Reproductive Autonomy and Sexual and Reproductive Health Outcomes among Young Women in Ghana

by

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Dedication

This dissertation is dedicated to my grandparents, Nellie and Peter Poulos. Though neither of them had the opportunity to attend college themselves, my grandparents instilled the importance of education upon their grandchildren from a very early age. Their dedication to our education lives on and has culminated in this work.

I also dedicate this dissertation to my parents, Kim and Patricia Loll, who have always believed in me and who always encouraged me to stay true to myself and my goals, even when the they felt out of reach. Thank you for being a source of constant support and reassurance.

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List of Acronyms

aOR	Adjusted Odds Ratio
aRRR	Adjusted Relative Risk Ratio
CI	Confidence Interval
CPR	Contraceptive Prevalence Rate
DHS	Demographic and Health Survey
GEM	Gender Equitable Men
GHS	Ghana Health Service
GSS	Ghana Statistical Service
ICFP	International Conference on Family Planning
ICPD	International Conference on Population and Development
ICRW	International Center for Research on Women
IPV	Intimate Partner Violence
MDG	Millennium Development Goals
MMR	Maternal Mortality Ratio
OR	Odds Ratio
PI	Principal Investigator
RA	Reproductive Autonomy
RRR	Relative Risk Ratio
SDG	Sustainable Development Goals
SRH	Sexual and Reproductive Health
SRPS	Sexual Relationship Power Scale

Abstract

Background: Women's empowerment is a powerful outcome of, as well as a pathway through which to improve, sexual and reproductive health (SRH) and wellbeing. Prior research suggests possible associations between women's empowerment and SRH outcomes. However, there is great variability in how researchers measure empowerment and proxies are frequently used. This dissertation will examine the construct of reproductive autonomy (RA), a specific domain of empowerment defined as "having the power to decide about and control matters associated with contraceptive use, pregnancy, and childbearing" (Upadhyay, Dworkin, et al. 2014). RA has not yet been studied in a Sub-Saharan African context nor among young women. This dissertation examines the following three relationships in a sample of young Ghanaian women: 1) demographic, reproductive and social factors associated with RA (Paper 1); 2) associations between RA and modern contraceptive use (Paper 2); and 3) associations between RA and pregnancy decision-making, an understudied SRH outcome reflecting who had the most say in the outcome of the last pregnancy (Paper 3).

Methods: The RA items and original research questions here were prospectively embedded into a larger parent study focused on stigma toward SRH among adolescents. This study sampled 1,080 young Ghanaian women ages 15 to 24 from facility and community-based sites in Accra and Kumasi, Ghana. Decision-making RA and communication RA measures were created as summative scales using items adapted from the validated scale and ranged from 3 (low RA) to 12 (high RA). In Paper 1, I tested associations between each RA sub-scale and sociodemographic,

reproductive history, and social context variables of interest using bivariate statistics (student's t-tests and ANOVA, where appropriate) and multivariable linear regression models. For Paper 2, I used bivariate statistics (chi-square and t-tests) and multivariable logistic regression models to examine the associations between the RA sub-scales and modern contraceptive use at last sex. For Paper 3, I used bivariate statistics (chi-square and ANOVA) and multinomial regression models to examine associations between the RA sub-scales and pregnancy decision-making (who made the decision about the outcome of the last pregnancy).

Results: Regarding Paper 1, I found that a different set of factors were significantly associated with decision-making RA as compared to communication RA. Ethnic group, religion, frequency of religious attendance, and previous pregnancy were significantly associated with decision-making RA, while educational attainment, ethnic group, and social approval for adolescent SRH were associated with communication RA (p-values <0.05). In Paper two, I found that after adjusting for socio-demographic factors of interest, decision-making RA was associated with modern contraceptive use at last sex among young Ghanaian women (Adjusted Odds Ratio [aOR]: 1.12; 95% CI: 1.01-1.24); communication RA was not significantly associated (aOR: 1.03; 95% CI: 0.88-1.19). In paper three, I found that higher levels of decision-making RA were associated with a decreased relative risk of a woman's partner having the most say about the pregnancy decision as compared to her having the most say (Adjusted Relative Risk Ratio: 0.79; 95% CI: 0.66-0.93).

Conclusions: The results of this dissertation demonstrate that RA may be an important construct to consider when addressing SRH among young Ghanaian women. Additional research should continue to explore the importance of social context for more robust conceptualization and measurement of RA. Public health interventions may benefit from incorporating gender

transformative approaches to increase RA among young women, thereby improving SRH outcomes including modern contraceptive use and pregnancy decision-making.

Chapter I: Introduction

During the 1994 International Conference on Population and Development (ICPD) meeting, nation states and stakeholders in the development community recognized the harms caused by the population control paradigm, a demography-driven approach that focused on reducing the population growth rate and included top down and coercive approaches to achieve this end (Kaler 2004). Instead, the international community embraced a reproductive rights approach, asserting the rights of women and their families. Reproductive rights are defined in the ICPD Programme of Action as:

> *"the rights of couples and individuals to decide freely and responsibly the number, spacing, and timing of their children and to have the information and means to do so, and the right to attain the highest standard of SRH. It also includes their right to make decisions concerning reproduction free of discrimination, coercion and violence as expressed in human rights documents" (UNFPA 2014).*

Furthermore, the Programme of Action included guiding principles for population and development programs and asserted that "Advancing gender equality and equity and the empowerment of women, and the elimination of all kinds of violence against women, and ensuring women's ability to control their own fertility, are cornerstones of population and development-related programmes" (UNFPA 2014). Thus, ICPD reframed the global approach to population and development programming, emphasizing the women's empowerment and protection of their reproductive rights. This framework of reproductive rights continues to guide

international reproductive health programs around the world and is the foundation for this dissertation examining RA among young women in Ghana. Specifically, this dissertation will explore the factors associated with RA, associations between RA and modern contraceptive use at last sex, and associations between RA and pregnancy decision-making (i.e. who had the most say in the outcome of the pregnancy). The justification for this research and the research questions themselves will be presented in more detail throughout this introductory chapter.

Women's Empowerment & Reproductive Autonomy

Given the importance of women's empowerment for achieving the reproductive rights established at the ICPD, research and programming on SRH since 1994 has often included understanding women's empowerment and its association with reproductive outcomes. Women's empowerment for the purposes of this dissertation can be defined as "women's ability to make decisions and affect outcomes of importance to them and their families" and generally includes the related components of choice, power, control, and options (Mandal, Muralidharan, and Pappa 2017). Specifically, women must have the agency to make decisions as well as the resources to execute the decisions and exercise their agency (Upadhyay, Gipson, et al. 2014). Empowerment is a multi-dimensional and multi-level construct, reflecting constraints and facilitators across several domains: psychological, social and familial, economic, legal, and political (Mandal, Muralidharan, and Pappa 2017). Furthermore, empowerment is not stagnant throughout the life course; it is a dynamic process that can change depending on life stage, circumstance, and context (Mandal, Muralidharan, and Pappa 2017). Women's empowerment is critical to achieve both optimal SRH outcomes and human rights as it enables women to make decisions on their own health and well-being.

A growing body of literature suggests that women's empowerment is related to a range of fertility-related outcomes including unintended pregnancy, contraceptive use, and length of birth intervals (Upadhyay, Gipson, et al. 2014; Prata et al. 2017; Bogale et al. 2011; Hindin and Muntifering 2011). However, measures of empowerment used in research and program evaluations have been varied and have included:

- Proxy measures such as sociodemographic or economic factors, age, education, employment, and household income (Chapagain 2005; M. J. Hindin 2000; Kabir et al. 2005)
- Household decision-making power (Feldman et al. 2009; Fikree et al. 2001; Hamid, Stephenson, and Rubenson 2011)
- Level of sexual and reproductive decision-making power (Crissman, Adanu, and Harlow 2012; Do and Kurimoto 2012; Saleem and Pasha 2008)
- Freedom of movement (Do and Kurimoto 2012; Mahmood 2002), financial power/autonomy (Do and Kurimoto 2012; Feldman et al. 2009; Kravdal 2001)
- Relationship characteristics and partner communication (Haile and Enqueselassie 2006; Hamid, Stephenson, and Rubenson 2011; Kabir et al. 2005; M. J. Hindin 2000; Mahmood 2002; Pande et al. 2011)
- Freedom from coercion by partner or others (Chapagain 2005; Morgan et al. 2002)
- Gender-related attitudes and norms (Bogale et al. 2011; Do and Kurimoto 2012)
- Participation in microcredit programs (Orso et al. 2016)
- Other measures (Mandal, Muralidharan, and Pappa 2017; Prata et al. 2017; Upadhyay, Gipson, et al. 2014).

The meaning and appropriate measures of empowerment vary geographically and culturally. For example, although women's independent mobility is a key measure of empowerment in South Asia, it does not appropriately measure empowerment in Sub-Saharan Africa, where women are able to move without regulation or restriction but have other ways in which their autonomy is restricted (Heckert and Fabic 2013).

The variability in the measurement of women's empowerment has resulted in limitations in synthesizing the literature and determining programmatic recommendations for realizing women's reproductive rights and improving their health. A recent review paper details the variability of measures of empowerment and therefore presents inconsistent results regarding the

relationship between empowerment and current contraceptive use (Prata et al. 2017). In general, women's literacy, husband's educational attainment, spousal communication, composite empowerment scores, and reproductive decision-making power, were consistently associated with current contraceptive use while the other domains had more variable relationships (Prata et al. 2017). A review of empowerment measures in program evaluations concluded that the findings are complicated with varied operationalization of the "empowerment" construct, making it challenging to draw conclusions across studies (Mandal, Muralidharan, and Pappa 2017). Furthermore, this paper called for specific measures of RA to be adapted and integrated into future program evaluations, thereby addressing this gap (Mandal, Muralidharan, and Pappa 2017). Scholars have developed some measures of empowerment specific to women's reproductive health and decision-making (Julie Pulerwitz and Barker 2008; J Pulerwitz, Gortmaker, and DeJong 2000). However, these existing measures are specific to relationship dynamics within a partnership and gender attitudes. They are limited in their ability to conceptualize and measure the full range of influences on a woman's reproductive decision-making and power.

RA is a more recently conceptualized and specific type of individual-level empowerment that is specifically related to women's SRH. RA is defined by Upadhyay et al (2014) as "having the power to decide about and control matters associated with contraceptive use, pregnancy, and childbearing" (Upadhyay, Dworkin, et al. 2014). Theoretically, high levels of RA facilitate a woman's ability to choose childbirth, abortion, or contraception without undue influence from men, health care providers, the government, the international development community, or religious doctrines. RA is composed of five highly related but unique concepts as defined by Upadhyay and colleagues (2014) below:

- Self-efficacy, “a belief in one’s ability to decide about and control matters related to contraceptive use, pregnancy, and childbearing”
- Decision-making power, “having primary say (either alone or with a partner) in matters related to contraceptive use, pregnancy, and childbearing”
- Communication ability, “feeling comfortable talking to one’s partner in matters related to contraceptive use, pregnancy, and childbearing”
- Equitable gender-role attitudes, “holding a perception that men and women can have equal sexual and reproductive responsibilities, needs, and desires”
- Management of coercion, “the ability to avoid and/or respond appropriately to coercion regarding contraceptive use, pregnancy, and childbearing” (Upadhyay, Dworkin, et al. 2014).

Upadhyay and colleagues (2014) developed and validated a RA scale, focusing on the domains of decision-making power, communication ability, and management of coercion related to situations involving sex, contraceptive use, and abortion. The resulting measure focused on autonomy over a romantic/sexual partner’s influences on a woman’s ability to achieve their reproductive intentions. Existing research has demonstrated associations between socio-demographic variables and RA and RA and odds of unprotected sex in an American population of women. These relationships will be further described in the discussion of the conceptual model in the next section. However, it is not yet clear to what extent these relationships are maintained in more communal, global settings. In Ghana, research has demonstrated an association between SRH stigma and family planning use among young women, demonstrating the importance of community influences on SRH in this context (Hall et al. 2017). Therefore, the Ghanaian context presents an important setting for the exploration of associations between RA,

socio-demographic factors, and SRH outcomes outside of the American context. In addition, the Ghanaian context has more liberal laws on abortion compared to other African countries, making this setting is a good place to study other levels of influence on RA including partner and community influences. In addition, Ghana is a highly religious country, with most people subscribing to the Pentecostal religion (Gyimah, Adjei, and Takyi 2012). Given that Kahn and colleagues demonstrated the important effects of religion on RA among highly religious women in the United States, Ghana is an important place to continue to explore these relationships (Kahn et al. 2014). Finally, Ghana, like other countries in Sub-Saharan Africa, is a context in which social networks factor heavily into individual experiences including reproductive decisions and outcomes (Adongo et al. 1997; Avogo and Agadjanian 2008). Specifically, research on contraceptive use has demonstrated the importance of peer influence on Ghanaian men's discussion of family planning with their partners, and ultimately their contraceptive use (Avogo and Agadjanian 2008). Given this more communal context, Ghana presents an important place to explicitly explore associations between social context and RA.

A better understanding of which sub-groups of young women may have higher levels of RA and whether those differences affect the relationships between RA and key SRH outcomes is central to this dissertation. While RA has not yet been assessed in a Sub-Saharan African context, related research suggests that there may be a relationship between RA and contraceptive use (Cau 2015; DeRose and Ezeh 2010; Nketiah-Amponsah, Arthur, and Aaron 2012). Crissman (2012) and colleagues used measures from the Ghanaian Demographic and Health Survey (DHS) to show that women's increased levels of sexual empowerment in Ghana, measured as a crude composite score of responses to five items regarding women's ability to negotiate sex and condom use, were related to increased contraceptive use (Crissman, Adanu, and Harlow 2012).

RA may be an especially important construct among Ghanaian adolescents, as approximately one-quarter of young women in a Ghanaian university reported that they had ever been coerced into having sex (Rominski et al. 2017).

To address these gaps in the previous research on this topic, this dissertation will focus on RA among young Ghanaian women. Specifically, I focus on two sub-scales from the RA measure: (1) decision-making RA, representing the degree to which a woman feels she has primary say in SRH decisions, and (2) communication RA, representing the degree to which a woman feels comfortable talking with one's partner about SRH decisions. I selected these two sub-scales based on their relevance to multiple SRH outcomes and excluded the freedom from coercion scale as it is more related to IPV.

Reproductive Health Outcomes

As previously described, RA is an important construct in and of itself from a reproductive rights perspective, as well as its relevance for potentially shaping public health priority SRH outcomes. In this section, I describe the key SRH outcomes that are central to this dissertation and which I hypothesize to be associated with RA.

Modern contraception

Modern contraception is an effective intervention for reducing pregnancy risk among sexually active individuals not desiring pregnancy (Trussell 2004; Hubacher and Trussell 2015). Modern contraceptive can be defined as "a product or medical procedure that interferes with reproduction from acts of sexual intercourse" (Hubacher and Trussell 2015). Although highly effective methods are available, modern contraceptives are under-utilized, particularly in developing countries (S. Singh, Sedgh, and Hussain 2010). In Ghana, only about 18% percent of all women ages 15-49 reported that they were currently using a modern method of contraception

in the 2014 DHS, even though the knowledge of contraception among these women of reproductive age was nearly universal (Ghana Statistical Service 2014).

The relatively low rate of contraceptive use is not indicative of high preferred fertility. The 2014 Ghanaian DHS indicates that nearly 30% of married women have an unmet need for family planning, meaning that these women do not want to become pregnant in the next two years but are not using a method of modern contraception. Unmet need encompasses avoidance of births that are both mistimed (individual would prefer to get pregnant at a later time and space the births) and unwanted (individual does not want to get pregnant and wants to limit births). In Ghana, more than seventeen percent of women have unmet need for spacing of births and 12.5 percent have unmet need for limiting the number of births (Ghana Statistical Service 2014). This unmet need may be explained by barriers including limited access to contraception, myths and misperceptions about modern contraceptives, stigma towards sexual activity among adolescent and unmarried women, and restrictions from male partners and family members (Avogo and Agadjanian 2008; M. J. Hindin, McGough, and Adanu 2014; Agyei et al. 2000; Ghana Statistical Service 2014; Hall et al. 2017).

In this dissertation, I will examine whether and how RA is associated with modern contraceptive use at last sex among a sample of young, Ghanaian women. Among a sample of American women, RA was associated with the odds of having had unprotected sex in the last three months (Upadhyay, Dworkin, et al. 2014). While this relationship has not been studied in the Ghanaian context, if the relationship occurs as hypothesized, low levels of RA would suggest low modern contraceptive use, resulting in more unintended pregnancies.

