Contraceptive Use Among Emerging Adult College Women:
Results from a National Survey

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Leslie Morrison, MS, RN, CNM

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Renee Sieving, PhD, RN, FSAHM
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Dedication

This dissertation is dedicated to my family, who has supported and encouraged me throughout this program. I would neither have started nor completed this degree without their encouragement, enthusiasm and flexibility. To my wonderful husband Scott, I cannot describe how many ways you have supported my dream to complete this degree. Thank you for the meals cooked, the dishes washed and the groceries bought. To my incredible daughters, Laura, Faith and Megan, thank you so much for your patience with me when I would try to fit just one more thing in before our scheduled activities. Thank you all for maintaining a good sense of humor, as it was often needed. Finally, thank you to my parents, George and Connie, for encouraging me to pursue my dreams.

Abstract

With most emerging adults being sexually active; contraceptive use is an important health consideration in this population. Contraceptive use patterns are influenced by complex and competing factors. While much research has focused on the relationships between risk indicators and contraceptive use, less research has focused on protective factors that may be associated with consistent contraceptive use. Emerging adult developmental theory and a positive youth development (PYD) framework may provide a structure for considering the roles of protective factors (i.e., external supports and internal assets) on consistent contraceptive and condom use among college attending emerging adult women.

Using secondary data analysis from Wave III of the National Longitudinal Study of Adolescent Health (Add Health), this study evaluated relationships between external supports (i.e., parental caring and current relationship with caring non-parental adult), and internal assets (i.e., self-esteem, confidence, independence and life satisfaction) and consistent contraceptive and condom use. It also evaluated relationships between risk indicators (i.e., heavy episodic alcohol use, marijuana use and depressive symptoms), and consistent contraceptive and condom use, and interactive effects of protective factors and risk indicators on consistent contraceptive use.

Findings indicated that all of the internal assets evaluated in this study (i.e., self-esteem, confidence, independence, life satisfaction) were significantly and positively related to consistent contraceptive use. There were no significant relationships between external supports and consistent contraceptive use. Among risk indicators, marijuana use

and depressive symptoms were significantly and negatively related to consistent contraceptive use. Protective factors did not moderate the relationships between risk indicators and consistent contraceptive use.

Examining consistent condom use, there were no significant relationships between any protective factors and this study outcome. Of the study's risk indicators, only heavy episodic alcohol use had a significant bivariate relationship with consistent condom use; this relationship became non-significant in a multivariate model that accounted for known correlates of consistent condom use.

This study supports the use of strengths based interventions throughout youth, adolescence and emerging adulthood to decrease the risks associated with inconsistent contraceptive use. The need for continued research to better understand the roles of protective factors and risk indicators on consistent contraceptive and condom use are discussed.

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Chapter I: The Research Problem

Background and Significance

Emerging adulthood, a developmental period that spans from around 18 to 25 years of age, is a time of increased independence and identity development (Tanner, 2006, Arnett, 2006a). During this time, emerging adults explore their sexuality and sexual relationships (Lefkowitz & Gillen, 2006; Collins & van Dulmen, 2006). With most emerging adults being sexually active, contraceptive use is an important health consideration with this population (Chandra, Martinez, Mosher, Abma & Jones, 2005).

Among emerging adults, contraceptive use patterns are influenced by complex and competing factors (Jaccard, 2009). A preponderance of research regarding emerging adult contraceptive use focuses on risk indicators, or factors that reduce the likelihood of use. Because the prevalence of certain risk indicators (e.g., heavy episodic drinking, illicit drug use) increases in emerging adulthood compared to adolescence (Mulye, et al., 2009), the relationships of these risk indicators to contraceptive use patterns may provide direction for intervention. Previous studies of associations between risk indicators and contraceptive use among emerging adults have resulted in mixed findings (Wechsler, Lee, Kuo & Lee, 2000, Walsh, Feilder, Carey & Carey, 2013; Scholly, Katz, Cole & Heck, 2010).

Strength-based frameworks have served as catalysts for research identifying protective factors, or influences that support healthy sexual behaviors including consistent contraceptive use (Catalano, Gavin, & Markham, 2010). One such framework

is the positive youth development (PYD) framework (Lerner et al., 2005) that proposes that programs designed to prepare youth for healthy adulthood will also prevent problems (Pittman, Irby, Tolman, Yohalem, & Ferber, 2003). Goals of PYD programs are to support and encourage youth competence, confidence, connections, character and caring (Lerner et al., 2005) through the development of external supports (i.e., extrinsic influences) and internal assets (i.e., individual attributes; Leffert et al., 1998; Pittman et al., 2003). Although selected external supports and internal assets have been identified as having positive effects on indicators of reproductive health among adolescents (Catalano et al., 2010), less is known about the role of protective factors in emerging adult reproductive health. Furthermore, little is known about external supports and internal assets that specifically encourage effective contraceptive use in this population.

In addition to the unique effects that protective factors and risk indicators may have on consistent contraceptive and condom use, moderating effects may be present. External supports and internal assets may moderate the negative effect of risk indicators on contraceptive use (Fergus & Zimmerman, 2005; Masten, Obradovic & Burt, 2006). Risk indicators (e. g., heavy episodic drinking, marijuana use and depressive symptoms) are relatively common during this developmental period (Mulye et al, 2009). Yet, little is known about potential moderating effects of protective factors on relationships between risk indicators and consistent contraceptive and condom use among emerging adults.

An emerging adult developmental lens provides a theoretical basis for examining external supports and internal assets that may support consistent contraceptive use and

reproductive health during this stage of the life course. Emerging adulthood is a developmental period that has specific characteristics (Arnett, 2006a). An essential developmental task of this period is that of "recentering," the process of gaining adult self-sufficiency (Tanner, 2006). Separation-individuation and identity development are central to this developmental task (Tanner, 2006; Arnett, 2006a). Parental support is key in the process of separation-individuation and identity development. Likewise, caring, non-parental adults encourage exploration of self and relational identities, including issues of sexuality (Tanner, 2006; Lefkowitz & Gillen, 2006).

In addition to these forms of external supports, certain internal assets encourage healthy intimate relationships and are instrumental in defining the sexual self (Lefkowitz & Gillen, 2006). Emerging adulthood represents a time of transition from childhood dependence to adult independence, including sexuality (Tanner, 2006). Life satisfaction, as a component of well-being has been studied as an indicator of reproductive health (Schwartz, et al., 2011). A sense of agency is critical to this developmental period (Schwartz, Cote & Arnett, 2005) and may support healthy behavior, including healthy sexual behavior, by fostering future oriented actions including contraceptive use (Schwartz, Forthun et al., 2010). Measures of agency include self-esteem, purpose in life, internal locus of control, and ego strength (Schwartz et al., 2005). In summary, emerging adult theory indicates that external supports of parental caring and relationships with non-parental adults as well as internal assets of self-esteem, confidence,

independence, and life satisfaction may encourage consistent contraceptive use during this stage of life.

Contraceptive use is a complex action requiring correct and consistent use (Jaccard, 2009). Different types of contraceptives require different actions from the user. Among emerging adults, oral contraceptive pills and condoms are among the most common forms of birth control (Jaccard, 2009). Non-coital forms of contraception, (e.g., hormonal methods) require efforts to obtain the contraceptive well ahead of intercourse, but little effort at the time of intercourse; whereas coital methods (e.g., condoms) require use of the contraceptive at the time of intercourse (Jaccard, 2009). Different forms of contraceptives may have distinct motivators (e.g., STI prevention, pregnancy prevention, menstrual cycle regulation) and challenges (e.g., access, partner cooperation).

Despite high rate of unintended pregnancy (Finer & Henshaw, 2006), much of the research on sexual risk behavior among emerging adults has focused on condom use and STI prevention. Although condoms fulfill a unique role by protecting against STIs and pregnancy, a variety of other contraceptive options are available to emerging adults. A comparison of how protective factors and risk indicators are associated with two outcomes (i.e., consistent use of any type of contraceptive and consistent condom use) may allow for greater understanding of how general pregnancy prevention efforts may differ from condom specific outcomes, which may be related to both pregnancy prevention and/or STI prevention.

Significance of the Problem to Young Women Attending College

The developmental tasks of emerging adulthood are similar for individuals in college and not in college, but the college students may have unique stressors related to the college transition (Fromme, Corbin & Kruse, 2008; Tanner, 2006b). Additionally, unintended pregnancy and abortion may be particularly relevant issues for women in their college years. Among women with some college, pregnancies are often unintended; compared to women who have completed their college education or those with a high school diploma or less, unintended pregnancies among women with some college more often end in abortion (Finer & Henshaw, 2006). An understanding of influences on contraceptive use among emerging adult women in college provides an important avenue for addressing unintended pregnancy (Jaccard, 2009).

Unintended pregnancy rates among adolescents have declined in recent years (Hamilton & Ventura, 2012); however, similar improvements have not been seen among emerging adults (Zolna & Lindberg, 2012). Additionally, compared to studies of adolescents, fewer studies have addressed contraceptive use among emerging adults (Jaccard, 2009). This combination of limited research on a problem that has proven resistant to change, suggests a need for further investigation. This study, a secondary analysis of data from Wave III of the National Longitudinal Study of Adolescent Health (Add Health) addressed these gaps in research using data from a national sample of sexually active, 18 – 24 year old women attending 4-year colleges.

Statement of Purpose

The purpose of this study was to examine relationships between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use, and between risk indicators and consistent contraceptive and condom use among emerging adult college women. Additionally, this study examined whether relationships between select risk indicators and contraceptive use were altered by the presence of protective factors.

This study addressed four specific aims and related research questions.

Aim 1. Explore bivariate correlations between external supports, internal assets, and indicators of risk among a nationwide sample of sexually active emerging adult college women.

Aim 2. Examine associations between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 2:

1. Are external supports of caring parents and current relationships with caring non-parental adults positively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

2. Are internal assets of self-esteem, confidence, independence and life satisfaction positively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

3. Which protective factors have the strongest relationships with consistent contraceptive and condom use among sexually active, emerging adult college women?

Aim 3. Examine associations between risk indicators and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 3:

1. Is heavy episodic drinking negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

2. Is marijuana use negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

3. Are depressive symptoms negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

4. Which risk indicators have the strongest relationships with consistent contraceptive and condom use among sexually active, emerging adult college women?

Aim 4. Informed by relationships found to be significant in Aims 2 and 3, examine protective factors as moderators of associations between risk indicators and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 4:

1. Are significant relationships between consistent contraceptive and condom use and identified risk indicators moderated by the external supports of parental closeness or relationships with caring non-parental adults?

2. Are significant relationships between consistent contraceptive and condom use and identified risk indicators moderated by internal assets of self-esteem, confidence, independence, or life satisfaction?

By using data from a nationwide sample of emerging adult women attending college, this study addressed several important gaps in the research literature. First, informed by a synthesis of PYD and emerging adult theories, the influences of several external supports and internal assets on consistent contraceptive and condom use were evaluated. Few studies have addressed these relationships; furthermore, substantial changes in protective factors and risk indicator are common in emerging adulthood (Masten et al., 2006). Therefore, a cross-sectional design was used to explore current assets, supports, and risks in relation to consistent contraceptive and condom use.

Second, this study assessed the influences of common risk indicators in this population on consistent contraceptive and condom use as well as the potential moderating role of protective factors on relationships between risk indicators and consistent contraceptive and condom use. A third, methodologic gap addressed by this study relates to measures used to assess contraceptive and condom use. This study assessed consistency of contraceptive and condom use, rather than use at last intercourse. The former provides a better measure of contraceptive effectiveness, which is essential

for pregnancy prevention (Shai et al., 2010; Zhou et al., 2010). Using a general measure

of contraceptive consistency (any method of contraceptive use) and condom use

consistency as outcome variables can differentiate how various protective factors and risk

indicators relate to overall contraceptive use compared to condom use. Addressing these

gaps in existing research, findings from this study may help nurses and other health care

providers working with female college students assess potential supports and barriers to

consistent contraceptive and condom use, and tailor messages regarding both pregnancy

and STI prevention.

Chapter II: Review of the Literature

Emerging adulthood is a time of increased independence and identity

development (Tanner, 2006, Arnett, 2006a). During this time, emerging adults explore

their sexuality and sexual relationships (Collins & van Dulmen, 2006; Lefkowitz &

Gillen, 2006). With most emerging adults being sexually active, contraception is an

important health consideration (Chandra et al., 2005). A Positive Youth Development

(PYD) framework posits that external supports and internal assets may encourage healthy

development among children, adolescents and young adults, including healthy sexual

development and healthy sexual behaviors (Catalano, Berglund, Ryan, Lonczak, &

Hawkins, 2004; Galinsky & Sonenstein, 2011; Romeo & Kelley, 2009). Contraceptive

use is an important part of reproductive health among emerging adults (Jaccard, 2009).

External supports (e.g., caring relationships with parents) and internal assets (e.g., self-

efficacy, aspirations and attitudes) may act at a proximal level or at a more distal level to

affect emerging adults' contraceptive use patterns (Jaccard, 2009). At the same time, risk

indicators may be associated with lack of contraceptive use and other sexual risk taking

behaviors (Catalano et al., 2004). These risk factors (e.g., heavy episodic drinking,

marijuana use, depressive symptoms) may act at a near-distal level to diminish

contraceptive use (Dorfman, Trokel, Lincoln, & Mehta, 2010; Ingersoll, Ceperich,

Nettleman, & Johnson, 2008; Jaccard, 2009, Wagner, 2011).

This study, a secondary analysis of data from Wave III of The National

Longitudinal Study of Adolescent Health (Add Health), examined relationships between

protective factors (i.e., external supports and internal assets), risk indicators, and

consistent contraceptive and condom use among sexually active, 18 – 24 year old women

attending 4-year colleges. This chapter will outline the theoretical underpinnings that

provide the foundation for this study including emerging adult development and PYD in

a social-ecological framework, and provide a rationale for the use of the combined

theories to guide this study. The chapter will continue with a review of the empirical

literature on contraceptive use among emerging adults, as well as evidence on the role of

external supports and internal assets as protective factors supporting contraceptive use

among emerging adults and college students. The effects of substance use and depressive

symptoms as risk indicators related to contraceptive non-use among emerging adults and

college students will be assessed. The chapter will conclude with a summary of the

literature and its relevance to the current study.

Theoretical Underpinnings

Emerging Adulthood as a Developmental Stage

Emerging adulthood is a developmental period that spans from around 18 to 25

years of age (Tanner, 2006). Five features distinguish it from adolescence and adulthood:

identity development, instability, self-focus, feeling "in-between," and possibilities

(Arnett, 2006a; Arnett, 2006b). Themes that relate to each of these features include

exploration and frequent changes in relationships, residence, and school; decision making

based on personal desires rather than others' needs; a sense of being in-between youth

and adulthood; and feelings of hopefulness and optimism about the future (Arnett,

2006a).

Tanner (2006) proposes that a main task in emerging adulthood is "recentering," which she defines as the "process that underlies emerging adults' gains in adult sufficiency" (p. 29). Recentering describes the change in relationships between emerging adults and their parents and society, in which emerging adults take on more responsibility for their actions and rely less on family and institutions (e.g., school) to provide structure for decision making and behavior. Tanner suggests that recentering occurs in three stages, beginning in adolescence and ending in adulthood. During the first stage, adolescents are governed extensively by family and social structures. Stage two is the period of time generally referred to as emerging adulthood in which identity development, instability, self-focus, feeling "in-between," and possibilities are most evident, and stage three is marked by system commitments in which more permanent relationships and demands are placed on young adults (Tanner, 2006).

Separation-individuation and ego development are central to this developmental period (Tanner, 2006). Parental relationships that encourage communication, acceptance and empathy may be supportive of separation-individuation and, ultimately, movement toward adult self-sufficiency (Aquilino, 2006; Tanner, 2006). Ego development has been conceptualized as the "ability to understand self and world" (Tanner, 2006, p. 37). In emerging adulthood, higher levels of ego development are thought to be associated with greater success in moving toward self-sufficiency. A higher level of ego development is associated with greater autonomy in emerging adults (Tanner, 2006).

College and emerging adulthood. College attendance influences emerging adult development; simultaneously, the developmental tasks of emerging adulthood shape the college experience (Fromme et al., 2008). College allows time and space for exploration and self-focus. It is also a challenging transition often marked by changes in relationships with family and friends, moving away from home, and increases in risk behavior (Buote et al., 2007; Fromme et al., 2008; Hofer, Souder, Kennedy, Fullman, & Hurd, 2009; Kenyon & Koerner, 2009). The exposure to the supports and challenges of college provides a unique experience for emerging adults, thereby establishing emerging adult college students as a distinct population.

Although college provides a unique experience for emerging adults, there are distinct differences between students who attend two-year and four-year institutions and between resources available to those students. Students who attend two-year colleges are likely to be older, have families, and work more hours than students at four-year colleges (National Center for Education Statistics, 2013). Additionally, reproductive health resources differ, with four-year universities more likely to offer more health services and sexual health resources to students (Eisenberg, Lechner, Frerich, Lust, & Garcia, 2012; Eisenberg, Garcia, Frerich, Lechner, & Lust, 2012). The availability of health services and the presence of the resources may eliminate some barriers to reproductive health care. This environment provides a useful context for considering determinants of consistent contraceptive and condom use in an environment of relatively high access to services and resources.

Positive Youth Development

Positive Youth Development (PYD), a framework based on concepts and research from the fields of psychology, biology and life-span development, proposes that a combination of external supports and internal assets are instrumental in providing youth with the tools to become healthy, contributing adults (Lerner et al., 2005; Pittman et al., 2003). The external supports and internal assets may also benefit emerging adults and college students as they continue their development into adulthood (Hawkins et al., 2011; O'Connor et al., 2011; Schwartz et al., 2011; Zullig, Ward, King, Patton, & Murray, 2009). The goals of PYD include attributes described as the *five Cs*: competence, confidence, connection, character and caring/compassion. Competence describes an individual's domain-specific actions (e.g., social competence, cognitive competence); confidence describes an individual's sense of self-worth and self-efficacy, connections focuses on positive bi-directional bonds with family, peers and adults; character is respect for society and culture; and caring is related to the development of empathy (Lerner et al., 2005).

The PYD framework conceptualizes youth development as an opportunity to foster growth that encompasses both problem prevention and preparation for adulthood (Pittman et al., 2003). In this framework, external supports are extrinsic influences such as healthy relationships with family, peers and adults; high expectations and standards; role models; resources and networks; challenging experiences and opportunities; and high quality instruction and training (Leffert et al., 1998; Pittman et al., 2003). Internal assets

include a diverse range of individual attributes (e.g., social competence, problem-solving skills, sense of independence, sense of purpose, commitment to learning, positive values, positive identity) that encourage success (Leffert et al., 1998; Pittman et al., 2003).

Positive Youth Development and reproductive health. External supports and internal assets identified by the PYD framework may be instrumental in the development of reproductive health (Gavin, Catalano, David-Ferdon, Gloppen & Markham, 2010; Romeo & Kelley, 2009). Several external supports and internal assets have been investigated as determinants of contraceptive use among adolescents (Gloppen, David-Ferdon, & Bates, 2010; House, Bates, Markham, & Lesesne, 2010; House, Mueller, Reininger, Brown, & Markham, 2010; Markham et al., 2010). Although fewer studies have examined external supports and internal assets related to emerging adults' contraceptive use, recent research has focused on internal assets and other aspects of emerging adult reproductive health (Galinsky & Sonenstein, 2011; Schwartz, Phelps et al., 2010; Schwartz et al., 2011).

Theoretical Framework for the Current Study

Evidence of the benefit of external supports and internal assets on emerging adult contraceptive use is limited. Yet, emerging adult theory provides guidance regarding external supports and internal assets that may be salient to reproductive health during this developmental period. Essential tasks of emerging adulthood, ego development and separation-individuation, both play a role in the establishment of intimate relationships (Tanner, 2006). Ego development supports both separation-individuation and identity

development (Tanner, 2006). An essential part of identity development is the development of sexual identity, including sexual behaviors and contraceptive use (Lefkowitz & Gillen, 2006).

