prevalence rate. Only 5% of all 15-24 year olds use LARC (Branum & Jones, 2015). This is a two-fold increase from the 2006-2010 NSFG when LARC use among this age group was 2.3% (Branum & Jones, 2015). Peak usage is for women ages 25-34 who have a LARC prevalence rate of 11% (Branum & Jones, 2015). Despite updated guidelines recommending LARC as a good choice for nulliparous women, those who have had at least one child use LARC at significantly higher rates. LARC use is three times higher among parous (11%) compared to nulliparous women (2.8%) (Branum & Jones, 2015).

These prevalence rates differ in comparison to other forms of contraception. Among all women ages 15-44, the most common methods are the oral contraceptive pill (OCPs) (16%), female sterilization (15.5%), and condoms (9.4%) (Daniels et al., 2014). Only 4.4% of women in total use injectable contraception, the contraceptive ring, or the contraceptive patch (Daniels et al., 2014). The OCP is the most common method of contraception for all women ages 15-24 with 22.4% using this method, followed by condoms (10.1%), and LARC (5%) (Daniels et al., 2014). Among all age groups, female sterilization is most common among non-Hispanic black women (21.3%), followed by Hispanic women (18.8%), and non-Hispanic white women (14%) (Daniels et al., 2014). In contrast, non-Hispanic white women use the pill most frequently (19%),

followed by Hispanic women (10.9%), and non-Hispanic black women (9.8%) (Daniels et al., 2014). Condom use is similar across race/ethnicity categories ranging from 8.6% for Hispanic women to 9.4% for non-Hispanic black women (Daniels et al., 2014). There is significant differences among women of different educational groups in regards to most common contraceptive method used. Women with no high school diploma use sterilization (33%) much more frequently compared to women with a bachelor's degree or higher (10.3%) (Daniels et al., 2014). In contrast, women with a bachelor's degree or higher are much more likely to use the pill (21.5%) than sterilization (3.6%) (Daniels et al., 2014). Rates of condom use by education status does not vary significantly.

Discontinuation and failure rates. The two most common methods of birth control used by young adult women are OCPs and condoms, which have high typical use failure rates as well as higher discontinuation rates compared to LARC. Typical use failure rates for OCP and condoms is 9% and 18%, respectively (CDC, 2017). In one study, women who used OCP, the contraceptive patch, or the contraceptive ring were 22 times more at risk for unintended pregnancy compared to women using LARC (Winner et al., 2012). However, typical use failure rates are higher for some groups due to poor adherence. For example, OCP users ages 20-29 had a 67% greater risk of contraceptive failure compared to women older than 30 (Kost, Singh, Vaughan, Trussell, & Bankole, 2008). Furthermore, women younger than age 20 were twice as likely to experience failure compared to those older than 30 (Kost et al., 2008). This pattern is seen again with condom use with those younger than 30 years old more likely to experience failure than those over the age of 30 (Kost et al., 2008). In comparison, failure rates for LARC range from 0.05% for the implant to 0.2% and 0.8% for the hormonal IUD and the copper IUD, respectively (CDC, 2017). These methods are user independent so adherence is not an issue.

Discontinuation rates of OCPs and condoms are significantly higher compared to LARC. In a study of 4,000 women ages 14-45, Peipert and colleagues (2011) found that the 1-year continuation rate for LARC methods was 86% compared to 55% for OCP users. In another

study, 6-month continuation for OCP was found to be as low as 29% (Gilliam et al., 2010).

Research has showed that OCP users will often switch to another, less effective method such

as condoms or they will not initiate a new method at all (Rosenberg & Waugh, 1998). Condoms

also suffer from high rates of inconsistent use and discontinuation (Braun, 2013; Mullinax et al.,

2017). This leads to an increase risk of unintended pregnancy. In nearly half of unintended

pregnancies, contraception was used during the month of conception (Trussell, 2007). Given

the high use of less effective methods and the higher discontinuation rates of these methods,

this a major contributing factor to the high rate of unintended pregnancy in the U.S. Additionally,

many factors can either facilitate or create barriers to a young woman using LARC.

Social and Ecological Determinants of LARC Use

Many studies focus on only one or two ecological factors even though to improve health

we must acknowledge the role of biology, behavior, and socioenvironmental domains (Institute

of Medicine, 2003). The five hierarchical and interconnected socio-ecological levels are

intrapersonal, interpersonal, organizational, community, and social/policy (Institute of Medicine,

2003). The intrapersonal level consists of the characteristics of the individual such as

demographics, knowledge, attitudes, and behavior (McLeroy, Bibeau, Steckler, & Glanz, 1988).

Intrapersonal Level. Research has shown that many women have little and/or incorrect

knowledge in regards to the likelihood that they can become pregnant. Additionally, studies

have demonstrated that many women are uninformed on the efficacy and safety of various

contraceptive methods. For example, the 2009 National Survey of Reproductive and

Contraceptive Knowledge was a nationally representative survey that focused on the attitudes

and behavior of unmarried young adults (ages 18-29) towards pregnancy planning and

contraception. Among participants in this sample, 56% and 25% had never heard of the implant

or the IUD, respectively (Kaye, Suellentrop, & Sloup, 2009). In comparison, 98% were aware of

the OCP (Kaye et al., 2009). In this same population, knowledge of LARC was found to be

associated with use. Respondents who had high IUD knowledge were six times more likely to

be current LARC users (Dempsey, Billingsley, Savage, & Korte, 2012). In regards to the likelihood of becoming pregnant, 59% women in this study believed — without cause — that it was somewhat likely that they were infertile (Kaye et al., 2009). In fact, available data indicates that among women ages 15-29 about 8% have impaired fecundity (Kaye et al., 2009).

For those who had heard of the implant or the IUD, many had misperceptions regarding the safety of these methods. Twenty-seven percent of women believed that using a hormonal method of contraception for long periods of time would lead to serious health problems like cancer (Kaye, et al., 2009). Thirty percent thought that an IUD would cause an infection (Kaye et al., 2009). Other misperceptions about IUDs were as follows: 46% believed that they can move around inside a woman's body; 40% believed that a woman must undergo surgery to have an IUD placed; and 24% believed that LARC methods cannot be discontinued early (Kaye et al., 2009). Although participants believed that pregnancy should be planned (94% of men and 86% of women), 43% were either using no contraception or inconsistently using contraception (Kaye et al., 2009). These data present a strange confluence of factors. Young adults want to plan a pregnancy, but either do not use contraception or use it inconsistently. Those that are aware of LARC methods have numerous misperceptions about their safety. Finally, they erroneously believe that they are most likely infertile. Taken together, this partly explains the high unintended pregnancy rate for this age group.

Results from several other studies have also found that there is a lack of knowledge and awareness among adolescent and young adult women concerning the IUD and/or implant (Barrett, Soon, Whitaker, Takekawa, & Kaneshiro, 2012; Fleming, Sokoloff, & Raine, 2010; Hall et al., 2016; Hladky, Allsworth, Madden, Secura, & Peipert, 2011; Spies, Askelson, Gelman, & Losch, 2010; Stanwood & Bradley, 2006; Whitaker et al., 2008). In a review of young women's awareness, attitudes, and knowledge of LARC, there was a greater awareness and/or knowledge of the IUD compared to the implant (Teal & Romer, 2013). For example, a study conducted in 2013 at a large mid-western university included nearly 2,000 female students ages

18-22 (Hall et al., 2016). It was found that 79% and 88% reported little or no knowledge of the IUD and the implant, respectively (Hall et al., 2016). This study used a 20-item LARC knowledge scale and "never users" scored the lowest with a mean score of 9.1 (SD=5.7), followed by those that considered LARC but decided against it (mean: 13.4, SD=3.6) (Hall et al., 2016). Current/former LARC users had the highest mean score of 15.2 (SD=2.4) (Hall et al., 2016). In another study of women ages 14-19 conducted in 2009 at the University of Hawaii, 69% had never heard of the IUD (Barrett et al., 2012). For those that were aware of the IUD, a 16-item knowledge questionnaire was administered. The mean number of questions answered correctly was 6.7 (SD=4.3) (Barrett et al., 2012). Due to the misperception surrounding LARC, few women have positive attitudes towards the IUD or implant. In a study of 144 young women ages 14-24, it was found that only 37% of women had a positive attitude towards the IUD (Whitaker et al., 2008).

Pregnancy ambivalence is defined as having "unresolved or contradictory feelings about whether one wants to have a child at a particular moment" (Higgins, Popkin, & Santelli, 2012, p. 236). Pregnancy ambivalence has been strongly association with contraceptive behavior (Bruckner, Martin, & Bearman, 2004; Frost, Singh, & Finer, 2007; Sable & Libbus, 2000; Zabin, 1999). Miller (1986) hypothesized that a woman's use of contraception is influenced by any positive/negative feelings towards pregnancy and any positive/negative feelings towards a certain contraceptive method.

Research on pregnancy ambivalence among adolescents younger than 18 years old found that the greater the ambivalence towards becoming pregnant the less likely to use contraception consistently or to use a LARC method. (Baldwin & Edelman, 2013; Chambers & Rew, 2003; Crosby, Diclemente, Wingood, Davies, & Harrington, 2002; Daley, 2014; Jaccard, Dodge, & Dittus, 2003; Savio Beers & Hollo, 2009). Research on those older than 18 years of age found similar results. In a study conducted on 41 women ages 16-25, researchers found that if a participant had a strong negative attitude towards unintended pregnancy, then she was

more likely to choose a more effective contraceptive method (Free, Ogden, & Lee, 2005). Having a strong, negative attitude towards unintended pregnancy was also linked to having future career, educational, or travel aspirations (Free et al., 2005). In the 2009 National Survey of Reproductive and Contraceptive Knowledge, 52% of young adults were found to be ambivalent towards the timing and circumstances under which they would want to have a baby (Kaye et al., 2009). In this same study, pregnancy ambivalence was associated with being less likely to use contraception, but this finding was only statistically significant for men (Higgins et al., 2012). The authors hypothesized that pregnancy ambivalence would have a different relationship with user-dependent methods such as condoms compared to user-independent methods, i.e. LARC (Higgins et al., 2012). In a qualitative study conducted in 2014 among 50 women ages 18-29, level of pregnancy ambivalence and contraceptive method choice were found to be related (Higgins, 2017). Women with strong intentions to avoid pregnancy were more open to using LARC (Higgins, 2017). In contrast, women who reported being ambivalent about pregnancy were less interested in using LARC (Higgins, 2017).

There is a gap in research as to the knowledge, attitudes, and beliefs of current IUD users towards the implant and vice versa. Research in this area could provide insight into the disparity in prevalence rates between the IUD and the implant. Overall, there is a dearth of information on those in the emerging adulthood category. In the present literature review, it was specifically identified that there is little research on pregnancy ambivalence among women ages 18-25 and how this may affect contraceptive choice.

Interpersonal Level. The interpersonal level consists of the formal and informal social networks such as family, friends, and a person's health care provider (CDC, 2015b; McLeroy et al., 1988). A systematic review was conducted that included women ages 18-25 and examined the role of peers, partners, parents/family, and health care providers on initiating LARC (Mahony et al., unpublished). Twenty-eight articles met inclusion criteria. Some studies had multiple articles published so these 28 articles accounted for 21 unique studies.

Seven articles presented quantitative data only (Baugh & Davis, 2016; R. Cohen et al., 2017; Fleming et al., 2010; Gomez, Hartofelis, Finlayson, & Clark, 2015; Hoopes, Teal, Akers, & Sheeder, 2018; Madden, Mullersman, Omvig, Secura, & Peipert, 2013; A. J. B. Smith, Harney, Singh, & Hurwitz, 2017), 19 articles reported qualitative data only (Anderson, Steinauer, Valente, Koblentz, & Dehlendorf, 2014; Bessett et al., 2015; Blackstock, Mba-Jonas, & Sacajiu, 2010; Brown, Auerswald, Eyre, Deardorff, & Dehlendorf, 2013; Burke, Packer, Spector, & Hubacher, 2018; Downey, Arteaga, Villasenor, & Gomez, 2017; Gomez & Freihart, 2017; Gomez & Wapman, 2017; Hanson, McMahon, Griese, & Kenyon, 2014; Higgins, 2017; Higgins, Kramer, & Ryder, 2016; Higgins, Ryder, Skarda, Koepsel, & Bennett, 2015; Kavanaugh, Frohwirth, Jerman, Popkin, & Ethier, 2013; Melo, Peters, Teal, & Guiahi, 2015; Murphy, Burke, & Haider, 2017; Payne, Sundstrom, & DeMaria, 2016; Rubin, Felsher, Korich, & Jacobs, 2016; Schmidt, James, Curran, Peipert, & Madden, 2015; Sundstrom, Baker-Whitcomb, & DeMaria, 2015), and two articles employed a mixed methods design (Dasari et al., 2016; Levy, Minnis, Lahiff, Schmittdiel, & Dehlendorf, 2015).

In regards to examining LARC by type, one article reported on the implant only (Bessett et al., 2015), 14 articles examined the IUD only (Anderson et al., 2014; Baugh & Davis, 2016; Blackstock et al., 2010; Brown et al., 2013; Fleming et al., 2010; Gomez & Freihart, 2017; Gomez et al., 2015; Hanson et al., 2014; Higgins, 2017; Higgins, Kramer, et al., 2016; Higgins et al., 2015; Payne et al., 2016; Rubin et al., 2016; Schmidt et al., 2015), and eight articles reported on both the IUD and the implant and stratified by LARC type (Dasari et al., 2016; Gibbs et al., 2016; Harper et al., 2015; Hoopes et al., 2018; Levy et al., 2015; Madden et al., 2013; Melo et al., 2015; Murphy et al., 2017). The final five articles included information about the both the IUD and implant, but did not stratify by LARC type (Burke et al., 2018; Downey et al., 2017; Kavanaugh et al., 2013; A. J. B. Smith et al., 2017; Sundstrom et al., 2015). Additionally, seven studies were theory guided with four studies employing the Theory of Planned Behavior (Baugh & Davis, 2016; Blackstock et al., 2010; R. Cohen et al., 2017; Hoopes et al., 2018), two studies

using the Transtheoretical Model (Gomez et al., 2015; Melo et al., 2015), and two studies using

Diffusion of Innovations (Brown et al., 2013; Murphy et al., 2016).

Sixteen articles examined the role of peers in influencing LARC choice (Anderson et al.,

2014; Blackstock et al., 2010; Brown et al., 2013; R. Cohen et al., 2017; Dasari et al., 2016;

Fleming et al., 2010; Gomez & Freihart, 2017; Gomez et al., 2015; Hanson et al., 2014; Higgins

et al., 2015; Hoopes et al., 2018; Levy et al., 2015; Melo et al., 2015; Murphy et al., 2017; Rubin

et al., 2016; Sundstrom et al., 2015). Results on the role of peer influence on choice to use a

LARC method are mixed. In some studies, peer influence was reported to have no effect on

LARC initiation. In other studies, receiving negative information on LARC methods from peers

caused concern. This led participants to do one of three things: 1) reach out to other sources of

information in their social network such as other friends, family, or their health care provider to

either confirm or discredit this negative information; 2) seek out additional information from the

internet to either confirm or discredit this negative information; or 3) abandon pursuit of LARC.

Participants in some studies reported receiving positive information from peers about LARC.

This encouraged participants to continue to pursue this as a method of contraception. In other

studies, pro-LARC information received from peers was either confirmed or discredited by

reaching out to other friends, family members, health care providers, or the internet.

Mixed results were also found with influence from parents or other family members

(N=15) (Anderson et al., 2014; Baugh & Davis, 2016; Bessett et al., 2015; Blackstock et al.,

2010; Brown et al., 2013; Dasari et al., 2016; Fleming et al., 2010; Gomez & Freihart, 2017;

Gomez et al., 2015; Hoopes et al., 2018; Levy et al., 2015; Melo et al., 2015; Murphy et al.,

2017; Rubin et al., 2016; Sundstrom et al., 2015). Sometimes studies reported that information

had been received from family members, but did not specify which family members. In studies

that did specify the family member, it was always a female family member such as a mother or

sister. Influence from parents was almost exclusively negative for two reasons. First, many of

the participants' mothers were exposed to the debacle of the Dalkon Shield either personally or

through media coverage. This caused mothers to have an extremely negative opinion of IUDs and to discourage daughters from using this method. Second, many participants were covered under their parents health insurance at the time of the study. Since their parents would receive an explanation of benefits and/or doctor's bills, participants were concerned that their parents would know about their LARC use. Influence from sisters or other family members (not specified) was mixed. Influence from family members had a similar effect to peer influence. If a woman received negative information regarding LARC from a family member, she would then reach out to other sources to either confirm or discredit it. The negative information may also cause her to abandon pursuit of LARC. Alternatively, positive information served as encouragement to initiate LARC use.

The role of health care providers in LARC initiation was most frequently reported (N=18) (Anderson et al., 2014; Bessett et al., 2015; Blackstock et al., 2010; Brown et al., 2013; Burke et al., 2018; R. Cohen et al., 2017; Dasari et al., 2016; Fleming et al., 2010; Gomez & Freihart, 2017; Gomez et al., 2015; Higgins, 2017; Higgins, Kramer, et al., 2016; Melo et al., 2015; Murphy et al., 2017; Payne et al., 2016; Rubin et al., 2016; A. J. B. Smith et al., 2017; Sundstrom et al., 2015). Participants routinely described bringing information received (positive or negative) from other social network members (peers or family) to their health care provider for further discussion. Health care providers were often considered the final authority on information regarding LARC. In turn, this may have nullified advice received from other sources. Among articles reporting on health care provider influence, many (N=8) reported on data collected before ACOG issued new guidelines on LARC use in October 2012. This resulted in participants in several studies reporting either their provider discouraged LARC use or did not provide information on LARC methods. However, among the 10 articles that reported on data collected after October 2012, a minority of participants in three of the articles reported being told by their health care provider that they were not good candidates for LARC due to their age and/or nulliparity (Rubin et al., 2016; Sundstrom et al., 2015; Higgins, 2017).

No studies were found on the influence of a woman's partner in choosing to initiate

LARC. Only six articles mentioned the woman's partner in any capacity (Anderson et al., 2014

Dasari et al., 2016; Downey, 2017; Sundstrom et al., 2015; Higgins et al., 2015; Rubin et al.,

2016), and all of these studies reported on women who were using the IUD. Four of the articles

stated that a woman's partner had mentioned being able to feel the strings during intercourse;

however, the authors did not report if this had any influence on the participant's attitude towards

her IUD. One article simply stated that a woman's partner was supportive of her decision to use

the IUD. Another article stated that the participant would need to make sure her partner was OK

with her using an IUD before she would initiate this method.

Several gaps were identified. There is a paucity of literature on the role of interpersonal

influences on implant users. Several articles (N=9) did not report on LARC specific research. An

example of this is the article by Levy et al. (2015), that reported on the role of social influence in

choosing a contraceptive method (any method). While interviewing participants, LARC was

mentioned, but it was not the focus of the research. No studies reported on all four types of

interpersonal influence and, as stated previously, no studies could be found on partner

influence. Among articles that reported on family influence (N=15), the majority (N=10) did not

specify which family member was providing the information. Furthermore, many studies

combined different types of influence in their reporting. For example, reporting the effects of

friend influence and family influence as one category, i.e. friend/family influence. Additionally,

the role of friends and family in a young woman's choice to initiate LARC use is not completely

understood. Only one study was found to examine differences between IUD users and implant

users (R. Cohen et al., 2017). However, 93% of participants in this study had no experience with

LARC and the data reported on interpersonal influences was limited. None of the articles that

reported on the results of a quantitative survey used a validated and reliable LARC-specific

survey instrument. Upon further review of the literature, no such instrument could be found.

Authors of the included articles either created their own questions or adapted existing

instruments. However, none reported on the validity and reliability of their survey items. Among all included articles (N=28), less than half (N=11) reported on data collected since ACOG updated their LARC guidelines and even fewer (N=4) since the AAP updated their guidelines. Finally, only eight articles were theory guided.

Among all articles (N=28), 18 included participants that were either current LARC users or using other forms of contraception, e.g. birth control pill, condoms, etc. In seven articles, all participants had never used a LARC method. In three articles only, all participants were current LARC users. For the majority of articles that included a mix of never users and current users, authors often were not clear in attributing reported findings to never users or current LARC users.

Organizational, Community, and Social/Policy Levels. Other socio-ecological levels are organizational, community, and social/policy. The organizational level is comprised of social institutions with formal or informal rules and regulations such as clinics or hospitals (McLeroy et al., 1988). The community level is the relationships among organizations and institutions as well as the built environment, public facilities, the media, and social class (CDC, 2015b; Hanson et al., 2005; McLeroy et al., 1988). The final socio-ecological level is social/policy which consists of government laws and policy, economics, and educational policy (Hanson et al., 2005; McLeroy et al., 1988). As discussed in more detail below, these three levels are very intertwined.

One organizational barrier to LARC uptake is whether or not a patient has health insurance and if their insurance includes no-cost sharing contraceptive coverage. The Affordable Care Act (ACA; social/policy level) made contraceptive coverage a nationally required policy for most health insurance plans. However, the following groups of women are excluded from this coverage: women enrolled in "grandfathered" plans (i.e. plans in existence prior to March 23, 2010); and women who work for religious employers, nonprofit religiously-affiliated organizations, or private for-profit organizations that object to contraceptive coverage on religious grounds (Kaiser Family Foundation, 2016b). Additionally, the ACA mandates that

children can stay on their parent's health insurance until their 26th birthday. Of course, this can be impacted if their parents do not have insurance. For those covered under Medicaid, most programs cover family planning services. But, this can vary both by state and when the woman enrolled in Medicaid, i.e. pre- or post-ACA implementation (Kaiser Family Foundation, 2016a). Women who are uninsured can obtain LARC through different avenues such as Title X Family Planning Clinics or through a subsidy program provided by the pharmaceutical company, Bayer (Kaiser Family Foundation, 2016a). It should be noted that through Bayer's Access and Resources in Contraceptive Health (ARCH) program, only IUDs are available (Bayer, 2019). Findings from the Contraceptive CHOICE Project highlight how the cost of LARC acts as a barrier. The CHOICE Project was a prospective cohort study of 9,000 women in the St. Louis Region that focused on addressing three barriers to LARC: cost, access, and lack of knowledge (Birgisson, Zhao, Secura, Madden, & Peipert, 2015). When women were offered LARC methods at no-cost, in addition to contraceptive counseling, 75% chose a LARC method (Birgisson et al., 2015). Having health insurance that includes no-cost sharing contraceptive coverage can also be contingent on social class (community level) and government policy (social/policy level). As discussed in more detail below, other organizational barriers that exists are the following: a woman's access to clinics that provide LARC; the preference of health care providers to insert IUDs during menses; the common practice of waiting until STI screening results are available; and requiring patients to return for a second visit for LARC placement.

Community health centers are the main source of care for many low-income and uninsured women of reproductive age. Community health centers may not provide LARC due to high upfront costs and limited training and availability of staff (Kaiser Family Foundation, 2016a). Results of a nationwide survey of these centers (N=423) found that only 59% prescribed and placed IUDs and 36% prescribed and placed the implant (Wood et al., 2013). In another survey of 1615 publicly-funded health centers, 21% reported that no staff were trained

in inserting or removing any LARC method (Bornstein, Carter, Zapata, Gavin, & Moskosky, 2017).

Additionally, many clinics require two visits in order for a woman to obtain LARC. In a survey conducted of 1221 obstetricians and gynecologists (OB/GYN), 87% required two or more visits for IUD insertion (Luchowski et al., 2014). OB/GYN's who provided single day insertion of IUDs reported a higher number of insertions than those who did not (Luchowski et al., 2014). Findings from a study of clinics in Colorado and Iowa found that multiple visits are usually required for implant insertion as well. Sixty-one percent reported that two visits were typical to insert the implant (Biggs, Arons, Turner, & Brindis, 2013). In a retrospective database review of 700 women, nearly half of the women who requested an IUD did not return for the insertion visit (Bergin, Tristan, Terplan, Gilliam, & Whitaker, 2012). Although clinical guidelines support same-day provision of LARC (ACOG, 2009, 2017b), in practice this is often not the case. Being able to access clinics that have LARC is also dependent on woman's social class and built environment which are both community level factors.

Another organizational barrier to LARC obtainment is the training received by physicians during their residency. Referring again to the survey conducted among 1221 OB/GYN's, only half of the physicians surveyed provided the implant within their clinics. This disparity can be partially explained by training received during their residency with 92% receiving training on IUD placement and only 50% were trained on implant insertion (Luchowski et al., 2014). When examining training in LARC insertion among pediatricians, the numbers are even lower. In a sample of 561 pediatricians practicing in New York, Utah, Illinois, or Kansas, only 4% inserted either the IUD and/or implant (Fridy, Maslyanskaya, Lim, & Coupey, 2018). In a study of 292 family medicine providers practicing in Wisconsin, 40% were skilled in IUD insertion and 20% inserted implants (Olson et al., 2018).