Unintended Pregnancy

While unintended pregnancy is not directly measured in this dissertation, it is an intermediate outcome central to the integrated conceptual framework guiding this dissertation (described below), as it is a consequence of contraceptive behaviors (e.g. no use, inconsistent use and/or incorrect use) examined in paper two and is a prerequisite for the pregnancy decision-making outcome studied in paper three. Reduced levels of modern contraceptive use would likely increase rates of unintended pregnancy among these women, with health and social consequences for these women and their children. Unintended pregnancy, commonly defined as a pregnancy that is mistimed or unwanted, is a global public health problem, particularly among socially disadvantaged women (S. Singh, Sedgh, and Hussain 2010; Dehlendorf et al. 2010; Bearak et al. 2018; Blackstone 2017). Worldwide, approximately 44% of pregnancies are reported as unintended with higher levels in developing country contexts (Bearak et al. 2018). In West Africa, for example, the unintended pregnancy rate is 72 per one thousand women compared to the global average of 62 per thousand (Bearak et al. 2018). Women living in certain geographical regions and at transitional life stages have an elevated unintended pregnancy risk. Sub-Saharan African countries have the highest unintended pregnancy rates in the world (S. Singh, Sedgh, and Hussain 2010; Bearak et al. 2018). According to a recent analysis of survey data from the DHS, Ghana has an unintended pregnancy rate of approximately 30% but unintended pregnancies are particularly common among 15 to 19 year old's (nearly 70%) and 20 to 24 year old's (43%) (Blackstone 2017). In addition to experiencing the highest risk of unintended pregnancy, adolescent girls and young women also tend to have the most serious consequences of unintended pregnancy (Finer 2010; Aguilino and Losch 2005; Gipson, Koenig, and Hindin 2008; Johnson and Madise 2011; Molina et al. 2010).

The consequences of unintended pregnancy can vary by woman, depending on multiple factors including age, relationship status, and cultural and political context. In some cases, early (and perhaps unintended) childbearing can result in an increase in a woman's status within the society (Gyesaw and Ankomah 2013). However, in many cases, unintended pregnancy carries negative health and social consequences for young women, their children, and the health system (Gipson, Koenig, and Hindin 2008; A. Singh, Singh, and Thapa 2015; Yazdkhasti et al. 2015). Particularly where abortion is illegal, unsafe abortion, maternal mortality, and infant mortality are possible outcomes of unintended pregnancy (Gipson, Koenig, and Hindin 2008; Grimes et al. 2006).

In addition to being at increased risk of poor maternal and perinatal morbidity and mortality, young unmarried women experiencing unintended pregnancy may face consequences of rejection from their communities, families, and partnerships as well as diminished self-esteem, curtailed educational attainment, altered life goals and increased poverty throughout the life course (Atuyambe et al. 2005; M. J. Hindin and Fatusi 2009; Fatusi and Hindin 2010; Gyesaw and Ankomah 2013; Molina et al. 2010; Sneha Challa et al. 2017). Furthermore, childbearing among young women can have negative consequences for their own social networks, education, and skills, but also their health across the life course and the well-being of their children (Sawyer et al. 2012). Given the severity of the potential outcomes of unintended pregnancy, it is essential that women are able to maintain their reproductive rights and autonomy in reproductive decision-making, allowing them to avoid unintended pregnancy or mitigate the effects of a pregnancy.

Pregnancy decision-making

In the event of any pregnancy but particularly unintended or unwanted pregnancy, women must make decisions about the outcome of the pregnancy. For this dissertation,

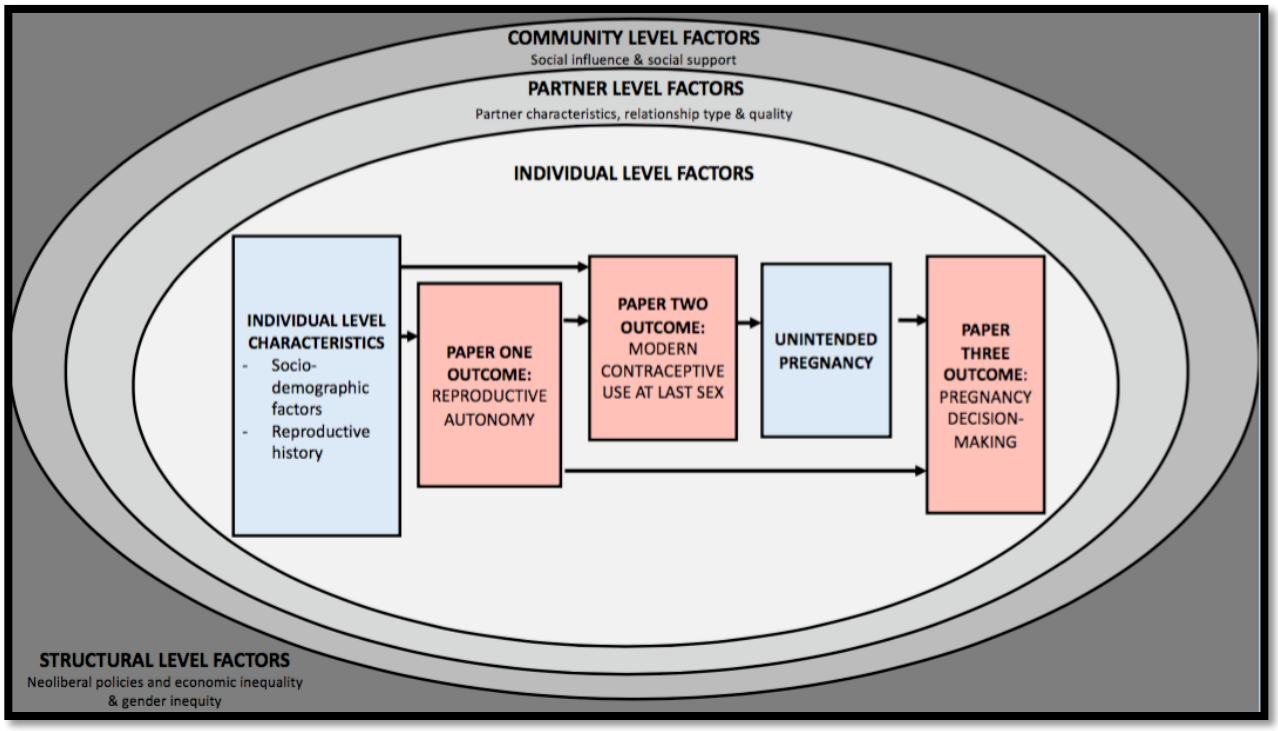
pregnancy decision-making refers to who had the most say in considering and choosing the outcome (i.e. abortion or live birth) of a pregnancy. Pregnancy decision-making applies to all pregnancies regardless of whether they result in an abortion or in a live birth. The limited existing research on pregnancy decision-making indicates that it is a complex process including coercive and supportive influences of the woman herself, her partner, family members, and the community (Hoggart 2012; Lohan et al. 2013; Loke and Lam 2014). Thus, pregnancy decision-making is likely affected by a woman's level of RA, though this has not been studied to my knowledge.

Both childbearing and abortion can result in maternal death and disability in situations where these procedures are done without skilled providers and/or adequate facilities and supplies. In Ghana, the most common causes of pregnancy related death are hemorrhage, abortion, hypertensive disorders, ectopic pregnancy, uterine rupture, and genital tract sepsis (Der et al. 2013). These causes of maternal death have resulted in Ghana's relatively high Maternal Mortality Ratio (MMR) of 319 per 100,000 live births- over 100 deaths higher than the global average of 216 per 100,000 live births (World Health Organisation 2015). In Ghana, abortion is a leading cause of maternal death, demonstrating that many women continue to seek unsafe abortions outside of the health facility (Lee et al. 2012; Der et al. 2013; Ahiadeke 2001; Mills et al. 2008; Baiden et al. 2006). The Ghanaian abortion law was modified in 1985 and now allows for pregnancy termination if the pregnancy would risk life of the woman or would have negative implications for her physical or mental health, though physicians interpret these outcomes liberally (H. M. Schwandt et al. 2011; Sundaram et al. 2012; Morhee and Morhee 2006). According to a recent Maternal Health Survey, approximately one-fifth of Ghanaian women have had an abortion at some point during their lives (Ghana Statistical Service (GSS)/Ghana

Health Service (GHS)/ICF International 2018). Unfortunately, Ghanaian women often seek abortions outside of the health system due to misinformation about the law, the stigma related to accessing abortion services, and/or challenges in accessing safe and legal abortion services (Sundaram et al. 2012; H. M. Schwandt et al. 2013; Oduro and Otsin 2014). Health-seeking outside of the health system has implications for increased maternal mortality associated with abortion. Given the potential maternal morbidity and mortality outcomes associated with childbearing and abortion, pregnancy decision-making and the final outcome affect a woman's health and well-being as well as her reproductive rights.

Based on the review of the literature and the gaps in the state described above and guided by an integrated theoretical framework, this dissertation will investigate whether and how RA is associated with demographic, reproductive, and social factors (Paper 1), modern contraceptive use (Paper 2), and pregnancy decision-making (Paper 3). Although RA conceptually includes all five of the domains listed above, this dissertation will focus on two of these domains, namely decision-making RA (having primary say in SRH decisions) and communication RA (being comfortable talking with one's partner about SRH decisions). Figure I.1 presents the integrated conceptual model guiding this dissertation research, reflecting multiple levels of the social-ecological model.

Figure I.1: Dissertation Conceptual Model



Multi-level Influences on Reproductive Autonomy and Sexual and Reproductive Health Outcomes

RA and SRH outcomes--and likely the relationship between them--are influenced by a number of factors operating at multiple levels of a social ecological framework. The social ecological framework has been used by other authors to describe influences on adolescent SRH (Svanemyr et al. 2015) and is a useful perspective for this context and research. While this dissertation focuses primarily on specific RA constructs and hypothesized outcomes operating at the individual and inter-personal levels, it is important to acknowledge the body of research examining the broader context of multi-level factors that influence RA and SRH outcomes. RA and SRH outcomes among young women are driven by factors at the individual, partner, community, and structural levels (Bronfenbrenner 1986; Bronfenbrenner 1977), reflected in

Figure 1. While many of these factors are beyond the scope of this dissertation and these data, the forthcoming section will outline key aspects of what is known about the influences of these multi-level factors on RA and SRH outcomes (particularly contraceptive use, the most researched SRH outcome relevant to this dissertation). This provides an important theoretical foundation from which we can explore associations between RA and SRH outcomes and interpret findings.

Structural Level Factors

Structural level forces of economic inequality resulting from global policy, and gender inequity are fundamental causes of disparities in contraceptive use and unintended pregnancy. Fundamental cause theory suggests that health outcomes reflect the social conditions and access to resources that place certain populations at risk of disease and poor outcomes (Link and Phelan 1995; Link and Phelan 1996; Phelan, Link, and Tehranifar 2010). As such, fundamental causes include socio-economic status, race/ethnicity and gender, which are tied to resources including power, prestige, wealth, and social connections (Link and Phelan 1995; Phelan, Link, and Tehranifar 2010). In Ghana, economic inequality resulting from colonial and post-colonial exploitation, and the inferior status of women can be understood as fundamental causes of health by reducing women's RA and their ability make decisions and access SRH services.

Neoliberal policies and economic inequality: Ghana's utility for the West as a resource for minerals, cash crops, and slaves began prior to colonialism and has continued arguably until the present day (Overa 2007). Due to colonial and post-colonial exploitation, Ghana's economy has been reliant on cash crops, increasing its vulnerability to environmental and market fluctuations (Konadu-Agyemang 2010; Overa 2007). Based on this vulnerability, Ghana was compelled to receive a Structural Adjustment loan from the International Monetary Fund and

World Bank, the terms of which exacerbated existing inequalities and denigrated health outcomes for the most vulnerable populations (Kanji, Kanji, and Manji 1991; Konadu-Agyemang 2010; Loxley 1990; Overa 2007; Pfeiffer and Chapman 2010; Weissman 1990). Specifically, education and maternal and child health programs suffered tremendously, resulting in poverty and malnutrition among vulnerable populations (Konadu-Agyemang 2010). Increasing inequality is reflected in low rates of contraceptive use among the poorest segments of African populations (Creanga et al. 2011; Gakidou and Vayena 2007). While contraceptive use has increased in many African countries, gaps remain and in some cases are widening between use among those in the wealthiest and poorest quintiles (Creanga et al. 2011; Adebowale et al. 2014; Finlay, Mejía-Guevara, and Akachi 2018). Poverty increases barriers to contraceptive use and likely also reduces levels of RA among vulnerable women, who may be more dependent on male partners for survival.

Gender inequity: Gender reflects social expectations and classifications and can be understood as "how we are perceived and expected to think and act as women and men because of the way society is organized" (Ostlin, George, and Sen 2001). The Theory of Gender and Power provides a framework for understanding the ways in which the sexual divisions of labor, power, and cathexis intersect to disempower women at societal and institutional levels (Connell 1987). Cathexis, defined as social norms and affective attachments to these norms, is particularly important for understanding RA and SRH outcomes (Connell 1987; Wingood and DiClemente 2000). Through cathexis, taboos are created for female sexuality and women are constructed as virtuous if they are chaste (Connell 1987; Wingood and DiClemente 2000). Thus, women may be hesitant to access contraception for fear of exposing their reputations to be tarnished. Stigmatization of pregnant and sexually active adolescents in communities and inequitable

relationship power dynamics can be understood as the enactment of these structural societal gender biases (Varga 2003; Hall et al. 2018). In qualitative research, young women in Ghana reported that girls who were sexually active were perceived by the community to be "bad girls" and were judged, discriminated against, and marginalized (Hall et al. 2018). These overwhelmingly unsupportive and negative community attitudes stem from structural gender inequality and affect young women's reproductive health outcomes (Hall et al. 2018). Though not studied, these community level influences and stigma may also constrain women's reproductive choices, thus diminishing their RA. Additionally, inequitable gender dynamics also feature in interpersonal relationships including partner relationships, which will be described further below. These dynamics affect women's level of RA and reduce their ability to access services and make decisions about SRH outcomes.

Through the intersections of class and gender, poor Ghanaian women have been relegated to the bottom of the global hierarchy. As fundamental cause theory suggests, this social positioning is linked with poor access to resources and overall well-being (Link and Phelan 1995). Despite global aid and interventions aimed at improving SRH outcomes among poor Ghanaian women, these structural forces continue to disadvantage them.

Community Level Factors

Social network theory informs the community level portion of the model. Social networks refer to the "interpersonal social relationships that surround and affect individuals" (Heaney and Israel 2008). In particular, it is important to understand the ways in which social influence affects RA and SRH outcomes. The experience of an unintended pregnancy can have a detrimental effect on a young woman's connections with her social network through stigmatization and isolation. Hatzenbuehler, Phelan, and Link (2013) have made a compelling

case that stigma itself can be a structural factor and fundamental cause of health inequity (Hatzenbuehler, Phelan, and Link 2013). While stigma is discussed in this dissertation at the community level, it also operates more structurally to systematically disadvantage young women.

Many studies have demonstrated a connection between a woman's social network and her contraceptive behavior, through associations between social network and RA have not been explored (Perkins, Subramanian, and Christakis 2015). A social network is defined as "linkages between people that may or may not provide social support and that may serve functions other than providing support" (Heaney and Israel 2008). As such, an individual's social network can include friends, family members, community members, and partners. These important referents affect a woman's autonomy and behaviors through social influence and social support. In fact, several studies have pointed to the importance of including social context variables in models predicting contraceptive use (Cau 2015; Elfstrom and Stephenson 2012; Paz-Soldan A. et al. 2012).

Social influence: Social network theory defines social influence as the "process by which thoughts and actions are changed by the actions of others" (Heaney and Israel 2008). Thus, social influence can be understood as the process through which social norms are adopted or resisted by members of a social group (Cialdini and Trost 1998). Social norms, defined as "rules or standards that are understood by members of a group," appear to manifest through social influence when the situation is new, when the source of the norm is similar to the individual, and when the individual is motivated to develop or maintain a relationship with the source (Cialdini and Trost 1998). Social influence is related to reproductive outcomes, and potentially related to RA, though this has not been studied. For example, Stephenson and colleagues (2007) showed

that in Ghana and in other African countries, the level of community female approval of family planning was significantly associated with family planning use, presumably by affecting attitudes and intentions of individual women (Stephenson et al. 2007).