External supports. This study evaluated emerging adults' relationships with parents (i.e., parental closeness) and with caring non-parental adults as potential external supports associated with consistent contraceptive and condom use. Parental relationships change dramatically during adolescence and early adulthood. These relationships may be characterized as including more conflict, but not a decrease in caring and closeness (Aquilino, 2006). The ability of emerging adults to take on adult roles, including developing healthy intimate relationships, stems from supportive parental relationships that encourage separation-individuation (Tanner, 2006). Secure parent-child attachments support ego development, which, in turn, supports identity development (Tanner, 2006). Identity development supports emerging adults' development of intimate relationships, including sexual relationships (Lefkowitz & Gillen, 2006).

College offers an environment supportive of the recentering process by providing emerging adults with access to prosocial relationships and opportunities to develop and expand their skills and knowledge (Tanner, 2006). For college students without these college-based supports, other caring, non-parental adults may provide similar support (Tanner, 2006). Caring non-parental adults may provide guidance that encourages emerging adults to explore self-identity and intimate relationships (Tanner, 2006). Although studies that focus on relationships with non-parental adults specifically among

college students are lacking, the literature supports the important roles that these

relationships play in the development of older adolescents and emerging adults (Chang,

Greenberger, Chen, Heckhausen, & Farruggia, 2010; Haddad, Chen, & Greenberger,

2011; Hurd & Zimmerman, 2010; Kogan, Brody, & Chen, 2011).

Internal assets. As with external supports, internal assets that correspond to

identity development may nurture healthy intimate relationships and help define the

emerging adult's sexual self (Lefkowitz & Gillen, 2006). Emerging adulthood represents

a time of transition from childhood dependence to adult independence, this includes

independent decision making regarding sexuality (Tanner, 2006). Life satisfaction, a key

component of well-being, has been studied as an indicator of reproductive health

(Schwartz, et al., 2011). Similarly, agency, an essential component of identity

development, supports adaptation during emerging adulthood (Schwartz, Cote, & Arnett,

2005). Agency suggests a sense of personal responsibility, a sense of control for

decisions and life course, and confidence in the ability to meet life goals (Schwartz et al.,

2005). Measures of agentic personalities included self-esteem, purpose in life, internal

locus of control, and ego strength. These measures of agentic personalities have been

found to correlate to identity development across several ethnic groups (Schwartz et al.,

2005). Based on these principles, self-esteem, confidence, independence and life

satisfaction were investigated as internal assets that may support contraceptive use.

Risk indicators. Just as protective factors may influence contraceptive use

among emerging adults, so may risk indicators. During emerging adulthood, risk

behaviors are common and mental health concerns may emerge (Mulye et al., 2009). Whereas the PYD framework specifies that prevention of problem behaviors (e.g., drug use, unhealthy sexual behavior) is an important goal of youth development (Pittman et al., 2003), emerging adult literature proposes that some risk behaviors may be constructive in this population (Schulenberg & Zarrett, 2006). Alcohol and drug use and depressive symptoms may serve purposeful internal regulatory and external social needs (Schulenberg & Zarrett, 2006). Despite these potentially protective effects, empirical data suggests that these risk indicators (e.g., heavy alcohol use, marijuana use and depressive symptoms) may be negatively related to contraceptive use among emerging adults and college students (Dorfman et al., 2010; Guo et al., 2002; Ingersoll et al., 2008).

Moderating effects of protective factors. Resiliency theory posits that protective factors may act to diminish negative effects of risk exposures through either compensatory or protective mechanisms (Masten et al., 2006; Fergus & Zimmerman, 2005). In compensatory models protective factors compensate for risk by opposing the action of the risk indicator; in protective models external supports and internal assets moderate the relationships between risk indicators and outcomes (Fergus & Zimmerman, 2005). Little is known about potential moderating effects of protective factors on relationships between risk indicators (i.e., heavy episodic drinking, marijuana use and depressive symptoms) and consistent contraceptive and condom use. Because these risk indicators are common among emerging adults (Park, Mulye, Adams, Brindis & Irwin, 2006), the potential interaction effects are particularly salient to this population.

Contraceptive use. A social-ecological model, which posits that the interplay between multiple levels of influence govern behavior (Bronfenbrenner, 1977), may provide a structure to understanding contraceptive use. In an extensive review of contraceptive use among emerging adults, Jaccard (2009) uses a social-ecological framework to conceptualize influences on contraceptive use among emerging adults. In this review, Jaccard envisions contraceptive use as including contraceptive choice, contraceptive use consistency, contraceptive switching, correct use of contraceptives, and partner communication. Contraceptive use is affected by proximal, near-proximal, near-distal and distal determinants. At the proximal level, Jaccard's framework posits that behavior is directed by intentions; people who intend to use contraceptives are more likely to do so. At the near proximal level self-efficacy, social image, normative pressures and emotional reactions to the behavior affect contraceptive use. Near-distal determinants include general personality traits, values, goals, aspirations, general attitudes, mental health and alcohol and drug use. Distal level determinants are those found in individuals' environments; these include family, peer, school, work, health care providers, religious, neighborhood, media, government and policy, and cultural contexts. Both near-distal and distal determinants, in this framework, are expected to function on near-proximal or proximal determinants, rather than on contraceptive use directly. Both near-distal and distal determinants include attributes that are more difficult to influence; however, near-distal determinants may be instrumental in identifying groups with whom to tailor messages and to identify at risk populations (Jaccard, 2009).

Jaccard's framework provides a structure to understand the potential influence that internal assets and external supports may have on emerging adult women's contraceptive use. As indicated in **Figure 2.1**, risk indicators, including heavy episodic drinking, marijuana use and depressive symptoms may affect contraceptive use at near-distal level. Internal assets including self-esteem and confidence should exert an effect on contraceptive use at a near-distal level; external supports, including prosocial relationships should exert effects on contraceptive use at a distal level.
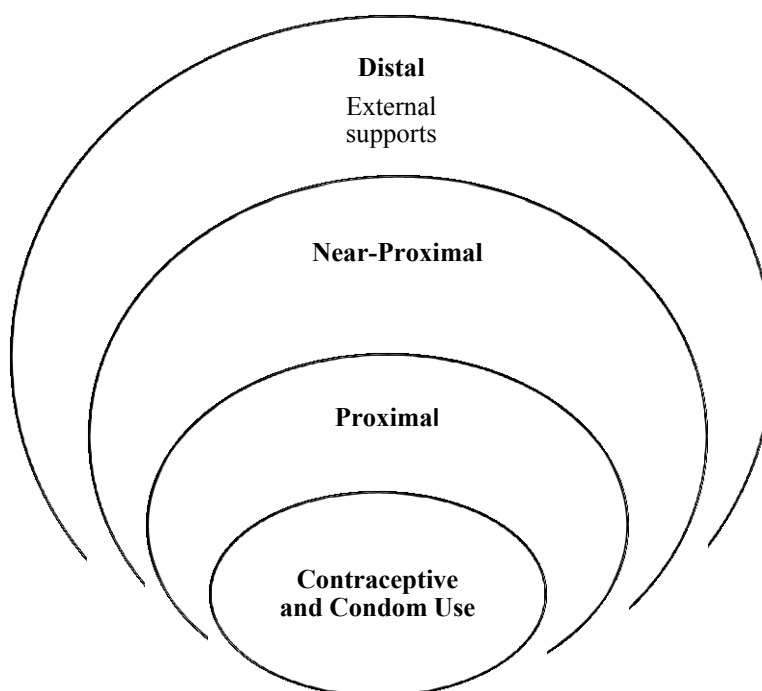
Figure 2.1. Social-ecologic framework of influences on emerging adults' contraceptive use (Jaccard, 2009).

This model also acknowledges the importance of sexual partner dynamics in contraceptive behavior. Intimacy and relationship length, partner communication, power dynamics, and satisfaction with the relationship have noteworthy influences on contraceptive behavior (Jaccard, 2009).

Application to this study. The current study was designed to test relationships between specific protective factors (i.e., external supports, internal assets) and risk indicators that have particular salience in emerging adult development, and consistent contraceptive use among emerging adult college women. Based on the PYD and emerging adult literature two external supports: (a) parental closeness and (b) caring relationships with non-parental adults; four internal assets: (a) self-esteem, (b) confidence, (c) independence, and (d) life satisfaction; and three risk indicators: (a) heavy episodic drinking, (b) marijuana use, and (c) depressive symptoms, were evaluated as correlates of consistent contraceptive and condom use. Emerging adult college students often explore behaviors that may put them at risk. Thus, this study also assessed if protective factors change the relationships between these relatively common risk indicators and consistent contraceptive and condom use. **Figure 2.2** depicts relationships evaluated in this study.
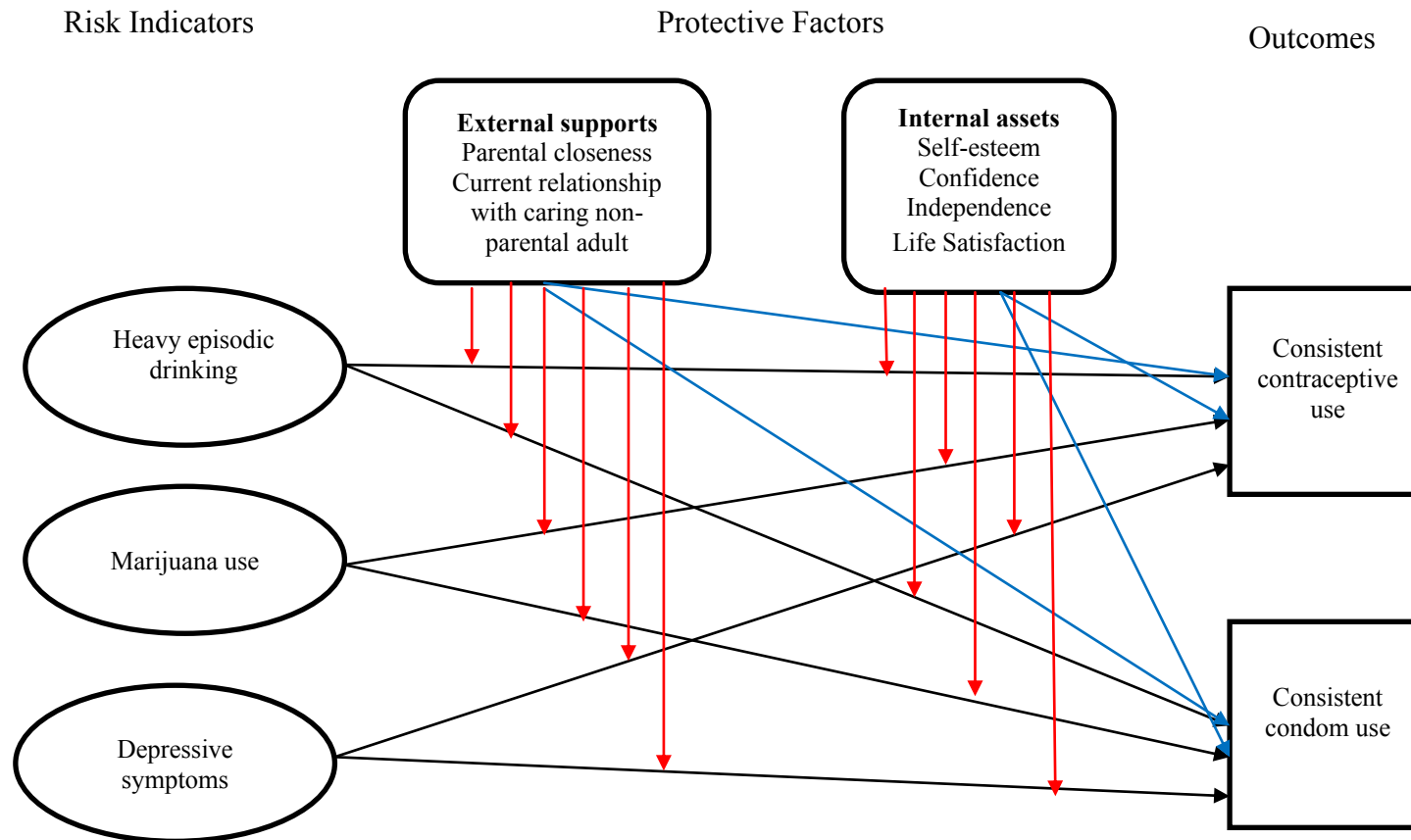
Figure 2.2. Relationships evaluated in this study include risk indicators (at the near-distal level) and consistent contraceptive and condom use; protective factors (at the distal and near-distal levels) and consistent contraceptive and condom use; and modifying effects of protective factors on the relationships between risk indicators and consistent contraceptive and condom use.

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Empirical Evidence

Reproductive Health in Emerging Adulthood

Identity development is a feature of emerging adulthood that is particularly salient

to issues of sexuality (Lefkowitz & Gillen, 2006). Identity development includes

examination of sexual orientation, sexual beliefs and attitudes, and aspects of gender

roles (Arnett, 2006b). Additionally, identity development may include exploration of

sexual relationships (Lefkowitz & Gillen, 2006). Increased sexual activity is normative

during emerging adulthood (Collins & van Dulmen, 2006). According to Daniels and

colleagues (2013), 27.1% of 15 – 17 year old women are sexually experienced, and

86.6% of 20 – 24 year old women are sexually experienced.

Because most emerging adults are sexually active, contraception is essential in the

prevention of unintended pregnancy. Unintended pregnancy disproportionately affects

emerging adult women compared to women in other age groups (Finer & Henshaw,

2006). Women aged 20 – 24 have the highest rates of pregnancy, and women aged 18 -

24 have the highest rates of both unintended pregnancy and abortion. Unintended

pregnancy and abortion may be particularly relevant issues for women in their college

years. Pregnancies among women with some college are often unintended and more

often end in abortion compared to pregnancies among women who have completed

college (Finer & Henshaw, 2006). An understanding of contraceptive use patterns among

emerging adults provides one avenue for addressing unintended pregnancy (Jaccard,

2009).

Contraceptive use and emerging adults. Among 20 – 24 year old women, the

two most commonly used forms of contraception have been oral contraceptives (48%) and condoms (20%), followed by no contraceptives (12%), injectable (Depo-Provera; 9%) and withdrawal (5%; Jaccard, 2009). Typical failure rates for these contraceptives are 3% (injectable), 8% (oral contraceptives), 15% (male condoms), and 27% (withdrawal); 85% of sexually active women who use no contraceptives will become pregnant within a year (Jaccard, 2009). Consistent and correct use may decrease the failure rate from 8% to 0.3% for oral contraceptives and from 15% to 2% for male condoms (Jaccard, 2009).

Contraceptive use among college women. College students represent a distinct population and their reproductive health needs are likely unique as well. Studies that examine contraceptive use among college students report high levels of sexual activity and variable rates of contraceptive use. Buhi, Marhefka and Hoban (2010), using data from the National College Health Assessment of 2007, reported that of the college students aged 18 – 24 surveyed across two- and four-year institutions, 75% had ever been sexually active, 70% had ever had vaginal sex and the majority (97%) had used some form of contraception with last vaginal intercourse. A second study found that a lower percentage of college student participants use contraceptives. Huber and Ersek (2009), with data from a random sample of 18 - 45 year old women at one university (N = 245), found that 78% had ever had vaginal intercourse with a man and that 23% used contraceptives.

Several reasons for contraceptive non-use have been reported among college women. Reasons for non-use include cost and lack of insurance, fear of parents finding

out, side effects, infrequent sex, desire for pregnancy, current pregnancy, and lack of knowledge about contraception (Bryant, 2009; Buhi et al., 2010; Gaydos, Neubert, Hogue, Kramer, & Yang, 2010; Huber & Ersek, 2009). Other factors associated with non-use include less positive attitudes toward contraceptives; living with a sexual partner or being married; and having ever been pregnant (Bryant, 2009; Buhi et al., 2010; Huber & Ersek, 2009). Studies of college students have also found racial/ethnic differences in contraceptive use prevalence (Buhi et al., 2010; Gaydos et al., 2010).

Studies of contraceptive use often focus on general measures (e.g., use of contraceptives at last intercourse). A more meaningful measure of contraceptive use includes measures of consistency (i.e., frequency of use or correct use) and efficacy (i.e., how effectively the method prevents pregnancy). Compared to general measures of contraceptive use, less information is available regarding contraceptive consistency and efficacy among college students. In a study of women ages 18 – 44 years at one university, 54%, 26% and 17% of participants reported consistent, inconsistent and non-use of contraceptives, respectively (Bryant, 2009). This study indicated that consistent users had more positive attitudes toward contraception than did intermittent users and non-users. A second study using data from the Behavioral Risk Factor Surveillance system (BRFSS), reported that among 18 – 24 year olds, African American students and older students were less likely to use highly effective contraceptive methods than were Caucasian students and younger students (Gaydos et al., 2010).

Contraceptive Use and Internal Assets, External Supports and Risk Indicators

In the following section, studies examining relationships between contraceptive

use and external supports, internal assets, and risk indicators included in this study will be discussed. When studies regarding contraceptive use among emerging adults or college students are available, they will be presented. When studies that address college students or emerging adults are not available, studies that focus on adolescents or adults will be presented. In studies that focus on emerging adults, attributes of the samples that are dissimilar to the focus of this study (i.e., college attending emerging adult women) will be noted.

External supports. Prior research examining relationships between college students' contraceptive use and the two external supports evaluated in this study, parental closeness and relationships with caring, non-parental adults, is limited.

Parental closeness. Evidence of an association between parental closeness and emerging adult contraceptive use is mixed. In a cross-sectional study of African-American emerging adults (N = 292), women who perceived their relationship with parents to be unsupportive were at increased risk of engaging in intercourse without use of a condom ($p = 0.016$; Kogan et al., 2010). In a longitudinal study using data from Waves I and III of Add Health (N = 10,131; Gillmore, Chen, Haas, Kopak, & Robillard, 2011), condom use during emerging adulthood was examined as a function of parental closeness, family support, parental monitoring and parent-child communication during adolescence. Neither parental closeness (e.g., youth satisfaction with relationship with parents) nor parental monitoring (e.g., parental control over adolescent decisions) during adolescence was significantly related to consistent condom use during emerging adulthood. However, family support (e.g., youth perception of being cared about by

parents) during adolescence was significantly and positively associated with consistent condom use in emerging adulthood (relative risk [RR] = 1.7, $p < 0.05$), and frequency of parental communication about reproductive health topics during adolescence was negatively associated with consistent condom use (RR = 0.94, $p < 0.05$).

A seven-wave study with African American youth ages 15 – 24 investigated condom use over time as a function of substance use, psychological distress, number of sexual partners and parental support (e.g., encouragement, emotional closeness) during adolescence and emerging adulthood (N = 627; Pingel et al., 2012). Data on all time-varying variables (i.e. condom use, age, number of partners, substance use, psychological distress and maternal and paternal support) were collected at each wave. For emerging adults, an increase in number of serious relationships was associated with a decrease in condom use over time. Over the seven waves of data collection, condom use became less consistent for emerging adults who reported greater psychological distress and substance use. In multivariate analysis, maternal support and paternal support were positively and significantly related to consistent condom use ($p < 0.001$ and 0.01 respectively). Furthermore, with the addition of the maternal and paternal support variables to the model, the relationship between condom use and psychological distress disappeared. The relationship between condom use and substance use continued even in the presence of parental support (Pingel et al., 2012).