It has been the preferred practice to insert IUDs during menses to ensure that the patient is not pregnant (Whiteman, Tyler, Folger, Gaffield, & Curtis, 2013). This preference could create

access barriers. In a systematic review conducted in 2012, no effect on continuation, effectiveness, or safety could be found to inserting an IUD during menses compared to at other times in a woman's cycle (Whiteman et al., 2013). Furthermore, ACOG also recommends that IUD insertion can occur at any time during the menstrual cycle (ACOG, 2017b). Another common practice with IUD insertion has been waiting until the results of STI screening are made available. However, ACOG states that insertion should not be delayed while waiting for test results and doing so could create unnecessary barriers to IUD use (ACOG, 2017b).

A community level factor that can affect LARC uptake is the media. As stated previously, negative media coverage of the IUD in the 1970s and 1980s and of the implant in the 1990s is considered a main reason as to why prevalence in the U.S. is low. Among currently available hormonal IUDs, Mirena has been available for the longest period of time and marketing has been focused on parous women (Farrington, 2013). Consequently, a persistent misperception among potential users is that IUDs are only for women who have had children (Hauck & Costescu, 2015). Because of their age some adolescents and young adults mistakenly believe that, due to images presented in marketing media, LARC are not an option (CDC, 2015a). Recently, a public health intervention used multiple media platforms to dispel misperceptions and provide information about LARC (Sundstrom, Billings, & Zenger, 2016). Using this community-level intervention, 19% of participants obtained a LARC method (Sundstrom et al., 2016).

Many of the previously mentioned factors are intertwined with the highest socio-ecological level — social/policy. For example, the availability of public funding to create and implement public health interventions is contingent on the U.S. Congress and President to allocate funding to federal and state agencies. Furthermore, the contraceptive coverage requirement put in place by the ACA may drastically change in the future. The current congress periodically introduces health care bills that would greatly weaken this provision (Levey & Kim, 2017). In looking at specific policies from health organizations, updated guidelines from ACOG

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and AAP and the goals of Healthy People 2020 all serve as examples of policy level factors that facilitate the use of LARC among women ages 18-25. Although initial research shows that health care providers attitudes have been slow to change (Higgins, Kramer, et al., 2016; Rubin et al., 2016; Sundstrom et al., 2015), these policy shifts by professional and governmental organizations have undoubtedly facilitated the use of LARC among this population.

Limitations of Current Research

This literature review identified existing gaps in research at the intrapersonal and the interpersonal levels. More research is needed on the attitudes, beliefs, and knowledge of IUD users towards the implant and vice versa. Understanding these intrapersonal level factors may shed light on the disparity in prevalence rates between the IUD and the implant. Finally, the following gaps were identified in a systematic review by Mahony et al. (unpublished):

- lack of literature on the role of intrapersonal factors and interpersonal influences on implant users;

- paucity of studies focusing on LARC use;

- research on why women choose one LARC method over another;

- research on all four types of interpersonal influence;

- research examining the role of partner influence;

- research differentiating which family member is providing the influence, i.e. mother, sister, etc.;

- reporting each type of influence separately, i.e. family influence, peer influence, partner influence, and provider influence as separate categories and not combining them into one category such as family/friend influence;

- testing and reporting the validity and reliability of survey instruments;

- studies conducted after ACOG and the AAP updated their LARC guidelines; and

- studies guided by a theoretical framework.

Theoretical Framework

Social Cognitive Theory (SCT) formed the theoretical foundation for this research. Few studies of LARC use have based their research on theory and no studies could be found applying SCT to LARC initiation (Mahony et al., unpublished). The main hypothesis of this study was that observational learning is key to LARC initiation. Having a social role model with positive LARC experiences could greatly influence choice. It was also hypothesized that personal cognitive factors and behavioral factors all interact dynamically with socioenvironmental factors to bring about LARC initiation. These hypotheses make SCT uniquely applicable to studying this topic area. Using SCT facilitated the understanding of how women chose LARC and why they chose one LARC method over the other.

SCT Overview

SCT posits that human behavior can be described by a model of triadic reciprocity in which behavior, personal cognitive traits, and the environment all interact as determinants of each other (Bandura, 1986). Bandura developed what was originally termed Social Learning Theory after a series of experiments demonstrating that children learned aggressive behaviors vicariously from other children or adults (Kelder, Hoelscher, & Perry, 2015). Included in his theory was the groundbreaking construct of self-efficacy, which would go on to be utilized in other theories (Ajzen, 2002; Rosenstock, Strecher, & Becker, 1988).

The manner in which the constructs of behavior, personal cognitive, and socioenvironmental interact is called reciprocal determinism (see Table 2 for definition of each construct and application to LARC initiation), and the combinations of these interactions is unique to each person or specific health behavior (Kelder et al., 2015). Personal cognitive factors consist of the constructs of self-efficacy, collective efficacy, outcome expectation, and knowledge (Bandura, 2004; Kelder et al., 2015). Outcome expectations consist of judgements made about the social, physical, and self-evaluative consequences of the behavior (Kelder et al., 2015). Bandura (1986) hypothesized that self-efficacy is a central mechanism in human

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agency. Self-efficacy is important because knowledge and skills are necessary, but not sufficient, to achieve behavior change. This is due to the fact that self-referent thought mediates the relationship between knowledge/skills and action (Bandura, 1986). Self-efficacy requires that a person be able to use their cognitive, social, and behavioral skills with success in a variety of situations (Bandura, 1986). Self-efficacy is formed as a result of vicarious experience, social persuasion/support, mastery experience, and emotional arousal (Kelder et al., 2015)

Socioenvironmental factors include the constructs of observational learning, normative beliefs, social support, and opportunities and barriers. Observational learning is a core concept of the theory. Bandura (1986) determined that, "observers can acquire cognitive skills and new patterns of behavior by observing the performance of others" (pg. 49). Observing others can be in the form of being informed about their thoughts and opinions as well as observing behavior (Bandura, 1986). Bandura also goes on to discuss that a person's perceptions and preconceptions as well as their environment can influence what they remember from the observation and how they interpret behavior from a social role model (Bandura, 1986). Observational learning of a specific health behavior is also contingent upon a person's social network (Bandura, 1986). If, for example, no one in a woman's social network has experience using LARC, then the opportunities for having a social role model for this behavior are diminished. Once a behavior is modeled either verbally or through imagery, the observer must retain the knowledge of the observation (Bandura, 1986). The observer is more likely to remember the modeled behavior if the social role model is someone they see as important such as friend or family member (Bandura, 2004; Kelder et al., 2015). Finally, behavioral factors consist of the constructs of skills, intentions, and positive or negative reinforcement (Kelder et al., 2015). By modifying the constructs within each of these factors, SCT suggests that health-related behavior can be changed.

Application of SCT to Sexual Behavior

SCT has been applied extensively to study non-LARC sexual behaviors such as the use of condoms and abstinence (CDC, 1999; Coyle et al., 2001; Coyle et al., 2006; Dilorio, Dudley, Soet, Watkins, & Maibach, 2000; Jemmott & Jemmott, 1992; Markham et al., 2014; McAlister et al., 2000; O'Leary, Goodhart, Jemmott, & Boccher-Lattimore, 1992; Sieving et al., 2011; Wulfert & Wan, 1993). Many of these studies tested interventions that were developed using SCT as the theoretical foundation (CDC, 1999; Coyle et al., 2001; Coyle et al., 2006; Jemmott & Jemmott, 1992; Markham et al., 2014; McAlister et al., 2000; Sieving et al., 2011). Past research shows that interventions targeting SCT constructs leads to a reduction in risky sexual behavior (Jemmott & Jemmott, 1992; Lopez, Grey, Chen, Tolley, & Stockton, 2016).

In a study of community-level HIV interventions, the constructs of observational learning, normative beliefs, and self-efficacy were used to increase consistent condom use among high risk populations (CDC, 1999). Community newsletters and pamphlets were distributed containing stories of role model's behavior in protecting themselves against HIV infection (CDC, 1999). The purpose of this media communication was to encourage participants to imitate the social role models (McAlister et al., 2000). In another application of SCT to HIV prevention, researchers found that the constructs of self-efficacy and outcome expectations predicted condom use among college students (Dilorio et al., 2000).

In a middle school-based sexual health education program, the SCT constructs of knowledge, self-efficacy, normative beliefs, intentions, and observational learning were targeted by the intervention (Markham et al., 2014). The goal of the program was to increase rates of abstinence and condom use compared to the control group (Markham et al., 2014). A statistically significant association was found for the constructs of knowledge, self-efficacy, normative beliefs, and observational learning. Specifically, youth who had high knowledge and self-efficacy for using condoms were more likely to use them (Markham et al., 2014). Likewise, youth whose parents talked to them about sexual health topics (observational learning) or who

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had more positive views of abstinence (normative beliefs) were less likely to engage in risky sexual behavior (Markham et al., 2014). Safer Choices, a school-based HIV/pregnancy prevention program, was also based on SCT (Coyle et al., 2001). It focuses on the constructs of knowledge, normative beliefs, self-efficacy, observational learning, and opportunities and barriers (Coyle et al., 2001). In a randomized control trial, it was found that youth in the intervention arm were more likely to use a condom in the last 3 months and had fewer sexual partners compared to those in the control group (Coyle et al., 2001).

In a systematic review of the literature, no study could be found that used SCT to examine why and how women choose LARC (Mahony et al., unpublished). However, two LARC interventions were developed using SCT, and one study used SCT to examine early removal of IUD (Amico, Bennett, Karasz, & Gold, 2016; Garbers et al., 2015; Mesheriakova & Tebb, 2017). Additionally, there were two interventions — based on SCT — that were focused on improving the sexual and reproductive health outcomes of adolescents. (Green, Oman, Lu, & Fluhr, 2018; Plant, Montoya, Snow, Coyle, & Rietmeijer, 2018). Although these interventions included a LARC component, increasing LARC use was not the sole focus.

In one intervention study, an iPad-based program focused on modifying participants' self-efficacy, intentions, and outcome expectations (Mesheriakova & Tebb, 2017). The intervention was evaluated within school-based clinics using girls ages 12-18. By increasing knowledge and dispelling myths regarding LARC, the intervention aimed to increase the intention to use LARC (Mesheriakova & Tebb, 2017). The intervention possessed an observational learning component whereby participants watched videos of a diverse group of women talking about their contraceptive method of choice (Mesheriakova & Tebb, 2017). The authors did not provide a rationale for why they used SCT to develop their intervention (Mesheriakova & Tebb, 2017). In another intervention, a pregnancy prevention video about IUDs was assessed for efficacy and feasibility (Garbers et al., 2015). The video was administered online in a single session to women ages 18-45. The video includes a story of a

fictional woman who is interested in different contraceptives. She thinks about the IUD and the misinformation commonly associated with it. This fictional woman then visits the doctor's office to get factual information about the IUD. The intervention aimed to modify the SCT constructs of observational learning, knowledge, and intentions (Garbers et al., 2015).

In an exploratory study of women's experiences with early elective IUD removal, the SCT constructs of self-efficacy, observational learning, and normative beliefs were used (Amico et al., 2016). Women included in the study were between the ages of 18-35 and reported discussing IUD removal within 9 months of insertion (N=16) (Amico et al., 2016). Findings suggest that observational learning influenced some participants to discontinue LARC. Specifically, women who were exposed to media messages regarding the class action lawsuit against the maker of Mirena were concerned about safety. The study also found that there are barriers to IUD removal and women had to exhibit self-efficacy in overcoming these barriers (Amico et al., 2016).

Application of SCT to Current Study

SCT was used as the theoretical framework in this dissertation study of how young women choose LARC and why they choose one LARC method over another (see Table 2 and Figure 1). In the quantitative phase, the constructs of self-efficacy, outcome expectations, knowledge, observational learning, normative beliefs, social support, and opportunities and barriers were measured. In the qualitative phase, the aforementioned subconstructs plus behavioral skills, intentions, and reinforcement were explored. These constructs were also compared across two groups of women: (1) IUD users; and (2) implant users.

In summary, the central concept of reciprocal determinism is a good fit to study LARC initiation in the following way. In order to initiate LARC, a woman must be able to overcome the numerous barriers to obtaining LARC. Ideally, to overcome these barriers, she will have the correct knowledge regarding LARC methods, and where and how to get them. She will also have self-efficacy to overcome these barriers and have positive outcome expectations of using

LARC. Important individuals in her social environment may serve as social role models to facilitate observational learning. These social role models may either provide opportunities or barriers to LARC use. Additionally, those in her social environment may aid in the formation of her normative beliefs regarding LARC use. These constructs that form personal cognitive, socioenvironmental, and behavioral factors could dynamically interact to influence LARC initiation uniquely for each individual. How specific measures are related to the theoretical framework is described in Chapter 3.

Table 2. SCT Constructs and Application to LARC Initiation

Constructs	Subconstructs	Definition[a]	Application Example
Personal Cognitive	Self-efficacy	Individual's confidence in their ability to perform the behavior	Confidence overcoming obstacles to obtaining LARC
	Outcome Expectations	Judgments made about the likely physical, social, or self-evaluative consequences of actions	Reducing risk of unintended pregnancy; Changes in menses; Side effects of LARC
	Knowledge	Understanding risks and benefits of health practices and knowing the necessary information to perform the behavior	Information about risk of unintended pregnancy; Correct and factual information about LARC
Socioenvironmental	Observational Learning	Learning about a new behavior and potential consequences by observing the behaviors of others	Having a friend or family member who is using LARC; Observing LARC use through mass media
	Normative Beliefs	Cultural norms and beliefs about the social acceptability and perceived prevalence of the behavior	Social acceptability and perceived prevalence of using LARC; Social acceptability and perceived prevalence of preventing unintended pregnancy
	Social Support	Encouragement and support received from ones social network	Social support provided to seek out and obtain LARC
	Opportunities and Barriers	Characteristics of the social and physical environment that make behaviors easier or harder to perform	Opportunity: easy access to health care provider willing/able to provide chosen LARC method; Barrier: No health insurance
Behavioral	Behavioral Skills	Abilities needed to successfully perform the behavior	Navigating our complex health care system to obtain chosen LARC method; communication skills with health care provider; decision-making skills to consider LARC as an option
	Intentions	Proximal and distal goals of adding new behaviors or changing existing ones	Obtaining LARC requires intentionally setting the goal of achieving this behavior
	Reinforcement	Rewards or punishments can increase or decrease the likelihood of the behavior occurring	Punishments: changes in menses; side effects Rewards: decrease in stress and worry of unintended pregnancy; increase of sexual enjoyment
Reciprocal Determinism: LARC initiation is uniquely influenced by these constructs interacting dynamically.			

[a] Kelder, S. H., Hoelscher, D., & Perry, C. L. (2015). How individuals, environments, and health behaviors interact. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research, and practice* (5th ed.). San Francisco, CA: Jossey-Bass.
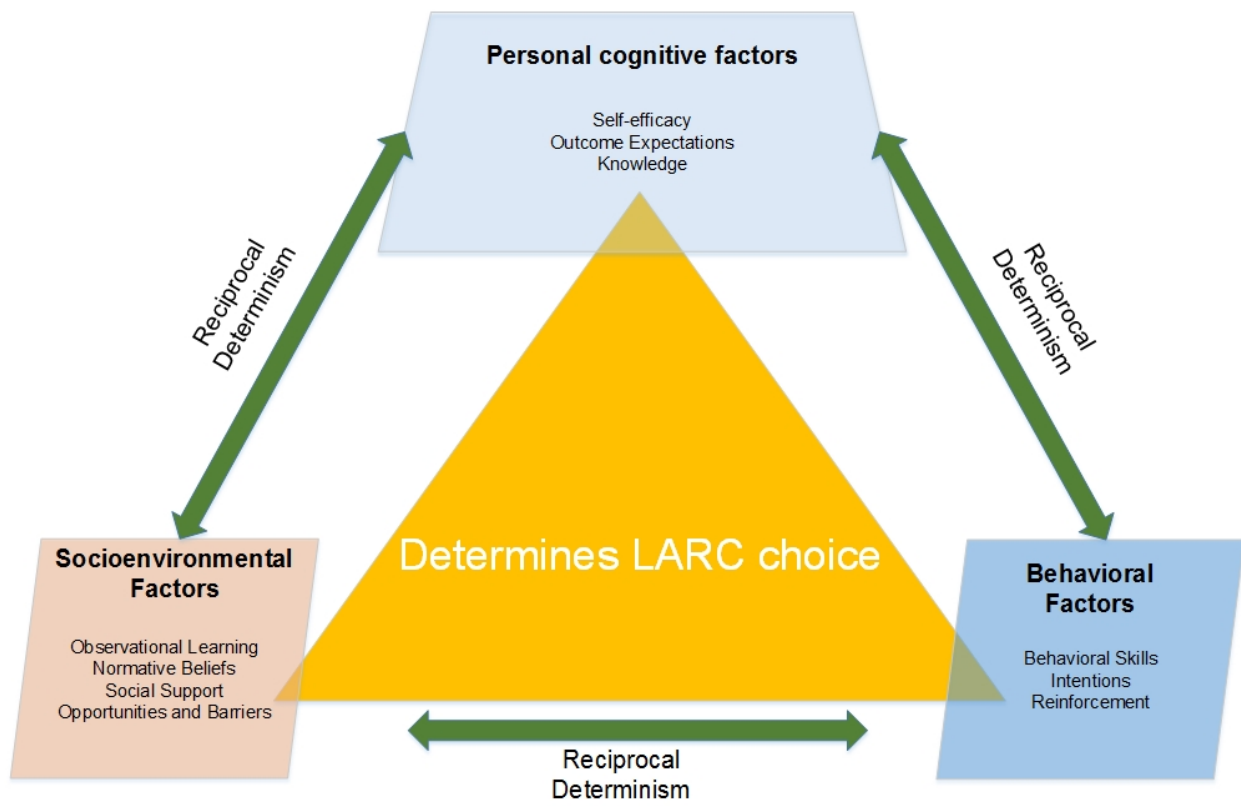
Figure 1. Application of Social Cognitive Theory to LARC Use

CHAPTER 3: METHODS

Overview

The long-term goal of this research is to increase the number of young adult women using LARC, thereby decreasing the number of unintended pregnancies. The purpose of this mixed methods study was to explore how a young adult woman's socioenvironment, personal cognitive, and behavioral factors affect her choice to use LARC. This objective was accomplished through the following specific aims:

1. **Determine if differences exist between IUD users and implant users.**

   The majority of women who choose LARC use the IUD. The reason for this is not understood. One way to increase LARC use would be to increase the prevalence of both methods. Therefore, primary data was collected through an online survey to discover if intrapersonal and interpersonal level factors differ between IUD users and implant users.

2. **Explore how participants chose either the IUD or the implant.**

   Research on LARC is an emerging area in public health. To further our understanding of factors that contribute to a women's choice to use LARC, one-on-one, semi-structured qualitative interviews were conducted with 30 women, stratified by LARC type, i.e. 15 IUD users and 15 implant users. Each woman's specific survey responses were used to inform part 2 of the interview guide (Appendix D). Applied thematic analysis was conducted to describe how women chose LARC and to further explore participant responses provided in the online survey.

Table 3. Timeline for Dissertation Research

Activity	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Phase I												
IRB approval	▓											
Survey Pilot		▓	▓									
Data Collection				▓	▓	▓	▓					
Data Analysis								▓	▓			
Report Findings									▓	▓		
Phase II												
Pilot Interview Guide		▓	▓									
Recruitment				▓	▓	▓						
Data Collection				▓	▓							
Data Analysis									▓	▓	▓	
Report Findings										▓	▓	▓

Population and Approach

The inclusion criteria were as follows: 1) female; 2) between the ages of 18-25 years old; 3) nulliparous; 4) used either the IUD or the implant at any time within the last 12 months; 5) primary reason for using LARC is prevention of pregnancy; 6) engaged in vaginal sex in the last 12 months; and 7) obtained their LARC method while living in the United States. This mixed methods study included two phases that aligned with the study aims to understand what and how a young woman was influenced to choose LARC. Phase I was a quantitative analysis of participants recruited through an online survey. Phase II consisted of semi-structured, in-depth interviews of a subset of women who participated in Phase I. Participant responses to certain questions in Phase I were explored in-depth in Phase II. The results of the interviews conducted in Phase II were used to triangulate findings from Phase I.

Each interview was based on the individual participant's survey responses. Additionally, there was concern about losing interview volunteers if too much time elapsed between survey completion and interview. Therefore, there was overlap in the timeframe for Phase I and Phase II data collection. Thus, this study contains elements of both a concurrent triangulation design and an explanatory sequential design (Creswell & Plano-Clark, 2007).

Phase I: Quantitative, Primary Data Collection

  Overview. The purpose of this phase was to understand if differences exist between IUD users and implant users in regards to interpersonal and intrapersonal factors. Specifically, the research questions were the following: 1) Do interpersonal level factors such as observational learning, social support, normative beliefs, and opportunities and barriers differ between IUD users and implant users?; 2) Do intrapersonal level factors such as self-efficacy, outcome expectations, and knowledge differ between IUD users and implant users? To achieve this goal, an online survey was administered.

  Sample size. The primary research question was concerned with determining the difference in the response means between IUD users and implant users using the Interpersonal Influences scale (see Instrumentation section below), which consists of six variables. The response options for each variable are a 5-point, Likert-type scale ranging from "Definitely does not describe me" to "Very much describes me". A one-way multivariate analysis of variance (MANOVA) was conducted to investigate if statistically significant differences in the means of the scale exist by the outcome variable. MANOVA allows for the simultaneous assessment of multiple independent and dependent variables, which controls for potential inflation of Type I error and takes into account the relationships among variables. G*Power was used to calculate sample size based on an alpha level of 5%, power level of 80%, and a medium effect size of eta-squared=0.0625 (D'Amico, Neilands, & Zambarano, 2001; Stevens, 2002). This produced a target sample size of 226.

  Recruitment. Participants were recruited through the following approaches:

- flyers provided to patients at Student Health Services at a large, public university in the southeast;

- flyers posted in the campus library, recreation center, and student activity center of above mentioned university;

- flyers posted on bulletin boards throughout the above mentioned university campus;

- e-mails sent to 49 instructors at the above mentioned university. Instructors were chosen if they taught multiple classes and/or the enrollment in their class(es) exceeded 50. Fourteen instructors taught in the College of Public Health, two taught in the College of Business, and 33 taught in the College of Arts and Sciences;

- presidents and vice presidents of 10 student organizations were asked to share the survey with their members;

- leadership of eight university sororities were contacted to share the survey with their members;

- posted in six Facebook groups (four are student-focused)

- posted in the university alumni LinkedIn group

- posted on the Principal Investigator's personal LinkedIn page

- shared through the University Health Research Study Alert Network

- shared through the university student news bulletin

Additionally, the principal investigator (PI) contacted five community-based health clinics requesting assistance with distributing flyers to their patient population. Due to various reasons, these community clinics declined to participate.

Recruitment challenges. On September 17, 2018, the survey link and digital recruitment flyer were posted in four student-focused Facebook groups. Initially, the PI thought that all of these groups were closed Facebook groups. When a group is closed, only administrator-approved members can see the posts in the group. It was later determined that one of these groups was a public group meaning that anyone on Facebook can see the posts in the group. In the 24 hours after posting in these groups, there was an unusually high number of

responses (N=341). Additionally, there were numerous data abnormalities, e.g. participant's completing the survey within a few seconds, numerous participant's completing the study at odd hours, strange responses to the open textbox question, and more gift card responses than survey responses. This led the PI to determine that these were fraudulent responses. An adverse event report was submitted to the USF Institutional Review Board (IRB). In the adverse event report, a plan was outlined for how to resolve this situation (see below). The USF IRB approved this plan on September 27, 2018.

- Remove participants who did not volunteer for an interview. These participants were unable to be contacted to confirm eligibility.
- Among those who volunteered to be interviewed:
  - Respondents were removed if name provided was clearly a man's name or if e-mail address was a man's name.
  - Respondents were removed if their responses to the open textbox survey question did not make sense.
- The remaining respondents were contacted and asked the following validation questions:
  1. What year were you born?
  2. What method(s) of birth control have you used in the past 12 months?
- Respondents who provided valid answers to these questions were included in the data set (N=29).

Data collection procedures. The recruitment flyer contained a link to the survey homepage (see Appendix A). The survey was administered through Qualtrics, which is provided on a secure site by the University of South Florida (USF). The survey homepage included a description of the study and an informed consent with participant rights, investigator contact information, and IRB information listed. Once a participant agreed to participate, they were

taken to the eligibility questionnaire. If eligible, they were automatically directed to the survey. The survey took approximately 10 minutes to complete. Each participant who completed the survey received a $5 gift card.