Social support: Social network actors including partners, peers, and family members may play a critical role in promoting or preventing reproductive health behaviors through the provision of social support. A recent meta-analysis demonstrated a significant increase in behaviors to protect sexual health among adolescents who discuss sexual health with their parents (Widman et al. 2016). Additionally, research has shown that mothers and male partners can be important resources for accessing safe abortion services, helping young women to achieve their preferred reproductive outcomes (Kedia 2018; Izugbara, Otsola, and Ezeh 2009).

Partner Level Factors

Partner characteristics and relationship dynamics are related to the woman's attitudes and intention to use contraception, to the woman's RA to use contraceptives, and indirectly to contraceptive use. Associations between partner-level variables and RA have not been studied to my knowledge.

Partner socio-demographic characteristics: Socio-demographic characteristics of the male partner, specifically the age gap with his sexual partner and his educational attainment, are associated with a woman's attitudes towards contraception, autonomy to use contraception, and use of contraception in Ghana (Amo-adjei 2012; Stephenson, Beke, and Tshibangu 2008). In Ghana, an age difference of more than ten years in sexual relationships is associated with decreased likelihood of condom use at first sex (Amo-adjei 2012). This finding suggests that intergenerational sex may be associated with power imbalances and difficulty negotiating contraceptive use.

Relationship dynamics with partner: Relationship dynamics between partners reflect the reciprocity, intensity, formality, and complexity of the dyad (Heaney and Israel 2008). Existing research on married or cohabiting couples in Ghana suggest that relationship dynamics factor heavily into contraceptive use decision-making (Cox et al. 2013; Osei et al. 2014). Relationship quality (operationalized as commitment, trust, constructive communication, and satisfaction) and relationship stage both appear to contribute to the likelihood of contraceptive use (Cox et al. 2013; Osei et al. 2014). Women with higher relationship satisfaction scores had higher contraceptive use, possibly reflecting more equitable relationship conditions (Cox et al. 2013).

Intimate partner violence (IPV) is also related to RA and SRH outcomes, particularly among young women. However, the relationship between IPV and contraceptive use in Sub-Saharan Africa varies. Generally, IPV is associated with decreased contraceptive use but in Sub-Saharan Africa the reverse is sometimes true (Miller, Jordan, et al. 2010; Miller, Decker, et al. 2010; Kidman, Palermo, and Bertrand 2015; Adjiwanou and N'Bouke 2015; Maxwell et al. 2018). Some researchers have found that although there was not an association with contraceptive use overall, IPV was associated with decreased use of partner dependent contraceptive methods. Though nuanced, the literature suggests that experience of IPV affects women's autonomy and ability to discuss and use modern contraception.

Reproductive coercion is a potential pathway through which IPV affects SRH (Silverman and Raj 2014a). Reproductive coercion can be defined as "behavior that interferes with contraception use and pregnancy in ways that reduce female control over reproductive decisions, including pregnancy coercion and contraceptive sabotage" (Silverman and Raj 2014a). While there is little data in the sub-Saharan African context, studies in the United States have demonstrated associations between reproductive coercion and unintended pregnancy, possibly by

reducing women's levels of RA and their ability to use modern contraception (Miller, Jordan, et al. 2010; Miller, Decker, et al. 2010; Grace and Anderson 2016).

Individual level factors

At the individual level, key socio-demographic characteristics and reproductive history often shape a woman's RA and reproductive behaviors. Existing research has demonstrated associations between various measures of empowerment and individual level characteristics (Upadhyay, Gipson, et al. 2014). Regarding RA specifically, the relationship between socio-demographic and reproductive history factors and RA has been studied among a sample of American women (Upadhyay, Dworkin, et al. 2014). However, to my knowledge, research to date has not investigated the relationship between these factors and RA in other global contexts.

Socio-demographic characteristics and reproductive history: In many settings. socio-demographic characteristics have been shown to be associated with RA and with modern contraceptive use. As mentioned above, associations between RA and socio-demographic and reproductive history variables have not been studied outside of the American context. The existing research suggests that a similar set of factors including age, educational attainment, marital status, and religion may be associated with RA and with modern contraceptive use (Upadhyay, Dworkin, et al. 2014; Kahn et al. 2014; Marrone et al. 2014). In a sample of American women, married women typically had lower RA than unmarried women, increased education was associated with increased RA, and younger women had higher RA than women over forty (Upadhyay, Dworkin, et al. 2014). Furthermore, women who were sampled from abortion clinics had lower RA than those sampled from family planning clinics, suggesting that abortion experienced may be associated with decreased RA in this population (Upadhyay, Dworkin, et al. 2014).

In terms of modern contraceptive use, socio-economic status, marital status, and parity (the number of times that a woman has given birth) appear to be important factors associated with contraceptive use (A. Bankole et S. Malarcher 2010; Gyesaw and Ankomah 2013; Finer and Zolna 2014; Nketiah-Amponsah, Arthur, and Aaron 2012). Women with more wealth, unmarried women, and women with more children generally have an increased probability of using modern contraception (Nketiah-Amponsah, Arthur, and Aaron 2012; Bankole and Malarcher 2010).

Dissertation Objective and Research Questions

Based on the previously described literature review and gaps, the overarching aim of this dissertation is to characterize RA among young women in Ghana and examine factors associated with having high RA among these young women. The specific research aims for the three papers are as follows:

- To examine the association between (a) socio-demographic, (b) reproductive history, and (c) social context factors and RA among young women in Ghana. (Paper 1)
- To investigate the relationship between RA and modern contraceptive use at last sex. (Paper 2)
- To investigate the relationship between RA and pregnancy decision-making (who decided the outcome of the last pregnancy) (Paper 3)

Through this dissertation, I apply the adapted communication and decision-making RA sub-scales to a new, sub-Saharan African context in order to understand the extent to which RA is associated with SRH outcomes in this context. I also test associations between social context variables (social approval and social stigma towards adolescent SRH) and RA. This will help scholars to understand the extent to which social context affects RA and whether future research

should consider inclusion of social influences on RA. Finally, I seek to understand the extent to which RA may be associated with pregnancy decision-making, a novel SRH outcome. This will provide evidence regarding the extent to which RA may be associated with other SRH outcomes. The results of this analysis will also be important in order to understand how RA may affect abortion decision-making and the safety of the resulting procedure.

Data Source

The data used for this dissertation were collected through the Adolescent SRH Stigma Study in Ghana, herein referred to as the parent study. The parent study aimed to develop a formal survey instrument to measure stigma associated with various dimensions of SRH and multiple domains of stigma (enacted stigma, internalized stigma, lay attitudes, disclosure, and stigma resilience) (Hall et al. 2017). I coordinated with the principal investigator (PI) to add questions related to RA and pregnancy decision-making and resolution into the survey prospectively in preparation for this dissertation research. I selected the RA sub-scales and items that were most theoretically meaningful to multiple SRH outcomes (including modern contraceptive use and pregnancy decision-making). In consultation with the PI of the parent study, I determined that the use of these abbreviated communication RA and decision-making RA sub-scales was the most feasible and appropriate measurement approach.

The cross-sectional survey was fielded among a sample of 1080 young women recruited from community and facility-based sites in Accra and Kumasi, Ghana, two large cities in the West African country. Using a clustering sampling technique, the team recruited participants from four Senior High Schools within the Ghana Educational Service, two universities (University of Ghana and Kwame Nkrumah University for Science and Technology), and five Ghana Health Service facilities (including antenatal, postnatal, family planning, and child

welfare clinics). Thus, the sampling frame allowed for heterogeneity in types of clinics and schools, as well as the populations that they served, which provided a variety in reproductive history, relationship, and socioeconomic statuses of the respondents. Research assistants from the University of Ghana obtained written informed consent and then enrolled eligible participants in the study. Participants completed the survey on tablets using Qualtrix Mobile, a secured, web-based data collection and management system. The time to completion of the survey was dependent on reproductive experiences/histories and ranged from 30 to 90 minutes. All participants received cell phone calling credit as a token of appreciation for their time. This data source is used for all three dissertation papers.

Chapter II: Factors Associated with Reproductive Autonomy among Young Women in Ghana

Abstract

Objective: RA is a domain of women's empowerment specific to control over SRH decisions and outcomes. The aim of this paper was to understand the socio-demographic, reproductive history, and social context variables associated with two previously validated RA sub-scales. We explored factors associated with decision-making and communication RA.

Methods: This analysis included 516 young women between the ages of 15 and 24, sampled from health facilities and schools in Accra and Kumasi, Ghana. We used multiple linear regression modeling with robust standard errors to test associations between possible factors associated with RA and the two RA sub-scales. Theoretically informed factors included age, educational attainment, ethnic group, employment, religion, religious attendance, relationship type, previous pregnancy, previous abortion, social approval for adolescent SRH and social stigma towards adolescent SRH.

Results: Results from final models demonstrated that factors associated with the communication RA included education (p=0.008), ethnic group (p=0.039), and social approval for adolescent SRH (B=0.12, p=0.003). Factors associated with the decision-making scale included ethnic group (p=0.002), religion (p=0.003), religious attendance (p=0.043), and previous pregnancy (p=0.008).

Conclusions: Communication RA and decision-making RA were associated with different factors, providing insight into potential intervention approaches and points. Social approval for

adolescent SRH was associated with increases in young women's abilities to communicate with their partners about SRH issues including sex, contraceptive use, and fertility.
Key words: Reproductive autonomy, Ghana, partner, empowerment

Background

Since the 1994 International Conference on Population and Development (ICPD), reproductive rights- defined as "the power to make informed decisions about one's fertility, childbearing, gynecological health, and sexual activity and to carry out these decisions" – has been the globally endorsed approach for international family planning programs (Eager 2017). At ICPD, the international development community embraced reproductive rights and upheld these rights as human rights and the framework through which all SRH programs should be designed and implemented. The importance of reproductive rights and empowerment have been incorporated into international development goals including the Millennium Development Goals (MDGs) and the more recent Sustainable Development Goals (SDGs). Through both initiatives, the United Nations and stakeholders have set targets for improving SRH outcomes as well as targets for women's empowerment and improved status.

In Ghana, the focus of this paper, the national family planning policy was also modified in 1994 in order to better reflect the needs of the Ghanaian context and reflect a reproductive rights paradigm (May 2017). Through this modification and through the liberalization of the Ghanaian abortion law, Ghana has taken important steps towards promoting women's reproductive rights at the policy level. However, beyond this political context, women's reproductive decision-making, autonomy, and goals and the multi-level factors that influence

them, have been given little scientific attention, especially in Sub-Saharan African countries like Ghana.

Women's Empowerment and Reproductive Autonomy

Over the past two decades, reproductive research and programming related to reproductive rights has often focused on women's empowerment. As mentioned above, achievement of women's empowerment has also been included in SDG number five, which seeks to achieve gender equality and empower young women and girls. Empowerment is defined as "women's ability to make decisions and affect outcomes of importance to them and their families" and generally includes the related components of choice, power, control, and options (Mandal, Muralidharan, and Pappa 2017). Empowerment is a multi-dimensional construct reflecting psychological, social & familial, economic, legal and political domains (Mandal, Muralidharan, and Pappa 2017). Additionally, empowerment is a dynamic and multi-level process and can be conceptualized and measured at individual, couple, household, service-provider, and community levels (Mandal, Muralidharan, and Pappa 2017). As demonstrated in SDG 5, empowerment is a powerful end in and of itself as well as a pathway through which SRH outcomes may be improved.

Researchers, particularly those operating under a human rights or reproductive rights paradigm, have been interested in measuring women's empowerment. Measures of empowerment implemented in research and program evaluations have been diverse and have included the measurement of sociodemographic and economic factors (age, education, employment, and household income) (Chapagain 2005; M. J. Hindin 2000; Kabir et al. 2005), household decision-making power (Feldman et al. 2009; Fikree et al. 2001; Hamid, Stephenson, and Rubenson 2011), sexual and reproductive decision-making power (Crissman, Adanu, and

Harlow 2012; Do and Kurimoto 2012; Saleem and Pasha 2008), freedom of movement (Do and Kurimoto 2012; Mahmood 2002), financial power/autonomy (Do and Kurimoto 2012; Feldman et al. 2009; Kravdal 2001), relationship characteristics and partner communication (Haile and Enqueselassie 2006; Hamid, Stephenson, and Rubenson 2011; Kabir et al. 2005; M. J. Hindin 2000; Mahmood 2002; Pande et al. 2011), freedom from coercion (by partner or other) (Chapagain 2005; Morgan et al. 2002), gender related attitudes and norms (Bogale et al. 2011; Do and Kurimoto 2012), and participation in microcredit programs (Orso et al. 2016), among others (Mandal, Muralidharan, and Pappa 2017; Prata et al. 2017; Upadhyay, Gipson, et al. 2014). In addition, operationalization, interpretations and estimates of empowerment measures have varied geographically and culturally. For example, Heckert and Fabric (2013) demonstrate that women's independent mobility, a measure of empowerment relevant in South Asia, is not a meaningful measure in Sub-Saharan African contexts where women's movement is not regulated nor restricted to the same extent (Heckert and Fabic 2013). A recent review of empowerment measures in program evaluations assessed empowerment measures related to family planning and maternal health outcomes (Mandal, Muralidharan, and Pappa 2017). While many of the studies cited demonstrated relationships between empowerment and SRH outcomes, the findings are complicated with varied operationalization of the "empowerment" construct, making it challenging to draw conclusions across studies (Mandal, Muralidharan, and Pappa 2017).

A woman's RA is a more recently conceptualized and specific type of individual-level empowerment that is related to her SRH. Arguably, it is a key element of having reproductive rights. RA is defined by Upadhyay et al (2014) as "having the power to decide about and control matters associated with contraceptive use, pregnancy, and childbearing" (Upadhyay, Dworkin, et al. 2014). Thus, RA is essential for an individual woman's well-being as it facilitates her ability

to choose childbirth, abortion, or contraception without undue influence from men, health care providers, the government, the international development community, or religious doctrines. Based on Upadhyay and colleagues' review of existing literature, five highly related but unique concepts comprise the construct of RA. These include self-efficacy, decision-making power, communication ability, equitable gender-role attitudes, and management of coercion (Upadhyay, Dworkin, et al. 2014).

Multi-level Factors Potentially Associated with Women's Reproductive Autonomy

Research from the United States (US) has demonstrated that a number of socio-demographic characteristics are associated with a woman's level of RA (Upadhyay, Dworkin, et al. 2014; Kahn et al. 2014). Upadhyay et al. (2014) developed a RA scale among 1,892 urban/suburban women in recruited from family planning and abortion clinics across the US and found that age, race, education, and marital status were associated with RA (Upadhyay, Dworkin, et al. 2014). With regards to communication autonomy, older women had significantly higher communication RA scores compared to 15 to 19 year old women (Upadhyay, Dworkin, et al. 2014). Compared to white women, non-Hispanic black women and Hispanic women had significantly lower communication RA scores (Upadhyay, Dworkin, et al. 2014). Women with less than high school education had lower communication RA than those with high school or GED education and those who had some college or an associate's degree had significantly higher communication RA (Upadhyay, Dworkin, et al. 2014). Married women had significantly higher communication RA than unmarried women (Upadhyay, Dworkin, et al. 2014). Decision-making autonomy was associated with many of the same factors but in some cases had opposite relationships compared to communication autonomy. Older women had lower decision-making RA than the 15 to 19 year old's and non-Hispanic black women had higher decision-making RA

than white women (Upadhyay, Dworkin, et al. 2014). Educational attainment was not significantly associated with decision-making RA and married women had lower decision-making RA than did unmarried women (Upadhyay, Dworkin, et al. 2014). Kahn et al (2014) conducted a study with 25 highly religious women in the Midwest US and demonstrated the importance of accounting for religious influences in measures of RA. Through both qualitative and quantitative research using the same RA scale developed by Upadhyay and colleagues, Kahn and colleagues showed that religiosity and associated gender roles are factors that constrain highly religious women's RA (Kahn et al. 2014).

In Ghana, the site of this research, young women's RA is potentially affected by individual-level factors and social context factors – although these multi-level factors have not been fully studied. Based on findings in the US, we hypothesize that the individual-level factors of age, education, marital status, and religion/religiosity to be associated with RA, such that younger age, lower education, being unmarried, and being religious are associated with lower RA (Upadhyay, Dworkin, et al. 2014). We expect that these individual level factors will be associated with RA in similar ways as the American sample of women. Employment and educational attainment have often been used as proxy indicators for empowerment and a body of research (around the world as well as in Sub-Saharan Africa) has demonstrated robust associations between these indicators and fertility control behaviors and outcomes (Zanin, Radice, and Marra 2015; Diamond, Newby, and Varle 1999; Basu 2002). We expect that these two measures of women's status serve to increase RA, enabling women to better navigate reproductive decision-making and achieve their reproductive goals.