Among adolescent populations, parental closeness has been associated with lower levels of sexual risk behaviors (Markham et al., 2010). In a study of 15 – 18 year old sexually active adolescent females (N = 522), participants who lived with their mothers

and perceived their family as supportive (e.g., "my family really tries to help me"; p. 176) had lower odds of not using condoms with both a steady partner (OR [Odds Ratio] = 0.52, p = 0.005) and with any partner (OR = 0.55, p = 0.008) than participants without those supports (Crosby et al., 2001). Consistent contraceptive use has also been associated with a caring family. In a study of adolescents (grades 6 – 12; N = 476), among sexually experienced participants, parental support was associated with consistent contraceptive use (use of contraception most or all of the time) but not with consistent condom use (Chewning et al., 2001).

In summary, research indicates that close parent-child relationships during adolescence have positive associations with condom use during adolescent and emerging adult years. Very few studies have examined the relationship between parental closeness during the adolescent and emerging adult years and contraceptive use.

Caring relationships with non-parental adults. Studies have begun to examine the effects of mentors and other caring non-parental adults on health outcomes among emerging adults. The studies that have been published, many using data from Add Health, support the value of caring non-parental adult relationships for older adolescents and emerging adults. With Wave III Add Health data (N = 2053), DuBois & Silverthorn (2005a) described the associations between three types of non-parental adult relationships (i.e. family, informal relationship, formal relationship) and consistent contraceptive and condom use (all or most of the time). Compared to individuals who had a relationship with a caring non-parental adult family member (e.g., grandparent, sibling), those who had a relationship with a caring non-parental adult in an informal (e.g., coach, neighbor)

or formal role (e.g., teacher, clergy), reported higher levels of consistent contraceptive use (OR = 1.74, $p < 0.01$ [informal role]; OR = 1.66, $p < 0.05$ [formal role]). However, no differences in consistent condom use were found among emerging adults who identified having relationships with different types of caring non-parental adults. Additionally, none of the characteristics of relationships with non-parental adults (i.e., duration, closeness, frequency of contact) were significantly related to emerging adults' consistent contraceptive or condom use.

Two studies with African American emerging adults provide additional evidence of the positive effect that caring non-parental adults may have. In a cross-sectional study of 18 – 21 year olds (n = 214), having a non-parental adult with whom reproductive health matters were discussed was associated with a decreased risk of unprotected intercourse for women (OR = 0.93, $p < 0.0001$), but not for men (Kogan et al., 2010). In a longitudinal study of African American emerging adults (N = 615), baseline data were collected during the participants' senior year in high school, followed by four more waves over 5 years. Emerging adults who self-identified as having a relationship with a non-parental adult during the senior year in high school reported fewer sexual risk behaviors in that same year (i.e., fewer sexual partners, less frequent intercourse, and condom use with intercourse). Though sexual risk behaviors increased in the following years, emerging adults in caring relationships with non-parental adults during high school described lower levels of the risk behaviors than those who did not have those relationships (Hurd & Zimmerman, 2010).

A cross-sectional study with adolescents found no relationship between non-parental role models (a scaled score of adolescents' sense that adults other than parents were available to them) and contraceptive behavior. In this study, non-parental adult relationships were associated with never having sex among both females ($n = 1,159$, OR $= 2.12$, $p \leq 0.05$) and males ($n = 1,041$, OR $= 1.48$, $p \leq 0.05$), however among those who were sexually active, the non-parental adult relationship was not associated with using contraception at last intercourse (Mueller et al., 2010).

The role of caring non-parental adults has been minimally studied with college students, particularly in regards to contraceptive use or other reproductive health outcomes. Though the college environment may offer many opportunities for the prosocial relationships with non-parental adults, the effect of these relationships on reproductive health outcomes is unknown.

Internal assets. Existing research evaluating associations between contraceptive use and the internal assets examined in this study – self-esteem, confidence, independence and life satisfaction – were reviewed. Very few studies have examined relationships between these internal assets and contraceptive use among emerging adults attending college.

Self-Esteem. Self-esteem has exhibited inconsistent associations with contraceptive use both among emerging adult college students and adolescents (Adler & Hendrick, 1991; Berry, Shillington, Peak, & Hohman, 2000; Jaccard, 2009; Poppen & Reisen, 1999; Wagner, 2011). In a study of college women aged 18 – 23 (N $= 244$), no association was found between self-esteem and choice of contraception (oral

contraceptives, condoms, dual use, or no method; Poppen & Reisen, 1999). In a more recent study of university students (N = 541), self-esteem had a positive bivariate association with consistent condom use ($p < 0.05$); however self-esteem did not demonstrate a significant relationship with consistent condom use in multivariate models (Wagner, 2011). Similarly, using data from Wave I of Add Health, Shrier, Harris, Sternberg and Beardslee (2001) found that among adolescent males ($n = 3,192$) and females ($n = 3,391$), self-esteem had a bivariate association with condom use at last intercourse ($p < 0.05$). However, this association became non-significant in multivariate models.

Confidence. Confidence is a complex construct and one of the desired outcomes of the PYD framework for youth. Evidence supports a relationship between self-efficacy, a component of confidence, and reproductive health (Gloppen et al., 2010; Romeo & Kelley, 2009; Schwartz, Phelps et al., 2010).

In a critical review of the role of confidence on reproductive health outcomes among adolescents, Gloppen and colleagues (2010) conceptualized confidence to include: (a) belief in the future, (b) self-determination, (c) clear and positive identity, and (d) self-efficacy. These components of confidence were found to have mixed effects on sexual risk behaviors (Gloppen et al., 2010). This review found strong evidence that sexual self-efficacy was associated with condom use, and limited evidence that self-determination and clear and positive identity had an effect on condom or contraceptive use (i.e., no longitudinal studies).

Self-efficacy, a construct linked to confidence, may be associated with contraceptive use. Though evidence suggests that sexual self-efficacy fosters contraceptive and condom use among adolescents and emerging adults, less is known about the association between general self-efficacy and contraceptive behavior (Gloppen et al., 2010). A cross-sectional study conducted in a single high school in New York City (N = 409) found no relationship between general self-efficacy and condom use (Voisin, 2005).

Independence. Although self-determination has been considered a component of confidence (Gloppen et al., 2010), it can also be considered as a distinct construct. According to Gloppen and colleagues self-determination may refer to locus of control and is related to a sense of independence, autonomy and empowerment (p. S43). These developmental tasks of increasing independence and autonomy are essential characteristics of emerging adulthood (Aquilino, 2006; Tanner, 2006). Thus, the concept of self-determination will be explored as an indicator of increasing independence and autonomy in emerging adulthood.

Although no studies relating self-determination to contraceptive use in emerging adulthood were found, two studies provide mixed support for the protective effects of self-determination on condom use among adolescents. Using data from Waves I and II of Add Health, sexually active adolescent girls (N = 3,572) who reported higher levels of personal control were more likely to use condoms at most recent intercourse than those with lower levels of personal control (OR = 1.13, $p < 0.05$; Pearson, 2006). Findings from a second study did not support this association. Kowaleski-Jones and Mott (1998),

using data from the 1994 survey of the National Longitudinal Survey of Youth (NLSY),

found no correlation between general locus of control (the adolescent's sense of control

over self and environment) and contraceptive use among adolescent boys or girls ($n =$

483).

　　　Life satisfaction. Life satisfaction has been conceptualized as a part of subjective

well-being and has been studied in relation to health outcomes (Huebner, 2004; Park,

2004; Pavot & Diener, 2008; Schwartz et al., 2011), but few studies have focused on the

relationship between life satisfaction and contraceptive use. One study that explored this

relationship did not find strong associations between life satisfaction and condom use

(Schwartz et al. 2011).

　　　Schwartz and colleagues (2011) studied the relationship between well-being and

health risk behaviors among college-attending emerging adults (N = 9,515). Subjective

well-being assessed overall sense of satisfaction with life; psychological well-being was

described as the quality of psychological functioning; and eudaimonic well-being focused

on meaningfulness in life. Overall well-being was derived from three measures of well-

being. The four measures of well-being were assessed for their relationships with the

incidence and with frequency of unsafe sexual behavior. Overall well-being was

negatively associated with the incidence of unprotected sex (OR = 0.82; $p < 0.001$), and

positively associated with frequency of unprotected intercourse (Incident Rate Ratio

[IRR] = 1.05; $p < 0.001$). Subjective well-being (life satisfaction) was not significantly

related to either outcome. The authors speculated that the unexpected outcome of well-

being being positively associated with frequency of unprotected intercourse may have

reflected relationship status. Potentially those with higher levels of well-being were in

monogamous relationships characterized by regular sexual activity and less consistent use

of condoms.

Risk indicators. The risk indicators of heavy alcohol use, marijuana use and

depressive symptoms were evaluated relative to contraceptive use among emerging

adults. Whereas a body of evidence suggests that these risk indicators are related to

contraceptive use in this population, relationships differ in strength and magnitude.

Heavy episodic drinking. Among emerging adult college students, evidence of

an association between heavy episodic drinking and contraceptive use is mixed. Ingersoll

and colleagues (2008) found that among 18 – 24 year old women attending one university

(N = 2,012) risk drinking (defined as one or more binges in past 90 days or drinking eight

or more standard drinks per week on average) was more common among sexually active

women than non-sexually active women. In multivariate analysis, risk drinking was

positively associated with ineffective contraceptive use (either not using or incorrectly

using contraceptives; OR = 1.73, $p < 0.005$). Similarly, risk drinking was positively

associated with ineffective condom use (OR = 1.90, $p < 0.005$). These results were

partially supported by a study involving unmarried students (N = 815; 62% female) from

one university in southern Florida (Kim, De La Rosa, Trepka, & Kelly, 2007). Students

were asked to report heavy alcohol use (five or more drinks at one setting within the past

30 days), condom use with most recent vaginal intercourse, and self-defined "unprotected

sex" while under the influence of alcohol within the past 12 months. Those students who

reported heavy drinking noted a greater likelihood of engaging in unprotected sex under

the influence of alcohol than other students (OR=5.5, $p < 0.01$). However, condom use at

last vaginal intercourse was not associated with heavy alcohol use. An earlier study

(Wechsler et al., 2000) used a sample of students from 119 colleges to study the effects of

heavy episodic drinking (four more drinks in a row for women and five or more drinks in

a row for men). Among students who drank in the past 12 months ($n = 11,160$), those

who reported occasional heavy episodic drinking (one to two binges in the past two

weeks) were more likely to have unprotected intercourse than were non-binge drinkers

(OR $= 2.88$, $p < 0.001$). Frequent heavy episodic drinkers (three or more binges in the

past two weeks) were even more likely to have unprotected sex compared to non-binge

drinkers (OR $= 6.13$, $p < 0.001$). The authors did not specify how the term "protection"

was defined.

Two studies examined longitudinal relationships between drinking and condom

use. The first study used daily data collection over a 14-day time period to examine the

relationship between drinking and condom use (Patrick & Maggs, 2009). The authors

obtained data from 218 first year students (ages 18 – 20) at one university. Of the

possible 3,262 days of data, 2,879 data days were included in analysis, with the majority

of days (81.2%) being days in which participants neither drank alcohol nor had sex. In

this study, there was a trend toward decreased likelihood of condom use with sex on days

when alcohol was used (OR $= 0.636$, $p < 0.1$). A second study evaluated binge drinking,

condom use and change in condom use among college women (N $= 279$) during the first

year of college (Walsh et al., 2013). In this study, pre-college binge drinking (four or

more drinks on one occasion) was not associated with overall condom use during the first

year of college. However, women who engaged in binge drinking prior to the start of college had a more rapid decrease in condom use during their first year of college than those who did not binge drink prior to college ($p < 0.05$).

These studies indicate a weak link between heavy episodic drinking and contraceptive use among college students, with longitudinal studies providing inconsistent evidence of a relationship. It is also unclear if the relationship between drinking and contraceptive use varies based on the type of contraceptive use being studied (i.e., hormonal contraceptives or condoms).

Marijuana use. Studies that assess associations between marijuana use and condom and contraceptive use among college students and other emerging adult populations have shown mixed results. Three studies focused specifically on college students. In a study of students attending one university ($N = 541$; 64% female) marijuana use (ever versus never used) was negatively associated with consistent condom use among women, but not among men ($p = 0.007$ and $p = 0.435$, respectively; Wagner, 2011). In a study by Walsh and associates (2013; detailed on page 35), women who used marijuana in the month prior to starting college used condoms more consistently at the start of college than women who had not used marijuana ($p < 0.05$); however, change in use of condoms during students' first year in college was unaffected by pre-college marijuana use. Kim et al. (2007; detailed on page 34) found that college students who used marijuana were more likely to have unprotected intercourse under the influence of alcohol than those who did not use marijuana ($OR = 3.1$, $p < 0.01$). However, marijuana

use was not associated with condom use at last vaginal intercourse in Kim et al.'s (2007) study.

Similar results have been reported among other populations of emerging adults. Kogan and colleagues (2010) found that marijuana use in the past month was a significant risk factor for condom non-use among African American emerging adults (OR = 1.59, p = 0.01). A longitudinal study (N = 808) evaluated relationships between marijuana behavior trajectories from 5th grade to age 21 and sexual risk behaviors (Guo et al., 2002). Marijuana use trajectories included "early highs," "escalators," "late onsetters," and "nonusers." After adjusting for condom use at first sex, relationship stability and other substance use during adolescence, late onsetters were less consistent in their condom use than nonusers (OR = 1.93, p < 0.05). No differences in condom use consistency were noted between early highs, escalators, and nonusers.

In a study using data from the 2002 National Survey of Family Growth (N = 7,643; women, aged 15 – 44), 16% of women used marijuana in past 12 months. When data were stratified by age, among 15 – 25 year olds there were no associations between marijuana use and either contraceptive use during the past 3 months or type of contraceptive used. Similarly, condom use at last intercourse was not associated with marijuana use in the past 12 months (van Gelder, Reefhuis, Herron, Williams, & Roeleveld, 2011).

Collectively, these findings indicate that marijuana use may have a significant effect on emerging adults' condom use. However, this relationship varies with the measures of marijuana use employed and the sex and age of the group being studied.

Few studies have evaluated relationships between marijuana use and contraceptive use among adolescents or emerging adults.

   Depressive symptoms.   Three studies of college students have explored links between depression and sexual risk behavior or reproductive health. Certain, Harahan, Saewyc and Fleming (2009) examined the relationship between several factors, including depression, and condom use among students at four large universities who had engaged in alcohol use (N = 1,715). Consistent condom use was defined as always using a condom with intercourse over the past 6 months and depression was measured using the Beck Depression Inventory for Primary Care (Certain et al., 2009). In this population, inconsistent condom use was not associated with symptoms of depression. Swanholm, Vosvick and Chng (2009), using a sample of students enrolled in one university (N = 648), explored several correlates of depression, including risky sexual behavior. Students ranged in age from 18 – 54 years and depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D). The authors found a higher incidence of risky sexual behavior (e.g., sex with somebody known for < 1 day, "unprotected" intercourse) among those students who had higher levels of depressive symptoms ($p < 0.001$). Finally, Scholly and colleagues (2010) addressed the risk of emotional distress on unintended pregnancy among 18 – 24 year old full-time college students (N = 24,963). Unintended pregnancy was positively associated with emotional distress (OR = 1.36, $p < 0.01$) and negatively associated with condom use (OR = 0.46, $p < 0.001$); there was no association between unintentional pregnancy and oral contraceptive use. So, while pregnancy intention was associated with emotional distress,

evidence of a relationship between contraceptive use and emotional distress was inconsistent. Together, these findings provide mixed evidence regarding an association between contraceptive use and depression among college students.

Among other populations of adolescents and young adults, depression has been consistently associated with poorer contraceptive use. Using data from 15 – 21 year old women presenting to the pediatric emergency department (N = 297), Dorfman and colleagues (2010) assessed the relationship between depressive symptoms and contraceptive use (type not specified). Using an abridged version of the CES-D, depressive symptoms were more common among those did not use contraceptives during the past 3 months than among those who used contraceptives (OR = 2.45, 95% CI [1.27 4.73]). In a second study of low-income adolescent and adult women ages 30 years and younger (N = 2,476), Garbers, Correa, Tobier, Blust and Chiasson (2010) evaluated the relationship between depressive symptoms and type of contraceptive chosen. Hormonal contraceptives, IUD, and barrier contraceptives were categorized as "more effective methods" while periodic abstinence and no method were categorized as "less effective methods." Those who screened positive for depression had lower odds of choosing a more effective contraceptive method than those who did not screen positive (adjusted OR 0.57, $p < 0.01$). Similarly, Berenson, Breitkopf and Wu's (2003) study of low-income women ages 12 – 40 from Texas (N = 4726) evaluated associations between depressive symptoms (using a 13-item inventory) and contraceptive choices. In this study, women with moderate to severe depressive symptoms were more likely to use no contraceptive method than some contraceptive method (OR = 1.38, $p < 0.01$).

In contrast to findings regarding general contraceptive use, studies examining relationships between depressive symptoms and condom use among adolescents and young adults have had mixed findings. One longitudinal study focused on sexually active African American 15 – 21 year olds (N = 415, 57% female; Brown et al., 2006) with data collected at baseline and 6 months later. Depressive symptoms at baseline were positively associated with inconsistent condom use in bivariate and multivariate models (adjusted OR = 3.90, p = 0.03). A second study found that the relationship between depression and condom use was stronger among adolescents than young adults (Mazzaferro et al., 2006). When adolescents (ages 14 – 19) and young adults (ages 20 – 25) were evaluated separately, the relationship between depressive symptoms and consistent condom use in the past 6 months was significant for the younger age group (OR = 0.47, $p < 0.05$), but not the older age group (Mazzaferro et al., 2006). In a third study using data from Wave I of Add Health (N = 6,583), a significant relationship between depression and condom use was found for males but not females (Shrier et al., 2001).

In summary, though not significantly related to condom use and contraceptive use in all studies, depressive symptoms have generally been found to be related to contraceptive use patterns among emerging adults and adolescents. Relatively few studies have evaluated relationships between college students' depressive symptoms and contraceptive use.

Summary and Conclusions

Both emerging adult developmental theory and a PYD framework support potential protective roles of internal assets and external supports in fostering consistent contraceptive use among emerging adult college students. Empirical literature provides a strong foundation for the importance of understanding influences supporting consistent contraceptive use in this population. Despite this strong foundation, very little research has examined the roles of external supports and internal assets in promoting consistent contraceptive use among emerging adult, college women.

The external supports reviewed included *parental closeness* and *caring relationships with non-parental adults*. Emerging adult theory posits that emerging adults' positive relationships with parental and non-parental adults may support identity development which may, in turn, support healthy intimate relationships (Lefkowitz & Gillen, 2006; Tanner, 2006). In empirical studies, parental relationships were defined in a variety of ways with concepts of parental closeness and parental support often having similar measures. No studies were found that examined relationships between parental closeness and contraceptive use among emerging adult college students. However, existing research indicates that parental closeness may encourage contraceptive use among broad groups of emerging adults. No studies were found that examined relationships between caring non-parental adult relationships and contraceptive use among emerging adult college students. Among general emerging adult and adolescent populations, limited research suggests that caring non-parental adults may support regular contraceptive use. With no studies investigating the role of caring non-parental adults in

college students' contraceptive behaviors, further investigation of this relationship is warranted.

Internal assets reviewed in this chapter included *self-esteem, confidence, independence* and *life satisfaction*. Studies examining relationships between contraceptive use and the asset of self-esteem have demonstrated mixed findings. The complex nature of the construct of self-esteem may contribute to inconsistent associations with contraceptive use across studies (Jaccard, 2009). Impacts of confidence, independence and life satisfaction on emerging adult college students' contraceptive behaviors have been minimally studied. Confidence, as a broad construct, may be protective for contraceptive use among adolescents. No studies examining the relationship of confidence to contraceptive use among college students or emerging adults were found. Though no studies examined the relationship between self-determination (a concept closely related to independence) and contraceptive use among emerging adults or college students were found, studies of adolescents provide evidence linking a stronger sense of control to contraceptive use. Finally, only one study evaluated life satisfaction and condom use. This study found no association between life satisfaction and unprotected sex for emerging adult college students. Because few studies have examined the role of these internal assets in relation to contraceptive use and because these internal assets are important aspects of emerging adult development, further study is warranted.