Instrumentation. No validated LARC-specific survey instrument of any kind exists; however, two survey instruments were found in the literature and were adapted for the proposed research. The first survey instrument was used in the 2009 National Survey of Reproductive and Contraceptive Knowledge conducted by the Guttmacher Institute in partnership with the National Campaign to Prevent Teen and Unplanned Pregnancy (Kaye et al., 2009). This survey contains seven sections and a total of 87 questions (See Appendix I for proof of public availability). See Table 4 for the items that were selected for this dissertation research. In some instances, the original item was used verbatim.

Previous measures of validity and reliability. The items on the 2009 National Survey of Reproductive and Contraceptive Knowledge were developed by nationally recognized content experts at the Guttmacher Institute and the National Campaign to Prevent Teen and Unplanned Pregnancy (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009a). National Campaign/Guttmacher research staff reviewed the survey for content validity, and it was then pilot tested with the target population (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009a). Revisions from the expert review and the pilot test were incorporated into the final survey instrument (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2009a).

The second survey — The Contraceptive Decision-Making Questionnaire — was developed by Noone and Allen (2010) (See Appendix H for permission to use). It consists of four validated scales: Personal Beliefs, Accessibility, Interpersonal Influences, and General Properties (Noone & Allen, 2010). The scales of Personal Beliefs, Accessibility, and General Properties each have numerous items that are not applicable to LARC methods. For example, an item from the Accessibility scale states, "I prefer to use a birth control method that I can get

without seeing a health care provider." Since this study was focused on LARC, this item was not

relevant.

Table 4. Questions Selected from the 2009 National Survey of Reproductive and Contraceptive Knowledge

Original Item	Adapted Item
Have you ever gotten information about birth control or pregnancy prevention from each of the following sources? (check all that apply)	Have you ever gotten information about the **IUD** from the following sources? (check all that apply)
Among these sources, from which <u>one</u> source have you received the most information in the past 12 months?	Among these sources, from which <u>one</u> source have you received the most information about the **IUD**?
Among all possible sources of information, which <u>one</u> source would you trust to give you the most accurate information about contraception and birth control?	Among these sources, which <u>one</u> source do you trust the most to give you accurate information about the **IUD**?
Have you ever gotten information about birth control or pregnancy prevention from each of the following sources? (check all that apply)	Have you ever gotten information about the **implant** from the following sources? (check all that apply)
Among these sources, from which <u>one</u> source have you received the most information in the past 12 months?	Among these sources, from which <u>one</u> source have you received the most information about the **implant**?
Among all possible sources of information, which <u>one</u> source would you trust to give you the most accurate information about contraception and birth control?	Among these sources, which <u>one</u> source do you trust the most to give you accurate information about the **implant**?
Many of my friends have had unplanned pregnancies.	Original item used verbatim.
In my family, it is not acceptable to have a child out-of-wedlock.	Original item used verbatim.
Most of my friends think using birth control is important.	Most of my friends think that it is important to use very effective birth control such as the IUD or the implant.
Overall, how much do you feel you know about **IUDs** and how they are used?	Original item used verbatim.
Overall, how much do you feel you know about **IUDs** and how they are used?	Overall, how much do you feel you know about the **implant** and how it is used?
Thinking about your life right now, how important is it to you to avoid becoming pregnant?	Original item used verbatim.
If you found out today that you were pregnant, how would you feel?	Original item used verbatim.
Pregnancy is something that should be planned.	Original item used verbatim.
I have all the information I need to avoid an unplanned pregnancy.	Original item used verbatim.

The Interpersonal Influences scale was selected for the proposed research and it contains six

items. The items ask participants whether or not their peers, parents, health care provider, or

sexual partner influenced their choice to use birth control (Table 5). For the current study, the

phrase "birth control" was changed to IUD or implant depending on the participant's experience. Additionally, the items were reworded in the past tense since participants have already obtained LARC. The response options were a 5-point Likert-type scale ranging from "Definitely does not describe me" to "Very much describes me."

Table 5. Interpersonal Influences Scale

Original Item	Adapted Item
My female friends influence the birth control method I use.	My female friends influenced my choice to use the [IUD/implant].
I am influenced in my choice of a birth control method by other women who have used the method.	I was influenced to choose the [IUD/implant] by other women who have used this method.
I am influenced in my choice of a birth control method by the advice of my health care provider.	I was influenced to choose the [IUD/implant] by the advice of my health care provider.
My choice of a birth control method may change as my relationship with a partner changes.	My choice to use the [IUD/implant] was influenced by my relationship status with my partner.
My female family members influence the birth control method I use.	My female family members influenced my choice to use the [IUD/implant].
My sexual partner's preferences influence the birth control method I use.	My sexual partner's (current or past) preferences influenced my choice to use the [IUD/implant].

Previous measures of validity and reliability. The Contraceptive Decision-Making Questionnaire was developed based on qualitative interviews with women regarding how they make choices about birth control (Noone & Allen, 2010). The instrument was then reviewed by content experts to assess relevance, clarity, conciseness, and comprehensiveness (Noone & Allen, 2010). Once these revisions were incorporated, the instrument was pilot tested for empirical evidence of validity and reliability among current contraceptive users. All scales on the questionnaire — including the Interpersonal Influences scale — were found to have construct validity and acceptable internal reliability. For the interpersonal influences scale, the EFA showed that all items loaded at .40 or higher on the factor and the Cronbach's alpha was .64 (Noone & Allen, 2010).

Survey items adapted from the Contraceptive Decision-Making Questionnaire and the 2009 National Survey of Reproductive and Contraceptive Knowledge measured the following SCT constructs: knowledge, self-efficacy, normative beliefs, social support, opportunities and

barriers, outcome expectations, and observational learning (Table 6). The survey also included

demographic questions that were sampled from four different sources (Campo et al., 2013;

Kaye et al., 2009; Noone & Allen, 2010; U.S. Census Bureau, 2010). In total, the survey

contained 41 questions. Please see Appendix B for the eligibility questionnaire and Appendix C

for the quantitative survey. Throughout the survey in Appendix C different words or phrases

appear in brackets. In Qualtrics, the questions were worded specifically for the participant. If the

participant had experience with the IUD, then the question only displayed "IUD".

 Instrument pilot test. The survey instrument underwent two rounds of pilot testing. The

first round of pilot testing was with PhD/MD and Doctoral student level experts in sexual and

reproductive health among adolescent and young adult populations (N=8). The second round of

pilot testing involved participants from the target population (N=3). In the second round of pilot

testing, two participants were implant users and one was using the IUD. Cognitive interview

questions are listed in Appendix E. The main revisions suggested during pilot testing were

improving question flow, providing more response options, and clarifying terminology. Most

participants commented that the survey was easy to use and understand.

 Data analysis. A multivariate analysis of variance (MANOVA) was used to answer the

primary research question. Assumptions of MANOVA are the following: 1) samples are from

multivariate normally distributed population; 2) samples are from populations that have the

same variance; and 3) observations are independent (Raykov & Marcoulides, 2008).

Table 6. Survey Questions and Related SCT Construct(s)

Survey Questions	SCT construct
2009 National Survey of Reproductive and Contraceptive Knowledge	
Have you ever gotten information about the **IUD** from the following sources? (select all that apply)	Observational Learning
Among these sources, from which <u>one</u> source have you received the most information about the **IUD**?	Observational Learning
Among these sources, which <u>one</u> source do you trust the most to give you accurate information about the **IUD**?	Observational Learning
Have you ever gotten information about the **implant** from the following sources? (select all that apply)	Observational Learning
Among these sources, from which <u>one</u> source have you received the most information about the **implant**?	Observational Learning
Among these sources, which <u>one</u> source do you trust the most to give you accurate information about the **implant**?	Observational Learning
Many of my friends have had unplanned pregnancies.	Normative Beliefs
In my family, it is not acceptable to have a child out-of-wedlock.	Normative Beliefs
Most of my friends think that it is important to use very effective birth control such as the IUD or the implant.	Normative Beliefs
Overall, how much do you feel you know about **IUDs** and how they are used?	Knowledge
Overall, how much do you feel you know about the **implant** and how it is used?	Knowledge
Thinking about your life right now, how important is it to you to avoid becoming pregnant?	Self-evaluative Outcome Expectations
If you found out today that you were pregnant, how would you feel?	Self-evaluative Outcome Expectations
Pregnancy is something that should be planned.	Self-evaluative Outcome Expectations
I have all the information I need to avoid an unplanned pregnancy.	Self-efficacy
Interpersonal Influences Scale	
I was influenced to choose the [IUD/implant] by other women who have used this method.	Observational learning; Normative Beliefs; Social Support
My female family members influenced my choice to use the [IUD/implant].	Observational Learning; Normative Beliefs; Social Support
My sexual partner's (current or past) preferences influenced my choice to use the [IUD/implant].	Social Support; Opportunities and Barriers; Normative Beliefs
My choice to use the [IUD/implant] was influenced by my relationship status with my partner.	Social Support; Opportunities and Barriers; Normative Beliefs
My female friends influenced my choice to use the [IUD/implant]	Observational Learning; Normative Beliefs
I was influenced to choose the [IUD/implant] by the advice of my health care provider.	Social Support; Opportunities and Barrier; Observational Learning

Upon completion of data collection, tests of normality revealed that the data were non-normal. Data transformations were conducted to normalize the data (Raykov & Marcoulides, 2008); however, the data remained non-normal (see Chapter 4 for more detail). MANOVA is robust to violations of normality if sample size is greater than 30 and group sizes are approximately equal (Blanca, Alarcon, Arnau, Bono, & Bendayan, 2017; Schmider, Ziegler, Danay, Beyer, & Bühner, 2010). However, the group sizes were also unequal, i.e. there were more IUD users compared to implant users. This was an expected outcome since the prevalence of these methods is imbalanced in the general population. The SAS procedure GLM was used, which automatically accounts for unequal group sizes (Gurevitch & Scheiner, 2001). Additionally, Pillai's trace was reported since this test statistic is more robust to unequal group sizes (Field & Miles, 2010). Due to the non-normal nature of the data, the Mann-Whitney test was also conducted to verify the results of the MANOVA (J. Beckstead, personal communication, March 13, 2019). The Mann-Whitney test is a non-parametric test, which measures the differences in medians between two populations (Conover, 1999).

In addition to the MANOVA, follow-up ANOVA results were checked for significance (Raykov & Marcoulides, 2008). Data on the following demographic factors were collected: age, education, race/ethnicity, and health insurance status. To analyze whether these demographic covariates affected the results of the primary outcome analysis, a multivariate analysis of covariance (MANCOVA) was employed.

Validity and reliability of the Interpersonal Influences Scale was assessed using a confirmatory factor analysis (CFA) and Cronbach's alpha. The Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) were used to determine model fit of the CFA. The cutoff value for the CFI is ≥0.90, meaning that a value less than 0.90 is indicative of poor model fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). For the RMSEA, a value greater than 0.10 indicates poor model fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). For

Cronbach's alpha, a value of greater than 0.80 was considered good internal reliability (Nunnally, 1978). Mplus was used to conduct the CFA.

For the demographic questions, significance was assessed with the chi-square test. For the race variable, only two participants identified as either American Indian or Pacific Islander. These two participants were recategorized as Asian. Age was dichotomized into two categories, 18-21 years old and 22-25 years old. Participants had several different options to choose from for relationship status (Appendix C). For analyses, these options were collapsed into the following three categories: 1) long-term, monogamous (including the 10 participants who were married); 2) dating; and 3) not in a relationship.

For the items selected from the 2009 National Survey of Reproductive and Contraceptive Knowledge, response options were dichotomized as this was the approach used in the initial Guttmacher report and in subsequent publications (Bader, Kelly, Cheng, & Witt, 2014; Craig, Dehlendorf, Borrero, Harper, & Rocca, 2014; Dempsey et al., 2012; Hayford & Guzzo, 2013; Higgins et al., 2012; Kaye et al., 2009; Marshall, Guendelman, Mauldon, & Nuru-Jeter, 2016). It should be noted that when dichotomizing response options potentially important information can be lost (J. Cohen, 1983; MacCallum, Zhang, Preacher, & Rucker, 2002). But, following the approach used in previous publications allowed for the findings of the present study to be compared to the findings of previous research. Significance was assessed with the chi-square test. If a significant association was found, the relationship was further explored with logistic regression.

Pregnancy ambivalence was assessed by two survey questions: "Thinking about your life right now, how important is it to you to avoid becoming pregnant?" and "If you found out today that you were pregnant, how would you feel?" (Higgins et al., 2012). Women who responded that it is important to avoid becoming pregnant and who responded that they would be upset if they became pregnant were categorized as unambivalent about avoiding pregnancy (Higgins et al., 2012). Women who provided conflicting responses to these two questions were

categorized as being ambivalent towards pregnancy (Higgins et al., 2012). Missing data was assumed to be missing at random (Rubin, 1976) and listwise deletion was implemented. All analyses were conducted in SAS version 9.4.

Phase II: Qualitative Interviews

The purpose of Phase II was to 1) examine SCT constructs that were not measured in the survey and 2) explore participant responses to survey items in Phase I. Triangulating findings is a key component in mixed methods research (Creswell, 2015). Triangulation was achieved by asking each interview participant to elaborate on their responses to the Interpersonal Influences Scale on the survey. In addition to identifying themes, frequencies were calculated for each code that emerged under every theme to further confirm quantitative findings.

The research questions for this phase of the study were 1) What do women perceive as the key factors that contributed to their LARC initiation?; 2) In what ways do interpersonal level factors such as observational learning, social support, and opportunities and barriers differ between IUD users and implant users?; and 3) In what ways do intrapersonal level factors such as intentions, knowledge, outcome expectations, behavioral skills, and self-efficacy differ between IUD users and implant users?

Subjects and Settings. Phase II consisted of semi-structured, in-depth interviews. All women who participate in Phase I were eligible to participate in Phase II. At the end of the survey in Phase I, women were asked if they would like to participate in a 30-minute interview either in-person or over the phone — whichever they preferred. Participants who indicated they were interested in being interviewed were asked to provide their phone number and/or e-mail address. All Phase II participants received a $10 gift card.

This phase of the study employed quota sampling by LARC type. Quota sampling enables the investigator to compare and contrast characteristics that are the same or different between groups (Teddlie & Yu, 2007). Since more women use the IUD compared to the implant

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(Guttmacher Institute, 2016), this approach ensured that there were equal number of women interviewed who have experience with each method. Fifteen women per group were sampled, resulting in a final sample size of 30 (Creswell, 2005). No new themes according to SCT constructs were emerging by the 25th interview; however data collection continued until the minimum sample size had been reached. Once data collection was complete, the audio-files of the 30 interviews were reviewed, and it was confirmed that saturation had been reached, i.e. no new themes relevant to the research questions were being found in the data. Thus, data collection for phase II was closed.

Data collection procedures. Women had already consented to participate in the research at the beginning of the online survey in Phase I. At the beginning of the interview, participants were asked permission to audio-record the interview. Interviews lasted between 15 to 25 minutes and were audio-recorded using two devices. All interviews were conducted over the phone, which was the preference of all participants as opposed to conducting the interview in-person.

During the interview, the investigator took field notes. Audio-recordings were transcribed by a professional transcription service, Rev.com. Transcriptions did not include participant names or any other identifying information. After the audio files were transcribed, the recordings were destroyed to protect the participants' confidentiality.

Instrumentation. The interview guide was developed based on constructs from SCT (Appendix D). Additionally, an aim of Phase II was to triangulate findings from Phase I. Therefore, several questions in the interview guide were focused on understanding participant responses to the Interpersonal Influences Scale. Questions on the interview guide also addressed SCT constructs that were not measured on the survey. For example, self-efficacy is formed through the following four mechanisms: mastery experience, vicarious experience, social persuasion/support, and emotional arousal. The interview guide included questions on self-efficacy formed through mastery experience, vicarious experience, and social

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persuasion/support. Emotional arousal is defined as experiencing a strong emotional response when engaging in the behavior of interest. This was determined to not be relevant to the behavior of LARC initiation. All questions were open-ended and probing questions were used to elicit more information from the participants.

As part of the pilot testing phase, the interview guide was reviewed by PhD/MD and Doctoral student content-area experts (N=6). Additionally, the PI role-played the interview with two of the Doctoral student content-area experts. The same women who participated in the second round of pilot testing for the survey also took part in the pilot testing of the interview guide (N=3). Based on pilot testing feedback, the order of the questions was revised and additional probing questions were added. Additionally, the audio-recordings of the pilot test were reviewed with the PI's major professor, who provided guidance on how the PI could improve interviewing skills.

Data analysis. Transcripts were imported into NVivo 12 for data analysis. This study used the Applied Thematic Analysis (ATA) approach. ATA is a unified framework of various qualitative data analysis methods such as grounded theory, positivism, phenomenology, and interpretivism (Guest, MacQueen, & Namey, 2012). In this approach, "ensuring the credibility of findings to an external audience is paramount and…achieving this goal is facilitated by systematicity and visibility of methods and procedures" (Guest et al., 2012, p. 15).

A codebook was developed a priori based on constructs from SCT, i.e. self-efficacy, outcome expectations, knowledge, behavioral skills, intentions, reinforcement, observational learning, normative beliefs, social support, and opportunities and barriers. Listed in the codebook was the code, a short and long definition of the code, when to use and when not to use the code, and example text where this code would be used (Guest et al., 2012). Each transcript was read while taking notes of any emergent themes that did not fit within the a priori codebook. Emergent codes that were added to the codebook included *Aversion* and *Political Climate*. During this initial reading, themes were identified and text was segmented to indicate a

complete thought between the participant and the interviewer (Guest et al., 2012). The content of codes between the two groups (IUD users and implant users) was compared and differences and similarities were noted. A matrix was used to facilitate the comparison of the themes between these two groups.

Trustworthiness. In qualitative research, trustworthiness of the data is a term used to address issues of validity and reliability. The four constructs to assess the trustworthiness of qualitative data are credibility, transferability, dependability, and confirmability (Guba, 1981). Credibility was established by triangulating different data sources, using rich, thick descriptions to report findings, clarifying investigator bias prior to conducting the study, and presenting findings that were opposite to the dominant themes found. Transferability was addressed by providing detailed information on the theoretical framework used, recruitment locations, inclusion and exclusion criteria, data collection methods, number and length of interviews, and the time period over which data were collected. Confirmability was achieved by discussing theories or biases not confirmed by the data and providing a comprehensive description of the methodology. Furthermore, the PI periodically consulted with members of the research committee (ED and SM) to confirm that the participant's stories were being portrayed accurately.

To ensure dependability of the data, the PI checked that no errors occurred during transcription. Memos were recorded during and after the interviews, while reviewing the audio-files and transcripts, and during the coding process. Additionally, four transcripts (two from IUD users and two from implant users) were coded by both the investigator and an additional researcher in order to calculate a Kappa coefficient. A draft version of the codebook was reviewed by both the PI and the additional researcher. Based on feedback from the additional researcher, the codebook was revised and one transcript was coded. The PI and the additional researcher met and discussed areas of agreement and disagreement. The codebook was revised again and the initial transcript plus the three other transcripts were coded. Using NVivo

12 (QSR International, 2019), Cohen's Kappa was calculated and found to be 0.81. A Cohen's Kappa of 0.80 or higher is considered to be a very high level of agreement (Guest et al., 2012).

Triangulation

  The findings from Phase I and II were interpreted both separately and in combination to provide an overall understanding of study results. Participant responses to the Interpersonal Influences Scale were explored in Part 2 of the Interview Guide (Appendix D). Additionally, themes that arose during Phase II were compared to the results of Phase I using a matrix. This allowed for a more complete picture of why the women in the study chose LARC. Triangulation was also used to measure the construct of reciprocal determinism. Themes were analyzed to determine if any overlap existed. A lack of mutual exclusiveness indicated reciprocal determinism.

Protection of Human Subjects

  The level of risk to participants in this research project was minimal because the risks were similar to what the participant encounters in day-to-day life. There were no physical risks associated with this research. Although no risks were anticipated, there may have been psychological, privacy, and disclosure risks. Participants revealed sensitive information during the survey and/or in-depth interviews that may have made them feel uncomfortable or embarrassed.

  On the front page of the survey, the contact information for the PI and the major professor was provided if participants wanted to contact us with any concerns. At the end of the survey, the participant had the option of providing their contact information. This was for two purposes: 1) to receive the $5 incentive for completing the survey and 2) if they would like to participate in the in-depth interviews. Once the participant had been contacted for their incentive and/or to be interviewed, the contact information was destroyed.

  Interview participants were assigned a unique ID, and no identifying information was collected during the interview. After the audio-recordings were transcribed, they were destroyed.

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Access to all data was restricted to the PI and study staff. All data was stored in a password-

protected folder. This research received Institutional Review Board approval (Appendix G).

CHAPTER 4: RESULTS

Overview

The purpose of this research was to explore what interpersonal and intrapersonal factors influence a young woman's choice to initiate use of LARC. The results of this study are presented in two parts. In part one, the findings from the quantitative Phase I are presented, which examined differences between IUD users and implant users in regards to the SCT constructs of observational learning, normative beliefs, knowledge, outcome expectations, self-efficacy, social support, and opportunities and barriers. In part two, the findings from the qualitative Phase II are presented, which examined the SCT constructs of intentions, observational learning, knowledge, reinforcement, outcome expectations, behavioral skills, reciprocal determinism, social support, opportunities and barriers, and normative beliefs.

Phase I: Quantitative Analysis

This phase of the study had one aim and two research questions. Data collection took place between September 13, 2018 and December 12, 2018. Participants were recruited from university campus sources, e.g. flyers and course announcements (N=117), social media, i.e. LinkedIn and Facebook (N=83), and through the University Health Research Study Alert Network (N=35). From these sources, 235 participants took the survey; however, nine participants did not complete the survey. Per listwise deletion, these nine participants were removed, which resulted in a final sample size of 226. Phase I, research question 1 focused on differences in interpersonal influences between women who use the IUD versus the implant. Phase I, research question 2, examined differences in intrapersonal factors between these two groups.

Description of sample. Among the 226 women who completed the survey, 163 (72%) were using the IUD and 63 (28%) were using the implant (Table 7). The majority of participants

identified as white (74%) and were currently in college (81%). The mean age of the sample was 23 years old (SD: 2.25). Women who used the implant were more likely to be 18-21 years old (OR=2.04, 95% CI: 1.10-3.70) and more likely to be Hispanic (OR=2.28, 95% CI: 1.15-4.50) compared to women who use the IUD. Among women who were not in college (N=43), the majority (93%) had a four year degree or higher. Most (96%) participants had health insurance when they obtained their LARC method. Within this group, 82% had insurance through their parents and 8% through their employer. The remaining 10% were insured through their school, partner, the military, or Medicaid. Current college students who use the IUD were more likely to have obtained their LARC method at an on-campus clinic (OR=8.17, 95% CI: 2.41-27.71) compared to implant users who were in college. Fourteen percent of women (N=24) within the IUD group were using the copper IUD, ParaGard. Four of these women reported that they initially began using ParaGard as emergency contraception and 20 women initially began using it because it is hormone-free. Thirty-eight percent of participants had been using their LARC method for less than 12 months.

On average, women used approximately two previous methods of birth control (mean: 2.5, SD: 1.06) prior to using their LARC method. This did not differ by LARC type. The most commonly used methods were condoms, the birth control pill, withdrawal, and abstinence (Table 8). Note that this survey item was in the "select all that apply" format, so counts do not equal 100. A greater number of women in the sample used the IUD compared to the implant. This resulted in the counts in the IUD column to be larger than in the implant column. Among the entire sample, 34% of women reported choosing to use their LARC method partly because of negative side effects from a previous method of birth control.

Table 7. Frequencies of Demographics by LARC Type (N=226)

Variable	N Total	% Total	N (%) IUD	N (%) Implant	p-value
LARC Type					
IUD (any)	163	72%			
Copper IUD	24	14%			
Hormonal IUD	139	86%			
Implant	63	28%			
Race					0.66[a]
White	168	74%	124 (76%)	44 (70%)	
Black	21	9%	13 (8%)	8 (13%)	
Asian[c]	20	9%	14 (9%)	6 (9%)	
Multiracial	17	8%	12 (7%)	5 (8%)	
Hispanic					0.02
Yes	45	20%	26 (16%)	19 (30%)	
No	181	80%	137 (84%)	44 (70%)	
Age					0.02
18-21 years	68	30%	42 (26%)	26 (41%)	
22-25 years	158	70%	121 (74%)	37 (59%)	
College Student					0.13
Yes	183	81%	128 (79%)	55 (87%)	
No	43	19%	35 (21%)	8 (13%)	
Student Type[b]					0.0002[a]
Undergraduate	133	73%	83 (65%)	50 (91%)	
Graduate	50	27%	45 (35%)	5 (9%)	
LARC Obtained[b]					<0.0001[a]
On-campus clinic	44	24%	41 (32%)	3 (6%)	
Off campus clinic	139	76%	87 (68%)	52 (94%)	
Relationship Status					0.78
Long-term, monogamous	118	52%	86 (53%)	32 (51%)	
Dating	54	24%	37 (23%)	17 (27%)	
Not in a relationship	54	24%	40 (24%)	14 (22%)	
Ever Pregnant					0.32[a]
Yes	7	3%	5 (3%)	2 (3%)	
No	219	97%	158 (97%)	61 (97%)	
Insurance Coverage					0.27[a]
Yes	216	96%	156 (96%)	60 (95%)	
No	10	4%	7 (4%)	3 (5%)	

[a] Due to small cell size, Fisher's Exact Test conducted.
[b] Among those who are currently in college.
[c] This category includes two participants that identified as either American Indian or Pacific Islander.