Beyond socio-demographic characteristics, a woman's reproductive experiences may also be associated with her level of RA. Upadhyay et al (2014) demonstrated that being recruited

from an abortion clinic was associated with lower levels of decision-making and communication RA compared to recruitment from family planning centers (Upadhyay, Dworkin, et al. 2014). It is possible that women who experience unintended pregnancy that results in abortion may have lacked the RA to navigate contraceptive negotiation and use. This analysis will explore the possible associations between previous pregnancy and RA and previous abortion and RA.

At the community level, the social and cultural context of Ghana is arguably, different from the US. Given the importance of communitarianism in Ghanaian culture, there are norms regarding reproduction and deviation from these norms may have severe social consequences for women. For example, childbearing within marriage provides Ghanaian women with economic resources, social status, and ancestral ties (Fledderjohann and Johnson 2016). As an example of the power of social norms in this context, research regarding facility-based childbirth in Ghana has demonstrated that family and community-level attitudes regarding the prevalence and acceptability of facility-based delivery affected the likelihood that women would deliver in a health facility (Speizer, Story, and Singh 2014). Due to this context of social norms and consequences related to fertility, we expect that other salient factors at the community level may be more influential in shaping women's RA in Ghana than in the US.

Specifically, this research will investigate associations between social influence on adolescent SRH (measured as social approval for adolescent SRH and social stigma towards adolescent SRH). In our team's prior qualitative work in Ghana, Challa and colleagues (2017) reported on in-depth interview results from young women who reported severe consequences of sexual activity and reproductive care seeking, particularly within religious communities (Sneha Challa et al. 2017). Through this research, girls shared that religious institutions framed the sexuality of young and unmarried women as immoral, resulting in the guilt, shame, and stigma

experienced by these women (Sneha Challa et al. 2017; Hall et al. 2017). While not explicitly mentioned, it is possible that the RA of young, unmarried women may be curtailed by these teachings and by this stigma. However, this has not been previously studied.

The aim of this paper is to understand the sociodemographic, reproductive experience, and social factors associated with RA among young Ghanaian women. Variables included in the analysis are all collected at the individual level but reflect both individual and social context characteristics.

Methods

Data Source

The findings presented in this paper stem from a secondary research aim of a community-based survey focused primarily on SRH stigma in Ghana. A clustered sampling approach was used to recruit 1,080 females aged 15 to 24 from facility and community-based sites in Accra and Kumasi, Ghana, including four Senior High Schools within the Ghana Educational Service (public, co-education, and female only), two universities (University of Ghana and Kwame Nkrumah University for Science and Technology, and five Ghana Health Service facilities (antenatal, postnatal, family planning, and child welfare clinics). The final sample of young women included diversity in reproductive health experiences, including women who had given birth, used family planning, and accessed abortion as well as some who had not experienced sexual debut.

Trained Ghanaian research assistants obtained written informed consent and then enrolled eligible participants in the study. Interviewers administered the survey on tablets using Qualtrix Mobile, a secured, web-based data collection and management system. The time to completion of the survey ranged from 30 to 90 minutes, depending on reproductive history and experiences.

All participants received cell phone calling credit as a token of appreciation for their time. The University of Michigan, Ghana Health Service, University of Ghana, and Kwame Nkrumah University of Science and Technology provided IRB approval for the study.

The current analysis focuses on investigating the determinants of RA among this sample. Since the conceptualization and measurement of RA focused upon here occurs within the intimate partner relationship context, the analytic sample comprises participants who reported that they were currently in a romantic or sexual relationship. In addition, young women who were missing data on key variables of interest were excluded from the analysis. This resulted in an analytic sample of 552 adolescent girls and young women.

Measures

Dependent Variable: RA

The primary dependent variables of interest, RA, was comprised of two sub-scales measuring different dimensions of RA - the decision-making sub-scale and the communication sub-scale, adapted from Upadhyay, Dworkin, et al's (2014) RA scale (Upadhyay, Dworkin, et al. 2014). These two sub-scales were selected because they would likely be more applicable to a broader set of young women as compared to women experiencing reproductive coercion. Items comprising each sub-scale were selected based on their applicability to multiple domains of SRH including fertility preferences, sexual activity, modern contraceptive use, and pregnancy resolution. These items, along with all items in the survey, were translated into Twi by the research team after discussing the intended meaning of each question. The adapted decision-making sub-scale and communication sub-scale were analyzed separately as outcome variables.

Decision-making RA sub-scale: Decision-making RA is defined as having the primary say in matters related to contraceptive use, pregnancy, and childbearing (Upadhyay, Dworkin, et

al. 2014). The decision-making RA scale was created as a continuous variable reflecting the sum of three Likert response statements related to reproductive decision-making power. This measure is an adapted version of the measure developed by Upadhyay et al (2014). Each of the following statements included the options of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4):

- You, not your partner, has the most say about whether you would use a method to prevent pregnancy.
- You, not your partner, has the most say about when you have a baby in your life.
- If you became pregnant but it was unplanned, you, not your partner, would have the most say about whether you would raise the child, seek adoptive parents, or have an abortion.

In our sample, the Cronbach's alpha for the sub-scale was 0.62, demonstrating acceptable reliability. The overall scale ranged from 3 to 12 and the range among the analytic sample was the same, with higher scores indicating greater autonomy.

Communication RA sub-scale: Communication RA is defined as feeling comfortable talking with one's partner about contraceptive use, pregnancy, and childbearing (Upadhyay, Dworkin, et al. 2014). The communication RA sub-scale was created as a continuous variable reflecting the sum of three statements related to partner communication about reproductive decisions. This measure is an adapted version of the measure developed by Upadhyay et al (2014). Each of the following statements included the options of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4):

- My partner would support me if I wanted to use a method to prevent pregnancy.
- If I didn't want to have sex, I could tell my partner.
- If I really did not want to become pregnant, I could get my partner to agree with me.

In our sample, the Cronbach's alpha for the sub-scale was 0.64, demonstrating acceptable reliability. The scale ranged from 3 to 12, with higher scores indicating greater autonomy.

Independent Variables

In this paper, we sought to understand factors associated with RA in order to better understand these relationships and possible intervention points. Based on the existing literature and social-ecological theory, we explored relationships between RA and socio-demographic, reproductive history, and social context variables.

Social context factors: Our first independent variable of interest was *social approval for adolescent SRH*. Young women were asked the following question: "Please indicate how supportive the following places or people in your community are about teens' SRH issues and needs," for nine different social groups in their community. These groups included the following: the overall community, men, women, schools, health care facilities/workers, religious centers/leaders, parents, other family members, and friends. For each of the groups, response options included: extremely supportive, somewhat supportive, somewhat unsupportive, or extremely unsupportive. Those who reported extremely supportive or somewhat supportive were given one point while the other response options received a zero. These scores were added to create an additive index score, which reflected the overall level of community support for SRH. The Cronbach's alpha for this index was 0.71, demonstrating acceptable reliability of the index, which ranged from a minimum possible score of zero to a maximum score of nine.

Our second social context variable of interest was *adolescent SRH stigma*, the measure developed in the parent study. The psychometric scale development process is described elsewhere (Hall et al. 2017) but following confirmatory factor analysis, the final scale ranged from 1 (low stigma) to 20 (high stigma) and encompassed the domains of enacted stigma,

internalized stigma, and stigmatizing lay attitudes. The scale has good internal consistency as demonstrated with a Cronbach's alpha of 0.74.

Reproductive history

Based on Upadhyay et al's findings on the association between recruitment from an abortion clinic and RA, we included whether the client had ever been pregnant and if the client had ever had an abortion as possible factors associated with RA.

Ever pregnant: Pregnancy history was treated as a dichotomous variable and was asked only among those who had ever been sexually active. Those who had ever been pregnant were coded as 1 while those who had never been pregnant were coded as 0 (reference group).

Ever had an abortion: Abortion history was treated as a dichotomous variable. In order to maintain adequate sample size, those who had never been pregnant and those who had been pregnant but had not had an abortion were coded as 0 and served as the reference group. Respondents who had an abortion previously were coded as 1.

Socio-demographic characteristics

Age: Age was treated as a continuous variable; ages ranged from 15 to 24 years old.

Ethnic group: Ethnic group was measured as a categorical variable indicating the ethnic group to which the respondent self-reported that she belonged. Ethnic groups included Akan (reference group), Ga/Dangme, Ewe, and other ethnic groups which included all smaller ethnic groups.

Educational attainment: Education was treated as a categorical variable and included the categories of No formal education (reference group), Some or completed primary education, Some or completed middle school, Some or completed secondary school, and Some or completed higher (university) education.

Relationship status: Relationship status was treated as a categorical variable with options including married or engaged (reference group), cohabiting with partner (but not married or engaged), in a serious relationship (but not cohabiting), and dating casually or having sex with an acquaintance.

Employment: Employment in the past week was treated as a dichotomous variable that indicated that the respondent either had (1) or had not (0) been employed in the past 7 days.

Religious affiliation: Religious affiliation was treated as a categorical variable including the denominations of Pentecostal/Charismatic (reference group), Catholic, Anglican Methodist or Presbyterian, Other Christian, Muslim, or None.

Religious attendance: Religious attendance was measured as a categorical variable that indicated the frequency with which the respondent typically attended religious gatherings at church or mosque. Options included at least once a week (reference group), at least once per month, and less than monthly.

Recruitment site: Recruitment site was used as the clustering variable for the robust standard errors that were used for the analysis. Recruitment sites included health facilities (n=5), secondary schools (n=4), and universities (n=2) in Accra and Kumasi.

Statistical Analysis

For each of the RA sub-scale outcomes of interest, we first developed an analytic sample that included the individuals who were not missing data on key covariates of interest. The 'Descriptive Statistics section' of the Preliminary Results presents the descriptive statistics for this sub-sample. We also conducted a missing data analysis to better understand how those included in the analytic sample varied from those who were excluded (results not shown).

We first described young women's sociodemographic and reproductive background characteristics and RA levels (for each sub-scale) using descriptive statistics (means with standard deviations for continuous variables, frequencies with proportions for dichotomous/categorical variables). We examined bivariate associations between socio-demographic, reproductive history, and social context variables and the RA sub-scales using student's t-tests for dichotomous variables, one-way ANOVA for categorical variables, and unadjusted, univariate regression models for continuous variables. We used the Kruskal-Wallis H test, a non-parametric equivalent to one-way ANOVA, to test bivariate associations for religious attendance and for religion given the small sample sizes for some of the categories of these variables.

We further analyzed associations between social context, sociodemographic and reproductive factors and RA in multivariable linear regression models. Variables were included in multivariable regression models if they demonstrated bivariate associations at $p<0.10$. Separate models were run for each RA sub-scale. Variables that were not associated with the sub-scales at $p<0.10$ were not included in the models. We controlled for recruitment site-level correlations with inclusion of robust standard errors. Results are presented as adjusted beta coefficients with 95% confidence intervals and p-values (considered significant at $p<0.05$). All analyses were conducted in STATA 14.

Results

Table II.1 presents the descriptive statistics for the 516 adolescent and young adult women included in the analytic sample. The majority (77.3%) of young women had middle school education or more and 51.6% of them were of the Akan ethnicity. Most women (62.6%) were not employed within the past week. The largest proportion of young women reported

following the Pentecostal faith (39.7%), and more than 78.3% of all of the women reported that they attended church at least once per week. Approximately one–quarter of women reported being married or engaged (26.7%), while 22.3% reported cohabiting with their partners, 31.2% were in a serious relationship but not cohabiting, and 19.8% were dating casually or having sex with an acquaintance. While 74.2% reported that they had ever been pregnant, 17.7% reported that they ever terminated their pregnancies. The mean score on the social approval for adolescent SRH index was 5.77 of a total score of nine (range: 0-9; SD=2.22), suggesting that girls experience moderate to high levels of support. The mean stigma score was 12.71 (range 1-20, SD= 3.64) suggesting that on average, girls experienced moderate levels of stigma. The average decision-making RA sub-scale score was 7.65 (range: 3-12; SD=1.99) while the communication RA sub-scale was higher at 9.50 (range: 3-12; SD=1.75).

In unadjusted bivariate tests (Table II.2), the communication RA sub-scale was associated with age ($p<0.01$), education ($p<0.01$), ethnic group ($p=0.01$), religion ($p<0.01$), relationship status ($p=0.05$), previous pregnancy ($p<0.01$), and social approval for adolescent SRH ($p<0.01$). Overall, older participants, those with secondary or more education, those of Ewe ethnicity, participants of Catholic, Anglican, Methodist, or Presbyterian faith, those in a serious relationship (but not married or cohabiting), those who have never been pregnant, and those with higher levels of social approval for adolescent SRH had higher levels of communication autonomy as compared to their counterparts.

Factors associated with the decision-making RA scale included age ($p<0.01$), ethnic group ($p<0.01$), religion ($p=0.02$), religious attendance ($p=0.01$), and previous pregnancy ($p<0.01$). In general, younger participants, those of Ga/Dangme ethnicity, those who reported no

religion, those who attended religious services at least once a month, and those who have never been pregnant had higher decision-making autonomy scores as compared to their counterparts.

Table II.3 presents the full multivariable regression models of factors associated with the communication RA scale (where the lowest possible value of 3 = low autonomy and highest possible value of 12 =high autonomy). The results of this parsimonious model show that only educational attainment, ethnic group, and social approval for adolescent SRH were associated with communication RA (p-values<0.05). Compared to those with no formal education, those with secondary education had, on average, communication RA scores that were 0.92 points higher (B=0.92, CI: 0.31, 1.54; p<0.01). Participants from the Ewe ethnic group had communication RA scores that were, on average 0.37 points higher than those of the majority, Akan ethnicity (B=0.37, CI:0.02, 0.71; p=0.02). In addition, a one-point increase in the social approval for adolescent SRH index (reflecting an additional social group's support for adolescent SRH) was associated with a 0.12 increase in the mean communication RA score (B=0.12; CI: 0.05, 0.19; p<0.01). In this model, age, religion, pregnancy history, and stigma were not associated with communication RA.

Table II.4 presents results from a multivariable linear regression model of the factors associated with the decision-making RA sub-scale (which also ranged from 3-12). In this model, ethnic group, religion, religious attendance, and pregnancy history were factors associated with decision-making RA scores (p-values <0.05). Compared to the Akan ethnic group, the Ga ethnic group had a mean decision-making RA score that was, on average, 1.07 points higher (B=1.07; CI: 0.49, 1.65; p<0.01). In contrast, when comparing other Christian denominations to the predominant Pentecostal religious group, the other Christians had, on average, a decision-making RA score that was 1.00 point lower (B=-1.00; CI: -1.56, -0.44; p<0.01). Young women who had

ever been pregnant had decision-making RA scores that were 0.64 points lower than those who had never been pregnant (B=-0.64; CI: -1.08, -0.20; $p<0.01$).

Discussion

In this study of young Ghanaian women, we found that decision-making RA and communication RA were associated with a different set of factors. Although reasons for this finding are not fully clear from these data, it may be that this difference was related to the two potentially distinct conceptualizations of RA explored. Decision-making RA reflected the extent to which the woman had primary say in reproductive decisions but did not (necessarily) indicate the extent to which she engaged her partner or others in the decision (Upadhyay, Dworkin, et al. 2014). Communication RA, on the other hand, reflected the extent to which a woman is comfortable with communicating about reproductive decisions with her partner, which may or may not have impacted her decision-making processes (Upadhyay, Dworkin, et al. 2014). Among this sample, communication RA had a higher mean score than decision-making RA, indicating that on average, young women were more comfortable discussing their reproductive decisions with their partners than having the most say in the decision. This nuanced finding in this specific context may have important implications for understanding and addressing young women's RA, and this requires further exploration.

Additionally, employment in the past week, a traditional proxy for women's economic empowerment, was not associated with decision-making RA nor communication RA. This finding is in contrast to related research that has demonstrated a relationship between employment and sexual empowerment, for instance (Crissman, Adanu, and Harlow 2012). In this study, sexual empowerment was measured by a crude composite score that reflected the extent perceived their "rights to self-determination and equality in sexual relations and their ability to

express themselves in sexual decision-making" (Crissman, Adanu, and Harlow 2012). However, education, another variable used as a proxy for women's empowerment, was only associated with the communication RA scale among these women. Other studies have demonstrated that increased levels of education (for both the male and female partners) are associated with increased spousal communication about reproductive health issues (Berhane et al. 2011; Chiao, Mishra, and Ksobiech 2011), although it is not clear how general communication is related to communication RA. Our study builds upon that literature to more specifically measure different dimensions of RA as they differentially relate to social factors like education. Since the relationship between women's education and contraceptive use in Ghana have been documented (Adanu et al. 2009), we expected that educational attainment would also be associated with decision-making RA. Some other family planning studies with adolescent samples have shown that education level and age are collinear, which could help explain null findings for educational attainment here (Hall, Castaño, and Westhoff 2014). It may be possible that low educational attainment among these 15-24-year-old young women reflected their youth rather than social disadvantage, although both of which could be hypothesized as relevant to RA levels. Among our analytic sample, 17.2% of the sample was drawn from school-based settings, which could have also biased these effects. Future work should explore this relationship within a nationally representative, random sample.