Risk indicators reviewed in this chapter included heavy episodic drinking, marijuana use and depressive symptoms. Studies that focus on the relationships between

risk indicators and contraceptive use among emerging adult college students are more abundant that studies that focus on protective factors. However, results are not consistent across studies. Cross sectional studies have found evidence that heavy alcohol use is associated with inconsistent contraceptive use, however, longitudinal studies demonstrated mixed results. Studies that focus on marijuana use have shown mixed results as well. In studies that focus on condom use, marijuana use and condom use have either been negatively associated or have shown no relationship. The few studies that focused on contraceptive use showed no relationship between contraceptive use and marijuana use. Several factors may be at play in this pattern of mixed findings including differing measures of marijuana use (e.g. ever use, regular use) and disparate measures of contraceptive use. Depressive symptoms have shown a stronger association with contraceptive non-use than the other risk indicators. Though no studies of emerging adults attending college supported this relationship, studies among other emerging adult, young adult and adolescent populations have consistently shown a relationship.

Together, heavy alcohol use, marijuana use and depressive symptoms are factors that have been more extensively studied as correlates of contraceptive use than have protective factors. However, few studies have been conducted with nationwide samples of emerging adult college students. Additionally, it is not uncommon for studies to focus on a single contraceptive use outcome such as on condom use or "unprotected intercourse." Whether internal assets and external supports change relationships between risk indicators and consistent contraceptive and condom use is not well addressed in the

literature. This knowledge may provide a better understanding of contraceptive use and condom use in the emerging adult college student population.

Addressing Gaps in Knowledge

Several important gaps were addressed by this study. First, although studies have assessed relationships between indicators of positive youth development and adolescent reproductive health outcomes, few have considered the role of these protective factors in promoting reproductive health among emerging adult college students. Studies that investigate college student contraceptive use have generally focused on risk factors or demographic variables rather than assets and resources that may support use of condoms and other forms of contraception. At the same time, emerging adulthood is a period marked by significant transitions such as changes in relationships with parents and social supports, and a shift to adult independence (Tanner, 2006). Due to the a paucity of previous studies and the substantial changes in protective factors and risk indicator common in emerging adulthood (Maste et al., 2006), a cross-sectional design was used to explore current assets, supports, and risks associated with consistent contraceptive and condom use.

Second, based on concepts from resilience theory, the potential interactive role of protective factors and risk indicators were examined. Testing these moderating relationships could provide insight into whether relationships between risk indicators and consistent contractive use change, based on levels of college students' supports and assets (e.g., if life satisfaction mitigates the potentially negative effect of depressive symptoms on consistent contraceptive use).

Third, additional gaps focus on the outcome variables. Studies that investigate use of contraceptives or condoms often focus on contraceptive use at last intercourse rather than consistency of contraceptive use, the latter being a better measure of contraceptive effectiveness (Shai, Jewkes, Levin, Dunkle, & Nduna, 2010; Zhou et al., 2012). This study was unique in examining two contraceptive use outcomes, consistent use of any type of contraceptive and consistent use of condoms. By evaluating these outcomes side-by-side, similarities and differences in how protective factors and risk indicators are associated with each outcome may be illuminated. As consistent contraceptive and condom use play important and sometimes different roles in the reproductive health of emerging adult college women, this information may provide direction for further investigation. This study may also provide information to develop tailored messages for specific groups (those with or without specific risk indicators) and for specific behaviors (consistent contraceptive use or consistent condom use).

Chapter III: Methods

This study, a secondary analysis of data from Wave III of The National Longitudinal Study of Adolescent Health (Add Health) examined the relationships between protective factor (i.e., internal assets and external supports), risk indicators, and consistent contraceptive and condom use among sexually active, 18 – 24 year old women attending 4-year colleges. This chapter will outline the aims for the current study, the research design for both Add Health and the current study, the characteristics of the sample, measures used, and the analysis plan for the current study.

Purpose and Specific Aims

The purpose of this study was to examine relationships between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use, and between risk indicators and consistent contraceptive and condom use among emerging adult college women. Additionally, this study examined whether relationships between select risk indicators and contraceptive use were altered by the presence of protective factors.

This study addressed four specific aims and related research questions.

Aim 1. Explore bivariate correlations between external supports, internal assets, and indicators of risk among a nationwide sample of sexually active emerging adult college women.

Aim 2. Examine associations between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 2:

1. Are external supports of caring parents and current relationships with caring non-parental adults positively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

2. Are internal assets of self-esteem, confidence, independence and life satisfaction positively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

3. Which protective factors have the strongest relationships with consistent contraceptive and condom use among sexually active, emerging adult college women?

Aim 3. Examine associations between risk indicators and consistent contraceptive and condom use among sexually active, emerging adult college women. Research questions for Aim 3:

1. Is heavy episodic drinking negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

2. Is marijuana use negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

3. Are depressive symptoms negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

4. Which risk indicators have the strongest relationships with consistent contraceptive and condom use among sexually active, emerging adult college women?

Aim 4. Informed by relationships found to be significant in Aims 2 and 3, examine protective factors as moderators of associations between risk indicators and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 4:

1. Are significant relationships between consistent contraceptive and condom use and identified risk indicators moderated by the external supports of parental closeness or relationships with caring non-parental adults?

2. Are significant relationships between consistent contraceptive and condom use and identified risk indicators moderated by internal assets of self-esteem, confidence, independence, or life satisfaction?

Overview of National Longitudinal Study of Adolescent Health

The National Longitudinal Study of Adolescent health, or as commonly called, "Add Health" is a nationwide US study of adolescent health that has included four waves of data collection. Wave I of Add Health was initiated in 1994 – 1995 with an in-school questionnaire administered to a sample of 90,118 seventh to twelfth grade students from 80 high schools and 52 feeder schools (i.e., middle or junior high schools with students who will later attend the selected high schools). Sampling methods ensured that high schools included in the study were representative of US schools in terms of region of country, urbanicity, size, and race/ethnicity of students. For Wave I, 20,745 students from the in-school sample also completed in-home interviews. In-home surveys were repeated in Waves II, III, and IV in 1996, 2001 – 2002, and 2007 – 2008 respectively.

Computer assisted personal interviews (CAPI) and audio computer-assisted self-interviews (A-CASI) formats were used for in-home interviews. For less sensitive information, an interviewer read questions aloud and the participant responded to the question using a laptop computer (CAPI). For more sensitive topics, the participant listened to pre-recorded questions through earphones and entered the answers on the laptop computer (A-CASI). Items related to sexual experiences, contraception, alcohol and drug use were collected using A-CASI (Harris et al., 2009).

Add Health Wave III. Wave III of Add Health was administered 6 years after Wave I when participants were 18 – 26 years of age. Of the 20,745 participants who completed in-home surveys at Wave I, 19,962 were eligible to participate at Wave III and 15,170 completed the Wave III interview for a 76% response rate (Chantala, Kalsbeek, & Andraca, n.d.). The Wave III questionnaire included items from previous Add Health questionnaires as well as new items relevant to this older age group. Interviews averaged about 134 minutes and participants were provided incentives for completing the interviews (Harris et al., 2009)

Design and Sample for Current Study

Study design. This study, a secondary analysis of data from Add Health Wave III, investigated consistent contraceptive and condom use among a national sample of emerging adult women attending college. Protective factors (internal assets and external supports) suggested by the Positive Youth Development (PYD) framework were assessed as explanatory variables for consistent contraceptive and condom use. Additionally, risk indicators that may be negatively associated with consistent contraceptive and condom

use were assessed. Finally, as depicted in Figure 2.2 (see page 22), the moderating effects of protective factors were investigated with those risk indicators found to be significantly related to consistent contraceptive and condom use. Moderation analysis allows for examination of whether relationships between risk indicators and consistent contraceptive and condom use change as a function of a protective factor (Baron & Kenney, 1986).

Study sample. From the Add Health Wave III participants, the study sample was limited to women aged 18 -24 attending a four-year college or university full time, who reported having vaginal intercourse with a male in the past 12 months. Exclusion criteria include women who were attending two-year colleges, women who were married or cohabitating, and women who were currently pregnant or parenting.

Of the full Wave III Add Health sample, 870 participants met inclusion criteria. Of these participants, 28 were missing data regarding the region of the country in which they lived. Because Add Health uses a cluster sampling method, participants with missing region data are eliminated from analysis. Thus, the final study sample included 842 participants. One rule of thumb suggests a sample size for multivariate regression should have ten times the number of participants as independent variables (Dawson & Trapp, 2004). With nine independent variables, this study was adequately powered to test study aims.

Sample descriptors. Similar to the population of college students in the United States, the majority of the sample was White (58.7%) and the second largest group was Black or African American (23.3%; Berkner, Wei, He, Cominole, & Siegel, 2003).

Individuals who identified themselves as being of more than one race/ethnicity

constituted 11.3% of the sample. The remainder of participants identified themselves as

Asian (5.6%), American Indian (0.5%) or Hispanic ethnicity (0.7%). Among this sample

of sexually experienced, 18 – 24 year old women attending college, the average age of

participant was 20.7 years with 87% of the sample between 19 – 22 years of age. The

majority (85.2%) of the women in this sample were in their second, third or fourth year of

college. An additional 10.5% were in their fifth year of college, 3.7% were in their first

year, and 0.7% were graduate students.

The average age of first sexual intercourse was 16.9 years. Most (79.7%) of the

women in this sample reported using condoms within the past 12 months and oral

contraceptives were used by 67.8% of the women. The majority of the sample (59.9%)

lived apart from parents in dormitories, fraternities, sororities or other single or group

living arrangements and 40.1% were living with parents. Further information about the

sample can be found in **Table 3.1**.

Table 3.1

Demographic Characteristics of Study Sample (N = 842)

Characteristic	n	(%)
Age in years (Mean = 20.7)		
18	17	(2.0)
19	172	(20.4)
20	201	(23.9)
21	229	(27.2)
22	132	(15.7)
23	55	(6.5)
24	36	(4.3)
Race/Ethnicity		
White	494	(58.7)
Black or African American	196	(23.3)
Asian	47	(5.6)
Hispanic	6	(0.7)
American Indian	4	(0.5)
Mixed (more than one racial/ethnic group)	95	(11.3)
Family receipt of public assistance, past year		
No	836	(99.4)
Yes	5	(0.6)
Living arrangements		
With parent(s)	338	(40.1)
Other (e.g. dormitory, with roommates)	504	(59.9)
Types of contraceptives used, past 12 months		
Condoms	671	(79.7)
Oral contraceptives	571	(67.8)
Emergency contraception	48	(5.7)
Injectable (Depo-Provera)	47	(5.6)
Natural family planning	25	(3.0)
Other (i.e., implants, sterilization, diaphragm)	9	(1.1)
Number of sex partners, past 12 months		
Mean	1.8	
Range	1 – 20	
Frequency of intercourse (times had intercourse in past 12 months)		
Mean	38.5	
Range	1 – 101	
Age at first intercourse (years)		
Mean	16.9	
Range	10 – 24	

Variables and Measurement

The outcome variables for this study were consistent contraceptive use and consistent condom use. Protective factors and risk indicators served as independent variables in this study. Protective factors suggested from the PYD framework were categorized as either external supports or internal assets (Lerner et al., 2005). The study included two measures of external supports (parental closeness and current relationship with caring non-parental adult) and four measures of internal assets (self-esteem, confidence, independence, and life satisfaction). Risk indicators included heavy episodic drinking, marijuana use, and depressive symptoms. Covariates, variables known to be associated with contraceptive use among emerging adult or college student populations, included participant age, race/ethnicity, family socioeconomic status (SES), living arrangements, number of sexual partners in the past 12 months, frequency of sexual intercourse in the past 12 months, and age at first sex. Additionally, for consistent contraceptive use, condom use was included as a covariate and for consistent condom use, contraceptive use was a covariate. In the following sections study outcomes, independent variables, and covariates are described and measures for each variable are designated.

Outcome variables. The outcome variables for this study were indicators of consistent contraceptive use. Because Add Health measured condom use separately from contraceptive use, both consistent contraceptive use (e.g., hormonal, barrier, intrauterine devises) and consistent condom use were assessed. Participants' responses to the item: "On how many of these occasions of vaginal intercourse in the past 12 months did you or

your partner use some form of birth control or pregnancy protection?" was used to assess consistent contractive use. Response to the item, "On how many of these occasions did (you/your partner) use a condom?" was used to assess consistent condom use. Both of these items included five response options (none, some, half, most, all) anchored with 0 (*none*) and 4 (*all*).

Descriptive statistics indicated that contraceptive use consistency and condom use consistency had J- and U-shaped response distributions, respectively. Therefore, responses were collapsed into dichotomous categories of "consistent users" and "inconsistent or nonusers." We dichotomized the measure "consistent condom use" utilizing an empirical approach described by Crosby and colleagues (2004). Characteristics that have been associated with consistent condom use in previous studies (e.g., age, race, number of partners, frequency of sexual intercourse, age at first sex; Bearinger et al., 2011) were used to compare three groups; those who reported using condoms all of the time, those who reported using condoms "most of the time" and those who reported lower levels of condom use (i.e., those who selected "half," "some," and "none" responses). The "most of the time" condom users were similar to those who reported lower levels of condom use on a majority of these characteristics. Thus, "most of the time" users were included in the "inconsistent or nonusers" group.

A similar approach was used to compare three groups reporting different levels of contraceptive use consistency (e.g., used some form of birth control "all of the time" in the past 12 months, used some form of birth control "most of the time," and used some form of birth control "half," "some," and "none" of the time). Few differences were

found between groups of contraceptive users. Therefore to be consistent with categories of consistent condom use, and because in self-reports of contraceptive consistency may overestimate true contraceptive use (Hynie & Lydon, 1996; Noar, Cole, & Carlyle, 2006), participants who indicated using some form of birth control all the time during the past 12 months were classified as "consistent contraceptive users" and those who indicated they used birth control never, some, half or most of the time were classified as "inconsistent contraceptive users." For both contraceptive use and condom use variables, responses that indicated "consistent user" were coded = 1 and responses that indicated inconsistent or non-use were coded = 0. Of note, the correlation between the dichotomous outcomes was 0.39.

Independent variables.

Protective factors. Measures of external supports and internal assets (protective factors consistent with a PYD framework) were examined. **Table 3.2** lists the study's external supports and internal assets variables, items used to measure each variable, and response options for each item.

Table 3.2

Measures of Protective Factors

Variable	Item(s)	Response options
Parental closeness	Three items* "You enjoy doing things with (him/her)" "Most of the time (he/she) is warm and loving toward you." "How close do you feel to (him/her)?"	1 – Strongly agree/extremely close 2 – Agree/quite close 3 – Neither agree nor disagree/somewhat close 4 – disagree/not very close 5 – Strongly disagree/not close at all
Caring non-parental adult	Three items "Other than your parents or step-parents, has an adult made an important positive difference in your life at any time since you were 14 years old?" "Is he/she still important to you?" "How is this person related to you?"	0 – no, 1 – yes 0 – no, 1 – yes Choice of relationship
Self-esteem	Four items* "You have many good qualities." "You have a lot to be proud of." "You like yourself just the way you are." "You are doing things just about right."	1 – Strongly agree 2 – Agree 3 – Neither agree nor disagree 4 – Disagree 5 – Strongly disagree
Confidence	"How confident are you of yourself" *	1 – Very confident in myself 2 – Moderately 3 – Slightly 4 – Not at all
Independence	"How independent are you?" *	1 – Very independent 2 – Moderately 3 – Slightly 4 – Not at all
Life satisfaction	"How satisfied are you with your life as a whole?" *	1 – Very satisfied 2 – Satisfied 3 – Neither satisfied nor dissatisfied 4 – Dissatisfied 5 – Very dissatisfied

*All items recoded so that high scores indicate increased presence of the protective factor

Parental closeness. Parental closeness was defined as the presence of intimacy, positive affection and self-disclosure (Needham & Austin, 2010; Paulson, Hill, & Holmbeck, 1991). Similar to other studies addressing parental relationships with emerging adult (Needham & Austin, 2010; Siennick, 2011) three items (noted in **Table 3.2**) measured closeness to a participant's parent. Participants completed these items for all individuals who acted as a parent or parent figure to them (e.g., parents, step-parents). All items were re-coded so that higher scores indicated greater closeness with the parent. Following an approach used by Siennick (2011), the mean score across items was used to create a scale score ranging from 1 – 5 for each parent figure. The highest score across all reported parent figures was used in analyses. The internal consistency reliability of this scale among young women in the current sample was high ($\alpha = .82$).

Relationship with caring non-parental adult. Various terms are used to indicate relationships with caring non-parental adults. Some studies differentiate between formal mentors and informal or natural mentors (DuBois & Silverthorn, 2005a; DuBois & Silverthorn, 2005b; Kogan et al., 2011). These relationships between an older, wiser individual and a young person are thought to facilitate the transition to adulthood (Rhodes, 1994). For this study a relationship with a caring non-parental adult included both formal (e.g., volunteer organizations) and informal (e.g., older family members, teachers, coaches) relationships. As noted in **Table 3.2,** three items discerned involvement with a non-parental adult, and the relationship of the adult to the participant. A current relationship was determined to be present if a non-parental adult was identified and was reported to currently be important to the participant; consistent with previous

literature, relationships with a spouse/partner, younger sibling or friend were not considered mentor relationship (Ahrens, DuBois, Lozano, & Richardson, 2010; DuBois & Silverthorn, 2005b). The variable was coded 1 (a caring non-parental adult is currently present and important in the emerging adult's life) or 0 (no caring non-parental adult is currently present or not important in the emerging adult's life).

Self-esteem. Self-esteem has been defined as "a belief in one's self-worth" (Galinsky & Sonenstein, 2011, p. 611). As noted in Table 3.2, Add Health Wave III included four of the original 10 items from Rosenberg Self-Esteem Scale (Rosenberg, 1965). The Rosenberg Self-Esteem Scale, designed for use with adolescents, has been shown to have high levels of reliability and validity in adolescent populations (Blascovich & Tomaka, 1991). Similar to an approach used with other Add Health studies with young adults, all items were re-coded so that higher scores indicated higher levels self-esteem; an individual's self-esteem score was the mean of their responses to the items (Ahrens et al., 2010; DuBois & Silverthorn, 2005b; Galinsky & Sonenstein, 2011; Hu, Davies, & Kandel, 2006). The internal consistency reliability of this scale among young women in the current sample was high ($\alpha = .81$).

Confidence. Confidence has been defined as the belief in one's abilities to achieve success (Vealey, 1986). In the Add Health Wave III survey, this variable was measured with a single item *"How confident are you of yourself?"* For this study, responses were recoded so that higher scores indicated more confidence.

Independence. Independence has been described as a key quality of emerging adults' transition into adulthood (Kirkpatrick Johnson, Berg, & Sirotzki, 2007).

Consistent with previous research with Add Health Wave III data (Kirkpatrick Johnson et al., 2007), independence was measured with one item: *"How independent are you?"* For this study, responses were recoded so that higher scores indicated greater independence.

Life satisfaction. Life satisfaction has been defined as a "cognitive evaluation of one's life as a whole" (Huebner, 2004; Shin & Johnson, 1978). While various measures of life satisfaction exist (Huebner, Zullig, & Saha, 2012; Huebner, Antaramian, Hills, Lewis, & Saha, 2011; Pavot & Diener, 2008), the most commonly used measure consists of a single question, "How satisfied are you with your life as a whole these days?" (Kahneman & Deaton, 2010, p. 16489). Consistent with previous research employing Add Health Wave III data (De Neve, 2011; DuBois & Silverthorn, 2005b; Kanazawa & Hellberg, 2010) a single item was used to measure life satisfaction. Responses were reverse coded so that higher scores reflected higher life satisfaction.