Table 8. Previous Methods of Birth Control Used by LARC Type[a,b]

Previous Birth Control Method	IUD N (%)	Implant N (%)
Condoms	148 (66)	60 (27)
Pill	115 (51)	40 (18)
Withdrawal	73 (32)	24 (11)
Abstinence	35 (16)	8 (4)
Nuvaring	10 (4)	3 (1)
Birth control patch	6 (3)	6 (3)
Depo-Provera	10 (4)	6 (3)
Implant/IUD[c]	4 (2)	3 (1)
Spermicide	5 (2)	2 (1)
Natural Family Planning	8 (4)	6 (3)
Diaphragm	3 (1)	0 (0)

[a] Survey item was a "select all that apply" question. Counts do not equal 100.
[b] There were more IUD users in the sample compared to implant users. This resulted in the number of times a method was selected to be greater in the IUD column compared to the Implant column.
[c] Implant option only displayed for current IUD users and vice versa.

Research question 1: Validity, reliability, and normal distribution. The Interpersonal Influences Scale was used to determine if differences in interpersonal influence existed between women who used the IUD versus the implant. This scale contains six items with 5-point, Likert-type response options. A CFA was conducted and Cronbach's alpha was calculated to determine the validity and reliability of this scale within the current sample. For the CFA, the RMSEA=0.22 and the CFI=0.81, indicating poor model fit. Additionally, Cronbach's alpha was .59, indicating poor internal consistency.

As described in Chapter 3, an assumption of MANOVA is that the data are normally distributed. The Shapiro-Wilk test of normality was conducted and the probability for each item in the scale was less than 0.05, denoting non-normal data. A log transformation and a square-root transformation were conducted, but the data remained non-normal. MANOVA is robust to violations of normality if the sample size is greater than 30 and the groups are approximately equal. The non-parametric Mann-Whitney test was also conducted to confirm the findings from the MANOVA (J. Beckstead, personal communication, March 13, 2019).

Research question 1: Frequencies, MANOVA, and Mann-Whitney Test. The six

items used to answer part of the first research question asked whether the participant's choice

to use the IUD or implant was influenced by other women, female family members, female

friends, sexual partner, relationship status, and health care provider. By asking about the

influence of various social network members, these items aligned with the SCT constructs of

observational learning, normative beliefs, social support, and opportunities and barriers. The

frequencies of responses by LARC type are presented in Figures 2 and 3. Nearly two-thirds of

the entire sample responded that their health care provider was an important influence in

choosing LARC. This was the most commonly reported influence followed by other women

(54%), relationship status (44%), female friends (40%), female family members (20%), and

sexual partner (17%).

Results of the MANOVA, MANCOVA, and ANOVA are presented in Table 9. At a

conventional significance level of $p < 0.05$, none of the results were significant. However, using a

significance level of $p < 0.10$, notable findings were present. At this significance level, there was

a difference between IUD users and implant users in regards to their interpersonal influences.

This finding remained after controlling for the covariates of race and relationship status, i.e.

removing the effect of these covariates from the model did not change the results. However,

removing the effect of the covariates of Hispanic ethnicity, age, and college student status

caused the p-value to be greater than 0.10. This indicates that these variables are partly

responsible for this notable finding.
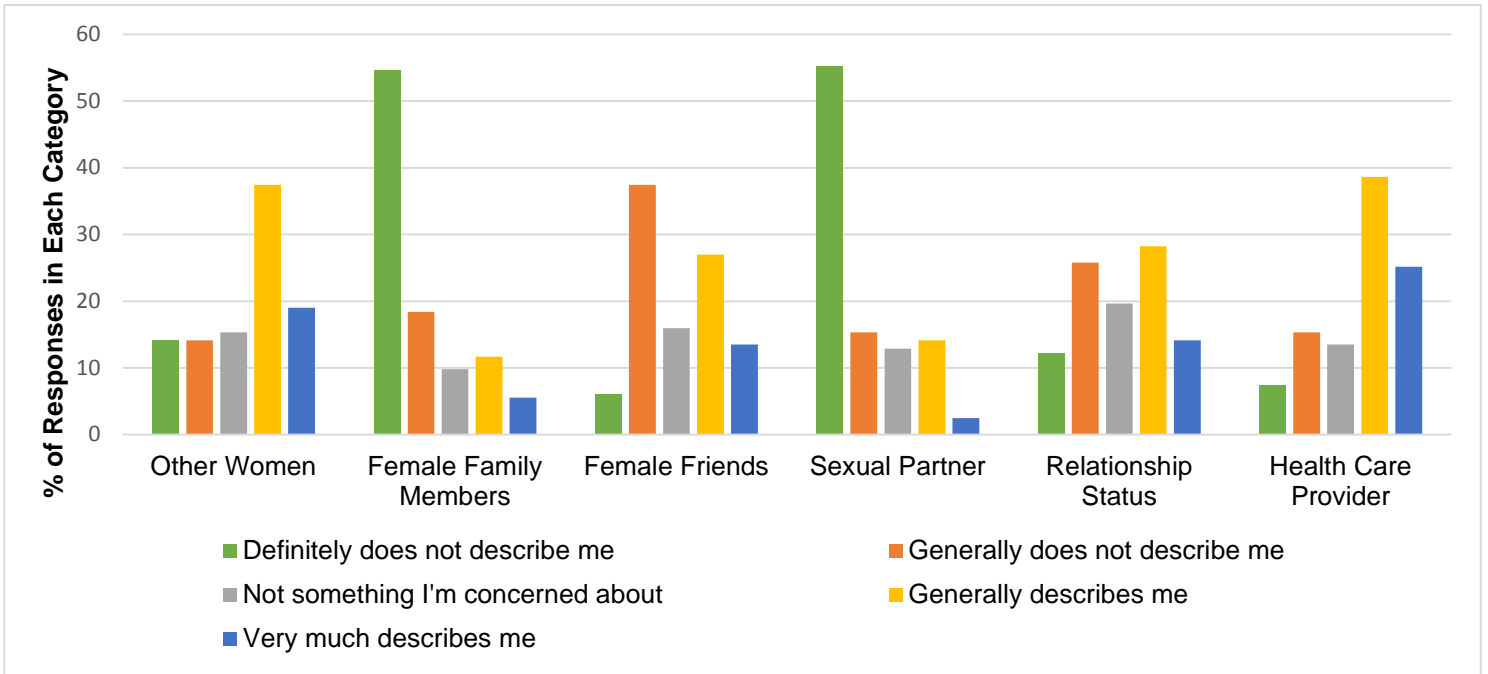
Figure 2. Percent Response for the Interpersonal Influences Scale among IUD Users (N=163)
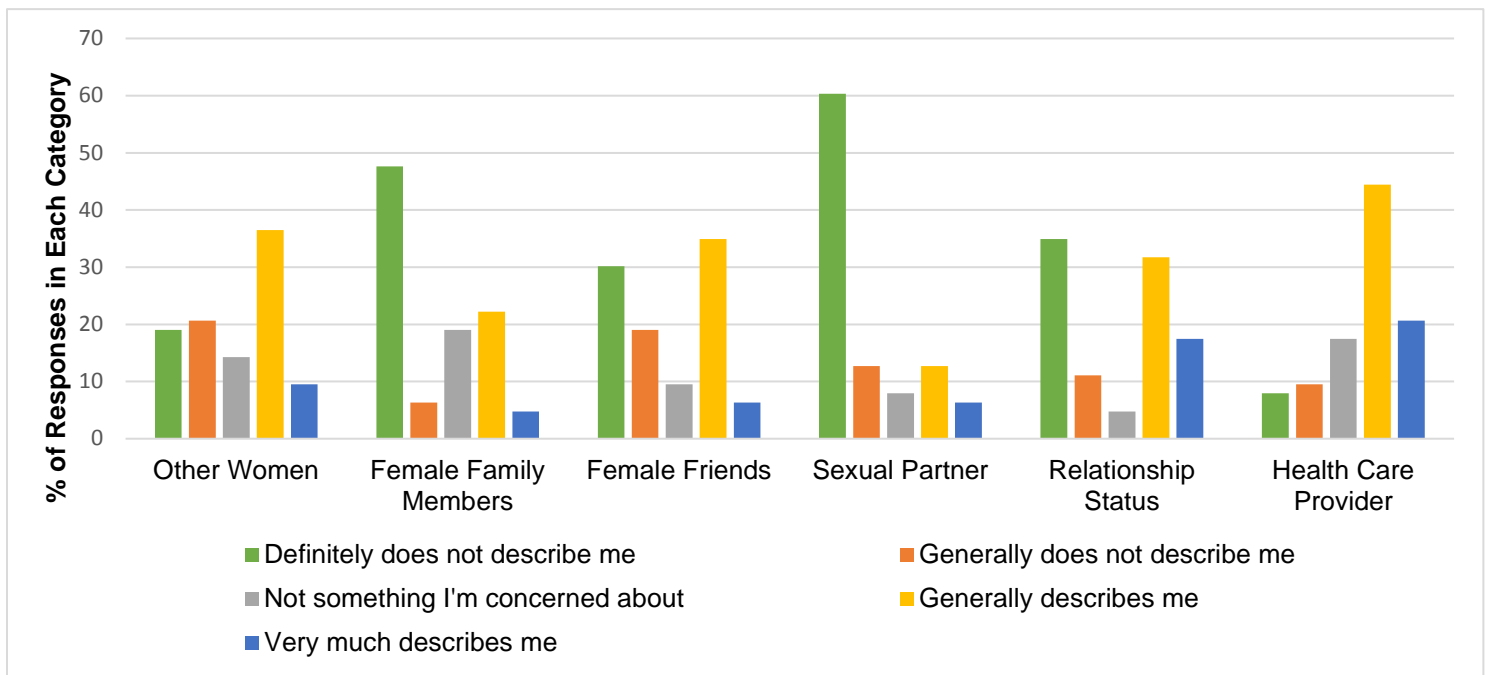
Figure 3. Percent Response for the Interpersonal Influences Scale among Implant Users (N=63)

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Table 9. Results of MANOVA, MANCOVA, and ANOVA

Analysis	Test Statistic[a]	P-value
MANOVA	0.05	0.08[b]
MANCOVA		
Race	0.05	0.08[b]
Hispanic Ethnicity	0.04	0.13
Age	0.04	0.18
College Student	0.04	0.12
Relationship Status	0.05	0.06[b]
ANOVA		
Female Family Members	3.29	0.07[b]
Female Friends	3.75	0.05[b]
Other Women	3.44	0.07[b]
Sexual Partner	0.004	0.95
Relationship Status	1.02	0.31
Health Care Provider	0.006	0.94

[a] For MANOVA and MANCOVA, Pillai's Trace is reported. For ANOVA, the F Value is reported.
[b] Significant at $p < 0.10$

The MANOVA was followed-up with the univariate ANOVA. As in the MANOVA, no significant findings were found at the $p < 0.05$ significance level. Using a $p < 0.10$ significance level, there were notable differences between IUD users and implant users in regards to the influence of other women, female family members, and female friends on choice to use LARC. The response options for the Interpersonal Influences Scale were coded from 1 to 5, with 1=Definitely does not describe me and 5=Very much describes me. A greater mean value indicates that the interpersonal factor had more influence on LARC initiation. Examining the location of the means, women who use the IUD had a greater mean value for the influence of other women compared to implant users. This corresponds to 56% of IUD users reporting that they were influenced by other women compared to 46% of women using the implant. For the influence of female friends, more implant users (50% vs. 43%) reported "definitely does not describe me" causing the mean value for implant users to be significantly lower compared to the mean value for IUD users. For the influence of female family members, 27% of implant users reported being influenced by female family members compared to 17% of IUD users resulting in

a larger mean value for implant users. Due to the non-normal data, the results of the ANOVA were compared to the results of the Mann-Whitney test. The only difference was for the influence of female family members. For this question, the Mann-Whitney p-value was 0.11.

Research question 1: Bivariate analyses. Nine other items on the survey also measured the SCT constructs of observational learning and normative beliefs. Four items measured where participants obtained the most information about the IUD/implant and what was their most trusted source of information for the IUD/implant. Response options were the following: friends, partner, mother or father, siblings or other relatives, health care provider, internet, books/magazines/pamphlets, TV/radio, school, other, or I did not receive information about the IUD/implant. Participants reported receiving the most information about the IUD from their health care provider (44%) or the internet (33%). Friends and family as sources of information about the IUD were reported by 10% and 6% of participants, respectively. Fourteen percent of those using the implant reported receiving no information about the IUD. For the most trusted source of information about the IUD, health care provider (67%) and the internet (17%) were again the most prevalent.

A similar pattern was found for implant information sources. Women reported receiving the most information about the implant from their health care provider (39%) and the internet (27%), followed by friends (18%) and family (4%). Thirteen percent of women using the IUD reported receiving no information about the implant. The most trusted source of information about the implant came from health care providers (65%), followed by the internet (11%), friends (9%), and family members (2%). In regards to normative beliefs, three questions asked participants about the attitudes and behaviors of their friends and family (Table 10). Responses were similar between groups (IUD vs. implant) and no significant differences were found.

Research question 2. The second research question for Phase I focused on understanding if differences existed between IUD users and implant users with regards to the SCT constructs of knowledge, outcome expectations, and self-efficacy (Table 11). The majority of women believed that pregnancy should be planned (66%) and reported having high self-efficacy to avoid an unintended pregnancy (83%). A minority of women reported that avoiding pregnancy was not important and that they would be pleased to experience an unplanned pregnancy. These two variables were then used to measure pregnancy ambivalence. If a woman reported that it was important to avoid pregnancy and she reported that an unintended pregnancy would be upsetting, then the participant was categorized as unambivalent. If the participant provided conflicting responses to these questions, then she was categorized as being ambivalent about an unintended pregnancy. Twelve percent of IUD users and 10% of implant users were ambivalent about pregnancy. No significant differences were found by LARC type. Among participants categorized as ambivalent, 64% (N=16) were either married or in a long-term monogamous relationship (p=0.02). Five participants were dating and four participants were not in a relationship. Additionally, participants who were ambivalent were significantly less likely to be college students compared to those who were not ambivalent (OR=0.36, 95% CI: 0.15-0.89).

Table 10. Normative Beliefs by LARC Type

Question	Agree N (%)	Disagree N (%)	p-value
Many friends have had unplanned pregnancies			0.91
IUD users	53 (33%)	110 (67%)	
Implant users	21 (33%)	42 (67%)	
Friends think it's important to use highly effective birth control			0.92
IUD users	138 (85%)	25 (15%)	
Implant users	53 (84%)	10 (16%)	
In my family, it's unacceptable to have a child outside of marriage			0.76
IUD users	92 (56%)	71 (44%)	
Implant users	37 (59%)	26 (41%)	

Participants were also asked questions regarding their knowledge of both the IUD and implant. Women who were using the IUD were more likely to report knowing "a lot/everything" regarding the IUD compared to women who were using the implant (OR: 19.89, 95% CI: 9.52-41.52). Likewise, women who were using the implant were more likely to report knowing "a lot/everything" of the implant compared to IUD users (OR: 8.45, 95% CI: 4.22-16.92).

Table 11. Knowledge, Outcome Expectations, and Self-efficacy by LARC Type

Variable	IUD N (%)	Implant N (%)	p-value
Knowledge of IUD			<0.0001
Knows a little/nothing	17 (10%)	44 (70%)	
Knows a lot/everything	146 (90%)	19 (30%)	
Knowledge of Implant			<0.0001
Knows a little/nothing	112 (69%)	13 (21%)	
Knows a lot/everything	51 (31%)	50 (79%)	
Pregnancy should be planned			0.80
Strong belief in planned pregnancy	109 (67%)	41 (65%)	
Moderate/weak belief in planned pregnancy	54 (33%)	22 (35%)	
Self-efficacy to avoid unintended pregnancy			0.96
High self-efficacy	135 (83%)	52 (83%)	
Moderate/low self-efficacy	28 (17%)	11 (17%)	
Importance of pregnancy avoidance			0.27[a]
Important	158 (97%)	59 (94%)	
Not important	5 (3%)	4 (6%)	
Pregnant today, how would you feel			1.00[a]
Upset	151 (93%)	59 (94%)	
Pleased	12 (7%)	4 (6%)	
Pregnancy ambivalence[b]			0.65
Ambivalent	19 (12%)	6 (10%)	
Not ambivalent	144 (88%)	57 (90%)	

[a] Due to small cell size, Fisher's Exact Test was conducted.
[b] This variable was created from the previous two variables, "Importance of pregnancy avoidance" and "Pregnant today, how would you feel".

Phase II: Qualitative Analysis

The purpose of Phase II was to explore why women chose to use their LARC method and why they chose one LARC method over the other. Little is known about why women who have experience with LARC chose to use this method of birth control. In-depth interviews were conducted to gain knowledge on this understudied topic, to measure SCT constructs not present in Phase I, and to triangulate the data. In this phase, the SCT constructs of intentions, observational learning, knowledge, social support, opportunities and barriers, outcome expectations, reinforcement, behavioral skills, self-efficacy, and reciprocal determinism were addressed. This phase of the study had one aim and three research questions.

Description of Sample. All women who completed the survey in Phase I were eligible to participate in the Phase II interviews. Among the women who volunteered to be interviewed (N=134), 52 were initially contacted (24 implant users and 28 IUD users). Twenty-two participants did not respond. The final analytical sample consisted of 30 women — 15 IUD users and 15 implant users. Demographic characteristics for the entire interview sample are presented in Table 12. The majority of interview participants were white (70%), 22-25 years old (73%), and currently in college (90%). Among college students, 60% were undergraduates and 40% were graduate students. The three participants who were not currently in college had either a four year degree (N=1) or a graduate degree (N=2). All interview participants had health insurance when they began their LARC method. Phase II used quota sampling to ensure equal number of IUD users and implant users. Table 13 shows demographic characteristics of interview participants by LARC type. Similar to the eligible sample, women using the implant in the interview sample were more racially and ethnically diverse and obtained their method at an off campus clinic in greater frequency compared to women using the IUD.

Table 12. Demographic Characteristics of the Eligible Sample and Interviewed Sample

Variable	Eligible Sample (N=226)	Interviewed (N=30)
LARC Type		
IUD (any)	163 (72%)	15 (50%)
Copper IUD	24	2
Hormonal IUD	139	13
Implant	63 (28%)	15 (50%)
Race		
White	168 (74%)	21 (70%)
Black	21 (9%)	3 (10%)
Asian	20 (9%)	5 (17%)
Multiracial	17 (8%)	1 (3%)
Hispanic		
Yes	45 (20%)	3 (10%)
No	181 (80%)	27 (90%)
Age		
18-21 years	68 (30%)	8 (27%)
22-25 years	158 (70%)	22 (73%)
College Student		
Yes	183 (81%)	27 (90%)
No	43 (19%)	3 (10%)
Student Type[a]		
Undergraduate	133 (73%)	16 (60%)
Graduate	50 (27%)	11 (40%)
LARC Obtained[a]		
On-campus clinic	44 (24%)	7 (26%)
Off campus clinic	139 (76%)	20 (74%)
Relationship Status		
Long-term, monogamous	118 (52%)	14 (47%)
Dating	54 (24%)	9 (30%)
Not in a relationship	54 (24%)	7 (23%)
Insurance Coverage		
Yes	216 (96%)	30 (100%)
No	10 (4%)	0 (0%)

[a] Among current college students.

Table 13. Demographic Characteristics of Interviewed Sample by LARC Type (N=30)

Variable	IUD (N=15)	Implant (N=15)
Race		
White	12 (80%)	9 (60%)
Black	1 (7%)	2 (13%)
Asian	2 (13%)	3 (20%)
Multiracial	0 (0%)	1 (7%)
Hispanic		
Yes	1 (7%)	2 (13%)
No	14 (93%)	13 (87%)
Age		
18-21 years	4 (27%)	4 (27%)
22-25 years	11 (73%)	11 (73%)
College Student		
Yes	14 (93%)	13 (87%)
No	1 (7%)	2 (13%)
Student Type[a]		
Undergraduate	5 (36%)	11 (85%)
Graduate	9 (64%)	2 (15%)
LARC Obtained[a]		
On-campus clinic	6 (43%)	1 (8%)
Off campus clinic	8 (57%)	12 (92%)
Relationship Status		
Long-term, monogamous	6 (40%)	8 (53%)
Dating	4 (27%)	5 (34%)
Not in a relationship	5 (33%)	2 (13%)

[a] Among current college students.

Research question 3. This research question focused on understanding the key factors to LARC initiation as perceived by participants. Results are presented according to the construct categories of SCT. Observational learning, normative beliefs, social support, and opportunities and barriers are categorized under socioenvironmental factors. Self-efficacy, outcome expectations, and knowledge are within personal cognitive factors. Behavioral factors consists of the constructs of behavioral skills, intentions, and reinforcement.

Socioenvironmental factors.

Observational learning. The most common source of observational learning was through friends (N=23) followed by family (N=10), social media (N=10), and health care provider (N=5). Observational learning was present in 29 out of 30 participants. All of these participants felt that

observational learning was an important factor in their choice to use LARC and many participants reported multiple sources of observational learning from friends, family, health care provider and/or social media.

> A close friend of mine, who was the first person who told me about it [IUD], she talked about how much she liked it, and how her periods have pretty much altogether stopped, which is also something I thought was nice, because she informed me also of another friend that uses it, and both of these friends I entirely trust, and I would think they're both very credible sources. And then I asked others, another friend as well, and everybody mostly has great things to say after the first couple months, that now it's worth it. (P15, IUD)

> My aunt had the implant, and she liked it…it wasn't something that you had to keep thinking about, you got it and it was a one time thing and it was done for 3 or 4 years…I just asked her does it hurt when the procedure is done? How were the side effects or what kind of side effects did she have? Did she think it was worth it? Did she think ... in regards to regulating her periods, did it do the job that she wanted? And that did she think that it could possibly be a good option for me? (P20, Implant)

Five of the participants who engaged in observational learning through social media reported that they did not know anyone personally who was using LARC. With these participants, reading and/or viewing the experiences of other women through social media was important in their choice to use LARC.

I didn't have a personal person to talk to who had an implant so I just heavily relied on peoples experience on Reddit. And I did go through a lot of different comments, different threads. And a lot of their experiences and response stories kind of pushed me to finally make the decision…their stories kind of just made me, okay let me just try to implant. (P29, Implant)

I know that one thing I was really nervous about before getting it was just the procedure itself, it sounded really scary, it sounded very painful…I was just very nervous for the pain. And it really helped like literally reading in the comment section of [Bedsider] articles about IUDs, women who were saying like, "Yes, it was hard. Here's exactly what it was like, but I'm a year and a half in, and I'm so happy I never have to think about my birth control. I never have to worry did I take my pill today? Am I gonna get pregnant?" And that really convinced me, seeing that so many people were saying that they were really happy that they made that choice. It made me feel like I would be really happy if I made that choice. (P11, IUD)

Although not reported as often, women whose health care provider shared their personal experiences with LARC found that to be reassuring.

When I talked to the midwife at the time, she told [me in] the past she had [the implant], so that made me feel a little bit better about it. (P3, Implant)

She's [my provider] been [using the IUD] for a couple years and she hasn't had any problems with it … she was fairly young. She was probably five years older than me. I just thought maybe it'd be a good option for me as well. (P6, IUD)

Several participants discussed that — since initiating LARC — they now share their positive experiences with their friends and/or family members thereby becoming an opportunity for observational learning in their own social network.

> I told everyone that they need to get it [IUD] 'cause it's the best form of birth control, but yeah … not shy about sharing how great it is. (P12, IUD)

> *Normative beliefs.* Participants reported varying normative beliefs from the friends, family, and/or partner regarding LARC initiation. Participants did not perceive that either negative or positive normative beliefs from those who had no LARC experience influenced their choice.

> Interviewer: Why wasn't your mom sure about it [IUD]?
>
> Participant: It's never something that she used so she didn't really know anything about it.
>
> Interviewer: Did you talk with her about what it was and why you wanted it? Did you have a conversation with her like that?
>
> Participant: Oh, absolutely, yeah. Like, I'm an adult, so it was my decision, but I still wanted to talk about that with her. (P13, IUD)

> I had talked to my other friends about it, but most of my other friends are on the pill … They were like, "I'm scared to do it. I don't wanna. I'm happy to just take the pill. It seems easier." But, I can't be trusted [to take the pill]. (P30, IUD)

Several participants reported that their mother's had negative beliefs towards LARC methods in general due to the controversial histories of the previous versions of LARC.