Ethnic group was associated with both communication and decision-making RA. Compared to women of Akan ethnicity, Ewe women reported significantly higher levels of communication RA. Ewe people are a patrilineal people, headed by a male elder (Shoup 2011). The bivariate unadjusted associations showed that women of Ewe ethnicity typically had higher communication RA and lower decision-making RA. This may suggest that Ewe women are

more likely to involve their male partners in decision-making but are less able to make autonomous decisions, reflecting the patrilineal culture. Women of Ga-Dangme ethnicity had higher decision-making scores on average than those who were Akan. Traditional living arrangements for the two groups are likely relevant to this finding, since Ghanaian fertility decision-making often rests with extended family members as well (Akafuah and Sossou 2008). While both ethnic groups are matrilineal, the Akan traditionally live in integrated extended family compounds (de Witte 2001). In comparison, the Ga-Dangme people live in compounds but typically cluster such that men live together in one compound and women live together in another (Brittanica 2013). It is possible that this living arrangement may provide women with an opportunity to discuss these matters and navigate reproductive decisions. However, future research more heavily focused on the unique cultural context related to marital, family, and residential dynamics, in Ghana is needed to assess the extent to which these notions may or may not be explanatory.

We found that neither communication nor decision-making RA were associated with relationship status. Another study in Ghana demonstrated no significant association between whether a respondent was married and their level of sexual empowerment (Crissman, Adanu, and Harlow 2012). We speculate that is possible that due to the young age of those in the sample, relationship status was not as meaningful as girls had not yet reached marriageable age. Furthermore, our relationship status variable did not include measures of relationship quality and only provided information on relationship type. In another study in central Ghana, approximately 40% of men reported talking to their partners about contraception but this proportion varied depending on whether they were in monogamous or polygamous marriages, a factor not included in our analysis (Akafuah and Sossou 2008). In addition, the social norm influences on fertility-

related decision-making in this context may have superseded effects of the individual's relationship type for RA (Akafuah and Sossou 2008).

Previous pregnancy was associated with decreased decision-making RA, a noteworthy result. We hypothesize that perhaps, an increased rate of previous pregnancy among young women with lower levels of RA could reflect reproductive coercion from male partners resulting in pregnancy (Miller, Jordan, et al. 2010). In the Sub-Saharan African setting, all of this requires further investigation as it has not been comprehensively studied. Previous pregnancy was not associated with communication RA.

Self-reported religious denomination and frequency of religious attendance were both associated with decision-making RA (but not communication RA). Ghana is a highly religious country, with most Ghanaians in the Central and Southern regions of the country adhering to Christian faith (Ghana Statistical Service 2014). Other studies in Ghana have noted the key association between religion and reproductive behavioral outcomes, for instance finding that non-Christian women are less likely to use contraception (Nketiah-Amponsah, Arthur, and Aaron 2012; Gyimah, Adjei, and Takyi 2012). Recent research in Ghana has found that religion is not associated with other potential forms of autonomy, for instance related to economic decision-making, health seeking, and freedom of movement (Fuseini and Kalule-Sabiti 2015). While RA as a distinct and novel outcome of religiosity has not been examined in this context, related work on women's sexual empowerment also found an association between religion and sexual empowerment (Crissman, Adanu, and Harlow 2012). Other work in Ghana and elsewhere provides insights into the reasons for this association. In qualitative work in Ghana by Challa et al (2017), religion was the most frequently cited social factor associated with adolescents' SRH (Sneha Challa et al. 2017). In this study, religious teachings highlighted the immorality of

adolescent sexuality, particularly among unmarried girls, bringing their religious doctrines into conflict with their personal desires (Sneha Challa et al. 2017). These findings show that religious affiliation is likely to affect a young woman's ability to make autonomous decisions about her SRH. In an American context, Kahn and colleagues (2014) echoed these findings in their study of RA among highly religious Christian, Jewish, and Muslim women. The results of this research showed that when highly religious women's reproductive desires or goals are brought into conflict with the their desire to fulfil the expectations of their religion and their community, their RA is often compromised (Kahn et al. 2014).

In other relevant research, social networks have been shown to affect fertility decision-making in Ghana, both directly and through social norms (Akafuah and Sossou 2008). Here, we found that social approval for adolescent SRH is associated with communication RA (but not decision-making RA). That is, young women living in communities where adolescent SRH is accepted and supported are more likely to communicate with their partners about SRH decisions. The role of social context in shaping reproductive health communication and decision-making has been understudied in family planning research in Africa and elsewhere. A recent review of 17 studies from developing country contexts found that general decision-making autonomy was associated with increased use of health care services and better outcomes (Osamor and Grady 2016). However, it also highlighted the lack of consideration of social context as a major gap for research related to women's autonomy and health care decision-making (Osamor and Grady 2016). While these analyses demonstrated that social approval for adolescent SRH was only associated with the communication sub-scale, additional analyses should investigate the role of social approval for adolescent SRH and other types of RA. For example, the previously referenced study of decision-making autonomy and institutional delivery in Ghana demonstrated

that social norms around SRH served as an effect modifier such that where norms discouraged facility-based delivery, decision-making autonomy was insufficient for young women to attain their reproductive goals (Speizer, Story, and Singh 2014).

Our research also investigated the possible associations between stigma towards adolescent SRH and RA. We hypothesized that those with lower levels of stigma would report more RA (both decision-making and communication). In the field of HIV research, studies have robustly shown disclosure to partner, a form of communication, is more common among those who perceive less stigma (Vu et al. 2012). We expected the same to be true related to communication and decision-making RA. However, our analysis found null results for associations (adjusted and unadjusted) between stigma and RA. Future work should investigate the role of the social context as a potential effect modifier that alters the relationship between RA and reproductive outcomes. In addition, research including qualitative methodologies, is needed in order to understand the nuances of the relationship between SRH stigma and RA.

Limitations

Our study has a number of limitations. First, the cross-sectional nature of the study does not allow for an understanding of the temporality of the effects and therefore we cannot make causal inferences. Future research should investigate the factors that shape decision-making and communication RA among a prospective cohort perspective to examine the directionality of these relationships. For example, an individual who receives an abortion may feel empowered by this experience, increasing RA. Likewise, women with higher levels of RA may be more likely to seek abortion services. We did not assess the role of the freedom from coercion in our analysis; however, reproductive coercion has been studied by researchers in domestic and global contexts and is an important consideration in issues of RA (Grace and Fleming 2016; Grace and

Anderson 2016; Miller, Decker, et al. 2010). In addition, our adapted and abbreviated RA scales resulted in a limited measurement approach. Future work should adopt the comprehensive measures in order to better reflect the latent construct. Beyond this, social desirability reporting bias may have affected our results, particularly with the sensitive measures that we collected. Finally, this study does not investigate associations between relationship quality variables and RA, including IPV. IPV is associated with reproductive coercion and is a factor that is likely to affect women's RA.

Implications

More research on RA and how it can be incorporated into public health programming is needed in order to understand how interventions can benefit from these findings. Robust evaluations of these programs (and the inclusion of RA scales into these evaluations) can provide more evidence about the role of RA and the pathways through which it affects health behaviors and outcomes. Potential interventions may include gender accommodating or gender transformative approaches. Gender accommodating interventions are harm reduction approaches that seek to work within inequitable gender norms in order to attenuate their effects (Mandal, Muralidharan, and Pappa 2017). One example of gender accommodating interventions is the recent call for male participation in maternal and child health due to male control over household decision-making. Since men in patriarchal settings are the key decision-makers in issues of health and well-being, proponents of this approach argue that their inclusion will increase access to maternal and child health services (Ganle et al. 2016). While the inclusion of men has, in many cases, increased uptake of services, this intervention does not necessarily increase RA and does not seem to be acceptable among many Ghanaian women (Kululanga 2011; Ganle et al. 2016). Since the health care environment provides women with an opportunity to freely discuss

issues of family planning and reproductive health, women in this qualitative study reported that they were concerned that the presence of men would transform safe spaces for women into censored environments, reducing their RA (Ganle et al. 2016).

Gender transformative approaches actively engage and question existing gender norms and structures, addressing the power dynamics between the sexes and promoting the status of women (Mandal, Muralidharan, and Pappa 2017). There have been several evaluations of gender transformative interventions that demonstrate effectiveness on a range of SRH outcomes (Kraft et al. 2014). However, these evaluations have not measured the extent to which they improved women's RA or created an enabling environment. Evaluations of gender transformative approaches have demonstrated that programs have been able to affect outcomes including reductions in IPV and increases in contraceptive uptake, two outcomes that are likely associated with RA (Julie Pulerwitz et al. 2015; Kraft et al. 2014).

The results of our study indicate potential locations and structures for intervention. Given the importance of education, religion, and reproductive history covariates to RA, for instance, program implementers may also consider multi-level intervention approaches that consider schools, religious institutions, communities and health facilities/providers as potential units to address the key protective and risk factors for RA. Such approaches, while in need of further scientific investigation, may hold promise for increasing young women's RA in order to promote positive reproductive health decisions, behaviors, and outcomes in Ghana and elsewhere.

Tables for Chapter II:

Table II.1 Descriptive statistics: Determinants of Reproductive Autonomy (n=516)

Variable	n	Mean or %	SD	Min	Max
Age	516	20.97	2.38	15	24
Education					
None	37	7.2%			
Primary	80	15.5%			
Middle/JSS/JHS	191	37.0%			
Secondary/SSS/SHS	182	35.3%			
Higher (university)	26	5.0%			
Ethnic group					
Akan	266	51.6%			
Ga/Dangme	66	12.8%			
Ewe	63	12.2%			
Other	121	23.5%			
Employment					
Yes	193	37.4%			
No	323	62.6%			
Religion					
Pentecostal/Charismatic	205	39.7%			
Catholic	52	10.1%			
Anglican, Methodist, or Presbyterian	124	24.0%			
Other Christian	59	11.4%			
Muslim	68	13.2%			
None	8	1.6%			
Frequency of religious attendance					
At least once a week	404	78.3%			
At least once a month	95	18.4%			
Less than monthly	17	3.3%			
Relationship status					

Married or engaged	128	26.7%			
Cohabiting with partner	115	22.3%			
In a serious relationship but not cohabiting	161	31.2%			
Dating casually/having sex with an acquaintance	102	19.8%			
Ever pregnant					
Yes	383	74.2%			
No	133	25.8%			
Ever had an abortion					
Yes	91	17.7%			
No	422	82.3%			
Social approval for adolescent SRH	516	5.77	2.22	0	9
Stigma towards adolescent SRH	516	12.71	3.64	1	20
Communication RA scale	516	9.5	1.75	3	12
Decision-making RA scale	516	7.65	1.99	3	12

Table II.2: Bivariate associations between RA scales and covariates of interest (n=516)								
	COMMUNICATION RA SCALE				**DECISION-MAKING RA SCALE**			
Variable	**Mean score**	**Standard deviation**	**t or F or H**	**p**	**Mean score**	**Standard deviation**	**t or F or H**	**p**
Age	B=0.105	0.03	t=3.26	**0.001**	B=-0.0998	0.04	t=-2.72	**0.007**
Education			F=5.78	**<0.001**			F=.27	0.900
None	8.62	2.25			7.62	1.64		
Primary	9.26	1.71			7.79	1.91		
Middle/JSS/JHS	9.36	1.75			7.67	2.11		
Secondary	9.91	1.51			7.62	1.97		
Higher education	9.69	1.95			7.35	2.06		
Ethnic group			F=4.10	**0.007**			F=5.52	**0.001**
Akan	9.54	1.72			7.49	2.02		
Ga/Dangme	9.36	1.64			8.55	1.87		
Ewe	10.1	1.56			7.40	2.17		
Other	9.17	1.88			7.64	1.78		
Employment			t=-0.34	0.735			t=-0.397	0.691
No	9.48	0.1			7.62	0.12		
Yes	9.53	0.12			7.69	0.13		
Religion[+]			H=18.05	**0.003**			H=11.22	**0.047**
Pentecostal	9.57	1.85			7.91	2.02		
Catholic	9.65	1.56			7.60	1.73		
Anglican Methodist or Presbyterian	9.69	1.42			7.62	2.06		
Other Christian	9.69	1.63			7.10	1.86		
Muslim	8.69	1.99			7.60	1.97		
None	9.38	2.07			6.13	1.73		
Frequency of religious attendance[+]			H=4.82	0.090			H=5.88	0.053
At least once a week	9.55	1.77			7.57	2.02		
At least once a month	9.36	1.61			8.08	1.83		
Less than monthly	9.00	1.97			7.12	2.00		

Relationship status			F=1.71	0.164			F=2.23	0.084
Married or engaged	9.51	1.83			7.30	2.12		
Cohabiting with partner	9.46	1.64			7.64	1.71		
In a serious relationship but not cohabiting	9.70	1.81			7.88	2.04		
Dating casually or having sex with an acquaintance	9.21	1.63			7.75	1.98		
Ever pregnant			t=2.75	**0.006**			t=3.301	**0.001**
No	9.86	1.72			8.14	2.18		
Yes	9.38	1.74			7.48	1.89		
Ever had abortion			t=0.3405	0.734			t=-1.58	0.114
No	9.52	1.75			7.59	2.03		
Yes	9.45	1.69			7.96	1.76		
Social approval for adolescent SRH	B=0.147	0.03	t=4.30	**<0.001**	B=0.069	0.04	t=1.76	0.080
Stigma towards adolescent SRH	B=-0.040	0.021	t=-1.91	0.056	B=-0.0051	0.02	t=-0.21	0.830

Excluding where otherwise noted, statistical tests included t-tests (dichotomous variables), one-way ANOVA (categorical variables) and univariable regression models (continuous)
+ Non-parametric Kruskal-Wallis test results presented
p significant at p<0.05 as indicated by bold p-value

Table II.3: Multivariable regression model: Factors associated with communication RA (n=516)

			95% CI	
Variable	**B**	**p**	**LB**	**UB**
Age	0.08	0.118	-0.25	0.19
Education				
None	*REF*			
Primary	0.70	0.105	-0.18	1.58
Middle/JSS/JHS	0.63	0.159	-0.30	1.56
Secondary *	0.92	0.008	0.31	1.54
Higher education	0.46	0.559	-1.24	2.16
Ethnic group				
Akan	*REF*			
Ga/Dangme	-0.19	0.353	-0.62	0.24
Ewe *	0.37	0.039	0.02	0.71
Other	0.18	0.589	-0.55	0.92
Religion				
Pentecostal	*REF*			
Catholic	0.00	0.984	-0.46	0.45
Anglican Methodist or Presbyterian	0.03	0.918	-0.60	0.66
Other Christian	0.24	0.342	-0.29	0.77
Muslim	-0.74	0.214	-1.99	0.50
None	0.24	0.551	-0.63	1.11
Ever pregnant				
No	*REF*			
Yes	-0.30	0.208	-0.80	0.20
Social approval for adolescent SRH*	0.12	0.003	0.05	0.19
Stigma related to adolescent SRH	-0.02	0.514	-0.08	0.04

**p-value significant at p<0.05*

Table II.4: Multivariable regression model: Factors associated with decision-making RA (n=516)

Variable	B	p	95% CI LB	95% CI UB
Age	-0.07	0.057	-0.01	0.00
Ethnic group				
Akan	*REF*			
Ga/Dangme *	1.07	0.002	0.49	1.65
Ewe	0.01	0.970	-0.35	0.37
Other	0.29	0.125	-0.10	0.68
Religion				
Pentecostal	*REF*			
Catholic	-0.14	0.299	-0.44	0.15
Anglican Methodist or Presbyterian	-0.25	0.343	-0.81	0.31
Other Christian *	-1.00	0.003	-1.56	-0.44
Muslim	-0.09	0.758	-0.75	0.57
None	-1.24	0.131	-2.93	0.44
Frequency of religious attendance				
At least once a week	*REF*			
At least once a month *	0.49	0.043	0.02	0.96
Less than monthly	0.02	0.972	-1.23	1.27
Relationship status				
Married or engaged	*REF*			
Cohabiting with partner	0.21	0.585	-0.61	1.02
In a serious relationship but not cohabiting	0.27	0.411	-0.44	0.98
Dating casually or having sex with an acquaintance	0.09	0.798	-0.67	0.85
Ever pregnant				
No	*REF*			
Yes *	-0.64	0.008	-1.08	-0.20
Social approval for adolescent SRH	0.07	0.198	-0.04	0.19
Stigma towards adolescent SRH	0.02	0.347	-0.03	0.07

**p-value significant at p<0.05*

Chapter III: Reproductive Autonomy and Modern Contraceptive Use at Last Sex among Young Ghanaian Women

Abstract

Objective: To understand whether a modified version of a validated RA measure was associated with modern contraceptive use at last sex among young women in Ghana. We also explored the between social context variables and contraceptive use in order to explore their influence on relationships between RA and modern contraceptive use at last sex.