Risk indicators. Substance abuse and mental health problems have been associated with poor reproductive health outcomes among emerging adults and college students (Dorfman et al., 2010; Ingersoll et al., 2008; Turchik, Garske, Probst, & Irvin, 2010). This study examined associations of three risk indicators (heavy episodic drinking, marijuana use, depressive symptoms) with consistent contraceptive use. **Table 3.3** lists the study's risk indicator variables, the items used to measure each variable and the response options for each item.

Table 3.3

Measures of risk indicators

Independent Variable	Item(s)	Response options
Heavy episodic drinking	"During the past 12 months, on how many days did you drink five or more drinks in a row?"	0 – None 1 – One or two days in past 12 months 2 – Once a month or less 3 – Two to three days a month 4 – One or two days a week 5 – Three to five days a week 6 – Every day/ almost every day
Marijuana use	"During the past 30 days, how many times have you used marijuana?"	Range 0 – 999
Depressive symptoms	Nine items "Now, think about the past 7 days. How often was each of the following things true during the past 7 days?" "You were bothered by things that usually don't bother you." "You could not shake off the blues, even with help from your family and your friends, during the past 7 days." "You felt that you were just as good as other people, during the past 7 days."* "You had trouble keeping your mind on what you were doing, during the past 7 days." "You were depressed during the past 7 days." "You were too tired to do things, during the past 7 days." "You enjoyed life, during the past 7 days."* "You were sad, during the past 7 days." "You felt that people disliked you, during the past 7 days."	0 - Never or rarely 1 - Sometimes 2 - A lot of the time 3 - Most or all of the time

* Item recoded so that a higher score indicates greater depressive symptoms

Heavy episodic drinking. Heavy episodic drinking has been defined as consuming five or more drinks on a single occasion over the past 12 months (Jackson, 2008). Heavy episodic drinking is more predictive of negative outcomes than many other measures of alcohol use (Jackson, 2008). For this study, heavy episodic drinking was assessed over the past 12 months, rather than using a shorter timeframe (e.g., two weeks, 30 days). This time frame assured that this variable was measured over the same time period as the study's contraceptive use outcome measures. Heavy episodic drinking was defined by participants' responses to one survey question. Consistent with prior research (Hoyt, Chase-Lansdale, McDade, & Adam, 2012; Hussey, Chang, & Kotch, 2006; Shin, Edwards, & Heeren, 2009), participants who reported consuming five or more drinks in a row at least two or three days a month in the past 12 months were classified as having engaged in heavy episodic drinking.

Marijuana use. Marijuana use was determined by participants' response to one survey item. For Aim 3 analyses, a continuous measure of this variable was employed. To evaluate the moderating effects of protective factors on the relationship between marijuana use and consistent contraceptive and condom use (Aim 4), marijuana use was dichotomized into heavy marijuana use versus lower levels of use. Consistent with previous research, (Cronk & Sarvela, 1997; Gfroerer, Wu, & Penne, 2002), heavy marijuana use was defined as using marijuana on a daily or almost daily basis. Marijuana use responses were collapsed into two categories with participants who reported using marijuana on ≥ 20 occasions during the past 30 days classified as engaging in heavy marijuana use. This level of marijuana use has been associated with abuse and

dependency among young adult women (de Dios et al., 2010).

   Depressive symptoms. The Centers for Epidemiological Studies – Depression Scale (CES-D) was designed to measure depression in general populations (Radloff, 1977). The CES-D has been shown to have high levels of reliability and validity among college students (Radloff, 1991). Wave III of Add Health included 10 of the 20 items from the CES-D. Nine items assess depressive symptoms over the past 7 days; a tenth item assesses symptoms over the past 12 months. Consistent with previous studies of emerging adults (Needham & Austin, 2010; Primack, Swanier, Georgiopoulos, Land, & Fine, 2009), this study used nine items that reflect symptoms over the past 7 days to measure depressive symptoms. All item responses were summed so that higher scores indicated greater depressive symptoms; the total score for the items ranged from 0 – 27. The internal consistency reliability for this scale among the study sample was high ($\alpha =$ .82). For Aim 3 analysis, this variable was measured continuously. To evaluate the potential moderating effects of protective factors on the relationships between depressive symptoms and consistent contraceptive and condom use (Aim 4), responses were collapsed into two categories. Consistent with other studies of depressive symptoms in emerging adults (Needham & Austin, 2010; Primack et al., 2009), participants with scores of ≥ 11 were classified as having depressive symptoms.

   Study covariates. Demographic variables, including *age, race* and *socioeconomic status* (SES) have also been associated with contraceptive use patterns among college students (Gaydos et al., 2010; Huber & Ersek, 2009). Additional covariates for this study were derived from emerging adult literature.

Age. Among college students, age has shown mixed results as a predictor of contraceptive use (Gaydos et al., 2010; Huber & Ersek, 2009). Age was assessed at Wave III with participants reporting an age range of 18 – 24 years.

Race/Ethnicity. Similar to age as a predictor of contraceptive use, the race and/or ethnicity of college students have not been consistently related to contraceptive use (Bryant, 2009; Gaydos et al., 2010; Huber & Ersek, 2009). Study participants self-identified as White, Black or African American, American Indian or Native American, Asian, Hispanic, or as having multiple racial/ethnic backgrounds, as noted in Table 3.1. Due to small numbers who identified themselves as American Indian, Asian, Hispanic and of mixed race/ethnicity, participants were grouped into three racial/ethnic categories for purposes of analysis: White, Black or African American, and "other." Individuals who did not identify themselves as only White or only Black (i.e., Asian, American Indian, Hispanic and mixed racial/ethnic backgrounds) were included in the "other" category.

Family socioeconomic status (SES). Among college students, SES has been associated with contraceptive use (Gaydos et al., 2010). Similar to previous research with Add Health Wave III data (Ford, Jaccard, Millstein, Bardsley, & Miller, 2004), SES was assessed with one question that assessed whether the participant or any member of her family received public assistance since the participant turned 18 years old. The responses were coded 0 (received public assistance [low SES]) or 1 (did not receive public assistance [middle/high SES]).

Living arrangements. Previous research and emerging adult theory indicate that

leaving parents' homes may have an impact on emerging adults' choices and decisions (Arnett, 2006a, White, Fleming, Kim, Catalano & McMorris, 2008). However, findings related to contraceptive use have been mixed, with one study showing a positive association between living with parents (versus other living arrangements) and contraceptive behavior (Langer, Warheit & McDonald, 2001) and others finding no relationship (Bailey, Fleming, Henson, Catalano, & Haggerty, 2008; Kim et al., 2007). For this study, one item, "Where do you live now? That is, where do you stay most often?" was used to indicate whether the participant was living with parents. Participants were grouped as living with parent(s) vs. living in other arrangements.

Number of sexual partners. Number of sexual partners has been associated with contraceptive use among adolescents, young adults and adults (Cavazos-Rehg et al., 2010; East et al., 2007; Kuortti & Kosunen, 2009). A continuous variable was constructed from a single item, "With how many different partners have you had vaginal intercourse in the past 12 months?" Responses range from 1 – 20 sexual partners.

Frequency of sexual intercourse. Frequency of intercourse has been associated with contraceptive use and condom use in young adult populations (East, Jackson, O'Brien, & Peters, 2007; Frost, Singh, & Finer, 2007). Frequency of intercourse was measured with the item, "How many times have you had vaginal intercourse in the past 12 months?" The distribution of this variable was positively skewed, ranging from 1 – 500 episodes of vaginal intercourse with less than 9% of participants responding that they engaged in intercourse between 101 – 500 times in the past year. For the current study, responses between 101 and 500 episodes of intercourse were grouped into a single

category: 101 or more episodes. The range for the current study was 1 – 101 or more.

Age at first sex. Younger age at first intercourse has been repeatedly associated with less consistent contraceptive use and condom use (Magnusson, Masho, & Lapane, 2012; Manning, Longmore, & Giordano, 2000; Shih et al., 2011). A continuous variable was constructed from a single item, "How old were you the first time you had vaginal intercourse?" Responses range from 10 – 24 years.

Consistent contraceptive/condom use. For the outcome of consistent condom use, *contraceptive use* served as a covariate, for the outcome of consistent contraceptive use, *condom use* served as a covariate. Condom use and other contraceptive use are often inversely related (Civic, 2000; Cooper, Agocha, & Powers, 1999; Manlove et al., 2011).

Analytic Plan

The analysis plan for each specific aim is detailed below. All analyses were completed using Stata 11.0 (StataCorp, 2009) to account for the complex clustered sampling design of Add Health. Add Health sampling weights were not be used because of the highly select nature of the study sample.

Missing data. In all analyses, only participants with complete data on all variables included in the analytic model were used. Sample sizes for all analyses have been included in all tables.

Descriptive statistics. Central tendency of all ordinal and continuous measures were assessed using means, and distributional properties of measures were examined using standard errors and ranges. The distributions of nominal-level measures have been described using counts and percentages.

Based on the J- and U-shaped distributions of consistent contraceptive use and consistent condom use, respectively, both outcome variables were transformed into dichotomous variables as previously described.

Aim 1. A correlation matrix including all protective factors and risk indicators was developed. Correlations were assessed for direction and strength of bivariate associations. Bivariate relationships were assessed using Pearson's *r* when both variables were measured at an interval level. When one variable was measured dichotomously and the other was measured at an interval level, bivariate relationships were assessed using a point biserial correlation (Huck, 2008). When both variables were measured dichotomously, the significance of the bivariate association was assessed using a chi-square statistic.

Aim 2. Aim 2 was addressed in a 4-step process outlined below for the outcome of consistent contraceptive use. The same process was followed for the outcome of consistent condom use.

Step 1. Initially, bivariate analyses examined relationships between consistent contraceptive use and each protective factor (i.e., external supports: parental closeness and relationship with caring non-parental adult; and internal assets: self-esteem, confidence, independence, and life satisfaction).

Step 2. Each covariate (i.e., age, race/ethnicity, family SES, living arrangements, number of sexual partners, frequency of intercourse, age at first intercourse, condom use) was assessed for a bivariate relationship with consistent contraceptive use. Covariates with significant bivariate relationships ($p \leq 0.05$) with this outcome were retained in Step

3 multivariate models.

Step 3. Protective factors found to have a significant or marginally significant bivariate relationship with the outcome variable (i.e., $p \leq 0.10$) were included in an initial multivariate logistic regression model predicting consistent contraceptive use. Each initial multivariate model included a single protective factor and covariates that had significant bivariate relationships with consistent contraceptive use. Odds ratios and 95% confidence intervals (CI) were computed and assessed. Protective factors and covariates that demonstrated a significant relationship with consistent contraceptive use ($p \leq 0.05$) at this step were retained for step 4.

Step 4. Those protective factors found to have significant relationships ($p \leq 0.05$) with consistent contraceptive use in Step 3 were included in a multivariate logistic regression model that included all significant protective factors and covariates using a stepwise forward approach. Covariates were included in an initial step; protective factors were added in the second step. Odds ratios and 95% CI were computed and assessed.

Aim 3. Similar to Aim 2, Aim 3 was addressed in a four step process for each of the outcome variables. Initially, bivariate analyses were used to examine relationships between each risk indicator (i.e., heavy episodic drinking, marijuana use, depressive symptoms) and consistent contraceptive use. Those risk indicators found to have a significant or marginally significant bivariate relationship with the outcome variable (i.e., $p \leq 0.10$), and those covariates found to have significant bivariate relationships ($p < 0.05$) with the outcome variable were retained for inclusion in multivariate logistic regression models. In an analytic step parallel to Step 3 of Aim 2, initial models included a single

risk indicator and covariates that were found to have significant bivariate relationships with consistent contraceptive use. In an analytic step parallel to Step 4 of Aim 2, risk indicators found to have significant relationships were included in a multivariate logistic regression model that contained all significant risk indicators and covariates using a stepwise forward approach. The same analytic process was used for the outcome of consistent condom use.

Aim 4. To determine if relationships between risk indicators and consistent contraceptive use varied based on levels of protective factors, moderation effects were explored. To determine moderating effects of protective factors on relationships between risk indicators (in dichotomized form) and consistent contraceptive use, multivariate regression models were developed for each protective factor found to have a significant ($p \leq 0.05$) relationship with consistent contraceptive use in initial multivariate models (Aim 2, step 3). This was accomplished using a stepwise forward modeling approach. In Step 1, study covariates, one protective factor (significantly related to contraceptive use in Aim 2, step 3 initial multivariate models) and one risk indicator factor (significantly related [$p \leq 0.05$] to contraceptive use in Aim 3, step 3 initial multivariate models) were included in a multivariate model of consistent contraceptive use. In Step 2, if both the protective factor and the risk indicator maintained significant relationships with consistent contraceptive use ($p \leq 0.05$), an interaction term between the risk indicator and the protective factor was added to the model. This process was repeated with each risk indicator so that all protective factors significantly related to consistent contraceptive use in initial multivariate models in Aim 2 were examined for moderation effects. A parallel

stepwise analysis was planned for the second outcome, consistent condom use.

Human Subject Protection, Data Management and Security

The Add Health study was approved by the Institutional Review Board (IRB) at the University of North Carolina, Chapel Hill and participants completed informed consent procedures. Add Health data is available to researchers who have an agreement with the University of North Carolina at Chapel Hill; the University of Minnesota has an agreement (M. D. Resnick, PI). In keeping with a security agreement, Add Health data are encrypted and stored on a password-protected external hard drive in a locked cabinet in a locked office in the University of Minnesota School of Nursing. This secondary analysis of Add Health data was approved by the University of Minnesota Institutional Review Board as an exempt study (University of Minnesota IRB approval letter is in the Appendix). The principal investigator for this study did not have access to any Add Health participant identifiers.

Chapter IV: Results

Through this secondary analysis of data from the Longitudinal Study of Adolescent Health (Add Health), four aims were addressed. This chapter presents these results. The purpose of this study was to examine relationships between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use, and between risk indicators and consistent contraceptive and condom use among emerging adult college women. Additionally, this study examined whether relationships between select risk indicators and contraceptive use were altered by the presence of protective factors.

This study addressed four specific aims and related research questions.

Aim 1. Explore bivariate correlations between external supports, internal assets, and indicators of risk among a nationwide sample of sexually active emerging adult college women.

Aim 2. Examine associations between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 2:

1. Are external supports of caring parents and current relationships with caring non-parental adults positively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

2. Are internal assets of self-esteem, confidence, independence and life satisfaction positively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

3. Which protective factors have the strongest relationships with consistent contraceptive and condom use among sexually active, emerging adult college women?

Aim 3. Examine associations between risk indicators and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 3:

1. Is heavy episodic drinking negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

2. Is marijuana use negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

3. Are depressive symptoms negatively associated with consistent contraceptive and condom use among sexually active, emerging adult college women?

4. Which risk indicators have the strongest relationships with consistent contraceptive and condom use among sexually active, emerging adult college women?

Aim 4. Informed by relationships found to be significant in Aims 2 and 3, examine protective factors as moderators of associations between risk indicators and consistent contraceptive and condom use among sexually active, emerging adult college women.

Research questions for Aim 4:

1. Are significant relationships between consistent contraceptive and condom use and identified risk indicators moderated by the external supports of parental closeness or relationships with caring non-parental adults?

2. Are significant relationships between consistent contraceptive and condom use and identified risk indicators moderated by internal assets of self-esteem, confidence, independence, or life satisfaction?

This chapter begins by presenting descriptive statistics for all independent and outcome variables, including means and confidence intervals (CI), ranges, and standard errors (SE) for continuous variables; and counts and percentages for categorical variables. To address Aim 1, bivariate associations between all independent variables are examined. To address Aims 2-4, findings are presented from bivariate and multivariate logistic regression models for consistent contraceptive use and consistent condom use outcomes.

Descriptive Statistics

Outcome variables. Add Health included two items that measured contraceptive and condom use in the past year. **Table 4.1** provides a descriptive summary of findings for the contraceptive and condom use variables.

Consistent contraceptive use. In this sample of college attending emerging adult women, contraceptive use rates were high. About two thirds of the study sample (64.4%) reported using contraception all the time in the past 12 months. However, 35.6% of the women indicated that they did not use contraception all of the time. The responses were non-normally distributed; with a J-shape distribution evident.

Table 4.1

Means, Standard Errors and Distributions of Outcome Variables

Variable	Distribution (%)
Consistent contraceptive use (*N* = 839)	
0 – None (*n* = 36)	4.3
1 – Some of the time (*n* = 52)	6.2
2 – Half of the time (*n* = 46)	5.5
3 – Most of the time (*n* = 165)	19.6
4 – All the time (*n* = 540)	64.4
Consistent condom use (*N* = 838)	
0 – None (*n* = 145)	17.3
1 – Some of the time (*n* = 168)	20.0
2 – Half of the time (*n* = 89)	10.6
3 – Most of the time (*n* = 184)	22.0
4 – All the time (*n* = 252)	30.1

Note. Totals may not equal 100% due to rounding.

Consistent condom use. Fewer women reported consistent condom use in the

past 12 months. Just over 30% of the study sample indicated that they used condoms all

of the time and 17.3% reported never using a condom with intercourse. The responses

for condom use also were non-normally distributed, with a U-shape distribution.

Due to the non-normal response distributions, both contraceptive use and condom

use were dichotomized into groups of "always users" versus all other responses (never,

less than half, half and most of the time). The empirical basis for this decision is detailed

in Chapter 3. **Table 4.2** illustrates the response distributions of the dichotomized

outcome variables.

Table 4.2

Consistent Contraceptive Use and Consistent Condom Use, Dichotomized

Outcome Variable	*n*	(%)
Consistent contraceptive use (*N* = 839)		
None or inconsistent	299	(35.6)
All the time	540	(64.4)
Consistent condom use (*N* = 838)		
None or inconsistent	586	(69.9)
All the time	252	(30.1)

Independent variables.

Protective factors. High levels of external supports and internal assets were evident in this sample of emerging adult women. **Table 4.3** provides a summary of descriptive data regarding external supports and internal assets. These college women felt close to their parents; the average parental closeness score was 4.7 on a 5-point scale with 60.8% of the women rating their closeness with at least one parent at five on a 5-point scale. Many of the participants had relationships with caring non-parental adults during their adolescent or young adult years; 62% of the women indicated that these adults were currently important to them.

On average, the emerging adult women in this sample reported high levels of self-esteem, confidence, independence, and life satisfaction. Over half (52.5%) of the women scored > 4 on a 5-point scale on self-esteem, 39.3% described themselves as very confident and 44.2% considered themselves as very independent; 40.3% were very satisfied with their lives.

Table 4.3

Means, Standard Errors, Ranges, and Distributions of Protective Factors

Variable/Indicator	Mean [95% CI]	Standard error	Range	*n* (%)
Parental closeness (*N* = 837)	4.72 [4.68, 4.75]	0.02	2.0 – 5.0	
Caring non-parental adults (*N* = 839)				
Currently important relationship				520 (62)
Other				319 (38)
Self-esteem (*N* = 842)	4.24 [4.20, 4.28]	0.02	1.3 – 5.0	
Confidence (*N* = 835)	3.22 [3.17, 3.28]	0.03	1.0 – 4.0	
Independence (*N* = 834)	3.30 [3.26, 3.35]	0.02	1.0 – 4.0	
Life satisfaction (*N* = 842)	4.30 [4.24, 4.35]	0.03	1.0 – 5.0	

Note. CI = confidence interval.

Risk indicators. **Tables 4.4 – 4.6** summarize descriptive data regarding heavy

episodic drinking, marijuana use and depressive symptoms in this sample. Among this

sample of emerging adult women, heavy episodic drinking was the most commonly

reported risk indicator in this study. Almost 25% of the women reported consuming five

or more drinks more than once per month in the past 12 months; however, 44% reported

never engaging in heavy episodic drinking. Most women (76.9%) used no marijuana in

the 30 days before the survey; however, 3.7% of the sample used marijuana 20 or more

times in the past 30 days. Although most women described few depressive symptoms,

7.2% of the sample had CES-D scores of ≥ 11, a standard minimal cut point for

depressive symptoms (Needham & Austin, 2010; Primack et al., 2009).