My mom was like, "I've heard a lot of bad things about it." She was talking about the older version of it. The new and improved one is out now, so I was like, "I don't think that really applies". (P26, Implant)

Eighteen participants described having a conversation with their partner about their choice to use LARC. Almost all (N=17) reported that their partner had positive beliefs regarding LARC initiation.

He [my partner] hadn't even heard of implants before I mentioned it, so I had to do a little bit of educating him about it and what it was like, and he seemed to respond positively to it too. He knew taking the pill every day didn't always go on schedule, so he thought that it would be a good fit based on my description. (P19, Implant)

However, many participants reported that regardless of their partner's beliefs that they would do what was best for them.

Well like personally I feel like it's my body, so I don't care what they [my partner] want. If I don't want to take the pill or have the implant then that's not up to them. Like he didn't even know I got it to be honest. I didn't tell him until after. So it was already done and then had already been re-checked. 'Cause he didn't need to be a part of that [decision]. (P1, IUD)

Social support. The participant's mother or the participant's partner — if they were in a relationship — were the most common sources of social support. Social support received from the participant's mother consisted of navigating health insurance issues, assisting them in

researching LARC online, finding an OB/GYN, accompanying them to the consultation and/or insertion, and asking the health care provider questions regarding side effects of LARC.

> My mom and I kind of came to a decision that I should get on some kind of birth control before leaving for college. I was a little worried about doing something like the pill because I'm very, very forgetful. So, I knew I didn't wanna do that. But I didn't know really about my other options. So, we [my mom and I] went to my gynecologist at the time. (P11, IUD)

Similar to normative beliefs, participants did not perceive lack of social support to change their intention to initiate LARC. Eight participants reported coming from conservative and/or religious families who held negative normative beliefs regarding pre-marital sex. Because of this, these participants realized that they could not rely on social support from their families in their choice to initiate LARC.

> I didn't feel like I had a lot of support outside of the healthcare system because my background ... both my parents are very strict and Sicilian, first generation … And I didn't really feel like it was something that I could speak to my mom about. (P30, IUD)

Social support received from the participant's partner entailed providing transportation to/from the health care provider's office, telling the participant that they would take care of them after the insertion procedure, and emotional support during the participant's decision-making process.

He [my partner] was really involved with my [decision]. He was the primary person that I talked through my anxieties, my concerns about, he was my primary person I talked to about the whole decision. (P25, IUD)

Barriers. Nineteen participants experienced barriers to LARC initiation. Barriers that participants experienced were issues with health insurance (N=2), having to be referred to another provider (N=4), health care providers engaging in non-evidence based practice behaviors (N=14; defined below), and an unusually long delay (3 weeks or longer) between the consultation appointment and the insertion appointment (N=4). Five participants experienced multiple barriers to LARC initiation.

While discussing the steps taken to obtain the implant, one participant summarized experiencing both health insurance issues and an unusually long delay in obtaining her birth control implant.

I called my insurance maybe 2-3 times and every time they said that I'm covered and that … they sent the information to the doctors and now it's the doctors turn to go order it. And I don't know what happened there with the doctors office 'cause they kept saying they had to wait to order. Or it wasn't in stock, it's not in [the] office ready. So I kept, I called the doctors a few times just to keep checking on it. 'Cause it did take a month and they didn't give me a day when it was gonna be ready. (P29, Implant)

Four participants reported needing to be referred to an OB/GYN's office because their primary care provider or pediatrician did not provide LARC. Two of the participants were frustrated at having to be referred to another provider, while the other two did not seem to view it as a barrier. Here one participant discusses receiving a passive referral to LARC providers.

He [my primary care provider] gave me a list of places where I could go get it done because they didn't do it in our office, and I ended up going to Planned Parenthood to get it placed. (P20, Implant)

The most frequently mentioned barrier was providers engaging in non-evidence based practice behaviors. These behaviors included requiring participants to be menstruating for IUD insertion, requiring participants to take misoprostol prior to IUD insertion, failure to present contraceptive options in a tiered fashion based on typical use failure rates, and providing inaccurate information regarding LARC methods, e.g. IUD's are only for women who have had a baby.

Here a participant describes how she initially wanted an IUD, but was told incorrect information by her health care provider such as IUD's are only for women who have had a baby, IUD's only last for one year, and the implant is more effective than the IUD.

I was going to get the IUD. But when I went and talked to my nurse practitioner about it, she said that if I've never had a child before, she was worried it would hurt a lot … She said that the size of IUD that she would give me would only last a year and in that amount of time, it wouldn't be a benefit at that point. It wouldn't last long enough, and the implant would be more effective. (P18, Implant)

This participant also experienced issues with health insurance and had to be referred from her primary care doctor to an OB/GYN clinic.

Interviewer: Had you ever dealt with anything like this before, where you had to overcome similar issues to get access to healthcare that you needed?

Participant: I don't think I've ever had such a headache as that experience. Like, whenever I wanted my pills, I went in, I said, "I want the pills", they said, "okay, here you go". I never expected such a lengthy processing, trying to get the IUD and trying to get the implant. But that long process was very back and forth between different clinics, the different tasks, then some people said it wasn't covered, my insurance said it was covered. It was just a very long, kind of a headache. (P18, Implant)

One participant — who is currently in college — described declining to take misoprostol prior to her insertion appointment, and she was not menstruating on the day of the appointment.

My journey with the IUD was a frustrating one. When I went in for my birth control refill in March 2018 I asked the doctor's advice, she wasn't a doctor, she was actually an ARNP. I asked her should we do this and so shared with me some things I already knew like what the insertion procedure looked like, how many years it would be valid for, and then eventually she got me set up with an IUD. Then when I went to the actual doctor's office the day of, I ended up, she prescribed me, I forget the name of it, it softens the cervix [misoprostol], it's often used to induce labor and she prescribed me that and then I did some research on my own about the fact that it wasn't very effective and it makes things worse for the IUD insertion. I ended up not taking it and when I got to the doctor's office and they were upset that I wasn't on my period. I told them I wasn't going to be on my period and then they told me how painful and difficult it was going to be to insert it and at that point I ended up backing out and that was in April 2018. (P25, IUD)

After having this experience, the participant ended up traveling several hours to her hometown to obtain the IUD from her usual OB/GYN.

Finally, participants discussed asking their provider about birth control and their provider immediately offering a non-LARC method of contraception such as the pill or the patch instead of discussing all of the options from most effective to least effective.

> I could tell that she [my provider] wanted me to like, just do the patch or whatever, but she did go ahead and explain everything to me … once I told her that … I wasn't thinking about the patch. (P23, Implant)

> It was my annual well-woman's exam. And then I just mentioned to my doctor that I wanted birth control because she had a chart on the wall with all of the birth control methods. She rolled out the pill, but I said a long-lasting method, then we talked about the implant or the IUD. (P14, Implant)

Some participants also reported feeling as if their provider was advocating for one specific type of birth control regardless of whether that was what the participant wanted. This participant wanted a long-term, low maintenance method of birth control, but was uncomfortable with the idea of the IUD.

> All he [OB/GYN] recommended for me was IUD's … even after I asked if there were different alternatives, he said, "Not really". (P8, Implant)

This participant then asked a different provider at the same clinic about other non-IUD, long-term options and was again told that the IUD was the only option. She then discussed her situation with a friend who had just recently obtained the implant and was recommending it to the participant. This participant then went back to the provider and told her provider that she wanted the implant.

I went to my gynecologist again and then I mentioned that [the implant] to her and she was like, "Yeah, I mean we could do that too if you're more interested in that." (P8, Implant)

Opportunities. All participants reported that having health insurance that covered contraception afforded them the opportunity to initiate LARC. Twelve participants reported having comprehensive discussions with their providers regarding all of the contraceptive options including side effects and effectiveness.

She [nurse practitioner] sat down and did all the things that you're supposed to do with patients to make them feel like they're being heard … She went over all the different options, she really took the time to make sure that I understood things ... And so I trusted her advice a lot. And I just appreciated that she had taken the time to kind of consult me about all the different options. (P30, IUD)

Eight participants discussed having a short wait time (1-2 weeks) between the consultation and the insertion and another eight participants were offered same-day insertion. Among the eight participants who were offered same-day insertion, seven decided to move forward with the LARC insertion. One participant declined the offer of same-day insertion because she wanted more time to think over the decision. The seven participants who obtained LARC on the same-day as their consultation appointment all reported that the opportunity for same-day insertion made the process of getting LARC easier.

Then I set up an appointment with my gyno. I believe it was the time for an annual exam too, so I just talked to her then about that as well. Then yeah, the day that I went in for

my appointment, we decided on the IUD and I got it inserted that day... It was a pretty

easy process. (P4, IUD)

Personal cognitive factors.

Knowledge. All interview participants reported seeking knowledge regarding LARC from

a variety of sources. The most common sources of information were their health care provider

(N=30) and/or the internet (N=24). Websites most often visited were Planned Parenthood,

Bedsider, WebMD, and the LARC manufacturer's website.

I had a consultation with my gynecologist. It was pretty comprehensive, and it was a

good three minutes of her describing each [method of contraception] and letting me ask

questions, and her just saying what she thought were benefits or not benefits for each

type, or each one. So she talked about the shot, the pill, the implant and the IUD, and all

the different types of IUDs. (P15, IUD)

So I had looked at a few websites, there's Bedsider and Scarlateen are the bigger ones,

and then Planned Parenthood kind of has, like database too, and so I just kind of looked

at different types of birth control. (P9, Implant)

Outcome expectations. All participants discussed considering the physical, social, and/or

self-evaluative consequences of initiating LARC. Reflecting on the outcome expectations of

LARC compared to their current method of birth control was the first step in considering LARC

as an option. Physical consequences were often mentioned such as the side effects (positive

and negative), the low maintenance characteristics, and/or length of effectiveness of LARC.

I also like that the [hormonal] IUD only had a small amount of hormones that were concentrated in my cervical area as opposed to just going through my whole body. And I thought that was appealing just so that I wouldn't have to deal with some of the issues that my friends had had with hormones like gaining weight, losing weight, getting acne, getting rid of acne, all those things. (P11, IUD)

Participants also discussed judging the social consequences of LARC initiation such as the ability to finish school and/or pursue a career.

I just finished school, I'm looking for a job. [I'm in my] mid 20's … having a little more protection because I'm not ready for that responsibility [having a baby] yet. (P29, Implant)

Most participants (N=23) began considering LARC as an option because they were inconsistent with their previous method of birth control, e.g. forgetting to take the pill, missing a Depo-Provera shot, or inconsistent condom use. These participants were reflective on how their behaviors put them at risk for unintended pregnancy and how they wanted to change their behavior to better align with their internal standards, i.e. self-evaluative outcome expectations.

And I was honest with myself, not necessarily with others, but I was honest with myself about how at the time I wasn't as diligent about using condoms and protection. So, I knew that although I hoped my behaviors would change and that I would make smarter choices. I also needed to be realistic and that I needed to get on birth control because I was interested in dating people, hooking up, whatever I wanted to do at that time, and that I needed to protect myself. (P11, IUD)

Self-efficacy. As discussed in chapter 2, self-efficacy is formed through the following mechanisms: 1) mastery experience; 2) vicarious experience; 3) social persuasion/support; and 4) emotional arousal. This study examined self-efficacy formed through the first three mechanisms.

All participants had used other forms of contraception prior to LARC initiation and many had a regular health care provider that they had seen previously (mastery experience). Several participants (N=17) reported that having experience with a familiar health care provider made it easier to discuss LARC.

> I actually just went straight to the Planned Parenthood route just because I used them before to access birth control… I think just being familiar and being aware of the process through Planned Parenthood, like going in I knew what their intake office was like, that kind of procedure. So I think like going into that, I knew how to prepare ahead of time … So just being familiar with that definitely helped. (P19, Implant)

> I have the sweetest GP [general practitioner] of all time, she just sat down with me just going over every single method and I feel like she kind of knows me. When I go into her office, she knows my name, I know the charts there, but she knows my relationship status, everything along those lines. (P2, IUD)

As discussed in the section above, observational learning was a key factor in LARC initiation. Women highly valued hearing and observing the experiences of other women who had experience with these methods. Subsequently, this increased their self-efficacy to initiate LARC through the mechanism of vicarious experience.

I knew my sister and my mom had experience with it [the implant]…. I would say that

they did have some influence on me just because it was something familiar. I knew

people that had it, so it didn't seem as scary. (P22, Implant)

Participants who reported social persuasion/support from those in their social network did feel

that it increased their self-efficacy to obtain LARC.

Interviewer: Was there anyone throughout this whole process who helped you to

overcome these barriers?

Participant: Definitely my parents. My insurance is through them, so they were very

helpful in helping me figure out who to call, and different things I had to deal with. (P18,

Implant)

However, several women discussed lack of social persuasion/support and this having no effect

on their self-efficacy. Below is a quote from a participant whose mother had previously told her

that she did not want her to get an IUD due to incorrectly believing that IUD's cause cancer.

I kind of came home from winter break and I told my mom that I had gotten it over the

semester and that it was working fine. She kind of was taken aback. I kind of rationalized

it and I was like "I'm and adult and I can make my own decisions I've done research,"

yeah, so I kind of just ... I told her I had done it and she couldn't really do anything about

it so she didn't say much. (P7, IUD)

Behavioral factors.

Intentions and behavioral skills. All women set an intentional goal of obtaining LARC and then used their behavioral skills to initiate conversations with their health care providers and navigate the health care system.

> So I first heard about it a long time ago when I started going to the gynecologist and then it became a reality or something I actually wanted to do for a couple years when my friends started getting them. And then I was gonna be moving in a few months so at that point was when I decided I actually wanted to get it 'cause I really liked the gynecologist in the town I was in, so I made a consultation appointment with her and she gave me all the information and I decided it was a good fit for me and my lifestyle, and so she ordered it and I went in and I got it. (P21, IUD)

When asked to summarize the steps she took to initiate LARC, this participant discussed the behavioral skills she used to attain her goal of getting an IUD.

> Step one, was to hear about it from my health care providers. Step two, was to talk about it with other people and do a little bit of research on it myself. Actually, I should say step two was to check with my insurance company to make sure it was covered, which it was not the first time I went to do it. Then the step three was to find out more information and talk with others about it. And then I guess, next steps in terms of getting it, was to make the appointment, get the prescription that they gave me to take beforehand. Took that the night before and morning of and then went in for the procedure. (P10, IUD)

Reinforcement. The construct of reinforcement consists of rewards and punishments and is the origin of outcome expectations (Kelder et al., 2015). Rewards (perceived benefits of LARC) and punishments (perceived negative effects of LARC) were discussed in conjunction with judging the social and physical consequences of LARC initiation.

I actually just started a serious relationship, and last year I wasn't really in a relationship, and so I figured I don't want to be pregnant, and I would like to have sex without having to worry about becoming pregnant, now that I'm in a relationship. (P15, IUD)

…if it [IUD] falls out, it's whatever, if it perforates, it's not going to kill me… And the chances are so slim, that it's better that I try it, and have birth control for 5 years. (P2, IUD*)*

Other factors. Although not the focus of this study, a few (N=3) participants spontaneously mentioned the political climate as a key factor in deciding to initiate LARC. Participants were cognizant of the fact that without mandatory contraceptive coverage these methods would not be attainable for them.

The IUD could last five years, but you never know how long it's gonna be before I'm not able to get birth control for free, I'm gonna have to start paying for it. So that was under consideration, too. It was being able to afford it. (P15, IUD)

Interviewer: Is there anything else you would like to tell me about why you chose to use the implant?
Participant: Definitely with the political climate, I wasn't sure if my healthcare would be under attack. Because with how things were pulling, the anti-Planned Parenthood, anti-

reproductive health, I was concerned that I wouldn't be able to access a monthly birth

control pill just because I didn't know what my healthcare was going to be like at that

point, to have … a consistent kind of healthcare that would last for years, so I wanted to

get something that would last me years and I wouldn't have to worry about it. (P19,

Implant)

Reciprocal determinism. When socioenvironmental, personal cognitive, and behavioral

factors interact, this is termed reciprocal determinism and it was present among all interview

participants. For example, reinforcement, i.e. low-maintenance birth control (behavioral factors)

caused participants to make judgments (outcome expectations) and seek out information

(knowledge) about potential outcomes of LARC initiation. Outcome expectations and knowledge

were then influenced by observational learning.

I did some research on one (**knowledge**), and prior to that actually a few of my friends

mentioned that they were using the Nexplanon themselves and they like how long-

lasting it was (**observational learning**), you didn't have to worry about birth control, like

you usually would have to with the pill, so it was kind of interesting to me because

remembering to take the pill once a day sometimes doesn't always work out (**outcome

expectations/reinforcement**); I would forget or a schedule wouldn't line up, so that

really appealed to me. (P19, Implant)

Another example occurred when outcome expectations, knowledge, intentions, behavioral skills,

and observational learning dynamically interacted to bring about LARC initiation.

I found out about it [IUD] through my co-worker (**observational learning**), got interested

googled it (**knowledge**), I … set up the doctor appointment (**behavioral skills**) and

basically, I started out on the pill for I don't know a couple of months and I really don't

like the headaches and other side effects that I was getting and I went back to her and

said well I really wanted more, something better something I don't have to worry about in

college (**outcome expectations/reinforcement**), and she then set me up, my primary

[care provider] set me up with the gynecologist … and I came back in to get it

(**intentions/behavioral skills**). (P12, IUD)

Summary. Participants reported that observational learning, knowledge, outcome

expectations/reinforcement, opportunities, behavioral skills, and intentions were key factors in

LARC initiation. Additionally, participants had high self-efficacy formed through vicarious

experience and mastery experience to overcome barriers to LARC initiation. Normative beliefs

and social support were not reported to be as important. Participants who experienced negative

normative beliefs and/or lack of social support reported that this did not change their intention to

use LARC. Figure 4 depicts a conceptual model of LARC initiation based on the dominant

themes.
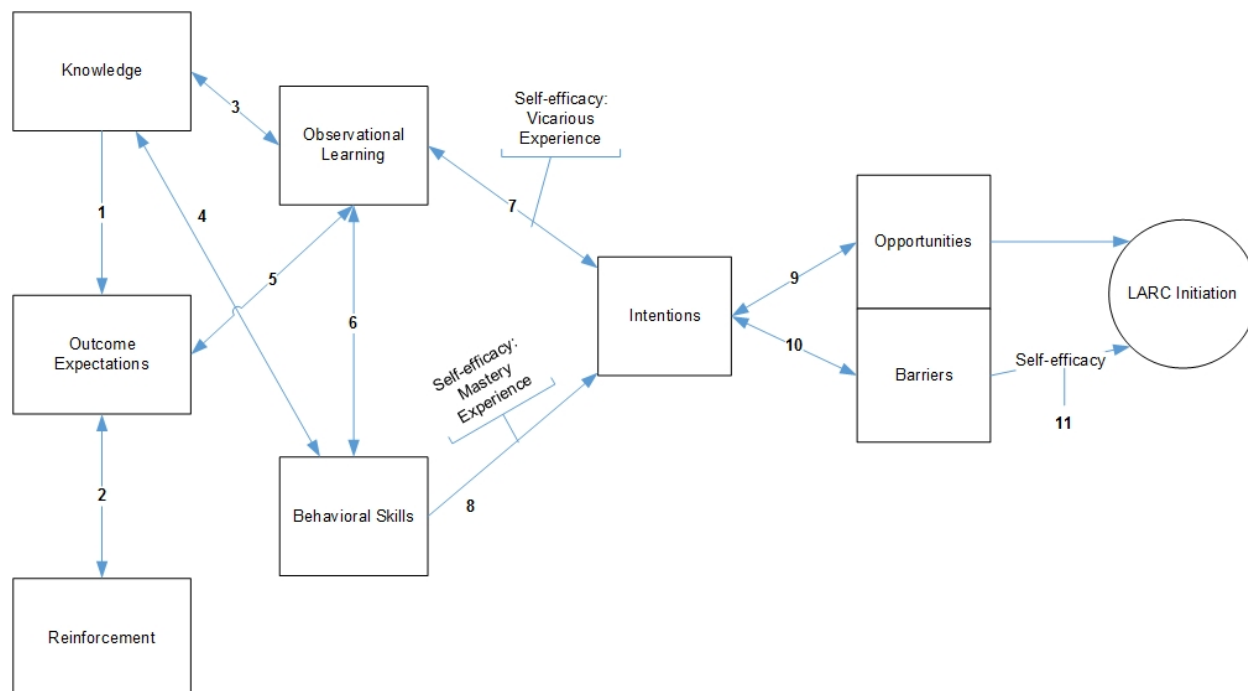
Figure 4. Conceptual Model of LARC Initiation among Study Participants, with Selected Quotes[a]

[a] Bidirectional arrow indicates reciprocal determinism.

1. Well I did some research on my own before I finally decided. I researched for about a month or so I felt like I was pretty informed and had enough information to make a good, informed, educated decision. (P20, Implant)

2. There wasn't really a way for me to forget this [the IUD] and somehow end up with an unwanted pregnancy. (P11, IUD)

3. When she [my coworker] came back she told me about the whole thing [IUD insertion] and how she doesn't get periods anymore and I was like that sounds really great! And then she told me that it lasts for 5 years and I was like well that sounds even better. (P12, IUD)

4. So at first it [IUD] was something I started thinking about, and from there I started doing independent research about it, like looking it up... And then I made an appointment with my gynecologist and I spoke with her about it. (P13, IUD)

5. One of my best friends got the implant a couple months beforehand. She was telling me how great it was and I was thinking about it. (P8, Implant)

6. I guess first off it was just doing the research of what was the best fit for me, and then taking [into consideration] of the non-hormonal versus hormonal and the time frame [length of effectiveness]. I kind of felt I narrowed it down, I was asking my friends who have IUDs their reactions, did they like it or not since they were on other birth controls as well before they switched, so just asking why they switched. (P27, IUD)

7. I didn't have a personal person to talk to who had an implant so I just heavily relied on peoples experience on Reddit. And I did go through a lot of different comments, different threads. And a lot of their experiences and response stories kind of pushed me to finally make the decision…their stories kind of just made me, okay let me just try to implant. (P29, Implant)

8. I went to my [doctor's office] where the nurse practitioner talked me through all the options, and so she gave me, when I decided on the implant, she gave me an entire pamphlet and I had to do a follow-up, go back, and schedule an appointment to actually get it implanted. So during that time that's when I researched about the implant a bit more. (P14, Implant)

9. **Interviewer**: Was there anything easy about getting the IUD?
   Participant: I guess the fact that my insurance covered all of it. I didn't have to pay for it. (P15, IUD)

10. So then I had to [wait] another month. But it was mainly just because [there was] such a tight window, that I could have it done in, and they kept scheduling me and my periods are very irregular so I would have an appointment and then two weeks later, I'm like, "Sorry, I still don't have it [my period] and we're going to have to push it [the appointment]." … so that was the hard part, just trying to find a day where she [my provider] was open and I was actually [on my period]. (P21, IUD)

11. **Interviewer**: How do you think you were able to overcome these barriers?
    Participant: I think just stubbornness. I think it was a lot of willingness to call up over and over, I don't think that someone who was as determined as me to change their birth control on this method, or start birth control on this method, would have gone through that many steps. Because I really wanted this. Because I was willing to go to all these departments, drive to the other places, call to make sure everything was covered, and had the discussion. I think anyone who wasn't as driven would just have said, "whatever, give me the pill". (P18, Implant)

Research questions 4 and 5. These research questions were concerned with examining differences between participants who use the IUD versus the implant in regards to intrapersonal and interpersonal level factors. Groups were similar in regards to outcome expectations, knowledge, self-efficacy, social support, observational learning, behavioral skills and intentions. There were differences in regards to opportunities and barriers due in part to the intrinsic differences between these methods. Barriers to IUD insertion included providers requiring women to be menstruating during the insertion appointment and to take misoprostol prior to insertion. Among the eight women who were offered same-day insertion, six were implant users. Additionally, two implant users were able to obtain their method through their primary care provider, whereas all IUD users had to go to either an OB/GYN or their student health clinic. Two implant users initially sought an IUD, but were told that they were not good candidates owing to their nulliparity. One IUD user reported that her nurse practitioner initially advised against Mirena due to the participant's nulliparity. However, the participant was very persistent on wanting a five-year IUD that would most likely stop her period.

> She [nurse practitioner] sat down with me and showed me the different kinds of IUD's and … that Mirena is best for people who had a baby and things like that and then they have smaller three-year ones … I right off the bat wanted the Mirena and I knew I wanted the Mirena when I came in because I had already done a tiny bit of research before I went in because I knew that it was a longer time period … So I definitely knew that that's what I wanted and we talked about it and she definitely made sure to mention the three year ones and the copper IUD but we did end up deciding on the Mirena in one. (P7, IUD)

Three implant users reported that their friends (non-LARC users) had negative normative beliefs towards the IUD and that this was a factor in their choice to use the implant.