Methods: This analysis included 325 women between the ages of 15 and 24, sampled from health facilities and schools in Accra and Kumasi, Ghana. We tested associations between the communication RA scale and decision-making RA scale with the odds of modern contraceptive use at last sex, controlling for socio-demographic, reproductive history, and social context variables (social approval and social stigma towards adolescent SRH).

Results: The decision-making RA scale, but not the communication scale, was associated with the odds of modern contraceptive use at last sex among these women (OR=1.12, CI:1.01-1.24, p=0.028). Previous pregnancy (OR=0.29, CI:0.10-0.82, p=0.02), age (OR=1.12, CI:1.03-1.21, p=0.005), employment in the past week (OR=1.09, CI:1.06-4.12, p=0.034), and Kumasi residence (OR=9.81, CI:3.77-25.48, p<0.001) were associated with modern contraceptive use at last sex. Neither social approval for nor stigma were associated. Effects of RA persisted despite inclusion of social approval but lost significance with the addition of stigma.

Conclusions: RA was associated with modern contraceptive use among young Ghanaian women. Additional research should evaluate programs that work to increase young women's RA in order to build evidence for effective intervention models.

Key words: Reproductive autonomy, Ghana, contraception, partner

Background

Unintended pregnancy, commonly defined as pregnancy that is mistimed or unwanted, disproportionately affects socially disadvantaged women and is often related to a woman's lack of autonomy or power within a relationship (S. Singh, Sedgh, and Hussain 2010; Klima 1998; Dehlendorf et al. 2010; Eliason et al. 2014). In Ghana, the focus of this paper, 37% of all births classified are classified as unintended (Eliason et al. 2014). The relative high levels of unintended pregnancy may be related to low contraceptive use among sexually active Ghanaian women and their partners. Despite near universal (>99%) knowledge of at least one modern contraceptive method, only 22.2% of married women age 15 to 49 and 31.7% of sexually active unmarried women age 15 to 49 reported currently using a modern method of contraception (Ghana Statistical Service 2014). In this paper, we aim to build on previous research on the role of relationship dynamics to examine how the construct of RA plays a role in young Ghanaian women's contraceptive use.

Prior research on relationship dynamics and contraceptive use demonstrates the important role of relationship quality, gender norms, and power dynamics in determining the likelihood of contraceptive use. In Ghana, Cox and colleagues (2013) demonstrated that measures of relationship quality including trust, communication, and relationship satisfaction were associated with contraceptive use (Cox et al. 2013). They found that men who reported higher levels of relationship trust and improved communication reported an increased likelihood of contraceptive

use (Cox et al. 2013). Women who reported higher levels of relationship satisfaction also reported higher levels of partner dependent contraceptive method use (Cox et al. 2013). In addition, research has assessed the dyadic differences in contraceptive use reporting between husbands and wives. These data demonstrate that husbands typically report higher levels of contraceptive use than their wives, with monogamous couples reporting higher levels of concurrence than couples who are part of polygamous marriages (Becker and Costenbader 2001; Koffi et al. 2012). Among the couples examined, the largest predictor of concurrence in the reports was the couples' communication regarding family planning (Becker and Costenbader 2001; Becker, Hossain, and Thomson 2006; Koffi et al. 2012). Taken together, these findings suggest that monogamous couples may discuss their family goals and contraceptive needs more openly, facilitating contraceptive access. The studies referenced above demonstrate the partnership dynamics and communication affect likelihood of contraceptive use in global settings and in Ghana in particular.

Beyond relationship quality and communication, scholars have investigated levels of power and equity within a partnership and the roles of these factors in determining contraceptive use. For example, Stephenson and colleagues (2012) demonstrated that among men and women in Kenya and Ethiopia, increased levels of gender equitable attitudes were associated with increased odds of reported contraceptive use (Stephenson, Bartel, and Rubardt 2012). Beyond this, scholars have shown robust relationships between women experiencing intimate partner violence and their decreased odds of modern contraceptive use (Stephenson et al. 2008; Silverman and Raj 2014b). The results of these studies demonstrate the particular influence of power, equity, and violence in determining a woman's ability to use contraception. While all of

these relationship characteristics point to the potential role of power imbalances in determining contraceptive use, it is important to study the role of power and autonomy in contraceptive use. As a step towards this more specific analysis, some researchers have investigated the relationship between a woman's level of empowerment and her likelihood of using contraception. However, studies of empowerment and contraceptive use have been complicated by varied operationalization of the construct including measuring household decision-making power, mobility/ freedom of movement, and attitudes towards women's status (Hindin & Muntifering, 2011; Lee-Rife, 2010; Mumtaz & Salway, 2009; Upadhyay, Gipson, et al., 2014). In some cases, educational attainment and employment have been used as proxy indicators for women's empowerment (Upadhyay, Gipson, et al. 2014). These findings generally indicate that where a woman is more empowered, she has better SRH outcomes including lower fertility, longer birth spacing, and lower levels of unintended pregnancy (all three of which are often achieved through increased contraceptive use) (Upadhyay, Gipson, et al. 2014).

Although empowerment is a multi-faceted process, to promote specificity and comparison across studies, it is important to focus on the empowerment of women specific to their reproductive health and outcomes. The construct of RA is related to decision-making power within the context of a relationship and has been an under-explored potential determinant of contraceptive use, particularly among young women in sub-Saharan African contexts. RA is defined as "having the power to decide about and control matters associated with contraceptive use, pregnancy, and childbearing"(Upadhyay, Dworkin, et al. 2014). Conceptually, RA means that women can "control whether and when to become pregnant, whether and when to practice contraception (and which method to use), and whether and when to continue a pregnancy" (Purdy 2006).

Upadhyay, Dworkin et al. (2014) showed that higher levels of RA (using a measure reflecting communication and decision-making within an existing relationship) were negatively associated with the odds of sexual intercourse without modern contraception in the past three months (Upadhyay, Dworkin, et al. 2014). While this single study suggests a relationship between RA and contraceptive use among a cohort of women in the United States, there is less known about how this construct operates in Sub-Saharan Africa, where rates and consequences of unintended pregnancy are more severe (Upadhyay, Dworkin, et al. 2014; S. Singh, Sedgh, and Hussain 2010; Grimes et al. 2006). Furthermore, social networks and social stigma around adolescent SRH feature prominently in the SRH of young women in Ghana and similar sociocultural contexts through parental influence, community norms, and inequitable gender partnership dynamics (Ann Biddlecom, Awusabo-Asare, and Bankole 2009; Agyei et al. 2000; Clements and Madise 2004; H. Schwandt et al. 2013; Crissman, Adanu, and Harlow 2012; Stanback and Twum-Baah 2001). Yet, the effects of RA on contraceptive use in this context of strong social influence on adolescent SRH has not been investigated

To address these gaps, we sought to test the construct of RA with adolescent and young women in Ghana, including whether a modified version of a validated measure reflecting autonomy within a partnership was associated with modern contraceptive use at last sex. We hypothesized that higher levels of RA would be associated with a greater likelihood of modern contraceptive use at last sex. In addition, we examined the associations between social context variables, specifically social approval and social stigma, and contraceptive use in order to explore their influence on relationships between RA and modern contraceptive use at last sex.

Methods

Data Source

This analysis draws upon data from a larger study of adolescent SRH stigma among young women between the ages of 15 and 24 in Ghana (referred to as the parent study). The original RA-related research questions and the survey items to answer them were embedded within the parent study prospectively during the design phase (Hall et al. 2017). The team employed clustered sampling to recruit participants from four Senior High Schools within the Ghana Education Service (public, co-education, and female only), two universities (University of Ghana and Kwame Nkrumah University of Science and Technology, and five Ghana Health Service facilities (including antenatal, postnatal, family planning, and child welfare clinics). This sampling frame ensured that a diversity of SRH experiences were included in the study including young women who had given birth, used family planning, and accessed abortion services. In fact, these sites were selected so that we purposively sampled young women who reported being currently pregnant and those who had ever been pregnant. A total of 1080 young women between the ages of 15 and 24 were recruited from these facility and community-based sites in Accra and Kumasi, Ghana. While this overall sample did include young women who were sexually inexperienced, the analytic sample (n=325) (described below) excluded them from the analysis.

The present RA focused analysis explores the associations between RA within a partnership--as operationalized by Upadhyay, Dworkin, et al (2014) -- and self-reported modern contraceptive use. Because of this research question, our analytic sample excludes participants who reported that they were not currently in a relationship (n=402), had never had sex (n=331), mentioned being pregnant or pregnancy intention as a reason for not using modern contraception at last sex (n=81), and were missing data on key variables of interest (n=59). This resulted in an analytic sample of 325.

The study was approved by institutional review boards at the University of Michigan, Ghana Health Service, University of Ghana, and Kwame Nkrumah University of Science and Technology. Research assistants obtained written informed consent and then enrolled eligible participants in the study. Interviewers administered the survey on tablets using Qualtrix Mobile, a secured, web-based data collection and management system. The time to completion of the survey was dependent on reproductive experiences/histories and ranged from 30 to 90 minutes. All participants received cell phone calling credit as a token of appreciation for their time.

Measures

Dependent variable

Use of modern contraception at last sex: Respondents who reported that they had ever used a modern contraceptive method (i.e. pills, IUD, injectable contraception, condom, EC, and sterilization) were then asked whether they had used any of those seven forms of modern contraception during the last time that they had sex. Responses were coded as Yes (1) or No/Don't know (0) for each of these methods. For this analysis, a dichotomous variable was created to indicate whether a woman responded yes (1) to use of any modern method during last sex versus no (0) to any modern method use.

Independent variables

For the independent variables of interest, we measured RA via adapted items representing abbreviated sub-scales from Upadhyay, Dworkin, et al's (2014) RA scale (Upadhyay, Dworkin, et al. 2014). Specifically, we adapted items from two of the RA sub-scales - decision-making RA and communication RA. Items were selected based on their applicability to multiple domains of SRH including fertility preferences, sexual activity, modern contraceptive use, and pregnancy resolution in our specific Ghanaian context. We tested statistical models with the decision-

making sub-scale and communication sub-scales analyzed separately first, as we conceptualized the two types of RA uniquely and were interested in their potentially independent effects on contraceptive use. We also tested models with them combined into a single abbreviated RA scale. Given the consistency in effects, the final models presented reflect both sub-scales in a single model.

Decision-making RA sub-scale: The decision-making RA scale was created as a continuous variable reflecting the sum of three Likert response statements related to reproductive decision-making power. As previously mentioned, this measure is an abbreviated version of the measure developed by Upadhyay, Dworkin, et al (2014) as it is a three-item version of their four-item scale. Each of the following statements included the options of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4):

- You, not your partner, has the most say about whether you would use a method to prevent pregnancy.
- You, not your partner, has the most say about when you have a baby in your life.
- If you became pregnant but it was unplanned, you, not your partner, would have the most say about whether you would raise the child, seek adoptive parents, or have an abortion

The Cronbach's alpha for our abbreviated 3-item decision-making RA sub-scale was 0.62, demonstrating acceptable reliability. The continuously treated scale ranged from 3 to 12 and was maintained as a continuous scale in the models.

Communication RA Sub-Scale: The communication RA scale was also created as a continuous variable reflecting the sum of three statements adapted from Upadhyay, Dworkin, et al's (2014) sub-scale related to partner communication about reproductive decisions. Each of the

following statements included the options of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4):

- My partner would support me if I wanted to use a method to prevent pregnancy
- If I didn't want to have sex, I could tell my partner
- If I really did not want to become pregnant, I could get my partner to agree with me

The Cronbach's alpha for the communication RA sub-scale was 0.64, demonstrating acceptable reliability. The continuously treated scale ranged from 3 to 12. This measure was maintained as a continuous measure in the models.

Covariates

Social approval for adolescent SRH: One key covariate of interest was a measure of social approval for SRH. Young women were asked the following question for nine different social groups in their community: "Please indicate how supportive the following places or people in your community are about teens' SRH issues and needs." The social groups were: the overall community, men, women, schools, health care facilities/workers, religious centers/leaders, parents, other family members, and friends. For each of the groups, girls reported whether they were extremely supportive, somewhat supportive, somewhat unsupportive, or extremely unsupportive. Those who reported being extremely supportive or somewhat supportive were given one point while those who reported not being supportive were not provided with any points. These scores were then added to create an additive index that reflected the level of community support for SRH. The Cronbach's alpha for this index was 0.71, demonstrating acceptable reliability of the index, which ranged from a minimum score of zero to a maximum score of nine.

Social stigma around adolescent SRH: The parent study for this research developed a scale to measure stigma towards adolescent sexual and reproductive behaviors and outcomes. The stigma scale items were informed by qualitative interviews with young Ghanaian women which demonstrated three major domains of stigma in this context: enacted stigma, internalized stigma and stigmatizing lay attitudes. The team then conducted confirmatory factor analysis using a backward elimination approach to develop a final scale that consisted of 20 items (Hall et al. 2017). The final stigma scale, an additive index reflecting the degree to which the respondent agreed with stigmatizing statements, ranged from 0 to 20 with higher scores indicating higher levels of stigma.

Existing research has demonstrated a number of socio-demographic factors are associated with the use of modern contraceptives including age, religion, educational attainment and employment status (M. J. Hindin and Fatusi 2009; Blanc and Way 1998; Wood and Jewkes 2011; Hebert et al. 2013; Gyimah, Adjei, and Takyi 2012; Addai and Pokimica 2010; Upadhyay, Gipson, et al. 2014; Zanin, Radice, and Marra 2015; Mmari and Sabherwal 2013; Ainsworth, Beegle, and Nyamete 1996; Shapiro and Tambashe 1994). Given their demonstrated relevance to the outcome of interest, we include these factors and others with theoretical relevance as control variables.

Age: Age was treated as a continuous variable. Ages ranged from 15 to 24 years old.

Ethnic group: Ethnic group was measured as a categorical variable indicating the ethnic group to which the respondent belonged. Ethnic groups included Akan, Ga/Dangme, Ewe, and other ethnic groups which included all smaller ethnic groups.

Employment status: Employment in the past week was treated as a binary measure that indicated that the respondent either had (1) or had not (0) been employed in the past 7 days.

Educational attainment: Educational attainment was treated as a categorical variable and included the following categories: No formal education (reference group), Some or completed primary education, Some or completed middle school, Some or completed secondary school, and Some or completed higher (university) education.

Relationship status: Relationship status was treated as a categorical variable. Categories included those who were married or engaged (reference group), cohabiting with partner (but not married or engaged), in a serious relationship (but not cohabiting), and dating casually or having sex with an acquaintance.

Religious affiliation: Religious affiliation was treated as a categorical variable and was asked among all participants. Options included Pentecostal/Charismatic (reference group), Catholic, Anglican Methodist or Presbyterian, Other Christian, Muslim, or None.

Religious attendance: Religious attendance was measured as a categorical variable that indicated the frequency with which the respondent typically attends church or mosque. Options included at least once a week, at least once per month, and less than monthly.

City: City was treated as a binary measure indicating whether the respondent was recruited from Accra (reference) or Kumasi.

Recruitment site: Recruitment site was used as the clustering variable for the robust standard errors that were used for the analysis. Recruitment sites included health facilities (n=5), secondary schools (n=4), and universities (n=2) in Accra and Kumasi.

Ever pregnant: Pregnancy history was treated as a binary variable and was asked among those who had ever been sexually active (n=730). Those who had ever been pregnant were coded as 1 while those who had never been pregnant were coded as 0. Respondents who had never been pregnant served as the reference group.

Ever had an abortion: Abortion history was treated as a binary variable. In order to maintain adequate sample size, those who had never been pregnant and those who had been pregnant but had not had an abortion were coded as 0 and served as the reference group. Respondents who had an abortion previously were coded as 1.