Table 4.4

Heavy Episodic Drinking, Past 12 months (N = 840)

Frequency of heavy episodic drinking in past 12 months	*n*	*(%)*
< 2 days/month	633	(75.4)
≥ 2 days/month	207	(24.6)

Table 4.5

Marijuana Use in Past 30 Days (N = 840)

Times used marijuana in past 30 days	*n*	%
0	646	76.9
1	54	6.4
2	29	3.5
3	18	2.1
4	15	1.8
5	19	2.3
6	5	0.6
7	1	0.1
8	1	0.1
9	1	0.1
10	13	1.5
12	2	0.2
15	4	0.5
18	1	0.1
20 - 60	31	3.7

Note. Percentage totals may not equal 100 due to rounding.

Table 4.6

Depressive Symptoms (N = 842)

Depressive symptoms[a]	*n*	%
0	109	12.9
1	122	14.5
2	118	14.0
3	99	11.8
4	83	9.9
5	73	8.7
6	64	7.6
7	42	5.0
8	29	3.4
9	27	3.2
10	15	1.8
11 - 24	61	7.2

Note. Percentage totals may not equal 100 due to rounding; [a]Based on modification of Centers for Epidemiological Studies - Depression Scale (see page 62).

Marijuana use and depressive symptoms were collapsed into dichotomous measures for Aim 4 analyses. **Table 4.7** summarizes these dichotomous variables.

Table 4.7

Marijuana Use and Depressive Symptoms, Dichotomized

Variable/Indicator	*n*	*(%)*
Heavy marijuana use (*N* = 840)		
< 20 times/month	809	(96.3)
≥ 20 times/month	31	(3.7)
Depressive symptoms (*N* = 842)		
Low (0 – 10)	781	(92.8)
High (11 – 27)	61	(7.2)

Aim 1: Correlations among Independent Variables

As depicted in **Table 4.8,** bivariate relationships among all independent variables were assessed for direction, statistical significance and strength of association. Bivariate relationships were assessed using Pearson's r, point biserial correlations or a chi-square test (Huck, 2008).

Bivariate analysis demonstrated that all significant correlations were in the expected directions. All of the internal assets were significantly correlated with each other. The0 magnitude of these correlations ranged in size from the ($r = .16$, $p < 0.001$) correlation between independence and life satisfaction to the *($r = .44$, $p < 0.01$)* correlation between confidence and self-esteem. Correlations between internal assets and external supports were somewhat smaller in magnitude. Parental closeness was significantly associated with self-esteem ($r = .16$, $p < 0.001$), confidence ($r = .15$, $p < 0.001$), independence ($r = .06$, $p < 0.05$) and life satisfaction ($r = .22$, $p < 0.001$). Having a caring relationship with a non-parental adult was significantly related to life satisfaction only ($r = .11$, $p < 0.001$). The external supports of parental closeness and relationships with caring non-parental adults exhibited small, non-significant correlation.

Risk indicators were less highly correlated with each other than were internal assets. There were small positive correlations among the three risk indicators (heavy episodic drinking and marijuana use $r_{pb} = .16$, $p < 0.001$; heavy episodic drinking and depressive symptoms $r_{pb} = .08$, $p < 0.05$; marijuana use and depressive symptoms $r = .10$, $p < 0.01$).

Table 4.8

Bivariate Correlations between Independent Variables (N = 842)

Variables	Self-Esteem	Confidence	Independence	Life Satisfaction	Parental Closeness	Caring n/p adult[1]	Heavy Episodic Drinking[1]	Marijuana Use	Depressive Symptoms
Self-Esteem	1.00								
Confidence	.44***	1.00							
Independence	.20***	.34***	1.00						
Life Satisfaction	.39***	.35***	.16***	1.00					
Parental Closeness	.16***	.15***	.06*	.22***	1.00				
Caring non-parental adult[1]	.03	.06	.02	.11***	.05	1.00			
Heavy Episodic Drinking[1]	-.09**	-.11***	.02	.01	.05	N/A[2]	1.00		
Marijuana Use	-.05	-.05	-.03	-.09**	-.01	-.06	.16***	1.00	
Depressive Symptoms	-.37***	-.32***	-.12***	-.46***	-.12***	-.04	.08*	.10**	1.00

Note. Correlations unadjusted for sample design; unless otherwise noted, bivariate correlations assessed using Pearson's *r*.
*p < 0.05, **p < 0.01, ***p < 0.001
[1] Bivariate associations of continuous variables with this dichotomous variable are expressed as point biserial correlations
[2] Bivariate association between two dichotomous variables tested with chi-square statistic.

Correlations between protective factors and risk indicators were in the expected direction. Heavy episodic drinking demonstrated small but significant negative correlations with the internal assets of self-esteem ($r = -.09$, $p < 0.01$) and confidence ($r = -.11$, $p < 0.001$). Marijuana use demonstrated a small, significant correlation with life satisfaction only ($r = -.09$, $p < 0.01$). Depressive symptoms had significant negative connections with all protective factors except for current relationships with a caring non-parental adult, with negative correlations of moderate magnitude with self-esteem ($r = -.37$, $p < 0.001$), confidence ($r = -.32$, $p < 0.001$), and with life satisfaction ($r = -.45$, $p < 0.001$). None of the bivariate correlations was substantial enough in magnitude to raise concerns regarding multicollinearity (Grove, Burns, & Gray, 2013).

Aim 2: Associations between Protective Factors and Consistent Contraceptive and Condom Use

Bivariate relationships between protective factors and consistent contraceptive and condom use. Bivariate relationships between each protective factor and the study's outcome variables of consistent contraceptive use and consistent condom use were assessed using logistic regression. **Table 4.9** details these bivariate relationships. Neither of the external supports of parental closeness nor current relationship with caring non-parental adult was significantly related to consistent contraceptive use. Among the internal assets, confidence and life satisfaction were significantly related to consistent contraceptive use ($p < 0.05$). Self-esteem and independence were both marginally associated with consistent contraceptive use ($0.05 < p < 0.1$). Contrary to associations with consistent contraceptive use, none of the

protective factors demonstrated a significant bivariate relationship with consistent condom use.

Table 4.9.

Bivariate Relationships between Protective Factors and Study Outcomes (N = 842)

Protective Factors	Consistent contraceptive use			Consistent condom use		
	OR	95% CI	*p* value	OR	95% CI	*p* value
Parental Closeness	1.10	[0.80, 1.50]	0.56	0.95	[0.72, 1.26]	0.73
Caring non-parental adult	1.05	[0.77, 1.45]	0.74	0.93	[0.67, 1.30]	0.67
Self-Esteem	1.30	[0.98, 1.73]	0.07	1.24	[0.87, 1.76]	0.23
Confidence	1.24	[1.01, 1.53]	0.04	1.12	[0.93, 1.36]	0.24
Independence	1.22	[0.99, 1.49]	0.06	1.19	[0.90, 1.56]	0.22
Life Satisfaction	1.50	[1.23, 1.82]	< 0.001	1.05	[0.87, 1.27]	0.63

Note. OR = odds ratio; CI = confidence interval.

Bivariate relationships between covariates and consistent contraceptive and condom use. Characteristics previously associated with consistent contraceptive and condom use were examined as potential covariates for models linking protective factors with consistent contraceptive use. The following demographic variables were assessed: participant age, race/ethnicity, family socioeconomic stats (SES), and living arrangements (living with parents vs. other arrangements). Likewise, the following sexual behaviors were assessed: number of sexual partners in the past year, frequency of sexual intercourse in the past year, and age at first intercourse. Consistent condom use (as a continuous variable) was assessed as covariate for consistent contraceptive use; consistent contraceptive use (as a continuous variable) was examined a covariate for consistent condom use.

Table 4.10 describes bivariate relationships between potential covariates and consistent contraceptive use and consistent condom use. Living with a parent, age at first intercourse, and consistent condom use were all significantly and positively associated with consistent contraceptive use ($p < 0.05$). Black/African American participants, those from other racial/ethnic backgrounds, and those having greater numbers of sex partners in the past year were significantly less likely to be consistent contraceptive user ($p < 0.01$).

Table 4.10

Bivariate Relationships between Covariates and Study Outcomes (N = 842)

Covariate	Consistent contraceptive use			Consistent condom use		
	OR	95% CI	p value	OR	95% CI	p value
Age	0.99	[0.90, 1.09]	0.80	0.99	[0.88, 1.12]	0.93
Race (reference: White)						
Black/African American	0.58	[0.42, 0.79]	0.001	1.44	[1.00, 2.07]	0.05
Other	0.56	[0.38, 0.83]	0.004	1.11	[0.73, 1.69]	0.62
Family SES	2.72	[0.35, 21.18]	0.34	0.64	[0.08, 5.03]	0.67
Living with parent(s) (vs. other arrangements)	1.37	[1.02, 1.84]	0.04	1.56	[1.13, 2.15]	0.007
Number of sex partners	0.86	[0.77, 0.96]	0.007	0.88	[0.75, 1.03]	0.12
Frequency of intercourse	1.00	[0.99, 1.00]	0.49	0.97	[0.96, 0.98]	< 0.001
Age at first sex	1.11	[1.03, 1.20]	0.006	1.21	[1.11, 1.32]	< 0.001
Consistent condom use	1.38	[1.26, 1.51]	< 0.001			
Consistent contraceptive use				3.11	[1.97, 4.92]	< 0.001

Note. SES = socioeconomic status; OR = odds ratio; CI = confidence interval.

Four of the selected characteristics exerted a positive effect on consistent condom use. Black/African American participants, those living with parents, those who were older at first intercourse and those who were consistent contraceptive users were all significantly more likely to be consistent condom use ($p \leq 0.05$). Conversely, greater

frequency of intercourse was negatively associated with consistent condom use ($p < 0.001$).

Multivariate models of protective factors. Because none of the study's protective factors were significantly related to consistent condom use, no multivariate logistic regression models were tested for this outcome variable. Multivariate logistic regression models were developed for each protective factor found to be significantly or marginally related to consistent contraceptive use at a bivariate level (i.e., $p < 0.1$). Each model included a single protective factor. All demographic characteristics and sexual behaviors significantly related to consistent contraceptive use at a bivariate level were included as covariates each model. **Table 4.11** depicts findings from multivariate regression models for each internal asset and consistent contraceptive use. In these multivariate models, self-esteem, confidence, independence, and life satisfaction had significant relationships with consistent contraceptive use ($p < 0.05$). All other covariates remained significant (all $p < 0.01$) with the exception of age at first sex.

Table 4.11

Multivariate Relationships between Protective Factors, Covariates, and Consistent Contraceptive Use

Internal Asset	Consistent contraceptive use		
Covariates	OR	95% CI	*p* value
Self-Esteem (*N* = 834)	1.38	[1.05, 1.82]	0.02
Race/Ethnicity (referent: White)			
Black/African American	0.44	[0.32, 0.62]	< 0.001
Other	0.41	[0.26, 0.64]	< 0.001
Living with parent(s) (vs. other arrangements)	1.53	[1.12, 2.09]	0.007
Number of sex partners	0.85	[0.76, 0.95]	0.004
Age at first sex	1.04	[0.96, 1.12]	0.37
Consistent condom use	1.45	[1.31, 1.60]	< 0.001
Confidence (*N* = 827)	1.43	[1.12, 1.81]	0.004
Race/Ethnicity (referent: White)			
Black/African American	0.43	[0.30, 0.61]	< 0.001
Other	0.39	[0.25, 0.62]	< 0.001
Living with parent(s) (vs. other arrangements)	1.55	[1.14, 2.11]	0.006
Number of sex partners	0.85	[0.76, 0.95]	0.005
Age at first sex	1.04	[0.96, 1.13]	0.29
Consistent condom use	1.45	[1.31, 1.60]	< 0.001
Independence (*N* = 827)	1.27	[1.02, 1.58]	0.03
Race/Ethnicity (referent: White)			
Black/African American	0.48	[0.34, 0.68]	< 0.001
Other	0.43	[0.28, 0.67]	< 0.001
Living with parent(s) (vs. other arrangements)	1.56	[1.14, 2.15]	0.006
Number of sex partners	0.84	[0.75, 0.94]	0.003
Age at first sex	1.04	[0.96, 1.12]	0.36
Consistent condom use	1.44	[1.31, 1.59]	< 0.001
Life Satisfaction (*N* = 834)	1.40	[1.12, 1.75]	0.003
Race/Ethnicity (referent: White)			
Black/African American	0.50	[0.36, 0.71]	< 0.001
Other	0.44	[0.28, 0.70]	0.001
Living with parent(s) (vs. other arrangements)	1.53	[1.13, 2.08]	0.007
Number of sex partners	0.85	[0.76, 0.95]	0.005
Age at first sex	1.03	[0.95, 1.11]	0.45
Consistent condom use	1.45	[1.31, 1.60]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

Table 4.12

Multivariate Model of Protective Factors with Consistent Contraceptive Use (N =829)

Variables	OR	95% CI	*p* value
Self esteem	1.03	[0.78, 1.38]	0.82
Confidence	1.23	[0.93, 1.61]	0.14
Independence	1.13	[0.89, 1.44]	0.31
Life satisfaction	1.25	[1.00, 1.57]	0.05
Race/Ethnicity (referent – white)			
Black/African American	0.45	[0.31, 0.65]	< 0.001
Other	0.42	[0.26, 0.67]	< 0.001
Living with parent(s)	1.57	[1.15, 2.15]	0.005
(vs. other arrangements)			
Number of sexual partners	0.85	[0.75, 0.95]	0.004
Consistent condom use	1.47	[1.33, 1.62]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

Research Question 3 for Aim 2 was addressed with a stepwise multivariate logistic regression model including all protective factors and covariates that were significance in initial multivariate models depicted in Table 4.11. **Table 4.12** depicts relationships between protective factors, covariates and consistent contraceptive use in this multivariate model. Of the protective factors that had significant relationships with consistent contraceptive use in the initial multivariate models, only life satisfaction maintained a significant relationship (OR 1.25, *p* = 0.05). Associations between consistent contraceptive use and all other protective factors (self-esteem, confidence and independence) were non-significant (*p* = 0.82, 0.14, 0.31 respectively). All covariates maintained a significant relationship with consistent contraceptive use (all *p* < 0.01). Black or African American participants, those from other racial/ethnic backgrounds, and those with greater numbers of sex partners in the past 12 months were all significantly

less likely to report consistent contraceptive use; those who lived with parents and those who were consistent condom users were more likely to report being consistent contraceptive users.

Aim 3: Associations between Risk Indicators and Consistent Contraceptive and Condom Use

　　Bivariate relationships between risk indicators and consistent contraceptive and condom use. Initial analysis for Aim 3 examined bivariate relationships between risk indicator and outcome variables. **Table 4.13** details these relationships. Significant negative relationships were found between marijuana use and consistent contraceptive use (OR = 0.97, p = 0.002), and depressive symptoms and consistent contraceptive use (OR = 0.90, p < 0.001). Significant negative relationships were found between heavy episodic drinking and consistent condom use (OR = 0.62, p = 0.007). Marginally significant relationships were found between marijuana use and consistent condom use (OR = 0.97, p = 0.07) and between depressive symptoms and consistent condom use (OR = 0.96, p = 0.10).

Table 4.13

Bivariate Relationships between Risk Indicators and Study Outcomes (N = 842)

Risk Indicator	Consistent contraceptive use			Consistent condom use		
	OR	95% CI	p value	OR	95% CI	p value
Heavy episodic drinking	0.88	[0.62, 1.26]	0.49	0.62	[0.44, 0.88]	0.007
Marijuana use	0.97	[0.95, 0.99]	0.002	0.97	[0.93, 1.00]	0.07
Depressive symptoms	0.90	[0.86, 0.94]	< 0.001	0.96	[0.92, 1.01]	0.10

Note. OR = odds ratio; CI = confidence interval.

Multivariate models of risk indicators. Initial multivariate logistic regression models were developed for each risk indicator that was significantly or marginally related to consistent contraceptive use and consistent condom use (i.e., $p \leq 0.1$). Covariates with significant relationships with each outcome were included (**Table 4.10** includes a list of covariates). As depicted in **Table 4.14** both risk indicators that had significant bivariate relationships with consistent contraceptive use maintained their negative relationships in the multivariate models (OR = 0.97, p = 0.02 [marijuana use]; OR = 0.90, p < 0.001 [depressive symptoms]). All covariates, with the exception of age at first intercourse, maintained significant relationships with consistent contraceptive use in these models.

Table 4.14

Multivariate Relationship between Risk Indicators, Covariates, and Consistent Contraceptive Use

Risk factor	Consistent contraceptive use		
Covariates	OR	95% CI	*p* value
Marijuana Use (*N* = 832)	0.97	[0.95, 0.99]	0.02
Race (referent – White)			
Black/African American	0.46	[0.33, 0.64]	< 0.001
Other race/ethnicity	0.40	[0.26, 0.63]	< 0.001
Living with parent(s)	1.49	[1.09, 2.05]	0.01
(vs. other arrangements)			
Number of sex partners	0.85	[0.76, 0.95]	0.003
Age at first sex	1.03	[0.95, 1.11]	0.47
Consistent condom use	1.44	[1.31, 1.59]	< 0.001
Depressive Symptoms (*N* = 834)	0.90	[0.86, 0.95]	< 0.001
Race (Referent- White)			
Black/African American	0.48	[0.34, 0.67]	< 0.001
Other race/ethnicity	0.43	[0.28, 0.68]	< 0.001
Living with parent(s)	1.49	[1.09, 2.05]	0.01
(vs. other arrangements)			
Number of sex partners	0.85	[0.76, 0.95]	0.004
Age at first sex	1.03	[0.95, 1.11]	0.47
Consistent condom use	1.44	[1.31, 1.59]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

Table 4.15

Multivariate Relationships between Risk Indicators, Covariates, and Consistent Condom Use

| Risk factor | Consistent condom use | | |
Covariates	OR	95% CI	*p* value
Heavy Episodic Drinking (*N* = 738)	0.66	[0.42, 1.03]	0.07
Black/African American (referent – White)	1.24	[0.79, 1.94]	0.35
Living with parent(s) (vs. other arrangements)	1.35	[0.91, 2.01]	0.14
Frequency of intercourse	0.97	[0.96, 0.97]	< 0.001
Age at first sex	1.14	[1.03, 1.26]	0.01
Consistent contraceptive use	2.26	[2.02, 5.29]	< 0.001
Marijuana Use (*N* = 737)	1.00	[0.97, 1.03]	0.10
Black/African American (referent – White)	1.38	[0.89, 2.12]	0.15
Living with parent(s) (vs. other arrangements)	1.35	[0.91, 2.01]	0.14
Frequency of intercourse	0.97	[0.96, 0.97]	< 0.001
Age at first sex	1.15	[1.04, 1.26]	0.007
Consistent contraceptive use	3.28	[2.02, 5.33]	< 0.001
Depressive Symptoms (*N* = 738)	1.00	[0.94, 1.05]	0.92
Black/African American (Referent- White)	1.38	[0.89, 2.12]	0.15
Living with parent(s) (vs. other arrangements)	1.35	[0.91, 2.01]	0.14
Frequency of intercourse	0.97	[0.96, 0.97]	< 0.001
Age at first sex	1.15	[1.04, 1.27]	0.008
Consistent contraceptive use	3.27	[1.98, 5.39]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

Although all three risk indicators had significant or nearly significant bivariate relationships with consistent condom use ($p \leq 0.1$), none of these relationships were significant in multivariate models that accounted for covariates. **Table 4.15** details these models. Several covariates maintained significant relationships with consistent condom use in models that included one risk indicator. Frequency of sexual intercourse was negatively associated with condom use in all models (all $p < 0.001$). Age at first sex and consistent contraceptive use were positively associated with consistent condom use.