> They [my friends] either were telling me like, "I heard that it [IUD] hurts. I've heard it has some issues." One was telling me that the IUD insertion actually breaks your cervix a little bit. And I was like, "I don't think that's true." But I mean, I don't know. (P8, Implant)

A dominant theme that emerged regarding why women chose one LARC method over the other was the theme of *Aversion*. Twenty-five participants reported having a strong aversion to the location of placement, insertion procedure, and/or some other intrinsic characteristic of the implant or IUD. Observational learning also played a part in a participant's aversion. Several women reported hearing or reading negative stories from LARC users about one of the LARC methods which further exaggerated their aversion.

The most common aversion among IUD users towards the implant was the location of placement. Nine women reported a strong aversion to being able to feel/see the implant in their arm. Other sources of aversion of IUD users towards the implant were the insertion procedure (N=2) and potential side effects and length of effectiveness of the implant (N=6).

> You know they told me that you might feel it in your arm and that kind of grossed me out a little bit, I wanted something that I didn't necessarily know was there. (P12, IUD)

> The thought of that [implant] kind of freaked me out. I wasn't familiar with the process, but I can imagine just injecting something into your skin. I wasn't very comfortable with that. (P4, IUD)

When asked why she chose the IUD over the implant, this participant describes having multiple aversions to the implant.

> I didn't like the idea of being able to feel something in my arm ... I guess when I was considering it [IUD], it was more based off the [not getting my] period thing. But I also just didn't like the idea of having a stick in my arm… (P30, IUD)

For women using the implant, a common aversion to the IUD was the risk of serious complication such as perforation of the uterine wall, infertility, and the IUD migrating or falling out (N=7).

> I heard it can cause certain types of complications in the future with pregnancies or certain type of uterine issues. (P20, Implant)

Other aversions were concerns about the insertion procedure (N=7), the location of placement (N=7), and the participant's partner being able to feel the strings of the IUD (N=2). Many implant users reported multiple aversions to the IUD.

> It [IUD] seemed a little invasive to me. Just 'cause the location and how you put it up there and how you have to keep having to check on it down there. As well as I guess people saying that the insertion gets painful or that it falls out and I just didn't want to deal with that. (P29, Implant)

> My friend also did that one [IUD] and she said it was really painful and she had really, really bad cramps for two weeks. And I heard that you can feel the strings too … that kind threw me off. So I was like, "I'll just do the implant". (P26, Implant)

Triangulation

   The survey question, "I was influenced to choose the [IUD/implant] by other women who have used this method" was intended to account for women in the participant's social network who were not friends or family members that may have influenced them to initiate LARC. Upon conducting the interviews, it was determined that participants had various interpretations of this question. Some participants did interpret this question in the way it was intended and some thought this question was referring to their friends and/or family members. This misinterpretation was not something that was discovered during the pilot testing phase.

   In Phase II, few differences in the dominant themes between IUD users and implant users were found. In Phase I, IUD users more often reported friends being influential in their choice and implant users reported more frequently reported that female family members were influential. However, this was not confirmed in the qualitative interviews, i.e. observational learning from a variety of sources was equally important to both groups of participants. Furthermore, in the quantitative phase, only 20% and 17% of respondents reported being influenced by their family or their partner to choose their method, respectively. Many participants in the qualitative phase reported that whether or not their family and/or partner supported their decision, they were going to do what was best for them. However, women who did get social support from their family or partner reported that this was valuable to them. Additionally, the most common sources of knowledge about LARC as reported in Phase I was the participant's health care provider or the internet, and this was confirmed in Phase II. Other areas of convergence include findings of high self-efficacy and the importance of participant's health care provider and friends. A dominant theme of why current LARC users chose one LARC method over the other was the emergent theme of Aversion, which has not been previously reported in the literature. Thus, no survey questions addressed this theme.

CHAPTER 5: DISCUSSION

Overview

In the United States, 45% of all pregnancies are unintended (Finer & Zolna, 2016). The rate of unintended pregnancy is not uniform across age groups with young women ages 18-25 having the highest rate of unintended pregnancy (Finer & Zolna, 2016). Although this group is at the highest risk of unintended pregnancy, use of the most effective reversible form of contraception — LARC — is low. LARC is recommended as first-line contraception for adolescents, young adult, and/or nulliparous women (AAP, 2014; ACOG, 2012). Increasing LARC use has the potential to significantly decrease rates of unintended pregnancy.

To better understand interpersonal and intrapersonal influences on LARC initiation, a mixed methods study was conducted. Phase I consisted of a quantitative survey administered online to nulliparous women ages 18-25 who had used a LARC method in the last 12 months, had never had a baby, were sexually active, and had obtained their LARC method while living in the United States. A subsample of survey participants were interviewed (Phase II) to further explore key factors to LARC initiation.

Aim 1: Determine if differences exist between women using the IUD versus the implant

A disparity exists in the prevalence rates of the two LARC methods. Among all women using LARC, 89% use the IUD and 11% use the birth control implant. By understanding why women chose one LARC method of the other, this can inform future public health interventions to increase LARC use overall.

In regards to demographics, this study found significant differences between IUD users and implant users for Hispanic ethnicity, age, student type, and where LARC obtained. Women who used the implant were more likely to be younger compared to IUD users (OR=2.04, 95% CI: 1.10-3.70). This confirms findings in other studies where implant users were younger than

IUD users. In a study of 1,048 women attending a Title X clinic, women using the implant were more likely to be under the age of 20 compared to IUD users (R. Cohen et al., 2017). A subgroup analysis of the Contraceptive CHOICE Project examined acceptance of LARC among adolescent participants and found that adolescents using the implant were more likely to be under age 17 compared to participants using the IUD (Mestad et al., 2011). In an analysis of NSFG data from 2008-2010 and 2011-2013, younger women in this nationally representative sample were also more likely to use the implant compared to the IUD (Kavanaugh et al., 2015). Several other studies confirmed this finding as well (Higgins, Sanders, Palta, & Turok, 2016; Kavanaugh & Jerman, 2018; McNicholas, Swor, Wan, & Peipert, 2017; Weber, Briggs, & Hanson, 2017). A related finding was that undergraduates were more likely to use the implant compared to graduate students. This supports the significant difference found by age as undergraduates are typically younger than graduate students. A variety of factors may result in younger women using the implant. For example, many clinicians still believe that the IUD is only appropriate for older and/or parous women (Higgins, 2017; Rubin et al., 2016; Sundstrom et al., 2015). As reported in Chapter 4 and discussed further below, two implant users in the qualitative phase of this study initially sought the IUD, but were told that they were not good candidates due to their nulliparity. Furthermore, the most recent cervical cancer screening guidelines state that women under age 21 do not need to routinely receive a pelvic exam and Pap test (US Preventive Services Task Force, 2018). Thus, younger women may be uncomfortable or unfamiliar with a pelvic exam, which is necessary for IUD insertion.

In this study, Hispanic women were more likely to use the implant compared to non-Hispanic women (OR=2.28, 95% CI: 1.15-4.50). However, the literature is conflicting on this topic with several studies reported no difference between IUD users and implant users in regards to race and/or ethnicity (Higgins, Sanders, et al., 2016; Kavanaugh & Jerman, 2018; McNicholas et al., 2017; Mestad et al., 2011) and other studies finding a difference. Cohen et al. (2017), found significant differences between IUD users and implant users for both race and

ethnicity. Women who were Hispanic (any race) or black, non-Hispanic were less likely to use the IUD compared to white, non-Hispanic women. In a study by Kavanaugh et al. (2015) using two waves of NSFG data, a significantly higher number of black women reported using the implant compared to white women. Among participants in the National Survey of Reproductive and Contraceptive Knowledge, fewer Hispanics (males and females) reported awareness of the IUD compared to whites. In an analysis of data from the National College Health Assessment, black college women were found to have a statistically significant increase in implant use between 2011-2014, and this was greater than increases seen in implant use compared to white or Hispanic students (Walsh-Buhi & Helmy, 2018). Further research is needed to understand differences in LARC type preference and access by race and ethnicity.

Finally, among current college students, those that were using the IUD were more likely to obtain their LARC method at the on-campus clinic compared to implant users who were currently in college. To the best of the Principal Investigator's knowledge, no similar finding has been reported in the literature. The sample in this study was primarily recruited from a single university in the southeastern United States and this finding may not be true of more heterogeneous populations. Future research could focus on understanding any system-level barriers to obtaining one's desired LARC method among college students.

Research questions 1 and 2. When examining differences between IUD users and implant users in relation to the Interpersonal Influences Scale, the p-value was 0.08. However, the results of this analysis should be interpreted with caution as this scale was found to not be valid or reliable in this population. For individual variables within the scale, notable differences were found between IUD users and implant users for the influence of other women (p=0.07) and the influence of female friends (0.05). As stated above in the Triangulation section, during the qualitative phase it became evident that participants had misinterpreted the meaning of the phrase "other women". For the influence of friends, women who were using the implant more frequently reported that friends had no influence on their choice to initiate LARC compared to

IUD users. This may be because more women use the IUD compared to the implant (Guttmacher Institute, 2016), allowing for increased opportunities for observational learning through friends. In a study by Hoopes et al. (2017), women were asked about the experiences of their friends and family in regards to either the IUD or the implant. Participants in that study were using a variety of birth control methods (LARC and non-LARC methods) and attitudes towards the IUD versus the implant were not directly compared. Twenty-six percent and 19% of participants reported having a friend that dislikes the IUD or implant, respectively. In another study of the contraceptive decision-making process for all methods, a woman's peers were found to be an important influence (Melo et al., 2015). However, women choosing to initiate the IUD versus the implant were not systematically compared. In a study of social network influence to choose any contraceptive method, friends were found to be the most influential, followed by the media (advertisements), female family members, and partner (Levy et al., 2015). Like the previous articles, this study did not compare women choosing the IUD versus the implant. Only one study has directly compared interpersonal differences between women using the IUD and the implant (R. Cohen et al., 2017). In this study, women who chose to use the IUD were more likely to know someone (not specified) who liked using this method compared to women using the implant. Likewise, implant users were more likely to know someone who preferred using the implant compared to women who chose the IUD.

Although no differences were found between IUD users and implant users in regards to influence of health care provider, a large number of participants (66%) reported that their health care provider was influential in their decision to initiate LARC. This is in agreement with other studies that found provider influence important in LARC initiation (R. Cohen et al., 2017; Melo et al., 2015; Murphy et al., 2017; Rubin et al., 2016; Schmidt et al., 2015). It should be noted that the majority of the current sample was non-Hispanic, white. Due to the legacy of mistrust between communities of color and the medical establishment (Gomez & Wapman, 2017;

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Higgins, Kramer, et al., 2016), this finding may have been very different in a more racially and/or ethnically diverse sample.

Another finding of this dissertation study was that IUD users had more knowledge of the IUD compared to implant users and vice versa. This is an expected finding as several other studies have found that women are more likely to be highly knowledge about a contraceptive method that they have experience with compared to women who do not have experience with that method (Anderson et al., 2014; Dempsey et al., 2012; Gomez & Freihart, 2017; Gomez et al., 2015; Hall et al., 2016; Higgins, 2017; Higgins, Kramer, et al., 2016; Kavanaugh et al., 2013; Murphy et al., 2017; Rubin et al., 2016). Additionally, 14% of implant users reported receiving no information about the IUD and 13% of IUD users received no information about the implant. Several provider professional organization recommend engaging in a tiered contraceptive counseling approach, whereby providers have a detailed discussion with their patients on all contraceptive methods starting with the most effective methods to the least effective methods (ACOG, 2017a; Eliscu & Burstein, 2016; Klein, Arnold, & Reese, 2015). The finding in the current study that participants did not receive comprehensive information on both LARC methods indicates that these guidelines are not being uniformly followed.

In the current study, women reported receiving the most information about LARC from their health care provider or the internet, and these same sources were reported as the most trusted sources. Several other studies have also found providers to be the most common and most trusted source of information (Melo et al., 2015; Murphy et al., 2017; Rubin et al., 2016; Schmidt et al., 2015). However a study by Gomez et al. (2015), examined information sources regarding the IUD among women ages 18-29 who had never used an IUD and found that the most common sources of information were their friends or the internet. In a study of contraceptive decision-making among 21 adolescents and young adults seeking care at a Title X clinic, peers were also listed as the most common source of information (Melo et al., 2015). As discussed further in the Limitations section, this dissertation study consisted of a mostly

white (74%) and highly educated (99%) sample, which may have affected the finding that health care providers are the most trusted sources of information. In a study of homeless young women who were predominantly non-white, participants reported being mistrustful of their health care provider and feeling forced to use certain contraceptive methods (Dasari et al., 2016). In another study where women of color made up nearly 50% of the sample, these women were more likely to report being reluctant to trust their providers recommendation to use LARC (Higgins, Kramer, et al., 2016).

A surprising finding of the current study is that 12% of IUD users and 10% of implant users reported being ambivalent towards pregnancy (p=0.65). The majority (64%) of these participants were either married or in long-term, monogamous relationships. Furthermore, participants who were ambivalent were significantly less likely to be college students compared to those who were not ambivalent. In a study of both LARC users and non-LARC users, women reported that student status and relationship status could both influence pregnancy ambivalence (Higgins, 2017). Women in that study — even those that were LARC users— reported that in long-term relationships it is normal to imaging having a baby with their partner. Subsequently, this can cause a woman to become ambivalent towards pregnancy. Additionally, those same participants discussed that being in school is a strong motivator to use a highly effective form of birth control. One LARC user in that study discussed that while a woman is in school the IUD is a great option for her. But, once she is done with school and has a job, having the IUD removed or switching to a less effective method could be an option. In a nationally representative study of young adult's ages 18-29 years old, 76% of participants who were ambivalent towards pregnancy reported using contraception in the last month (Higgins et al., 2012). However, the type of contraceptive method used was not reported.

In the current study, it is interesting that any woman using the most effective reversible method of birth control would report being ambivalent towards pregnancy. This points to the fact that pregnancy desire and ambivalence is a complicated concept, which is heavily influenced by

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relationship status and life stage. It has been proposed that the idea of women either being ambivalent or not ambivalent regarding pregnancy is too simplistic and that a woman may simultaneous have some desire to both avoid and achieve pregnancy (Aiken, Borrero, Callegari, & Dehlendorf, 2016). For women using LARC and that are ambivalent towards pregnancy, when it is time for their method to be replaced they may be more likely to either stop using contraception completely or switch to a less effective form of birth control. Future research could explore how health care providers could counsel patients in this situation in order to avoid an unintended pregnancy.

Aim 2: Explore how participants chose either the IUD or implant

      Research question 3.

      Socioenvironmental factors. Present in this construct category are observational learning, normative beliefs, social support, and opportunities and barriers. Nearly all (N=29) of Phase II participants reported that observational learning was important in their choice to use LARC. Participants who received social support and/or reported that their social network held positive normative beliefs found this to be helpful in LARC initiation. However, participants who had friends or family members that were not supportive of their choice to use LARC reported that this did not affect their decision-making process. The majority of participants (N=19) experienced a barrier to LARC initiation. The most common barrier was that their provider engaged in one or more non-evidence based practice behaviors such as requiring the participant to be menstruating for IUD insertion, requiring misoprostol prior to IUD insertion, failure to engage in tiered contraceptive counseling, and providing inaccurate information regarding LARC methods. All participants were highly cognizant of how having health insurance provided them with the opportunity to obtain LARC. Additionally, several participants (N=16) had either a very short wait time between the consultation and insertion or were offered same-day insertion. When providers used tiered contraceptive counseling (N=12), participants discussed appreciating their provider engaging in this practice behavior.

Several other studies have reported that observational learning has a role in contraceptive decision-making. However, many of these studies did not focus on LARC. Additionally, some of these studies found that observational learning was only somewhat important (R. Cohen et al., 2017; Higgins et al., 2015; Hoopes et al., 2018; Levy et al., 2015; Melo et al., 2015; Murphy et al., 2017; Rubin et al., 2016; Yee & Simon, 2010). In a qualitative study of African American women and contraceptive decision-making (any method), participants frequently reported hearing about a certain type of contraception for the first time from a female relative or friend that was using that method (Blackstock et al., 2010). This was supported in the current study in which participants reported a similar occurrence. In another study of adolescent IUD users, friends and family were reported to be common sources of observational learning (Brown et al., 2013). In that study, participants reported that hearing negative stories from LARC-experienced friends or family temporarily discouraged them from trying the IUD. In the current study, participants were highly motivated to prevent pregnancy and negative experiences did not dissuade them from initiating LARC. In the same study by Brown et al. (2013) and in another study by Anderson et al. (2014), some participants reported that their provider self-disclosed their IUD use to the patient and that this was seen as comforting. Likewise, this same finding emerged in the current study where five participants reported provider self-disclosure and found this to be reassuring.

Another interesting finding in the present study was the role of social media in observational learning, specifically among those who did not know anyone who used LARC. Other studies have reported on the use of social media in contraceptive decision making; however, these studies did not examine either observational learning through social media or the use of social media among women who do not know someone using LARC (Brown et al., 2013; Levy et al., 2015).

Although women in the current study were not influenced by negative normative beliefs or lack of social support, other studies have reported alternative findings. In a study of young

adult women regarding the consequences of unintended pregnancy, i.e. abortion, adoption, or keeping the baby, participants were highly influenced by the normative beliefs of their community that abortion or adoption were not acceptable (W. Smith et al., 2016). In a qualitative study of college women (never LARC users), participants reported that members of their social network had negative beliefs about the IUD stemming from the Dalkon Shield in the 1970s and this caused them to be less likely to use this method (Payne et al., 2016). These same women also reported not knowing anyone in their social network who was using the IUD. This indicates a relationship between normative beliefs and observation learning, whereby negative normative beliefs regarding LARC may be mitigated by positive observational learning. In the current study, 29 women reported receiving positive observational learning about their chosen LARC method, which may also partly explain why negative normative beliefs did not affect their decision-making. In a study of adolescent and young adult (ages 16-25) IUD users, receiving social support from one's mother was seen as an important factor in IUD initiation (Rubin et al., 2016). This may be due, in part, because some of these participants were minors and receiving social support from a parent is more important in this age group. In the current study, all participants were adults and viewed themselves to be completely in charge of their sexual behavior and contraceptive decision-making irrespective of their family members support. Among women in this dissertation study that did receive social support, it was viewed as a positive and participants were appreciative of their mother, sister, and/or friend, for supporting their choice.

Eighteen participants discussed their choice to use LARC with their partner. Nearly all (N=17) reported that their partner had positive beliefs and was supportive of their choice. Among this group, women found their partners to be very interested in their contraceptive choices and wanting to learn more about the options available. This is in agreement with a study conducted among adolescent and young adult IUD users where women also reported that their partners were supportive (Rubin et al., 2016). This finding addresses a gap in the literature that

had been previously identified concerning the role of partner influence in the decision to use LARC (Dempsey et al., 2012; Mahony et al., unpublished). Other research has found that when males are counseled on all contraceptive options — in addition to condoms — they take a more active role in contraceptive decisions within a relationship (Richards, Peters, Sheeder, & Kaul, 2016). The role of healthcare providers in counseling male patients on all contraceptive methods is supported by a recent position statement from SAHM, which states that adolescent and young adult males must have access to comprehensive sexual and reproductive health information (Society for Adolescent Health and Medicine, 2018).

Numerous barriers were reported by participants in their pursuit of LARC including having to be referred to another provider (N=4), health care providers engaging in non-evidence based behavior (N=14), and an unusually long delay between the consultation appointment and the insertion appointment (N=4). Similar barriers have been reported previously in the literature. However, many of these studies collected data prior to 2012 when ACOG released updated LARC guidelines. The present study adds to the literature as all of these women had obtained their LARC method after 2012 and 26 participants had been using LARC for two years or less.

In a qualitative study of 53 college women (LARC-experienced and never users), data were collected in early 2013 (Sundstrom et al., 2015). Participants in that study reported that providers routinely did not engage in tiered counseling. This has also been reported in two other studies that collected data after 2012 (Higgins, 2017; Rubin et al., 2016). Tiered counseling is defined as presenting all contraceptive methods from most effective to least effective (Klein et al., 2015) and it is recommended by ACOG, AAP, the American Association of Family Physicians (AAFP), and the World Health Organization (ACOG, 2017a; Eliscu & Burstein, 2016; Klein et al., 2015; Steiner, Trussell, & Johnson, 2007). Previous research has found that women desire a significantly greater amount of autonomy in regards to contraception decisions compared to general health decisions (Dehlendorf, Diedrich, Drey, Postone, & Steinauer, 2010). Women also desire comprehensive information on all methods of contraception (Biggs, Kimport,

Mays, Kaller, & Berglas, 2019). When providers appear to favor one contraceptive method and do not provide comprehensive information on all methods, women — especially women of color — may view this as a form of coercion (Gomez & Wapman, 2017). By providing women with information on all contraceptive methods, this supports a woman's reproductive autonomy (ACOG, 2007; Dehlendorf et al., 2010; Stanback, Steiner, Dorflinger, Solo, & Cates, 2015). Furthermore, when counseled about all contraceptive methods from most effective to least effect, women are more likely to choose LARC (Fleming et al., 2010; Peipert, Madden, Allsworth, & Secura, 2012). In the current study, participant's whose providers engaged in tiered contraceptive counseling appreciated being provided complete and unbiased information on all methods. A small number of participants reported that providers told them inaccurate information regarding the IUD, i.e. they were not good candidates for the IUD due to their age and/or nulliparity. In two studies that collected data after 2012, some participants also reported receiving this incorrect information from their health care provider (Rubin et al., 2016; Sundstrom et al., 2015).

ACOG, AAP, and AAFP have all clearly stated that it is not necessary for a woman to be menstruating for IUD insertion and that administering misoprostol prior to IUD insertion is not beneficial (ACOG, 2017b; Hardeman & Weiss, 2014; Randel, 2012). In fact, ACOG explicitly states that, "requiring a woman to be menstruating [for IUD insertion] is an obstacle to access" (ACOG, 2017b, p. 255). In the current study, several participants reported being required to either be menstruating or to take misoprostol prior to IUD insertion. For example, one participant had to wait three months between consultation and insertion because her periods are irregular. This made it extremely challenging for her to make an appointment for the insertion at the same time as her period.

Only eight participants in the qualitative phase of the present study were offered same-day insertion. A provider's inability to perform same-day insertion of LARC is a known barrier to LARC initiation (ACOG, 2018; Biggs et al., 2013; Eliscu & Burstein, 2016). Additionally, both

ACOG and AAP recommend same-day insertion of LARC (ACOG, 2018; Eliscu & Burstein, 2016). However, there are numerous structural, logistical, and provider training barriers to the provision of same-day LARC insertion. In a survey conducted among providers working in public-sector health centers or in private practice (N=2,056), 71% and 65% reported same-day insertion to be safe for the implant and IUD, respectively (Morgan, Zapata, Curtis, & Whiteman, 2019). However, this varied by LARC training with providers not trained in LARC insertion being less likely to view same-day insertion as safe. Structural and logistical barriers include scheduling constraints, i.e. having enough staff to accommodate same-day insertion requests, insurance verification practices, ordering and stocking devices, and having all staff trained on same-day counseling procedures, e.g. administering tests for STI's and pregnancy at the same time as LARC insertion (DeBoer & Hensley, 2018; Janiak, Clark, Bartz, Langer, & Gottlieb, 2018). Several clinics and health departments have implemented interventions to increase same-day LARC insertion, and all have reported that the intervention increased the use of LARC in their patient population (DeBoer & Hensley, 2018; Dobbins, Kenney, Meier, & Taormina, 2016; Jacobs, Maslyanskaya, & Coupey, 2015; Janiak et al., 2018). However, implementing these interventions was not without challenges. The authors of one study reported that it took nearly a year to address all of the structural and logistical barriers to same-day LARC insertion (Jacobs et al., 2015). Because of the numerous barriers to offering same-day insertion (e.g. STI and pregnancy screening, cost, and insurance verification practices), this may not be a feasible option for many clinics.

Finally, four participants in the current study had to be referred to another provider because their initial provider did not offer LARC. Although this only occurred in a minority of participants, it bears discussion. The majority of participants (90%) in the qualitative phase of this study were currently in college. Many colleges and universities contain student health centers, which may also provide contraceptive services (McBride, Orman, Wera, & Leino, 2010). This enables women in college to more easily access contraception compared to women

in the general population. Furthermore, these participants had high self-efficacy to obtain their chosen method of contraception. Thus, being referred to another provider was not viewed as a barrier for two of the participants. However, this is not typical of all women. In a study of low income women in central Florida, finding a clinician who provides LARC was found to be a significant barrier to access (Nall, O'Connor, Hopper, Peterson, & Mahajan, 2019). In another study of adolescents (ages 14-19) seeking LARC, 61% of patients who were referred by their pediatrician to a gynecologist did not attend that appointment (Hoehn et al., 2018). Reasons for not attending their LARC consultation appointment included lack of transportation and inconvenient appointment times.