Statistical Analysis

We first described young women's sociodemographic and reproductive background characteristics, social context variables, RA levels, and contraceptive use with descriptive statistics (means with standard deviations for continuous variables, frequencies with proportions for dichotomous/categorical variables). We examined bivariate associations between RA and contraceptive use at last sex and between covariates and contraceptive use at last sex using student's t-tests for continuous variables and chi square tests for categorical or dichotomous variables. We further analyzed associations between RA and contraceptive use using multivariable logistic regression models, controlling for sociodemographic, reproductive, and social context covariates. Variables were considered for inclusion in the multivariable models if they demonstrated bivariate associations greater than or equal to $p<0.10$ in the bivariate tests. We used a forward stepwise model building approach through which we progressively added each variable associated with the outcome at $p<0.10$. At each step of the analysis, we assessed model fit using the AIC values. Separate models were initially run for each RA sub-scale independently. We also tested a model including both RA sub-scales together. In an effort to be statistically parsimonious and theoretically relevant, we present reduced models. Finally, we tested the social approval and stigma variables separately in models. We controlled for recruitment site-level correlations with inclusion of robust standard errors.

All analyses were conducted in STATA 14 (College Station, TX). Results are presented as adjusted odds ratios (aORs) with 95% confidence intervals (CI) and p-values where $p<0.05$ is considered significant.

Results

Descriptive statistics

Descriptive statistics for the analytic sample are presented in Table III.1. The mean age of the sample was 21.1 years. Most respondents were of Akan ethnicity (54.46%, n=177). More of the respondents were recruited from Accra (54.47%, n=178) with the remaining 147 respondents recruited from Kumasi. The largest proportion (35.4%) of the respondents had received secondary education and only 5.9% of the girls (n=19) had received no education at all. Approximately one third (36.62%, n=119) of the sample reported that they had been employed (formally or informally) in the past week. Most of the girls were of Pentecostal or Charismatic faith (45.23%) and most of the sample (77.85%, n=253) went to church on a weekly basis. There was substantial variation in the relationship status of the girls, with the largest proportion reporting that they were in a serious relationship but not cohabiting (36.6%, n=119). In terms of reproductive history, the majority of the sample had ever been pregnant (63.1%, n=205) and 16.6% (n=54) had ever had an abortion.

Among those whom had ever used modern contraception (67.4% of sexually active women), about 47% had used modern contraception during the last time that they had sex. The mean score on the decision-making RA sub-scale was 8.01 (range: 3-12; SD=2.04) while the communication RA sub-scale had a mean score of 9.75 (range: 3-12; SD=1.69). Social approval for SRH was rather high overall; of the range from 0 of 9, the mean score for social approval for

adolescent SRH was 5.94 (SD=2.13). For the stigma scale, which ranged from 0 (low levels of stigma) to 20 (high levels of stigma), the mean score was 12.37 (SD=3.72).

This sample differed significantly from those not included in the analysis in several ways. Those included in the analytic sample were older than those not included ($p<0.001$) and all respondents were in a relationship of some kind and had ever been sexually active and used modern contraception. Those included in the analysis also had significantly higher decision-making autonomy scores ($p=0.0012$) and marginally significantly higher communication RA scores ($p=0.056$). We controlled for these differences in our models.

Bivariate associations between RA and modern contraceptive use

In unadjusted analyses (Table III.2), the mean communication RA score among those who used modern contraception was 9.94 compared to a mean communication RA score of 9.58 among contraceptive non-users ($p=0.055$). The mean decision-making RA score among those who used modern contraception was 8.03 compared to the mean decision-making RA score of 7.98 among contraceptive non-users ($p=0.826$). In the unadjusted analyses, there were no significant differences in social approval or in stigma comparing contraceptive users to non-users. The mean social approval for SRH score for non-users was 5.90 compared to 5.99 for contraceptive users ($p=0.6889$). The mean stigma score for contraceptive non-users (mean=12.68) was marginally higher than the mean for users (mean=12.03) though this difference was not significant ($p=0.1357$). Other factors associated with modern contraceptive use in unadjusted analyses included prior pregnancy ($p<0.001$), educational attainment ($p=0.002$), age ($p=0.0317$), relationship status ($p=0.025$), city ($p<0.001$), and ethnic group ($p=0.025$) (Table III.2).

Multivariable logistic regression models of RA and modern contraceptive use

In adjusted multivariable regression models (Table III.3), the decision-making RA sub-scale was associated with use of modern contraception at last sex (OR=1.12, CI: 1.01- 1.24, p=0.028). For each point increase in the decision-making RA scale, respondents experienced 1.12 times the odds of using modern contraception at last sex than those at a one-point lower score. The communication RA scale was not associated with modern contraceptive use at last sex (OR=1.03, CI=0.88- 1.19; p=0.725). Other covariates associated with modern contraceptive use in adjusted models included age (p=0.005), relationship status (p=0.055), pregnancy history (p=0.020), employment in the past week (p=0.034), and city (p<0.001) (Table 3). Educational attainment was not significantly associated with modern contraceptive use at last sex in these models.

Table III.4 presents the results of the multivariable logistic regression with the addition of the social context variables. Point estimates of the relationship between the decision-making RA subscale and use of modern contraception at last sex were stable and remained significant after controlling for social approval (Model 4: OR=1.13; CI: 1.01, 1.26; p=0.03), as did the non-significant effects of communication RA and contraceptive use. However, the inclusion of social stigma in models resulted in a loss of statistical significance in the relationship between the decision-making RA and modern contraceptive use (Model 5), although the direction of the relationships and effect sizes were generally maintained. Employment status remained significantly associated with contraceptive use in model 4 but not in model 5 (with stigma effects added). Educational attainment remained unassociated with modern contraceptive use at last sex.

Discussion

Results from these young urban Ghanaian women suggest that decision-making RA (as well as age, previous pregnancy, relationship type, employment, social approval for SRH, and city) is associated with use of modern contraception at last sex. In matters of SRH, these young women who reported having more say over use of a contraceptive method, when to have a baby, and pregnancy resolution, had higher odds of recent modern contraception use.

To our knowledge, no prior study has applied and measured these RA scales or investigated their association with modern contraceptive use in Sub-Saharan Africa. In related work across several African countries, higher levels of empowerment (operationalized using the DHS measures of household economic decision-making) have been associated with the use of female only or couple-based methods of contraception (Do and Kurimoto 2012). In their review of measures of empowerment in family planning evaluations, Mandal and colleagues recommended that researchers and program implementers review, adapt, and test existing reproductive empowerment measures (including the RA scale) in developing country contexts (Mandal, Muralidharan, and Pappa 2017). Our research has addressed this gap by applying validated items from a formal RA scale, developed in the US, to the Ghanaian context. Our findings add to this body of research by using a more precise measure of autonomy and demonstrating its relevance for family planning outcomes among young women in Ghana and provides evidence of the utility of the RA items in global settings. This work contributes to efforts to improve research methods and approaches for studying complex reproductive health phenomena in settings with high rates and severe consequences of unintended pregnancy. Decision-making autonomy items used here and adapted from Upadhyay's scale were designed to measure who makes SRH decisions, although this sub-scale does not indicate whether the partner was actually informed and involved in the decision-making process. It is unclear whether

these young women with high autonomy made decisions without the involvement of their partners or whether they were able to navigate decisions together with their partners. Results from the 2014 Ghana DHS indicate that for the majority of married women (63%), decisions about family planning are made together with their husbands (Ghana Statistical Service 2014). However, to what extent this finding holds true among women engaged in more casual relationships is not evident. In Ghana, women's responses to vignettes showed that where men are not supportive, many Ghanaian women supported covert use (Hindin, McGough, & Adanu, 2014). In older research among married urban Zambian women and their partners, Biddlecom and Fapohunda (1999) found that covert use is more common in low contraceptive prevalence settings and that it is associated with challenges in partner communication as well as male disapproval for contraception(Biddlecom & Fapohunda, 1998). In our study, we did not assess whether these young women were using their contraceptives covertly, nor were we able to statistically examine specific method types in this analysis due to sample size limitations. Additional research is needed to investigate the nature of the contraceptive decisions among women with high and low levels of decision-making autonomy in order to determine the level of partner engagement in these decisions and the impact on use of different methods, including female controlled, concealable methods such as Depo Provera and the IUD.

Our findings linking RA to reproductive health outcomes within our Ghana sample are generally consistent with those from the Upadhyay, Dworkin, et al's sample of American women in which the scale was developed. In the American sample, women who had higher autonomy were 13% less likely to have had unprotected sex in the past three months (Upadhyay, Dworkin, et al. 2014); though this effect size, while in the expected direction and comparable to ours, did not reach significance in their adjusted models. Together, these results may suggest that the

construct of decision-making autonomy operates similarly in regards to family planning behaviors in quite different geographical settings and social contexts. In contrast to our null findings for communication autonomy, though, communication autonomy was significantly associated with a 32% reduction in likelihood of unprotected sex in the Upadhyay et al. (2014) study. Reasons for our null findings and these differences across study settings and samples are not fully clear. It may be that the construct of communication autonomy, which approximates partner conversation and communication related to reproductive health issues, may be less salient among this African sample of young women. Instead of navigating decisions within a partnership, it is possible that Ghanaian young women who have high decision-making autonomy may simply seek out and use a method without partner knowledge or approval. Such a notion requires further investigation.

Another potential explanation for the null findings could be related to the sociocultural and community influences on SRH in Ghana, which we began to explore here. In other analyses of these data not yet published, we are finding that social approval for SRH is associated with communication RA among this sample. Here though, its inclusion in models of contraceptive use did not affect the RA estimates, nor was it associated with contraceptive use. Additional research on potential interactions between RA and social context are needed.

Inclusion of stigma related to adolescent SRH, on the other hand, did appear to affect the relationships between decision-making (but not communication) RA and modern contraceptive use at last sex, though the statistically significant changes in point estimates were perhaps not clinically or practically relevant. Stigma was not associated with the modern contraceptive use in this sub-sample analysis (although it was associated with contraceptive use in the larger parent study) (Hall et al. 2017). Inconsistent results for the two social context variables create

opportunities for additional inquiry around the specific types of social influence that may be important for understanding RA and contraceptive use in this context. This may help to clarify the ways in which these results differ from those in the American context. Future studies, employing qualitative methods, may help to better understand the experiences of young African women as they negotiate contraceptive use and the role of communication and other specific types of autonomy on shaping family planning outcomes, including the use of couple-based or coital dependent contraceptive methods that require communication and negotiation.

Limitations

This study has several important limitations. Adapted and abbreviated RA scales used here resulted in a limited measurement approach, one which may not have been as valid, reliable and robust in comprehensively describing the latent constructs. In addition, given the sensitivity of the survey content and the self-reported nature of these data, social desirability reporting bias cannot be ruled out. Beyond this, the sampling approach limits the inferences that can be made about these data; the design included a cross-sectional purposive sample of urban young women in Ghana. While women with higher levels of RA may be more likely to subsequently use modern contraceptives, it is also possible that the act of using modern contraceptives itself increases the RA of the young women. The design of this study does not allow for us to tease out the nature of this relationship and the pathways through which RA and contraceptive use interact. Prospective studies are needed to better estimate temporal associations between RA and contraceptive use, given that bidirectional relationships between family planning decision-making and behaviors and levels of RA are likely possible. Additionally, recruitment of women from more diverse settings and samples, including in other countries with potentially differing sociocultural and political contexts around reproductive health issues are needed to generalize

findings beyond our Ghanaian context. Finally, these data lack the partner perspective, which Becker and colleagues have shown to be an important component of understanding modern contraceptive use (Becker, Hossain, and Thomson 2006). Partner level data and partner perspectives of reproductive decision-making would result in a more robust understanding of RA in this setting, especially in regards to the effects of intimate partner violence (IPV), an experience that has been demonstrated to be associated with both RA as well as modern contraceptive use in U.S. research (Miller, Decker, et al. 2010; Miller, Jordan, et al. 2010; Upadhyay, Dworkin, et al. 2014). Future studies are needed to explore the relationships between IPV, RA, and family planning outcomes among young women in Africa.

Implications

Despite these limitations, the results from this research have several implications for public health research, programs and practice. In addition to the above-described areas for inquiry building upon the limitations noted, additional studies, using more comprehensive measures of RA and repeated-measures designs among randomly selected representative populations to prospectively assess the influence of changes in RA on contraceptive use patterns can offer additional insights into the temporal and dynamic relationships between the measures. The parent study in which this research was embedded demonstrated an association between community-level stigma and modern contraceptive use (Hall et al. 2017). Additional work should also be done to develop and include a community-level RA sub-scale for contexts where partnership decision-making may be an important but inadequate determinant in autonomous reproductive decision-making. Furthermore, this study highlighted consistent strong associations between employment and contraceptive use at last sex, even when controlling for decision-making and communication RA. However, educational attainment, often used as a proxy

measure for women's empowerment, was not associated in the multivariable models. Additional research should assess the reasons for this difference in associations and the ways that these conventional measures of empowerment interact with RA.

Given that RA is likely a modifiable factor, the results of this study have programmatic implications including the role of gender transformative interventions, interventions that are designed to "reshape gender relations to be more gender equitable" (Dworkin, Fleming, and Colvin 2015). These interventions often focus on changing the ways that men and women 'perform' gender to promote equity among men and women and have been shown to be effective with regard to improvements in sexual and reproductive outcomes among both men and women (Dworkin, Fleming, and Colvin 2015). Gender transformative interventions have the potential to provide young women with the knowledge, confidence, and negotiation skills to make pregnancy, contraceptive, and abortion-related decisions. They can also address notions of masculinity and allow men to perform another, more equitable type of masculinity. Thus, the reshaping of gender norms will likely result in the equalizing of power dynamics, subsequently increasing young women's levels of RA. The most effective approaches may target norms and decision-making within the partnership as well as within communities in which SRH is stigmatized and RA may not be fostered. These interventions, including robust evaluation designs, are necessary in order to improve RA and thus improving the health and well-being of young women around the world.

Overall, this study demonstrates that RA, while a valuable outcome in and of itself due to the established value of reproductive rights, is also important for young women's SRH outcomes in this Sub-Saharan African context. While this research demonstrated the importance of RA to modern contraceptive use at last sex, additional work should investigate the effects of RA on

other SRH outcomes including pregnancy resolution decision-making, condom use, and timing of children. In addition, program implementers should develop, implement, and evaluate novel gender transformative interventions to generate a body of evidence in how to increase and sustain young women's RA. Our results demonstrate that RA is an understudied contributor to contraceptive use among young Ghanaian women. Interventions to promote RA have the potential to increase use of modern contraception, thereby reducing rates of unintended pregnancy and associated negative outcomes.