Neither race/ethnicity nor living arrangements were significantly related to consistent condom use in any of the models.

Table 4.16

Multivariate Model of Risk Indicators and Consistent Contraceptive Use (N = 829)

Variables	OR	95% CI	*p* value
Marijuana use	0.98	[0.96, 1.00]	0.05
Depressive symptoms	0.91	[0.87, 0.95]	<0.001
Race/Ethnicity (referent – White)			
Black or African American	0.46	[0.33, 0.64]	< 0.001
Other	0.41	[0.26, 0.65]	< 0.001
Living with parent(s) vs. (other arrangements)	1.47	[1.07, 2.03]	0.02
Number of sexual partners	0.85	[0.77, 0.95]	0.004
Consistent condom use	1.45	[1.31, 1.59]	< 0.001

Note. OR = Odds Ratio, CI = confidence interval

Research Question 4 for Aim 3 was addressed with a stepwise multivariate logistic regression model including all risk indicators and covariates that maintained significance in initial multivariate models. Because none of the risk indicators maintained significant relationships with consistent condom use in models that accounted for covariates (Table 4.15) this final step was not completed for consistent condom use. **Table 4.16** depicts the results of the final model for consistent contraceptive use. In this model, both marijuana use (OR = 0.98, *p* = 0.05) and depressive symptoms (OR = 0.91, *p* < 0.001) maintained significant negative relationships with consistent contraceptive use. All of the covariates in the final model had significant relationships with consistent contraceptive use, with living with parents and consistent condom use having positive relationships. Conversely, Black participants and those with other racial/ethnic backgrounds (compared to White participants) and those with a greater number of sexual

partners in the past 12 months, were significantly less likely to report consistent contraceptive use.

Aim 4: Moderating Effects of Protective Factors on Relationships between Risk Indicators and Consistent Contraceptive Use

Aim 4 examined whether the presence of protective factors changed relationships between this study's risk indicators and outcomes. Because no risk indicators were significantly related to consistent condom use (as noted in Table 4.15), Aim 4 analyses focused on the outcome of consistent contraceptive use. There were four protective factors (self-esteem, confidence, independence and life satisfaction) and two risk indicators (marijuana use and depressive symptoms) that were significantly related to consistent contraceptive use. As detailed in Chapter 3, multivariate regression models were developed for each of these dichotomized risk indicators which included a single protective factor. If both the protective factor and the risk indicator had significant relationships with consistent contraceptive use in a main effects model, an interaction term was added to test for moderation effects.

Heavy marijuana use and protective factors. The results of the multivariate models including heavy marijuana use and are shown in **Tables 4.17 – 4.20.** As shown in **Table 4.17**, in the model including heavy marijuana use and self-esteem, heavy marijuana use did not maintain a significant relationship with contraceptive use, thus, an interaction term was not introduced. Self-esteem had a significant and positive relationship with contraceptive use (OR = 1.37, p = 0.02) in this model.

Table 4.17

Multivariate Model of Heavy Marijuana Use and Self-Esteem for Consistent Contraceptive Use (N = 834)

Variables	OR	95% CI	*p* value
Heavy marijuana use	0.52	[0.27, 1.02]	0.06
Self-esteem	1.37	[1.04, 1.81]	0.02
Race/Ethnicity (referent: White)			
Black or African American	0.42	[0.30, 0.60]	< 0.001
Other	0.39	[0.25, 0.62]	< 0.001
Living with parent (vs. other arrangements)	1.50	[1.10, 2.06]	0.01
Number of sex partners	0.85	[0.76, 0.95]	0.004
Consistent condom use	1.46	[1.33, 1.61]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

The results of the multivariate model including heavy marijuana use and confidence are shown in **Table 4.18.** Heavy marijuana use did not maintain a significant relationship with contraceptive use in this model, thus, an interaction term was not introduced. Confidence had a significant and positive relationship with contraceptive use (OR = 1.41, *p* = 0.006) in this model.

Table 4.18

Multivariate Model of Heavy Marijuana Use and Confidence for Consistent Contraceptive Use (N = 827)

Variables	OR	95% CI	*p* value
Heavy marijuana use	0.54	[0.27, 1.07]	0.08
Confidence	1.41	[1.11, 1.80]	0.006
Race/Ethnicity (referent: White)			
Black or African American	0.41	[0.28, 0.59]	< 0.001
Other	0.38	[0.24, 0.60]	< 0.001
Living with parent(s) (vs. other arrangements)	1.52	[1.11, 2.09]	0.01
Number of sex partners	0.85	[0.76, 0.95]	0.004
Consistent condom use	1.47	[1.33, 1.62]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

The results of the multivariate model including heavy marijuana use and independence are shown in **Table 4.19.** Heavy marijuana use did not maintain a significant relationship with contraceptive use in this model, thus, an interaction term was not introduced. Independence had a significant and positive relationship with contraceptive use (OR = 1.24, *p* = 0.05) in this model.

Table 4.19

Multivariate Model of Heavy Marijuana Use and Independence for Consistent Contraceptive Use (N = 827)

Variables	OR	95% CI	*p* value
Heavy marijuana use	0.55	[0.27, 1.09]	0.09
Independence	1.24	[1.00, 1.54]	0.05
Race/Ethnicity (referent: White)			
Black or African American	0.46	[0.33, 0.65]	< 0.001
Other	0.41	[0.26, 0.65]	< 0.001
Living with parent(s) (vs. other arrangements)	1.53	[1.11, 2.12]	0.01
Number of sex partners	0.84	[0.75, 0.94]	0.002
Condom use	1.45	[1.32, 1.60]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

The results of the multivariate model including heavy marijuana use and life satisfaction are shown in **Table 4.20.** Heavy marijuana use did not maintain a significant relationship with contraceptive use in this model, thus, an interaction term was not introduced. Life satisfaction had a significant and positive relationship with contraceptive use (OR = 1.38, *p* = 0.005) in this model.

Table 4.20

Multivariate Models of Heavy Marijuana use and Life Satisfaction for Consistent Contraceptive Use (N = 834)

Variables	OR	95% CI	*p* value
Heavy marijuana use	0.55	[0.29, 1.06]	0.07
Life satisfaction	1.38	[1.10, 1.73]	0.005
Race/Ethnicity (referent: White)			
Black or African American	0.48	[0.34, 0.68]	< 0.001
Other	0.42	[0.26, 0.68]	< 0.001
Living with parent(s) (vs. other arrangements)	1.51	[1.10, 2.06]	0.01
Number of sex partners	0.85	[0.76, 0.95]	0.004
Condom use	1.46	[1.32, 1.61]	< 0.001

Note. OR = odds ratio; CI = confidence interval

Depressive symptoms and protective factors.

The results of the multivariate model including depressive symptoms are shown

in **Tables 4.21 – 4.24.** As shown in **Table 4.21,** in the model of depressive symptoms

and self-esteem, depressive symptoms maintained a significant relationship with

contraceptive use (OR = 0.40, p 0.008). Self-esteem did not maintain a significant

relationship with contraceptive use in this model, thus, an interaction term was not

introduced.

Table 4.21

Multivariate Model of Depressive Symptoms and Self-Esteem for Consistent
Contraceptive Use (N = 836)

Variables	OR	95% CI	p value
Depressive symptoms	0.40	[0.21, 0.79]	0.008
Self-esteem	1.20	[0.91, 1.60]	0.20
Race/Ethnicity (referent: White)			
Black or African American	0.45	[0.32, 0.63]	< 0.001
Other	0.43	[0.27, 0.68]	< 0.001
Living with parent(s) (vs. other arrangements)	1.54	[1.13, 2.10]	0.007
Number of sex partners	0.84	[0.75, 0.94]	0.003
Consistent condom use	1.46	[1.32, 1.61]	< 0.001

Note. OR = odds ratio; CI = confidence interval.

The results of the multivariate model including depressive symptoms and

confidence are shown in **Table 4.22.** Both depressive symptoms and confidence had a

significant relationship with consistent use of contraception, thus, an interaction term

(confidence X depressive symptoms) was added to the multivariate model. In the model,

the interaction term was not significant ($p = 0.48$), indicating the negative effect that

confidence exerts on consistent contraceptive is not moderated by confidence.

Table 4.22

Multivariate Model of Depressive Symptoms and Confidence for Consistent
Contraceptive Use (N = 829)

	Depressive symptoms and confidence no interaction term			Depressive symptoms and confidence with interaction term		
	OR	95% CI	*p* value	OR	95% CI	*p* value
Depressive symptoms	0.43	[0.22, 0.81]	0.01	0.19	[0.02, 2.28]	0.20
Confidence	1.32	[1.04, 1.68]	0.02	1.28	[1.00, 1.64]	0.05
Race/Ethnicity (referent: White)						
Black or African American	0.43	[0.30, 0.62]	< 0.001	0.44	[0.30, 0.63]	< 0.001
Other	0.41	[0.26, 0.65]	< 0.001	0.41	[0.26, 0.65]	< 0.001
Living with parent(s) (vs. other arrangements)	1.56	[1.14, 2.13]	0.006	1.55	[1.31, 2.12]	0.006
Number of sex partners	0.84	[0.75, 0.94]	0.004	0.84	[0.75, 0.94]	0.004
Condom use	1.46	[1.33, 1.61]	< 0.001	1.46	[1.33, 1.62]	< 0.001
Confidence x Depressive symptoms	N/A			1.32	[0.61, 2.89]	0.48

Note. OR = odds ratio; CI = confidence interval; N/A = Variable not included in this model.

The results of the multivariate model including depressive symptoms and

independence are shown in **Table 4.23.** Depressive symptoms maintained a significant

relationship with contraceptive use in this model (OR = 0.38, *p* = 0.004). Independence

did not maintain a significant relationship with contraceptive use in this model, thus, an

interaction term was not introduced into the model.

Table 4.23

Multivariate Model of Depressive Symptoms and Independence for Consistent Contraceptive Use (N = 829)

Variables	OR	95% CI	p value
Depressive symptoms	0.38	[0.20, 0.73]	0.004
Independence	1.23	[0.99, 1.53]	0.06
Race/Ethnicity (referent: White)			
Black or African American	0.47	[0.33, 0.67]	< 0.001
Other	0.44	[0.28, 0.70]	< 0.001
Living with parent(s) (vs. other arrangements)	1.58	[1.15, 2.18]	0.005
Number of sex partners	0.84	[0.75, 0.94]	0.003
Condom use	1.45	[1.21, 1.60]	< 0.001

Note. OR = odds ratio; CI = confidence interval

The results of the multivariate model including depressive symptoms and life satisfaction are shown in **Table 4.24.** Depressive symptoms maintained a significant relationship with contraceptive use in this model (OR = 0.44, p 0.02). Life satisfaction did not maintain a significant relationship with contraceptive use in this model, thus, an interaction term was not introduced into the model.

Table 4.24

Multivariate Models of Depressive Symptoms and Life Satisfaction for Consistent Contraceptive Use (N = 836)

Variables	OR	95% CI	p value
Depressive symptoms	0.44	[0.22, 0.87]	0.02
Life satisfaction	1.25	[0.99, 1.59]	0.07
Race/Ethnicity (referent: White)			
Black or African American	0.49	[0.35, 0.69]	< 0.001
Other	0.45	[0.28, 0.71]	0.001
Living with parent(s) (vs. other arrangements)	1.54	[1.13, 2.10]	0.007
Number of sex partners	0.84	[0.75, 0.95]	0.004
Condom use	1.46	[1.32, 1.61]	< 0.001

Note. OR = odds ratio; CI = confidence interval

Chapter V: Discussion

The purpose of this study was to evaluate how protective factors (i.e., external supports and internal assets) and risk indicators may influence consistent contraceptive and condom use among sexually active, 18 – 24 year old women attending 4-year colleges. This study also examined whether protective factors moderated relationships between risk indicators and contraceptive use. This study had four specific aims, namely (1) to assess bivariate correlations between external supports, internal assets and risk indicators; (2) to evaluate associations between protective factors and consistent contraceptive use and consistent condom use behaviors; (3) to evaluate associations between risk indicators and consistent contraceptive use and consistent condom use; and (4) to examine protective factors as potential moderators of relationships between risk indicators (in dichotomized form) and consistent contraceptive and condom use.

The current study used data from a nationwide sample of college-attending emerging adult women participating in Wave III of the National Longitudinal Study of Adolescent Health (Add Health). Add Health Wave III had a high return rate (76%; (Chantala et al., n.d.) and provided a racially and ethnically diverse sample. This chapter will summarize and discuss findings of the study, by aim. Study limitations will be considered as will recommendations for future research. Finally, implications for nursing practice and college health will be addressed.

Aim 1: Correlations between Protective Factors and Risk Indicators

The focus of Aim 1 was to explore bivariate correlations between internal assets, external supports and risk indicators among a nationwide sample of sexually active,

emerging adult college women. In this sample, all bivariate correlations were in the expected directions. Protective factors were positively correlated with each other, with all internal assets being significantly correlated at a bivariate level. In other words, participants who described higher levels of one internal asset also reported higher levels of the other internal assets. The correlation coefficients between internal assets were weak to moderate in strength (Cohen, 1988). This finding supports the notion that these constructs (e.g., self-esteem, confidence, independence and life satisfaction) are distinct (Huck, 2008) rather than measuring the same underlying attribute. Parental closeness was significantly and positively related to all internal assets; however, the presence of a caring non-parental adult was associated only with life satisfaction. Findings regarding relationships between protective factors are consistent with previous research examining autonomy in emerging adulthood (Lamborn & Groh, 2009). In Lamborn and Groh's study with college students, higher levels of self-esteem were associated with both self-reliance (i.e., ability to make decisions independently) and parental closeness.

Likewise, all risk indicators were significantly and positively correlated at a bivariate level. The magnitude of these correlations was small. The significant correlation between marijuana use and heavy episodic drinking mirrors results from Jones, Oeltmann, Wilson, Brener and Hill (2001) who found that college students who drank heavily (five or more drinks within a few hours) were more likely than those who did not drink heavily to have used marijuana in the past 30 days.

Bivariate relationships between protective factors and risk indicators were in the expected direction. Of the risk indicators examined, depressive symptoms demonstrated

the strongest negative correlations with internal assets. This finding suggests that, in this sample, women with higher levels of depressive symptoms generally had lower self-esteem, less confidence, less sense of independence and lower life satisfaction. Lamborn and Groh (2009) similarly reported that depressive symptoms were negatively associated with college students' sense of self-reliance and self-esteem.

Findings from Aim 1 analysis can be considered in light of previous studies that have found positive youth development (PYD) assets and supports to be indicators of positive development (Hawkins et al., 2011; O'Connor et al., 2011) and predictors of lower levels of health risk behaviors (Schwartz et al., 2011; Zullig et al., 2009) among college students and other groups of emerging adults. Reproductive health (including consistent contraceptive and condom use) is an integral component of healthy development during emerging adulthood (Romeo & Kelley, 2009). Thus, the assets and supports that foster healthy development during the emerging adult years may also promote behavioral indicators of reproductive health.

Aim 2: Effects of Protective Factors on Consistent Contraceptive and Condom Use

Aim 2 analyses examined associations between protective factors (i.e., external supports and internal assets) and consistent contraceptive and condom use among sexually active emerging adult college women. Relationships between each external support (i.e., parental closeness, relationships with caring non-parental adults), each internal asset (i.e., self-esteem, confidence, independence, and life satisfaction) and the two outcome measures (i.e., consistent contraceptive use and consistent condom use) were assessed. Additionally, protective factors significantly related to the outcomes in

initial multivariate models were included in a final model to evaluate the relative strength of relationships between protective factors and consistent contraceptive and condom use.

External supports and consistent contraceptive and condom use. Neither parental closeness nor relationships with caring non-parental adults demonstrated significant associations with consistent contraceptive use or consistent condom use. Similarly, in one previous study on parental closeness, Deptula, Henry, & Schoeny (2010), found that parental closeness during adolescence was not associated with unintended pregnancy in emerging adulthood. No previous studies were found that tested the relationships between caring non-parental adults and contraceptive use during emerging adulthood. In contrast, the lack of a relationship between external supports and condom use in the current study differed from findings of previous studies. Using longitudinal data, other investigators have found that parental caring during adolescence and emerging adulthood is linked to improved condom use during both adolescence and emerging adulthood (Pingel et al., 2012). Similarly, relationships with caring non-parental adults during adolescence have been associated with higher levels of condom use during adolescence and emerging adulthood (Hurd & Zimmerman, 2010).

Emerging adult theory posits that close relationships with parents and relationships with caring non-parental adults may support healthy sexual relationships (Lefkowitz & Gillen, 2006; Tanner, 2006). Jaccard's (2009) model of contraceptive use provides insight into the difference between theory and findings from the current study. This model of proximal, near-proximal, near-distal and distal determinants of contraceptive use (as seen in Figure 2.1) posits that near-distal and distal factors act on

proximal and near-proximal factors to affect contraceptive use. In this model, both parental closeness and relationships with caring non-parental adults are distal factors that may influence contraceptive use through proximal and near-proximal factors (e.g., intention to use contraceptives, contraceptive self-efficacy). Jaccard's model and the lack of direct relationships between external supports and consistent contraceptive use in the current study suggest that future studies should evaluate the role of these external supports on more proximal determinants of contraceptive use.

Internal assets and consistent contraceptive use. In multivariate models controlling for race/ethnicity, living arrangements, number of sex partners in the past year, age at first intercourse and condom use, all of the internal assets (i.e., self-esteem, confidence, independence and life satisfaction) were significantly related to consistent contraceptive use. In a multivariate model that assessed the relationship between a single internal asset and consistent contraceptive use, each one unit increase in self-esteem (using a 5-point scale) increased the odds of consistent contraceptive use by 38%. The other assets demonstrated similar results in single protective factor models. For each unit increase in confidence, the odds of consistent contraceptive use increased by 43%. For each unit increase in independence, the odds of consistent contraceptive use increased by 27%. For each unit increase in life satisfaction, the odds of consistent contraceptive use increased by 40%. In a final multivariate model including all internal assets, only life satisfaction maintained a significant relationship with consistent contraceptive use. For each unit of increase in life satisfaction, the odds of consistent contraceptive use increased by 25%.

Few studies have addressed the role of these internal assets in relation to contraceptive use among emerging adults. One study, completed over a decade ago, found no relationship between self-esteem and contraceptive use (Poppen & Reisen, 1999). An extensive review of literature identified no previous studies examining relationships between confidence, independence or life satisfaction and contraceptive use among emerging adults.

The current findings are important in that they provide initial support for emerging adult developmental theory as a model to understand near-distal determinants of contraceptive use in this population. During emerging adulthood, independence, confidence and self-esteem are associated with identity development (Schwartz et al., 2005); an essential aspect of identity development is sexual identity, including contraceptive use (Lefkowitz & Gillen, 2006).

Life satisfaction is a component of well-being (Park, 2004), specifically subjective well-being (Kins & Beyers, 2010; Schwartz et al., 2011). Life satisfaction and subjective well-being are recognized as important elements of both positive youth development (Park, 2004) and emerging adult development (Kins & Beyers, 2010; Schwartz et al., 2011). Despite theoretical support, no previous studies have examined relationships between either life satisfaction or subjective well-being and consistent contraceptive use. The relationship found in this study is supported by the PYD framework and emerging adult theory and is a novel empirical finding.

That life satisfaction demonstrated a significant relationship with consistent contraceptive use in a model that included all internal assets, while the other assets did

not, may indicate that life satisfaction has more of a direct effect on this behavior than the other internal assets. As a near-distal determinant of contraceptive use, life satisfaction may relate to near-proximal and proximal determinants of consistent contraceptive use in a way that is different from self-esteem, confidence and independence.

Internal assets and consistent condom use. In bivariate analysis, none of the internal assets were significantly associated with consistent condom use. In light of the significant relationships between internal assets and consistent contraceptive use, this lack of relationships with condom use was surprising. As detailed in the following paragraphs, the lack of relationships between consistent condom use and internal assets may indicate the importance of internal assets may vary depending on the type of contraceptive method being considered, or that measurement error may have obscured relationships between internal assets and condom use.