In a study of 423 Federally Qualified Health Centers (FQHC), 66% and 36% provided insertion of the IUD and implant, respectively (Beeson et al., 2014). One of the main barriers to providing LARC at these centers was lack of providers trained in LARC insertion. In a study of 3,000 providers practicing in Wisconsin, provider training in LARC insertions was as follows: 94% of OB/GYN's, 43% of family medicine, and 7% of pediatricians (Olson et al., 2018). Lack of LARC insertion skills was the most cited barrier to LARC provision among family medicine and pediatrics practitioners. Several other studies have found that only a minority of pediatricians and family medicine practitioners insert LARC, and this is a barrier to women accessing this highly effective method of birth control (Chelvakumar, Jabbarpour, Coffman, Jetty, & Glazer Shaw, 2019; Dobbins et al., 2016; Fridy et al., 2018; Greenberg, Makino, & Coles, 2013; Norris, Pritt, & Berlan, 2019; Pace, Dusetzina, Murray Horwitz, & Keating, 2019; Potter, Koyama, & Coles, 2015; S. E. Rubin et al., 2018; Trope, Congdon, Brown, & Zuckerman, 2018). Few pediatric or family medicine residency programs provide LARC training, and there are few opportunities for practicing pediatricians or family medicine physicians to become trained (Chelvakumar et al., 2019; Greenberg et al., 2013; Norris et al., 2019; Pace et al., 2019; Potter et al., 2015; S. E. Rubin et al., 2018; Trope et al., 2018).

The Accreditation Council for Graduate Medical Education (ACGME) is the credentialing body for medical residencies and fellowships. Revised requirements for accredited pediatric residency and adolescent health fellowship programs will go into effect on July 1, 2019. For pediatric residency programs, neither LARC nor contraceptive counseling is mentioned anywhere in the requirements (ACGME, 2019b). Beginning on July 1, 2019, the requirements for adolescent fellowship programs have been revised to include the following statement, "Fellows must develop an understanding of the indications, risks, complications, and limitations of long acting reversible contraception (LARC), and have experience with LARC insertion/removal during the fellowship." (ACGME, 2019a, p. 27) Family medicine residency programs do not mention LARC specifically and only require that residents be trained on contraception and family planning (ACGME, 2018).

Personal cognitive factors. All participants reported seeking out knowledge from either the internet and/or their health care provider. These are common sources of information for women interested in initiating LARC (Anderson et al., 2014; Blackstock et al., 2010; Brown et al., 2013; Sundstrom et al., 2019). Previous research has found that college students were more likely to use the internet for finding health-related information compared to other sources (Basch, MacLean, Romero, & Ethan, 2018). Although knowledge is an important pre-condition for behavior change, it is widely known to be insufficient by itself to change behavior (Bandura, 1998; Kelder et al., 2015; R. E. Thomas, McLellan, & Perera, 2013).

Outcome expectations, i.e. considering the physical, social, and self-evaluative consequences of LARC, were reported to be the first step in LARC initiation in the present study. Twenty-three participants began considering LARC as result of using their previous method of contraception inconsistently and subsequently becoming concerned about an unintended pregnancy. The remaining seven women in this study reported first considering LARC due to the outcome expectations of convenience and/or decrease in menstruation symptoms; however, pregnancy prevention was still an important outcome in this group. In a

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qualitative study of 43 young women using the IUD, participants reported that choosing the IUD was also influenced by effectiveness at preventing pregnancy, convenience, and potential bleeding changes (Schmidt et al., 2015). In a survey of 413 non-LARC users, women who were interested in using the IUD in the future reported that weighing the potential outcomes of using LARC was important part of the decision-making process (Gomez & Freihart, 2017). In a study of young women using the IUD, implant, or a non-LARC method, participants reported considering the outcomes of starting a new method of contraception such as pregnancy prevention or menstrual cycle control (Melo et al., 2015).

Self-efficacy can be developed or increased through the following four mechanisms: vicarious experience, social persuasion/support, mastery experience, and emotional arousal. Self-efficacy is considered to be one of the most important factors in behavior change (Bandura, 1998). In the present study, mastery experience, vicarious experience, and social persuasion/support were examined. Among the women who reported observational learning as key to LARC initiation, all described that their self-efficacy increased through these vicarious experiences. In a systematic review and meta-analysis of physical activity interventions, vicarious experience was determined to be the most effective way of increasing self-efficacy (Ashford, Edmunds, & French, 2010). However, Bandura (1998) posited that mastery experiences was the best way to increase self-efficacy. Other studies have examined development of self-efficacy through observational learning and mastery experience in regards to condom use and/or abstinence and have found that increasing self-efficacy leads to increased condom use and/or abstinence (Coyle et al., 2001; Dilorio et al., 2000; Markham et al., 2014). This is confirmed in the present study as women discussed feeling more confident to pursue LARC when they were familiar with the provider or clinic. In the aforementioned systematic review and meta-analysis, social persuasion was found to actually decrease self-efficacy (Ashford et al., 2010). Participants in the current study who did not have social support or who had members in their social network that possessed negative normative beliefs reported

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that this did not affect their pursuit of LARC. However, this was a well-educated group that was highly motivated to prevent an unintended pregnancy. Thus, this finding may not be generalizable.

Behavioral factors. Due to the numerous barriers to initiate LARC as described previously, obtaining LARC requires women to intentionally set a goal and use behavioral skills to achieve this goal. As demonstrated in Figure 4, behavioral skills were influenced by knowledge and observational learning, and intentions were influenced by observational learning through the process of reciprocal determinism. Several interventions to increase condom use have found that targeting intentions and/or behavioral skills increases safer sex behavior (Markham et al., 2014; Myint-U et al., 2010; St. Lawrence, Jefferson, Alleyne, & Brasfield, 1995). In two interventions aimed at increasing LARC use, authors reported that intentions to use LARC were increased through observational learning (Garbers et al., 2015; Mesheriakova & Tebb, 2017). Reinforcement is the origin of outcome expectations, and in the present study the rewards and punishment of using LARC were discussed in conjunction with outcome expectations. In the aforementioned studies that examined outcome expectations in contraceptive decision-making, the potential benefits and perceived negative effects were also discussed in conjunction with the expected outcomes of using various contraceptive methods (Gomez & Freihart, 2017; Melo et al., 2015; Schmidt et al., 2015).

Research questions 4 and 5. A dominant theme as to why women chose one LARC method over the other was the emergent theme of *Aversion*. Twenty-five participants reported having a strong aversion to some intrinsic property of either the IUD or the implant. Previous research has found that women who have never used LARC report an aversion to either the IUD (Coates, Gordon, & Simpson, 2018; Fleming et al., 2010; Gomez & Freihart, 2017; Potter, Rubin, & Sherman, 2014) or the implant (Chernick et al., 2015). In the present study, participants expressed this aversion by describing the LARC method they did not choose as being gross or the idea of it freaking them out. When participants expressed these types of

statements, the PI would probe further with, "Why did it [freak you out/gross you out, etc]?" At this point, the participant would provide further detail. A second probing question asked by the PI was, "You said the idea of the [IUD/implant] freaked you out, did you consider this method any further?" All participants responded that they did not consider it further. In contrast, outcome expectations is defined as "judgements about the likely consequences of actions" (Kelder et al., 2015, p. 161). This indicates a kind of internal dialogue occurring, whereby women are weighing the rewards and punishments of initiating LARC. This internal dialogue is demonstrated in the quotes presented in Chapter 4. While discussing participant's aversion, it did not appear that an internal dialogue occurred signifying that the theme of aversion is distinct from outcome expectations.

To the best of the Principal Investigator's knowledge, the current study is the first to report that the predominant reason current LARC users chose their specific LARC method is based on an aversion to the location of placement, insertion procedure, and/or some other characteristic of the implant or IUD. This finding further emphasizes the importance of a tiered contraceptive counseling approach. Women who possess an aversion to one of the LARC methods may abandon pursuit of LARC if their provider only recommends one type of LARC. In fact, this almost occurred with one of the participants in the present study. Participant #8 had an aversion to the IUD, but her provider did not engage in tiered contraceptive counseling and never mentioned the implant. This participant was planning on abandoning pursuit of LARC until her friend told her about the implant.

Strengths and Limitations

All research studies possess both strengths and limitations and should be examined in conjunction with the reported results. The study limitations are described first followed by a discussion of the strengths. Additionally, the strengths and limitations of Social Cognitive Theory are presented.

As noted previously, the interpersonal influences scale was found to not have construct validity and to not be reliable in this population. This scale was originally developed to measure interpersonal influences on contraceptive decision-making (Noone & Allen, 2010). However, this instrument was not LARC-specific. Thus, the wording of the items had to be modified to be relevant to LARC initiation. Additionally, the population that was previously used to validate this scale consisted of women ages 18-45 who were nulliparous or parous. This is in contrast to the current population that was restricted to women ages 18-25 and nulliparous. Whenever a scale is adapted and/or used in a different population, there is risk of decreasing the validity and reliability (Finn & Kayande, 2004). Related to this finding was the revelation during the qualitative phase that participants had varying interpretations of the question, "I was influenced to choose the [IUD/implant] by other women who have used this method".

Furthermore, sample size and the number of items in the scale may have influenced the reliability and construct validity (Bollen, 1990; Tavakol & Dennick, 2011). For factor analysis, there is no consensus in the minimum required sample size. Sample size recommendations range from 100 to over 500 (Cattell, 1977; Comrey & Lee, 1992; Gorsuch, 1983). Other recommendations state that the sample size should be dictated by the number of items with ratios ranging from 3:1 to 20:1 (Everitt, 1975; Hair, Anderson, Tatham, & Black, 1995). For Cronbach's alpha, having a large number of items in the scale increases the likelihood of achieving an alpha level of .80 or higher (Tavakol & Dennick, 2011). Thus, the issues with construct validity and reliability may be due in part to an inadequate sample size and/or too few items on the Interpersonal Influences Scale. Although construct validity was not found, this survey was also assessed for content validity and response process validity. Content validity was achieved by having the research committee review and provide feedback on the survey instrument. Response process validity was established by conducting cognitive interviews with pilot test participants (Appendix E) (Cook & Beckman, 2006).

During the qualifying exam and dissertation proposal phase of this research, the principal investigator conducted an exhaustive review of the literature looking for a validated and reliable LARC-specific survey instrument. None was found. This gap in the LARC literature has been noted by other researchers (Hoopes et al., 2018). Thus, the principal investigator chose an instrument that was deemed the best of what was available. In summary, potential reasons that the scale was not found valid or reliable in this population are as follows:

- The scale was originally intended to measure the role of interpersonal influences for any method of contraception. Therefore, items were reworded to be LARC-specific (Table 5).
- The interpersonal influences scale was originally validated in women ages 18-45 who may or may not have been nulliparous.
- The sample size may have been too small to conduct a CFA and the scale may have had too few items to reliably measure interpersonal influences in this population.

Due to this limitation, the results of the analyses involving the interpersonal influences scale should be interpreted with caution.

For the analysis of the Interpersonal Influence Scale, the p-value for the MANOVA was 0.08. For the ANOVA of the influence of other women, female family members, and female friends, p-values were 0.07, 0.07, 0.05, respectively. In R. A. Fisher's groundbreaking textbook, *Statistical Methods for Research Workers*, he discusses the meaning of various p-values (Fisher, 1934). He states that with a p-value above 0.10, it is safe to fail to reject the null hypothesis. With a p-value of less than 0.05, then it is safe to reject the null hypothesis. However, he does not give clear guidance on p-values between 0.05 and 0.10. Regardless, a p-value of less than 0.05 remains the standard cut off for statistical significance. With this in mind, none of the results of analysis of the Interpersonal Influences Scale were significant. There may be significant differences, just not as demonstrated in this homogenous sample. Further

exploring interpersonal influences between women using the IUD versus the implant in a more heterogeneous sample may be warranted.

Another limitation is the homogeneous nature of the sample. This study population was heavily recruited from a single university, predominately white, and most participants had private health insurance. The principal investigator contacted five community-based clinics requesting assistance in recruitment in order to have a more heterogeneous sample; however, each clinic declined to participate. College students tend to have higher socioeconomic status and be more homogenous compared to the general public (Hanel & Vione, 2016). Therefore, the results of this study have limited generalizability. Nevertheless, important contributions to the literature were found regarding key factors to LARC initiation, why women chose one LARC method over the other, and barriers faced by women attempting to use LARC.

Lastly, recall bias may have made it difficult for participants to remember the exact factors that influenced their choice to use LARC. Eighty-five percent of Phase I participants had been using LARC for two years or less. Yet, two years may have been long enough that certain details about their choice are vague or difficult to recall. During the qualitative phase, five participants discussed having difficulty remember the specific websites that they searched when looking for LARC information. However, it was anticipated that recruitment would be difficult and having more flexible inclusion criteria was a way to overcome this.

Despite the limitations listed above, this dissertation study possesses several strengths including the use of theory, using SCT for the first time to study LARC initiation, assessing validity and reliability of the Interpersonal Influences Scale, using a mixed methods study design, evaluating the trustworthiness of the qualitative data, and addressing gaps in the literature. The use of theory in public health research facilitates our understanding of health behavior and provides suggestion for how to change behavior (National Institutes of Health, 2005). Although using theory in research has numerous strengths, many studies do not use theory (Jones & Donovan, 2004). Furthermore, to the best of the principal investigator's

knowledge, the current study is the first to use SCT to study LARC initiation. These findings add to the literature that SCT is a relevant and appropriate theory to examine why women choose to use LARC.

The primary research question was understanding the differences between IUD users and implant users in regards to the interpersonal influences scale. Thus, the validity and reliability for this scale was assessed. Although the scale was found to not be valid or reliable in this population (see above), it is important that the validity and reliability was reported as this is something that is missing in studies of LARC initiation (Mahony et al., unpublished).

Utilizing a mixed methods study design allowed for a greater level of depth and detail compared to using quantitative methodology only. SCT constructs that were not measured in Phase I were addressed in Phase II. Using a semi-structured interview approach permitted participants to provide information that may not have been explicitly sought. Additionally, a mixed methods study design allowed for triangulation of data sources. All four constructs of trustworthiness were addressed in the qualitative phase of this study (see Chapter 3).

This study addressed several gaps in the literature. For example, few studies have focused exclusively on women using LARC. Understanding why women choose to initiate LARC enables these factors to be used in the development of programs aimed at increasing the prevalence of LARC. This study measured influence from four different sources, i.e. health care provider, female family members, female friends, and sexual partner. Previous research has either not measured all of these four types of influence and/or has grouped different types of influence together, e.g. combining friend influence or family influence into one category. To the best of the principal investigator's knowledge, this is the first study to systematically investigate the role of a woman's partner on her choice to use LARC. Lastly, only one other study has compared IUD users and implant users; however, that study focused mostly on intrapersonal level factors. An important addition to the literature is that women were motivated to choose one LARC method over the other due to an aversion to either the IUD or the implant.

Strengths and Limitations of SCT. Social Cognitive Theory was chosen for this study because it allows flexibility when measuring constructs, includes the construct of observational learning, which was important to this research study, and possesses the concept of reciprocal determinism, which was also hypothesized to be important in LARC initiation. Observational learning was confirmed to be important in LARC initiation, which informs the development of future interventions. Through this research, SCT has been shown to be an appropriate theory to study LARC initiation. Since no validated survey instrument exists to study LARC initiation, the flexibility provided by SCT allowed the principal investigator to adapt existing instruments to measure these constructs.

However, the flexibility that SCT allows is also a limitation. With the exception of self-efficacy, there is little information in the literature on how to operationalize and measure SCT constructs. Furthermore, this dissertation study appears to be the first time SCT has been used to study LARC initiation, which adds to the challenge of operationalizing these constructs. This lack of information on how to operationalize these constructs was especially evident during the qualitative phase of the current study. The principal investigator and the second coder developed a codebook based on the SCT constructs. The manner in which these constructs were applied to this study is based on the PI's and second coder's interpretation of these constructs in the context of this research topic. Different researchers may have a dissimilar opinion on how these constructs should be operationalized.

Another limitation is that SCT does not specifically address the role of demographic factors on behavior. The present study did examine LARC initiation by demographic variables, but this was outside the theoretical framework used. Since SCT is an interpersonal level theory that also contains intrapersonal level constructs, constructs contained within upstream levels of the socioecological model were not measured. For example, data on the participant's health insurance status was collected; however, the reasons why a participant may or may not have health insurance were not examined.

Implications

      This study has several implications for research, policy, and practice. An important implication is the barriers faced by participants seeking LARC. Although numerous practice guidelines regarding LARC and contraceptive counseling have existed for several years, it is unknown why several providers did not follow the guidelines with these participants. Future research is needed to understand barriers to LARC guideline implementation by health care providers.

      The majority of participants in the qualitative phase (N=23) discussed that inconsistent use with a previous method of contraception — and their understanding that this put them at risk of unintended pregnancy — was the impetus for considering LARC as a potential contraceptive option. When women attend well-women or contraceptive counseling visits, providers could ask about whether they are using their current method consistently. This represents an opportunity for providers to discuss low-maintenance forms of contraception, e.g. LARC, with their patients. Additionally, previous research has found that women who use LARC are less likely to use condoms (Thompson et al., 2017; Walsh-Buhi & Helmy, 2018). However, this varies by relationship status with women in long-term monogamous relationships less likely to use condoms while using a LARC method (Thompson et al., 2017). During the qualitative phase of the present study, seven women spontaneously mentioned condom use. Five women who were in long-term monogamous relationships discussed not needing to use condoms anymore because of both their relationship status and LARC use. One woman who was casually dating reported that she still uses condoms even though she also has the IUD. Another participant who is also casually dating discussed that she was using condoms inconsistently, but also that she wanted a birth control method that was easier than condoms. It was not clear if she continued to use condoms after obtaining her IUD. If a LARC users ends a long-term monogamous relationship, it is unknown if she resumes condom use in a new relationship. More research is needed on the role of LARC on condom use and how this varies by relationship status. Health

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care providers should be aware of the association among LARC, condom use, and relationship status and counsel patients accordingly.

A minority of participants reported having to be referred to another provider because their initial provider did not insert LARC. There is a large body of research indicating that lack of LARC-trained providers is a barrier to access (Chelvakumar et al., 2019; Dobbins et al., 2016; Fridy et al., 2018; Greenberg et al., 2013; Norris et al., 2019; Pace et al., 2019; Potter et al., 2015; S. E. Rubin et al., 2018; Trope et al., 2018). Recently published commentaries from practicing pediatricians and family medicine physicians recognizes this as a problem and suggests solutions (Chelvakumar et al., 2019; Potter et al., 2015; Trope et al., 2018). There appears to be growing support for increasing the types of providers trained in LARC insertion. Barriers to provider training include lack of LARC insertion training both in residency programs and for practicing physicians. For family physicians and pediatricians, additional barriers are working in clinical environments that may not be equipped for gynecological procedures. Areas of future research include exploring incorporating LARC training by OB/GYN's into pediatric and family medicine residency programs and the development and support of community-based training programs for practicing providers.

Participants in this study were highly cognizant of the role of health insurance in their choice to use LARC. Under the ACA, the provision of no-cost sharing contraception is within the 10 categories of essential health benefits. Every health insurance plan must cover these 10 essential health benefits. A recent "repeal and replace" bill introduced by the U.S. Senate in September 2017 would allow states to waive some of these essential benefits (Park & Sanger-Katz, 2017). Previous legislation introduced in the House of Representatives completely eliminated the essential health benefits (Ollove, 2017). If bills such as these became law, this would cause millions of women to incur out-of-pocket costs for contraception including LARC, which has significant upfront costs (Adamczyk, 2016; Becker & Polsky, 2015). Attacks on the so-called "contraceptive mandate" continue, with the Trump Administration attempting to expand

the definition of which employers can refuse contraceptive health benefits to their female employees (Raymod, 2019). These attempts have thus far been blocked by federal judges. In December 2018, a judge ruled that the provision of subsidies to low-income families is unconstitutional. If that is upheld under appeal, this could cause the ACA to no longer be in place. The potential changes to health care has dominated the news. In the current study, three women spontaneously mentioned that the political climate was an important factor in their choice to use LARC.

Only two participants in the qualitative phase reported hearing about LARC methods in high school. Both participants stated that information on LARC was limited and that contraception education in school focused mostly on condoms. There have been 44 evidence-based teen pregnancy prevention programs identified by the Office of Adolescent Health (OAH) within the U.S. Department of Health and Human Services (HHS) (Office of Adolescent Health, 2015). Among these programs, 20 contain information about contraception methods in their curriculum. Two of these programs are for parenting teens. Among the 18 programs geared towards nulliparous adolescents, 14 programs provide information on condom use only. The remaining four programs list "contraception" on their lesson plans, but it is unclear what, if any, information is provided on LARC methods. Future research and program development should focus on incorporating information about LARC into adolescent sexual and reproductive health promotion programs.

The finding in the current study that observational learning played a very important role in the participant's choice to use LARC may be unique to LARC methods. These methods are relatively new (compared to OCP and condoms) and numerous misperceptions exists about them. This in turn may make hearing the experiences of LARC-experienced women even more important in LARC initiation. Further research is needed to understand how observational learning can be incorporated into interventions to increase LARC, and how to promote observational learning through social media for women who do not know someone using LARC.

A recently published feasibility study incorporated using Bedsider.org into a university health clinic (Giho et al., 2019). Bedsider.org has an observational learning component, whereby videos of women discussing their contraceptive experiences are available. Women in this study reported a 9% increase in the use of more effective contraception.

Although normative beliefs and social support were not found to be influential in this study, it should be noted that these participants were highly educated, possessed concrete educational and professional goals, and were extremely motivated to prevent an unintended pregnancy. Women who do not possess these characteristics may be more influenced by normative beliefs and social support. Additionally, participants in the qualitative phase reported hearing incorrect information regarding LARC methods. However, due to the education level of this group, they were able to immediately dismiss this incorrect information. Because of the controversial histories of these methods, a social marketing campaign to dismiss negative beliefs and misperceptions could potentially increase LARC use. In a social marketing campaign conducted in South Carolina to dispel myths about LARC, residents in the targeted counties reported a statistically significant increase in positive attitudes towards both the IUD and implant compared to non-targeted counties (Sundstrom et al., 2019).

Another area of future research is to examine key factors of LARC initiation among a community-based sample of women who are more demographically diverse. Participants in this study were predominantly white, highly educated, were mostly covered by private health insurance, and had relatively easy access to sexual and reproductive health services; yet, they still experienced barriers to LARC initiation. It is hypothesized that a less privileged sample may experience an even greater number of barriers, and it is important to understand these barriers in order to develop policies to overcome them. Additionally, more research is needed on how to increase same-day insertion policies. One potential option to consider would be the development of a same-day insertion information packet or tool-kit to support clinics who want

to offer same-day insertion. Lastly, a LARC-specific survey instrument needs to be developed and validated within a population of young women who are nulliparous.

Conclusions

This study found that women experience numerous barriers to using LARC and that observational learning is key to LARC initiation. Other key factors to LARC initiation were outcome expectations, knowledge, behavioral skills, intentions, and opportunities. The main reason why women chose one LARC method over another appears to be an aversion to intrinsic characteristics of either the IUD or the implant. This further supports the need for tiered contraceptive counseling.

The recent increase in LARC use has undoubtedly decreased the unintended pregnancy rate (Lindberg, Santelli, & Desai, 2018). Medical and public health professionals should continue to examine how barriers can be overcome, misperceptions can be dismissed, and programs can be implemented to allow each woman unfettered access to her desired method of contraception. However, even if every women who desired LARC was able to obtain it, the unintended pregnancy rate in the US would still be much higher compared to other developed countries (A. Thomas & Karpilow, 2018). Upstream level factors such as economic opportunity, income inequality, lack of educational opportunity, and system-level barriers to accessing any sexual and reproductive health service all impact unintended pregnancy rates more than LARC use (A. Thomas & Karpilow, 2018). Although we should continue to make access to and initiation of LARC a priority, comprehensive policy changes will ultimately bring about the greatest decrease in unintended pregnancy rates.

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Pregnancy Prevention Research Study
Have you used the **IUD** or the birth control **implant**?

We want to understand why women chose to use either the IUD or the birth control implant.

This study involves a survey that will take 10 minutes to complete.

You will receive no benefit from this study. This research is considered minimal risk.

The first 226 participants who complete the survey will receive a $5 gift card!