It is possible that the divergent findings of internal assets and consistent contraceptive use compared to internal assets and consistent condom use may reflect different influences on various contraceptive behaviors. This study supports the notion that the importance of internal assets may vary depending on the type of contraceptive method being considered. Condoms require action at the time of intercourse. While internal assets may aid emerging adults in planning ahead (to obtain and use contraceptives) they may not aid in using contraception at the time of intercourse.

Because condom use relies on partner participation, dynamics of sexual partnership may be a more important determinant of condom use than other forms of contraceptive use. Several studies have concluded that condom use is affected by partner

dynamics. Matson, Adler, Millstein, Tschann and Ellen (2011) used a longitudinal study design over a 3 year period to evaluate change in condom use. They found that among adolescents and emerging adults, condom use diminished if women went from several partners to one main partner, increased if they went from one main partner to multiple partners, and did not change if relationship pattern did not change. Likewise, Harvey et al. (2006) found that both relationship commitment and duration affected condom use intention by affecting condom attitudes and norms. Women in longer term, committed relationships tended to have diminished intent to use condoms. These finding support the distinct influence that partner dynamics may have on condom use consistency that is separate from the influences of other proximal, near proximal, near distal and distal variables (Jaccard, 2009).

Another reason for the lack of association may be due to error in measurement of condom use consistency (Mishel, 1998). It is possible that asking women to self-report condom use over a year, and potentially with multiple partners, introduced recall bias (Bearinger et al., 2011; Jaccard, McDonald, Wan, Dittus, & Quinlan, 2002), thus causing a true relationship between internal assets and consistent condom use to appear non-significant.

Summary, effects of protective factors on study outcomes. According to Jaccard's (2009) model of contraceptive behavior, the variables evaluated through this study would be expected to influence contraceptive behavior at the near-distal or distal levels. Thus, they would affect proximal (e.g., intention to use contraceptives) or near-proximal determinants (e.g., contraceptive self-efficacy), rather than directly influencing

consistent contraceptive or condom use. Regarding the non-significant association between external supports and both of the study's contraceptive use outcomes, it is possible that these external supports had effects on proximal and near-proximal determinants of these behaviors, but that the effect was not strong enough to directly influence consistent contraceptive or condom use. Likewise, the lack of significant associations between internal assets and consistent condom use may either suggest that these protective factors have weak effects on proximal and near-proximal determinants of condom use or that measurement error obscured a true relationship. In contrast, significant associations between internal assets and consistent contraceptive use suggest that internal assets have relatively powerful effects on proximal determinants of contraceptive use.

Few studies to date have evaluated internal assets as potential supports for consistent contraceptive use among emerging adults. Findings from the current study indicating associations between internal assets and consistent contraceptive use is a novel finding that warrants further investigation of these relationships.

Aim 3: Effects of Risk Indicators and Consistent Contraceptive and Condom Use

Aim 3 analysis examined associations between risk indicators (i.e., heavy episodic drinking, marijuana use and depressive symptoms) and consistent contraceptive and condom use among sexually active, emerging adult college women. Additionally, risk indicators were evaluated jointly, to determine which indicators exerted the strongest effects on consistent contraceptive and condom use.

Risk indicators and consistent contraceptive use. In models that controlled for race/ethnicity, living arrangements, number of sexual partners in the past year, age at first intercourse and condom use, both marijuana use and depressive symptoms demonstrated significant negative relationships with consistent contraceptive use.

In addition to being statistically significant, marijuana use had some clinical significance as an indicator of consistent contraceptive use. For each one-unit increase in frequency of marijuana use over the past 30 days, the odds of consistently using contraceptives decreased by 3%. As an illustration, compared to participants who did not use marijuana in the past 30 days, those who used marijuana 10 times in the past 30 days were 30% less likely to report consistent contraceptive use. Depressive symptoms had even greater clinical significance. For each one-unit increase in the depressive symptoms scale (range 0 – 24) the odds of consistent contraceptive use decreased by 10%.

A final multivariate model included both marijuana use and depressive symptoms. In this model, each one-unit increase in marijuana use frequency was associated with a 2% decrease in odds of consistent contraceptive use; and depressive symptoms were associated with a 9% decrease in odds of consistent contraceptive use. These findings suggest that marijuana use and depressive symptoms exert independent effects on consistent contraceptive use. Thus, emerging adult college women who use marijuana regularly and who exhibit depressive symptoms may be at particularly high risk of not using contraceptives consistently.

The few studies that have examined the relationship between marijuana use and contraceptive use among emerging adults have not shown a strong relationship between

these behaviors. One study using age stratified data from the National Survey of Family Growth, explored reproductive health outcomes among individuals who used marijuana in the past year (van Gelder et al., 2011). Among all women (age 15 – 44), marijuana use (one or more times in the past year) was associated with increased odds of not using contraceptives with in the past 3 months. When stratified by age, this relationship was not significant for 15- 25 year olds.

The divergent findings between the current study and the van Gelder and associates' (2011) study may be related to the way in which marijuana use was assessed. Marijuana use is common among college students, with about 33% of college students report using some marijuana in the past year (Johnston, O'Malley, Bachman, & Schulenberg, 2012). In the current study, almost 25% of participants used marijuana at least once in the past 30 days, yet < 4% used it daily. By using a continuous measure of marijuana use, findings from the current study suggest that frequency of marijuana use may be related to consistent contraceptive use.

The current study's findings related to depressive symptoms complement findings from previous research. Among sexually active young women (15 – 21 years) who presented to a pediatric emergency service, those with high levels of depressive symptoms were at increased risk for not using contraceptives in the past 3 months (Dorfman et al., 2010). A second study (Garbers et al., 2010), found that women who screened positive for depressive symptoms were less likely to choose highly effective contraceptive methods (e.g., hormonal methods, condoms, IUDs) than ineffective method (i.e., periodic abstinence or no method).

Risk indicators and consistent condom use. Unlike findings related to consistent contraceptive use, risk indicators did not exert independent effects on consistent condom use. Controlling for race/ethnicity, living arrangements, frequency of intercourse, age at first sex and consistent contraceptive use, none of the risk indicators of heavy episodic drinking, marijuana use or depressive symptoms were significantly related to consistent condom use.

Previous studies of risk factors and condom use have demonstrated mixed results. Consistent with findings from this study, some previous studies have found that marijuana use (van Gelder et al., 2011), heavy alcohol consumption (Certain et al., 2009) and depression (Certain et al., 2009; Mazzaferro et al., 2006; Walsh et al., 2013) were not associated with condom use in similar populations. In contrast to the current study's findings, Wagner (2011) and Kogan and colleagues (2010) both found that marijuana use was associated with less effective condom use among emerging adults and college students. Similarly, other studies with similar populations have found a relationship between depressive symptoms and consistent condom use (Brown et al., 2006) and between heavy episodic drinking and consistent condom use (Walsh et al., 2012).

The divergent findings across studies of risk indicators and condom use may be related to differences in measurement of independent and dependent variables, as well as to differences in populations and samples. For example, Wagner (2011) measured marijuana use dichotomously, comparing never used with ever used, among a sample of students from one university. Kogan and associates (2010) dichotomized marijuana use into any use or no use in the past 30 days, and measured condom use consistency over 3

months in a sample of 18 – 21 year old African Americans. Walsh and colleagues (2012) evaluated pre-college substance use, used a continuous measure of condom use, and included only first-year college women. In a study in which depressive symptoms were found to be linked to less consistent condom use, Brown and colleagues' (2006) sample included both men and women, used a dichotomous measure of depressive symptoms, assessed condom use over the past 90 days and defined consistent condom use as self-reported use at least 75% of the time the participants had sex.

Summary, effects of risk indicators on study outcomes. Findings from the current study support negative associations for both marijuana use and depression with consistent contraceptive use. The findings related to depressive symptoms are supported by previous studies with similar populations. Very few existing studies report associations between marijuana use and consistent contraceptive use. In contrast, this study found non-significant relationships between heavy episodic drinking, marijuana use or depressive symptoms and consistent condom use. Although multiple studies have examined the impact of these risk indicators on condom use among emerging adults, results have varied across studies. Non-significant finding in the current study may reflect error in the measurement of consistent condom use (discussed in detail on page 104). These findings may also reflect that condom use may be more related to partner dynamics or other determinants rather than to risk indicators.

Aim 4: Moderating Effects of Protective Factors

The objective of Aim 4 was to explore moderating effects of protective factors on relationships between risk indicators and consistent contraceptive and condom use.

Based on previously determined relationships in Aims 2 and 3, eight models were evaluated. In models of contraceptive consistency, none of the internal assets of self-esteem, confidence, independence or life satisfaction moderated the relationships between heavy marijuana use and consistent contraceptive use or between depressive symptoms and consistent contraceptive use. These results indicate that protective factors do not change the relationships between risk indicators and consistent contraceptive use. No studies were found that evaluated similar interactions. The lack of evidence for moderation suggests that protective effects of internal assets act directly on consistent contraceptive use, rather than moderating the effects of risk indicators on consistent contraceptive use.

Limitations

This study had several important limitations. As a cross sectional study, causation cannot be inferred from associations. It is possible that the protective factors and risk indicators examined in this study are merely associational. The cross-sectional design also did not allow for assessment of change in consistent contraceptive use over time.

Using existing data, even with the advantage of a large nationwide sample and a high return rate, has its own limitations. Though measurements of self-esteem and depressive symptoms used scales that have been used extensively in other research and were based on validated instruments (Blascovich & Tomaka, 1991; Radloff, 1991), several variables (i.e., confidence, independence, life satisfaction) were measured with single items that have not been validated. Thus, the concepts may not be fully represented by the items used to measure them. A second limitation was study measures

with differing time frames. Whereas contraceptive and condom use were measured over a year, independent variables of marijuana use and depressive symptoms were measured over shorter time frames. These variable timeframes could lead to ambiguity in relationships between the risk indicators and consistent contraceptive and condom use. Finally, this existing data set does not include variables that are likely to have important relationships to consistent contraceptive and condom use. For example, pregnancy intention was not assessed in the Wave III Add Health survey. Non-use of contraceptives among some participants may have been due to desire to become pregnant.

Measurement of outcome variables, likewise, was a limitation of this study. Specific types of contraceptives used were not assessed. It is possible that women who consistently use highly effective contraception (e.g., long acting hormonal contraceptives) differ from women who consistently use less effective contraception (e.g., withdrawal) in terms of protective factors and risk indicators. By considering those who use less effective contraceptive methods and those who use more effective contraceptive methods as a homogeneous group, associations between protective factors and consistent contraceptive use and risk indicators and consistent contraceptive use may have been weakened.

Despite the large sample size, this study may have lacked power to detect moderation effects. The artificial dichotomization of risk variables (i.e., heavy marijuana use and high levels of depressive symptoms) may have resulted in loss of statistical power (Aguinis, 1995). Additionally, in this sample of 842 women, only 31 (3.7% of the sample) reported heavy marijuana use and only 61 (7.2% of the sample) reported high

levels of depressive symptoms. Using Monte Carlo simulations, Stone-Romero and colleagues (1994) showed a considerable decrease in power to detect moderation effects when the size of a moderator-based subgroup is less than 10% of the total sample regardless of the total sample size. Though dichotomizing the risk indicators had the conceptual appeal of allowing for clearer designation of the high-risk group (e.g., women who report high levels of depressive symptoms versus those who do not), using continuous risk variables would have increased the power to detect moderation effects.

Alpha levels were not adjusted for the multiple tests of significance, therefore increasing the risk of type I errors. The relationships evaluated in this study have not been examined extensively in this population, thus, the decision to not adjust for multiple tests of statistical significance reflected a preference to limit the risk of type II errors associated with lower alpha levels (Cohen, 1992; Dawson & Trapp, 2004).

All items were self-reported. Self-reported measures hold the potential of response bias due to participant efforts to provide socially desirable responses and due to inaccurate recall of events over time (Schroder, Carey, & Vanable, 2003). Add Health's use of CASI methods may have attenuated risk of response bias due to social desirability (Schroder et al., 2003). Consistent condom use is a measure that may be particularly prone to recall bias. Studies have indicated that among adolescent girls, recall of condom use may be less accurate when assessed globally rather than as a partner specific pattern (Bearinger et al., 2011). Though a 6 month time frame has been shown to be appropriate for adolescent girls to be able to accurately recall condom use consistency (Sieving et al., 2005), Jaccard and colleagues (2002) recommend that a 3 month recall is more accurate

than either a one month or a 12 month time period. Despite these limitations, Jaccard and colleagues (2002) suggest that the 12 month time frame may be appropriate for correlational studies regarding sexual and contraceptive behaviors.

Implications

Recommendations for Further Research

Despite these limitations, this study provides a useful first step in understanding associations between protective factors and consistent contraceptive and condom use among emerging adult women attending four-year colleges. The bulk of existing studies regarding college students and emerging adults have focused on condom use rather than contraceptive use and on risk indicators rather than protective factors. The current study provides initial evidence of significant relationships between selected protective factors and consistent contraceptive use. Further longitudinal studies with more robust measures of protective factors are needed to expand our understanding of how internal assets may positively influence consistent contraceptive use among college women. Because internal assets are considered attributes that can be developed over time (Lerner et al., 2005; Pittman et al., 2003), intervention research should continue to assess *how* programs based on PYD frameworks support development of these attributes throughout adolescence and emerging adulthood, and *if* interventions that build these assets during adolescence have long-term effects on indicators of emerging adult reproductive health.

The different relationships of internal assets and risk indicators with consistent contraceptive versus consistent condom use suggests the need to further explore relationships between protective factors, risk indicators and distinct types of

contraceptive methods. According to Jaccard (2009), the protective factors and risk indicators included in this study work at the distal or near-distal levels to influence near-proximal and proximal determinants of contraceptive and condom use. Additional research is needed to identify distal determinants of consistent condom use among emerging adults, and to distinguish proximal determinants of consistent hormonal contraceptive use and consistent condom use within this population.

The external supports assessed in the current study did not influence consistent contraceptive use and condom use. Future studies should evaluate relationships between other external supports (e.g., college or community engagement, peer relationships support from sexual partners) and consistent contraceptive and condom use among emerging adult women. Additionally, future studies should examine the indirect effects of parental support and caring non-parental adults' contraceptive use, via direct influence on proximal determinants.

As a group, participants in the current study had high levels of protective factors and low levels of risk indicators. It is possible that the study's protective factors and risk indicators would demonstrate different relationships with consistent contraceptive use in a more heterogeneous population. Thus, future research should replicate this study in populations of emerging adult women (e.g., those not attending college, those attending community and technical colleges) who may have more diverse levels of assets and risks.

Recommendations for Nursing Practice with Emerging Adults

Unlike recent declines in adolescent pregnancy (Hamilton & Ventura, 2012), unintended pregnancy among emerging adults in the U.S. has not lessened in the past

decade (Zolna & Lindberg, 2012). Consistent contraceptive use is an essential

component in the prevention of unintended pregnancy (Jaccard, 2009). This study

indicated that college women, in general, have assets that may assist them in supporting

their contraceptive use, and ultimately, their reproductive health. Specifically, high

levels of self-esteem, confidence, independence and life satisfaction may all support

college women's consistent use of contraceptives. Nurses who work with emerging

adults women may be in a position to encourage ongoing development of these internal

assets.

Internal assets develop over time, and efforts to build these assets among young

people represent a growing area of research and practice (Pittman et al., 2003). There is

increasing evidence that internal assets may positively affect reproductive health (Gavin

et al., 2010). In the context of what is known about positive youth development, nurses

who work with college students may use the findings from this study in two ways. First

nurses are in a position to educate policy makers regarding the value of investing in

programs for emerging adults that support and encourage the development of protective

factors including internal assets. Nurses can help policy makers understand that

reproductive health is an aspect of healthy development and should be thought of as an

essential part of efforts to encourage emerging adults to thrive. Second, research

suggests that internal assets continue to develop throughout emerging adult years

(Hawkins et al., 2011) and that emerging adults may be on trajectories in which

protective factors are increasing, remaining at a steady state, or decreasing. Nurses are

in a unique role to support emerging adults in developing internal assets, a practice that may ultimately lead to healthier contraceptive and sexual behaviors.

Conversely, this study informs nurses and other health care professionals that college women with depressive symptoms may be at increased risk of inconsistent contraceptive use and unintended pregnancy; those who use marijuana and have depressive symptoms are at even greater risk. These individuals may benefit from contraceptive services and counseling which address these risks. Because this higher risk population may not routinely seek health care services, nurses and other health care providers should partner with other campus life resources that have regular access to higher risk women. Student services professionals, housing professionals and mental health professionals may have regular access to these students. Nurses can partner with these professionals in supporting these women in consistently using contraception. For example, mental health professionals treating female college students for depression can be encouraged to routinely ask about students' use of contraception and refer their clients to nurses for contraceptive counseling and services.

Finally, nurses who work with emerging adults should be aware of the demographic and sexual risk behaviors that are associated with consistent contraceptive and condom use. Data from this study indicated that risk of inconsistent contraceptive use among college women was elevated among students from racial/ethnic minorities, among those not living with parents, among those having more sexual partners, and among those where were younger at first sex. Risk of inconsistent condom use was elevated among students from racial/ethnic minorities, among those not living with

parents, among those having sex more frequently, and among those who were younger at first sex. Nurses can support efforts to meet the needs that women with these demographic and behavioral characteristics may have for improved access to high quality contraceptive services.

Conclusion

In models that controlled for known correlates of consistent contraceptive use, internal assets of self-esteem, independence, confidence and life satisfaction were associated with consistent contraceptive use among emerging adult women attending four-year colleges. Likewise, in this sample, risk indicators of marijuana use and depressive symptoms were independently associated with lower levels of consistent contraceptive use. Relationships between risk indicators and consistent contraceptive use were not moderated by internal assets. After controlling for known correlates of consistent condom use, none of the external supports, internal assets or risk indicators was significantly related to consistent condom use in this sample.

Because the majority of emerging adults are sexually active (Chandra et al., 2005), consistent contraceptive use is essential to reduce the risk of unintended pregnancy. Efforts to support consistent contraceptive use and reproductive health should include providing accessible and affordable reproductive health services; tailored sex education; and youth development strategies that promote internal assets throughout childhood and into emerging adulthood (Bearinger, Sieving, & Sharma, 2007). Consistent condom use may be influenced by factors other than the internal assets that

were assessed in this study, and further studies are needed to better understand and influence this outcome.

Attention to the needs of adolescents has resulted in increased understanding of this important developmental period and expansion health services tailored to this unique period. More recently, emerging adulthood has been acknowledged as another unique developmental period. Like adolescents, emerging adults have significant reproductive health need. Yet, little is known about the correlates of reproductive health or sexual risk among emerging adults. While this study provides evidence that consistent contraceptive use is associated with both internal assets and risk indicators, further research is needed to address the high rate of unintended pregnancy and the suboptimal rates of both consistent contraceptive and condom use in this population. It is essential that researchers and health care providers develop and use evidence based practices to effectively address the unique reproductive health needs of emerging adults.

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Appendix

Institutional Review Board Approval

The IRB: Human Subjects Committee determined that the referenced study is exempt from review under federal guidelines 45 CFR Part 46.101(b) category #4 EXISTING DATA; RECORDS REVIEW; PATHOLOGICAL SPECIMENS.

Study Number: 1204E13084

Principal Investigator: Leslie Morrison-Sandberg

Title(s):
Contraceptive Use Among Emerging Adult College Women: Results from a National Survey

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This e-mail confirmation is your official University of Minnesota RSPP notification of exemption from full committee review. You will not receive a hard copy or letter. This secure electronic notification between password protected authentications has been deemed by the University of Minnesota to constitute a legal signature.

The study number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

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The IRB wishes you success with this research.