To learn more or take the survey, visit: (survey link)

Long-acting reversible contraception among young women
Principal Investigator : Helen Mahony
hgeorgie@health.usf.edu
IRB Pro #00035566

APPENDIX B: ELIGIBILITY QUESTIONNAIRE

1. Are you male or female?
    a. Male
    b. Female

2. How old are you? [open numeric field]

3. Have you ever had a baby?
    a. Yes
    b. No

4. At any time in the last 12 months, did you use an intrauterine device (IUD) such as Mirena, Skyla, Liletta, Kyleena, or ParaGard?
    a. Yes
    b. No

5. [*If answered "Yes" to question 4*] What is/was your main reason for using the IUD?
    a. To prevent pregnancy
    b. To prevent heavy periods
    c. Both A and B
    d. Neither A or B

6. [*If answered "No" to question 4*] At any time in the last 12 months, did you use the birth control implant also known as Nexplanon?
    a. Yes
    b. No

7. Did you get your [IUD/implant] while living in the United States?
    a. Yes
    b. No

8. Have you had vaginal sex in the last 12 months? Vaginal sex is defined as a penis entering the vagina.
    a. Yes
    b. No

APPENDIX C: QUANTITATIVE SURVEY

Demographics

1. What is your race? (Select all that apply) (Census)
    a. American Indian or Alaska Native
    b. Asian
    c. Black or African American
    d. Native Hawaiian or other Pacific Islander
    e. White

2. Are you Hispanic or Latino? (Census)
    a. Yes
    b. No

3. What year were you born?
    a. Drop down list of years 1990-2001

4. Are you currently a student at a college or university?
    a. Yes
    b. No

5. [*Yes to question 4*] Are you a
    a. Undergraduate student
    b. Graduate student

6. [*No to question 4*] What is the highest level of education you have completed? (Guttmacher survey)
    a. Less than high school
    b. High school degree or GED
    c. Associate Degree/some college
    d. Four-year college degree
    e. Graduate degree

7. What is your current marital status? (CDMQ)
    a. Never married
    b. Married
    c. Separated
    d. Divorced
    e. Widowed

8. [If answered A, C, D, or E to question 7] What is your current relationship status?
    a. Living with a sexual partner
    b. In a serious, long-term relationship, but not living together
    c. Dating one person exclusively
    d. Casually dating one person
    e. Casually dating two or more people

        f.   Not in a relationship

9. Have you ever been pregnant?
        a. Yes
        b. No

10. [If yes to question 9] How many times have you been pregnant?
        a. Open numeric field

11. Where did you get your [IUD/implant]?
        a. Student Health Services
        b. Other

12. Approximately how long have you been using/did you use the [IUD/implant]? Your best estimate is fine.
        a. Less than 12 months
        b. 1-2 years
        c. 3-4 years
        d. 5-6 years
        e. 7+ years

13. When you got your [IUD/implant], did you have health insurance at that time?
        a. Yes
        b. No

14. [If Yes to question 13] At the time that you got your IUD/implant, was your health insurance through (Guttmacher survey)
        a. Your parents
        b. Your school
        c. Your employer
        d. Your partner
        e. The military
        f.   Medicaid
        g. Other

15. Other than the [IUD/implant], what other methods of birth control have you ever used? (CDMQ) (Select all that apply)
        a. Condoms
        b. Natural family planning (example: the calendar method or the cervical mucus method)
        c. IUD/implant (response option depends on current method)
        d. Birth control pills
        e. Birth control shot (Depo-Provera)
        f.   Vaginal ring (Nuvaring)
        g. Birth control patch
        h. Diaphragm
        i.   Birth control sponge
        j.   Cervical Cap (FemCap)
        k. Spermicide
        l.   Abstinence
        m. Withdrawal

16. Did you decide to use the [IUD/implant] because of negative side effects from a previous method of birth control?
    a. Yes
    b. No

17. Have you ever used the copper IUD also known as ParaGard?
    a. Yes
    b. No

18. [If Yes to Question 17] What was your primary reason for using the copper IUD (ParaGard)?
    a. Emergency Contraception
    b. Because it has no hormones
    c. Both A and B
    d. Other (open text box)

19. Why did you decide to use the [IUD/implant] instead of the [IUD/implant]?
    a. Open text box

20. How comfortable are you talking about topics relating to your sexual and reproductive health?
    a. Very comfortable
    b. Comfortable
    c. Neither comfortable or uncomfortable
    d. Uncomfortable
    e. Very Uncomfortable

Thinking back to when you made the decision to use either the birth control implant or the IUD answer the following questions:

Socioenvironmental Factors (items 1-9 from Guttmacher survey; 10-15 Contraceptive Decision Making Questionnaire [CDMQ])

1. Did you ever get information about the **IUD** from the following sources? (Select all that apply)
    a. Friends
    b. Partner (current or past)
    c. Your mother or father
    d. Siblings or other relatives
    e. Health care provider like a doctor or nurse
    f. Internet
    g. Books, magazines, or pamphlets
    h. TV or radio
    i. School
    j. Other (please specify)
    k. I did not receive information about the IUD.

2. From which <u>one</u> source did you receive the most information about the **IUD**?
    a. Friends
    b. Partner (current or past)

      c. Your mother or father
      d. Siblings or other relatives
      e. Health care provider like a doctor or nurse
      f. Internet
      g. Books, magazines, or pamphlets
      h. TV or radio
      i. School
      j. Other (please specify)
      k. I did not receive information about the IUD.

3. Which <u>one</u> source did you trust the most to give you accurate information about the **IUD**?
      a. Friends
      b. Partner (current or past)
      c. Your mother or father
      d. Siblings or other relatives
      e. Health care provider like a doctor or nurse
      f. The internet
      g. Books, magazines, or pamphlets
      h. TV or radio
      i. School
      j. Other (please specify)
      k. I did not receive information about the IUD.

4. Did you ever get information about the **implant** from the following sources? (Select all that apply)
      a. Friends
      b. Partner (current or past)
      c. Your mother or father
      d. Siblings or other relatives
      e. Health care provider like a doctor or nurse
      f. Internet
      g. Books, magazines, or pamphlets
      h. TV or radio
      i. School
      j. Other (please specify)
      k. I did not receive information about the implant.

5. From which <u>one</u> source did you receive the most information about the **implant**?
      a. Friends
      b. Partner (current or past)
      c. Your mother or father
      d. Siblings or other relatives
      e. Health care provider like a doctor or nurse
      f. Internet
      g. Books, magazines, or pamphlets
      h. TV or radio
      i. School
      j. Other (please specify)
      k. I did not receive information about the implant.

6. Which <u>one</u> source did you trust the most to give you accurate information about the **implant**?
   a. Friends
   b. Partner (current or past)
   c. Your mother or father
   d. Siblings or other relatives
   e. Health care provider like a doctor or nurse
   f. Internet
   g. Books, magazines, or pamphlets
   h. TV or radio
   i. School
   j. Other (please specify)
   k. I did not receive information about the implant.

Thinking back to the time when you chose to use the [IUD/implant], please answer the following questions:

7. I was influenced to choose the [IUD/implant] by other women who have used this method.
   a. Definitely does not describe me
   b. Generally does not describe me
   c. Generally not something I'm concerned about
   d. Generally describes me
   e. Very much describes me

8. My female family members influenced my choice to use the [IUD/implant].
   a. Definitely does not describe me
   b. Generally does not describe me
   c. Generally not something I'm concerned about
   d. Generally describes me
   e. Very much describes me

9. My sexual partner's (current or past) preferences influenced my choice to use the [IUD/implant].
   a. Definitely does not describe me
   b. Generally does not describe me
   c. Generally not something I'm concerned about
   d. Generally describes me
   e. Very much describes me

10. My choice to use the [IUD/implant] was influenced by my relationship status with my partner.
   a. Definitely does not describe me
   b. Generally does not describe me
   c. Generally not something I'm concerned about
   d. Generally describes me
   e. Very much describes me

11. My female friends influenced my choice to use the [IUD/implant]
    a. Definitely does not describe me
    b. Generally does not describe me
    c. Generally not something I'm concerned about
    d. Generally describes me
    e. Very much describes me

12. I was influenced to choose the [IUD/implant] by the advice of my health care provider.
    a. Definitely does not describe me
    b. Generally does not describe me
    c. Generally not something I'm concerned about
    d. Generally describes me
    e. Very much describes me

The next three questions ask about the attitudes of your family and friends.

1. Many of my friends have had unplanned pregnancies.
    a. Strongly agree
    b. Somewhat agree
    c. Somewhat disagree
    d. Strongly disagree

2. Most of my friends think that it is important to use very effective birth control such as the IUD or the implant.
    a. Strongly agree
    b. Somewhat agree
    c. Somewhat disagree
    d. Strongly disagree

3. In my family, it is not acceptable to have a child out-of-wedlock (outside of marriage).
    a. Strongly agree
    b. Somewhat agree
    c. Somewhat disagree
    d. Strongly disagree

The last six questions ask about your knowledge and attitudes.

Personal Cognitive Factors (Items 1-6 from Guttmacher survey)

1. Overall, how much do you feel you know about **IUDs** and how they are used?
    a. Know nothing
    b. Know a little
    c. Know a lot
    d. Know everything

2. Overall, how much do you feel you know about the **implant** and how it is used?
    a. Know nothing
    b. Know a little
    c. Know a lot
    d. Know everything

3. Thinking about your life right now, how important is it to you to avoid becoming pregnant?
    a. Very important
    b. Somewhat important
    c. A little important
    d. Not at all important

4. If you found out today that you were pregnant, how would you feel?
    a. Very upset
    b. A little upset
    c. A little pleased
    d. Very pleased
    e. Wouldn't care

5. Pregnancy is something that should be planned.
    a. Strongly agree
    b. Somewhat agree
    c. Somewhat disagree
    d. Strongly disagree

6. I have all the information I need to avoid an unplanned pregnancy.
    a. Strongly agree
    b. Somewhat agree
    c. Somewhat disagree
    d. Strongly disagree

Thank you for your time and participation! As a participant, you have the option to take part in a 30-minute in-depth interview about your choice to use either the IUD or the implant. The interview would be over the phone or in-person — whatever you prefer. If you participate in the interview, you will receive a $10 gift card as compensation for your time.

Are you interested in participating in an interview?

    a. Yes
    b. No

[Answers Yes]
Please provide your
Name_____
E-mail _____
Phone number _____

[All participants have the option of receiving a gift card.]
Thank you for completing this survey. If you are one of the first 226 respondents, you are eligible for a $5 Amazon gift card. Please enter your name and e-mail address to receive the gift card.
Name _____

E-mail _____

APPENDIX D: INTERVIEW GUIDE

<u>Part 1</u>

Interview Questions	SCT Construct
Thinking back to when you made the decision to use the [IUD/implant], how did you go about choosing that method of birth control?	Intentions
Probe: How did you first hear about this method of birth control?	Observational Learning; Knowledge
Why did you decide to use the [IUD/implant] instead of the [IUD/implant]?	Observational Learning; Social Support; Opportunities and Barriers; Knowledge; Outcome Expectations
Probe: Did someone you know influence your decision? How did they influence your decision?	Observational Learning; Social Support: Opportunities and Barriers
Probe: How much did you know about each method before making your decision?	Knowledge
Probe: What were your sources of information?	Knowledge
Were there certain characteristics of the [IUD/implant] that you liked better than the [IUD/implant]?	Reinforcement; Outcome Expectations
Probe: Were there side effects of the [IUD/implant] that influenced your choice to use the [IUD/implant]?	Reinforcement
What steps did you have to take to get your [IUD/implant]?	Behavioral Skills
What made it easy or difficult to get your IUD/implant?	Opportunities and Barriers; Social Support
Probe: How did you overcome these barriers?	Behavioral Skills; Knowledge
Probe: Did you have previous experience in overcoming similar barriers?	Self-efficacy: mastery experiences
Probe: Was there someone that helped you to overcome these barriers?	Self-efficacy: social modeling Self-efficacy: verbal persuasion

As you may recall, when you took the survey online, you answered several questions about people in your life that influenced you to choose the [IUD/implant]. I would like to find out more about your answers to those questions.

Interview Questions	SCT Construct
For the question, "My decision to use the [IUD/implant] was influenced by other women who have used this method", you answered _____. Can you help me understand your response?	Observational Learning; Normative Beliefs
Probe: How did other women influence you?	Reciprocal Determinism
Probe: Did they provide you with information? What kind of information?	Reciprocal Determinism
Probe: Did they share with you their experiences with the IUD/implant?	Reciprocal Determinism
For the question, "My female family members influenced my choice to use the [IUD/implant]", you answered _____. Can you help me understand your response?	Observational Learning; Normative Beliefs
Probe: How did your female family members influence you?	Reciprocal Determinism
Probe: Did they provide you with information?	Reciprocal Determinism
Probe: Did they share with you their experiences with the IUD/implant?	Reciprocal Determinism
For the question, "My female friends influenced my choice to use the [IUD/implant]", you answered _____. Can you help me understand your response?	Observational Learning; Normative Beliefs
Probe: How did your friends influence you?	Reciprocal Determinism
Probe: Did they provide you with information? What kind of information?	Reciprocal Determinism
Probe: Did they share with you their experiences with the IUD/implant?	Reciprocal Determinism
For the question, "My sexual partner's (current or past) preferences influenced my choice to use the [IUD/implant]?" you answered _____. Can you help me understand your response?	Social Support; Opportunities and Barriers
Probe: How did his preferences influence you?	Reciprocal Determinism
For the question, "My decision to use the [IUD/implant] was influenced by my relationship status with my partner", you answered _____. Can you help me understand your response?	Social Support; Opportunities and Barriers

For the question, "My choice to use the [IUD/implant] was influenced by my health care provider", you answered _____. Can you help me understand your response?	Social Support; Opportunities and Barriers
Probe: How did your health care provider influence you?	Reciprocal Determinism

We talked about the influence of family, friends, your sexual partner, and your health care provider on your choice to use the [IUD/implant]. Are there other people or influences that I didn't ask you about?

Is there anything else you would like to tell me about why you chose to use the [IUD/implant]?

Those are all of my questions. Do you have any questions for me? (Offer participant information on contraception)

Thank you for your time!

APPENDIX E: COGNITIVE INTERVIEW QUESTIONS

1. How do you feel about the length of time it took you to complete the survey?

2. Overall, how easy or hard was it to complete the survey?

3. Was there anything unclear or confusing about the survey?

4. Were response options appropriate? If not, which items could be improved and how?

5. Were there any questions that you felt were difficult to answer?

6. Were there any questions that seemed redundant?

7. Is there anything about the survey you would change?

APPENDIX F: DISSEMINATION PLAN

1. **Manuscripts**

Brief Title	Target Journals (Impact Factor)	Description
Barriers and Facilitators to LARC Initiation	Journal of Adolescent Health (3.838) Contraception (2.788)	The purpose is to report on barriers and facilitators that women face when attempting to initiate LARC. Methods will be from Phase II of the dissertation.
Key intrapersonal and interpersonal factors in LARC Initiation	BMJ Sexual & Reproductive Health (2.027) Women's Health Issues (1.811)	The purpose is to explore why women chose LARC. Methods will be from Phase II of the dissertation.
Differences between IUD users and Implant users	Journal of Pediatric and Adolescent Gynecology (1.683) Women & Health (1.377)	The purpose is to understand and explore differences between IUD users and implant users. Methods will be from Phase I and Phase II of the dissertation.

2. **Community Report**

A summary of these dissertation findings will be shared with the Director of Student Health Services. This report will translate the research findings into recommendations for practice.

APPENDIX G: IRB APPROVAL

USF
UNIVERSITY OF
SOUTH FLORIDA

June 15, 2018

Helen Mahony
Community and Family Health
12901 Bruce B. Downs Blvd
MDC 27
Tampa, FL 33612

RE: **Expedited Approval for Initial Review**
IRB#: Pro00035566
Title: Exploring young women's choice to initiate use of long-acting reversible contraception: A mixed methods approach

Study Approval Period: 6/14/2018 to 6/14/2019

Dear Ms. Mahony:

On 6/14/2018, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
Protocol v1 5.7.18.docx

Consent/Assent Document(s)*:
Informed Consent online survey v1 5.10.18.docx

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved. Online consent forms are not stamped.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review

research through the expedited review procedure authorized by 45CFR46.110. The research proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your study qualifies for a waiver of the requirements for the documentation of informed consent as outlined in the federal regulations at 45CFR46.117(c) which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: (1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context. (Online consent).

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) business days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Mark Ruiz, PhD, Vice Chairperson
USF Institutional Review Board

APPENDIX H: APPROVAL TO USE CONTRACEPTIVE DECISION-MAKING QUESTIONNAIRE

From: Joanne Noone
To: Mahony, Helen
Subject: RE: Contraceptive Decision-Making Questionnaire
Date: Monday, July 10, 2017 12:02:31 PM

For the first table, those are the results of the factor analysis and how each item laded on the subscale. The second table are the results of internal consistenty

Joanne Noone, PhD, RN, CNE
Campus Associate Dean – Ashland
Associate Professor
Oregon Health & Science University
541 552-8453
noonej@ohsu.edu
pronouns: she, her, hers

From: Mahony, Helen [mailto:hgeorgie@health.usf.edu]
Sent: Monday, July 10, 2017 8:34 AM
To: Joanne Noone <noonej@ohsu.edu>
Subject: RE: Contraceptive Decision-Making Questionnaire

Dr. Noone,

Thank you for sending this to me. It is very helpful. What are the numeric values assigned to each response option? Is a sum score calculated for each subscale?

Thank you again,

Helen

From: Joanne Noone [mailto:noonej@ohsu.edu]
Sent: Thursday, June 29, 2017 9:24 PM
To: Mahony, Helen <hgeorgie@health.usf.edu>
Subject: RE: Contraceptive Decision-Making Questionnaire

These tables should answer your questions. Joanne

Joanne Noone, PhD, RN, CNE
Campus Associate Dean – Ashland
Associate Professor
Oregon Health & Science University
541 552-8453
noonej@ohsu.edu
pronouns: she, her, hers

From: Mahony, Helen [mailto:hgeorgie@health.usf.edu]
Sent: Saturday, June 24, 2017 10:53 AM
To: Joanne Noone <noonej@ohsu.edu>
Subject: RE: Contraceptive Decision-Making Questionnaire

Dear Dr. Noone,

I contacted you back in February regarding your Contraceptive Decision-Making Questionnaire. Thank you again for sharing the 41-item instrument with me. I have a couple of follow-up questions that I hope you can help me with. 1) In your abstract, you state that after the EFA, the survey was reduced to 29 items. Would you be able to send me the final 29-item instrument? 2) Would you also be able to share with me which items belong to each of the subscales of accessibility, general factors, interpersonal influences, and personal beliefs?

Thank you,

Helen Mahony

Helen Mahony, MPH
Doctoral Student
Department of Community and Family Health
College of Public Health
University of South Florida

From: Joanne Noone [mailto:noonej@ohsu.edu]
Sent: Tuesday, February 07, 2017 3:54 PM
To: Mahony, Helen <hgeorgie@health.usf.edu>
Subject: RE: Contraceptive Decision-Making Questionnaire

Here you go — good luck in your research! Joanne

Joanne Noone, PhD, RN, CNE
Associate Professor, Associate Dean, Ashland Campus
Oregon Health & Science University
Churchill Hall 211, 1250 Siskiyou Boulevard
Ashland, OR 97520
(541) 552-8453 - office/(541) 552-6055 - fax

From: Mahony, Helen [mailto:hgeorgie@health.usf.edu]
Sent: Sunday, February 05, 2017 10:20 AM
To: Joanne Noone <noonej@ohsu.edu>
Subject: Contraceptive Decision-Making Questionnaire

Dear Dr. Noone,

I am a PhD student at the University of South Florida and for my dissertation I am examining the role of social networks in a young woman's decision to initiate use of long-acting reversible contraception. I came across a published abstract you authored in the journal Communicating Nursing Research in which you conducted a psychometric evaluation of a contraceptive decision-making questionnaire. I think this questionnaire may be helpful to me and I was wondering if you could provide more details. Is this questionnaire publicly available? If not, would you be willing to share it? Thank you in advance for any help you can provide.

Sincerely,

Helen

Helen Mahony, MPH
PhD Student, Community and Family Health
College of Public Health
University of South Florida

APPENDIX I: 2009 NATIONAL SURVEY OF REPRODUCTIVE AND CONTRACEPTIVE KNOWLEDGE PROOF OF PUBLIC AVAILABILITY

For more information visit: https://www.guttmacher.org/population-center/datasets and https://www.guttmacher.org/population-center/dataset/2009-national-survey-reproductive-and-contraceptive-knowledge

GUTTMACHER
INSTITUTE

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2009 National Survey of Reproductive and Contraceptive Knowledge

This survey was the first of its kind to focus in depth on the attitudes and behavior of unmarried young adults regarding pregnancy planning, contraception, and related issues. Commissioned by The National Campaign to Prevent Teen and Unplanned Pregnancy and conducted by the Guttmacher Institute, the survey gathered detailed results from a nationally representative probability sample of 1,800 unmarried men and women aged 18–29. The survey includes information on awareness of and knowledge about the various types of available birth control, information sources, the pervasiveness of popular myths and misconceptions and the frequency of contraceptive use. The study also gathered data on sexual relationship and pregnancy experiences.

Documents

ns-userguidecb2009.pdf

Includes a detailed description of the dataset, weights and other key variables, advice on using the file, and a codebook.

ns-questionnaire2009.pdf

Questionnaire

pu-datasetform.pdf

Available formats: Stata, SPSS
To obtain this dataset, complete the public-use dataset request form.

Additional Information
See other resources related to this study.

ABOUT THE CENTER

Datasets

A high priority for the Guttmacher Center for Population Research Innovation and Dissemination is to make available to the research community datasets created by Guttmacher Institute researchers. These datasets span the range of topics in the area of sexual and reproductive health. Over time, we hope to make available data from surveys of reproductive health care providers and clients, both female and male, from the U.S. and other countries. The datasets listed below are those that are currently available. Others will be added to this list and publicized when they are prepared for public use.

Researchers who would like to obtain any of the datasets listed below should complete the **public-use dataset request form (PDF)**, sign and scan it, and return it to **popcenter@guttmacher.org**.

Researchers may also wish to access the Guttmacher **Data Center**, which allows one to build and download customized data tables and maps at the state and national level for the U.S. and for several other countries.

2012–2014 Continuity and Change in Contraceptive Use Study

The Continuity and Change in Contraceptive Use study assessed contraceptive use patterns in the United States by collecting data from a nationally representative probability sample of more than 4,600 women who were aged 18–39 at baseline. Women completed four online surveys (one every six months) between 2012 and 2014. The longitudinal data collected allow examination of patterns of contraceptive use and a wide range of issues that inform those patterns, including pregnancy motivation, life events, relationship dynamics and access to health care.

2011–2012 Uganda Post-Abortion Care Costing Study

The Uganda Post-Abortion Care Costing Study includes data on 1,338 women who received postabortion care at health facilities across Uganda in 2011–2012. Data were collected from the women themselves, each patient's principal postabortion care provider and the Ministry of Health. The dataset includes information on women's individual and household socioeconomic characteristics and the type and cost of treatment they received, as well as how their abortion complications affected children in the household, productivity (of the respondent and other household members) and economic circumstances.

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DONATE

(Community-based Survey of Zambian Women)

This survey is one of eight surveys conducted in Zambia and Nigeria that explore how HIV status relates to attitudinal and behavioral measures regarding HIV services and fertility preferences. This dataset comes from a community-based survey of 1,441 Zambian women aged 18–49 who were surveyed in 2009 and 2010. Information collected includes fertility desires, HIV status, pregnancy intention, current and previous pregnancies, family planning use, current and past sexual activity, past abortions, attitudes toward and knowledge about HIV, and use of HIV services. The other seven surveys within this project on HIV and fertility desires include information on male and female populations in Nigeria and Zambia collected in communities and at health facilities.

We plan to make the datasets for the other seven surveys publicly available in the near future.

2010 Survey of U.S. Publicly Funded Family Planning Clinics (Clinic Survey)

The Guttmacher Institute has a long history of studying U.S. publicly funded family planning clinics and conducting sample surveys to better understand and document the clinic network's range of service delivery practices and the challenges it faces. These data are from a survey of a nationally representative sample of publicly funded family planning clinics conducted in 2010–2011, and are both an extension of earlier surveys and an investigation of new topic areas relevant to the provision of clinic services today.

2009 National Survey of Reproductive and Contraceptive Knowledge

("Fog Zone" study)

This survey was the first of its kind to focus in depth on the attitudes and behavior of unmarried young adults regarding pregnancy planning, contraception, and related issues. Commissioned by The National Campaign to Prevent Teen and Unplanned Pregnancy and conducted by the Guttmacher Institute, the survey gathered detailed results from a nationally representative probability sample of 1,800 unmarried men and women aged 18–29. The survey includes information on awareness of and knowledge about the various types of available birth control, information sources, the pervasiveness of popular myths and misconceptions and the frequency of contraceptive use. The study also gathered data on sexual relationship and pregnancy experiences.

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