Tables for Chapter III:

Table III.1: Descriptive statistics among sexually active young women in a relationship who ever used modern contraception (n=325)

VARIABLE	mean or %	SD or n	Min	Max
Basic demographic characteristics				
Age	21.08	2.28	15	24
Education				
None	5.85	19		
Primary	15.08	49		
Middle/JSS/JHS	36.00	117		
Secondary/SSS/SHS	35.38	115		
Higher (university)	7.69	25		
Religion				
Pentecostal/Charismatic	45.23	147		
Catholic	11.08	36		
Anglican, Methodist, or Presbyterian	22.77	74		
Other Christian	11.38	37		
Muslim	8.31	27		
None	1.23	4		
Religious attendance				
At least once a week	77.85	253		
At least once a month	19.08	62		
Less than monthly	3.08	10		
Employment in the past 7 days				
Not employed	63.38	206		
Employed	36.62	119		
Relationship status				
Married or engaged	24.62	80		
Cohabiting with partner	19.69	64		
In a serious relationship but not cohabiting	36.62	119		
Dating casually, having sex, or other relationship	19.08	62		
Ethnic group				
Akan	54.46	177		
Ga/Dangme	14.15	46		
Ewe	11.69	38		
Other	19.69	64		
City				
Accra	54.77	178		

Kumasi	45.23	147		
Reproductive history variables				
Ever pregnant				
No	36.92	120		
Yes	63.08	205		
Ever had an abortion				
No	83.38	271		
Yes	16.62	54		
Independent variables of interest				
Decision-making RA scale	8.01	2.04	3	12
Communication RA scale	9.75	1.69	3	12
Social approval for adolescent SRH	5.94	2.13	0	9
Stigma towards adolescent SRH	12.37	3.72	1	20
Outcome variable				
Used modern contraception at last sex	47.69	155		
Did not use modern contraception at last sex	52.31	170		

Table III.2: Bivariate associations between covariates and use of modern contraception at last sex among sexually active young Ghanaian women in a relationship (n=325)

	Did NOT use FP (n=170)	Used FP (n=155)	t or chi square	p
Decision-making RA scale	7.98	8.03	-0.22	0.826
Communication RA scale	9.58	9.94	-1.93	0.055
Social approval for adolescent SRH	5.90	5.99	-0.40	0.689
Stigma towards adolescent SRH	12.68	12.03	1.50	0.136
Ever pregnant*			14.89	<0.001
No	38.33	61.67		
Yes	60.49	39.51		
Ever had abortion			0.68	0.411
No	51.29	48.71		
Yes	57.41	42.59		
Religion			7.15	0.210
Pentecostal/Charismatic	57.14	42.86		
Catholic	44.44	55.56		
Anglican, Methodist, or Presbyterian	43.24	56.76		
Other Christian	48.65	51.35		
Muslim	66.67	33.33		
None	50.00	50.00		
Education*			17.04	0.002
None	57.89	42.11		
Primary	71.43	28.57		
Middle/JSS/JHS	54.70	45.30		
Secondary/SSS/SHS	46.96	53.04		
Higher (university)	24.00	76.00		
Age*	20.81	21.36	-2.16	0.032

Relationship status*			9.34	0.025
Married or engaged	51.25	48.75		
Cohabiting with partner	67.19	32.81		
In a serious relationship but not cohabiting	51.26	48.74		
Dating casually, having sex, or other relationship	40.32	59.68		
Employed in the past 7 days			3.61	0.057
Unemployed	56.31	43.69		
Employed	45.38	54.62		
City*			57.19	<0.001
Accra	71.35	28.65		
Kumasi	29.25	70.75		
Religious attendance			4.11	0.128
At least once a week	49.41	50.59		
At least once a month	61.29	38.71		
Less than monthly	70.00	30.00		
Ethnic group*			9.31	0.025
Akan	45.76	54.24		
Ga/Dangme	69.57	30.43		
Ewe	52.63	47.37		
Other	57.81	42.19		

Student's t-tests used for continuous variables; chi-squared tests for categorical and dichotomous variables
**p-value significant at p<0.05*

Table III.3: Multivariable regression models: RA and modern contraceptive use at last sex

	Model 1: Decision-making RA model (n=325)				Model 2: Communication RA model (n=325)				Model 3: Inclusion of both RA scales in same model (n=325)			
			95% CI				95% CI				95% CI	
Variable	**OR**	**p**	**LB**	**UB**	**OR**	**p**	**LB**	**UB**	**OR**	**p**	**LB**	**UB**
Decision-making RA scale	1.12	0.021*	1.02	1.24	-	-	-	-	1.12	0.028*	1.01	1.24
Communication RA scale	-	-	-	-	1.04	0.545	0.91	1.19	1.03	0.725	0.88	1.19
Ever pregnant	0.29	0.018*	0.10	0.81	0.28	0.019*	0.10	0.81	0.29	0.02*	0.10	0.82
Age	1.12	0.003*	1.04	1.21	1.09	0.042*	1.00	1.18	1.12	0.005*	1.03	1.21
Relationship status												
Married or engaged	1.00	-	-	-	1.00	-	-	-	1.00	-	-	-
Cohabiting with partner	0.65	0.111	0.38	1.11	0.62	0.093	0.36	1.08	0.65	0.113	0.38	1.11
In a serious relationship but not cohabiting	1.70	0.296	0.63	4.62	1.63	0.313	0.63	4.21	1.70	0.294	0.63	4.58
Dating casually/having sex with an acquaintance	2.32	0.053	0.99	5.45	2.21	0.059	0.97	5.04	2.34	0.055	0.98	5.59
Employed (referent group: unemployed)	2.08	0.034*	1.06	4.10	2.14	0.03*	1.07	4.27	1.09	0.034*	1.06	4.12
Education												
None	1.00	-	-	-	1.00	-	-	-	1.00	-	-	-
Primary	0.83	0.635	0.39	1.77	0.79	0.470	0.43	1.48	0.82	0.554	0.42	1.60
Middle/JSS/JHS	0.75	0.443	0.36	1.57	0.76	0.484	0.34	1.66	0.74	0.440	0.35	1.58
Secondary/SSS/SHS	1.01	0.968	0.55	1.87	1.00	0.992	0.55	1.84	1.00	0.989	0.55	1.80
Higher (university)	1.20	0.809	0.28	5.21	1.19	0.829	0.25	5.61	1.19	0.814	0.27	5.25
Kumasi (referent group: Accra)	9.98	<0.001*	3.90	25.51	8.64	<0.001*	3.75	19.93	9.81	<0.001*	3.77	25.48

**p-value significant at p<0.05*

Table III.4: Multivariable regression models of RA and modern contraceptive use at last sex including social context variables

	Model 3: No social context (n=325)				Model 4: Social approval (n=309)				Model 5: Stigma scale (n=301)			
			95% CI				95% CI				95% CI	
	OR	p	LB	UB	OR	p	LB	UB	OR	p	LB	UB
Decision-making RA scale	1.12	0.028*	1.01	1.24	1.13	0.028*	1.01	1.26	1.11	0.101	0.98	1.26
Communication RA scale	1.03	0.725	0.88	1.19	1.00	0.994	0.84	1.18	1.01	0.848	0.87	1.18
Social approval for adolescent SRH	-	-	-	-	0.96	0.407	0.87	1.06	-	-	-	-
Social stigma towards adolescent SRH	-	-	-	-	-	-	-	-	1.01	0.701	0.94	1.09
Ever pregnant	0.29	0.02*	0.10	0.82	0.32	0.032*	0.12	0.91	0.32	0.038*	0.11	0.94
Age	1.12	0.005*	1.03	1.21	1.12	0.002*	1.04	1.21	1.12	0.008*	1.03	1.23
Relationship status												
Married or engaged	1.00	-	-	-	1.00	-	-	-	1.00	-	-	-
Cohabiting with partner	0.65	0.113	0.38	1.11	0.70	0.163	0.43	1.15	0.78	0.334	0.46	1.30
In a serious relationship but not cohabiting	1.70	0.294	0.63	4.58	1.82	0.232	0.68	4.88	1.77	0.290	0.61	5.09
Dating casually/having sex with an acquaintance	2.34	0.055	0.98	5.59	2.53	0.022*	1.14	5.62	2.77	0.016*	1.21	6.38
Employed (referent group: unemployed)	1.09	0.034*	1.06	4.12	2.25	0.035*	1.06	4.76	2.03	0.060	0.97	4.27
Education												
None	1.00	-	-	-	1.00	-	-	-	1.00	-	-	-
Primary	0.82	0.554	0.42	1.60	0.85	0.654	0.43	1.70	0.86	0.670	0.43	1.71
Middle/JSS/JHS	0.74	0.440	0.35	1.58	0.86	0.721	0.39	1.92	0.74	0.429	0.35	1.55
Secondary/SSS/SHS	1.00	0.989	0.55	1.80	1.13	0.753	0.54	2.35	1.06	0.838	0.59	1.93
Higher (university)	1.19	0.814	0.27	5.25	1.20	0.815	0.26	5.63	1.38	0.608	0.40	4.71
Kumasi (referent group: Accra)	9.81	<0.001*	3.77	25.48	10.81	<0.001*	3.98	29.36	10.46	<0.001*	4.13	26.48

**p-value significant at p<0.05*

Chapter IV: Reproductive Autonomy and Pregnancy Decision-making among Young Ghanaian Women

Abstract

Objective: Pregnancy decision-making regarding the outcome of a pregnancy may include participation of the woman herself, her sexual partner, parents, family, and/or community. This paper considers pregnancy decision-making by examining who had the most say in the outcome of young Ghanaian women's last pregnancy and whether this correlates with her level of reproductive autonomy (RA).

Methods: We analyzed cross-sectional survey data from 380 previously pregnant young women ages 15 to 24 sampled from health facilities and schools in Accra and Kumasi, Ghana. We measured communication RA and decision-making RA using modified summative scales that ranged from 3 (low RA) to 12 (high RA). Using one-way ANOVA and chi-squared tests, we tested unadjusted associations between the RA sub-scales and who made the pregnancy decision (self, partner, both together, or someone else). We then used multinomial regression models to understand these associations when controlling for important covariates including socio-demographic, reproductive history, and social context variables.

Results: The pregnancy decision-maker varied for each woman, with the majority reporting having made the decision about the outcome of their last pregnancy equally together with their partner (46.1%), and fewer reporting that their partners had the most say (20.5%), that they themselves had the most say (18.2%), or that someone else had the most say (15.3%). In final multinomial regression models, a one-point increase in the decision-making RA scale was

associated with an adjusted relative risk ratio of 0.79 (95% CI: 0.66-0.93; p=0.006) of partner having the most say as compared to the woman having the most say. The communication RA scale was not associated with the pregnancy decision-making outcome.

Conclusions: In this study, decision-making RA--but not communication RA--was associated with decreased risk of partners making pregnancy decisions compared to the woman making her own decision. Programs aimed at increasing RA may be effective in increasing their rights to make and execute decisions about their reproductive health and outcomes. Future research should explore this notion and the role of pregnancy disclosure in this relationship.

Key words: Reproductive autonomy, Ghana, pregnancy decision-making

Introduction

With an unwanted pregnancy, women are faced with the decision of whether to terminate the pregnancy or continue the pregnancy to birth. Given access to the best health services and skilled attendants, both pregnancy outcomes can be safely achieved. In low- and middle-income countries and in places with high levels of wealth inequality, maternal death rates are often higher due to reduced access to life-saving services for some women. The Sub-Saharan African region has the highest Maternal Mortality Ratio (MMR) with 546 maternal deaths per 100,000 live births and a 1 in 36 lifetime risk of maternal death for women (World Health Organisation 2015). Ghana, the site of this research, has a MMR of 319 per 100,000 live births which is higher than the global average of 216 per 100,000 live births (World Health Organisation 2015). Abortion itself is a leading cause of maternal death in Ghana (Lee et al. 2012; Der et al. 2013; Ahiadeke 2001; Mills et al. 2008; Baiden et al. 2006). Beyond these maternal deaths, many

women survive the aforementioned complications but experience severe maternal morbidity (Tunçalp et al. 2012).

Approximately one-fifth of women in Ghana (20%) report that they have had a pregnancy where the outcome was an abortion (Ghana Statistical Service (GSS)/Ghana Health Service (GHS)/ICF International 2018). The Ghanaian abortion policy allows for women to choose pregnancy termination if the pregnancy would risk the life of the woman or would have negative implications for her physical or mental health, though physicians interpret these outcomes liberally (H. M. Schwandt et al. 2011; Sundaram et al. 2012; Morhee and Morhee 2006). Nonetheless, Ghanaian women often seek abortions outside of the health system, which are often unsafe, due to misinformation about the law, the stigma related to accessing abortion services, and/or challenges in accessing safe and legal abortion services (Sundaram et al. 2012; H. M. Schwandt et al. 2013; Oduro and Otsin 2014). According to the Ghana Medical Journal, as many as 20.8% of maternal deaths in Ghana are attributable to unsafe abortions performed by unskilled persons or in non-regulated environments (Der et al. 2013).

Despite the potential health risks posed by child-bearing and abortion, women's pregnancy decision-making processes, including who made or contributed to the decision, have been under-investigated in Sub-Saharan Africa. The language used in these studies to refer to this process includes "reproductive and abortion decision-making", "women's motives for pregnancy termination", and "pregnancy decision-making" (Tatum et al. 2012; Rosen 1980). For the purposes of this paper, we use the term "pregnancy decision-making" to refer to who is has the most say in the decision-making process regarding the outcome of an existing pregnancy regardless of whether pregnancy is terminated or continued.

A few existing studies have examined pregnancy decision-making following an unintended pregnancy (Tatum et al. 2012; Rosen 1980; Ekstrand et al. 2009; Loke and Lam 2014; Lohan et al. 2013). For the most part, these studies have been conducted in more developed countries including Mexico, the United States, Hong Kong, and Sweden and have largely used qualitative methods to understand the process of making pregnancy outcome decisions and the influential others who may be involved in these decisions (Rosen 1980; Tatum et al. 2012; Ekstrand et al. 2009). These studies demonstrate that pregnancy decision-making is a complex process, often including the woman herself, her partner or significant others, her family and community members (Hoggart 2012; Lohan et al. 2013; Loke and Lam 2014). Often, the male partner is noted as playing a key role in these decisions. (Loke and Lam 2014; Lohan et al. 2013; H. M. Schwandt et al. 2013). For example, young women in Hong Kong reported that their boyfriend was usually the first person that they told about the pregnancy and they described both supportive and unsupportive influences on the pregnancy decision (Loke and Lam 2014). In this small qualitative study of adolescents, women whose relationships were not well-established described men's influence as indirect through complaints and denial of pregnancy and these pregnancies were often terminated (Loke and Lam 2014). Studies have also demonstrated that parents, and mothers in particular, sometimes have a role in making the pregnancy decision (Izugbara, Otsola, and Ezeh 2009; Sneha Challa et al. 2017). A qualitative study in Kenya including male and female respondents, for example, demonstrated that mothers often provide informational support to their daughters on where and how to access abortion services (Izugbara, Otsola, and Ezeh 2009). Beyond these significant interpersonal influences, Hoggart (2012), in a study in the England, describes the strong influence of society and societal value judgements in the pregnancy decision-making process. Hoggart reports that young women

often struggle to reconcile their situation and needs with the dominant social narrative, increasing their anxiety and potentially affecting coping post-pregnancy (Hoggart 2012). While the aforementioned existing literature is helpful for exploring the decision-making process, these studies have been limited in their ability to quantify the prevalence with which each actor exerts control, and in the ability to understand the factors that are associated with others asserting their decision over the choice of the woman herself.

In Ghana, some primarily qualitative research has investigated the role of male partners, key figures in woman's social network, in women's pregnancy decision-making (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014; H. M. Schwandt et al. 2013; Oduro and Otsin 2014). Women in all three Ghanaian studies described the complexity of these decisions and the direct and indirect roles that others played in the decisions (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014; H. M. Schwandt et al. 2013; Oduro and Otsin 2014). Consistent with the data from Hong Kong, indirect influences included partner-level factors that affected the woman's perspective on whether this pregnancy should result in a birth (e.g. partner unemployment/lack of financial means) as well as the partner denying responsibility for the pregnancy and/or withdrawing financial support (H. M. Schwandt et al. 2013). Direct influences included partner 'orders' about the partner's desired outcome of the pregnancy (H. M. Schwandt et al. 2013). All three studies demonstrated that the relationship between the woman and her male partner was a key factor in determining the nature of pregnancy decision-making. Based on this finding, there is a need for more research on factors associated with who makes decisions about pregnancies. Only one study accounted for the role of the woman's mother and of other family members and friends in pregnancy decision-making (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). The team found that in 8% of cases, the woman's mother was involved and that about 5% of cases included

others (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). Additional research on others' participation in the pregnancy decision is needed.

Beyond the direct and indirect role of a woman's social network, these studies also point to the importance of the social context in the decision-making process. One study demonstrated that choosing abortion to resolve an unwanted pregnancy among adolescent women is a means of avoiding the shame and stigma associated with non-marital child-bearing (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). While abortion carries its own stigma, avoiding the evidence of premarital sex through the termination of a pregnancy is also a stigma avoidance strategy among some young women (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). In this study, some women also chose pregnancy termination because they felt that this decision had restored their power and control over their sexual health following an unintended pregnancy (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014; Oduro and Otsin 2014). In these cases, the pregnancy decision was a source of empowerment and reclaiming their control over their bodies, their fertility, and their sexual health. Thus, pregnancy decision-making is a process that includes influences of partners and family members as well as complex social and contextual influences.

Reproductive Autonomy

Perhaps even less is known about individual-level or women-centered factors that influence pregnancy decision-making and the outcome of the pregnancy. One factor that may play an important role in whether a woman decides the outcome of her pregnancy is her level of reproductive autonomy (RA). RA is defined as "having the power to decide about and control matters associated with contraceptive use, pregnancy, and childbearing," and is a key factor that may be associated with pregnancy decision-making (Upadhyay, Dworkin, et al. 2014). A woman's level of RA reflects the extent to which she is able to execute her reproductive

decisions free from undue influence from her partner, family, community, and government. As discussed further in the description of the measures, RA encompasses several domains including decision-making RA (i.e. the power to make reproductive decisions) and communication RA (i.e. a young woman's ability to discuss reproductive decisions with her partner). RA has demonstrated associations with contraceptive use in samples of American (Upadhyay, Dworkin, et al. 2014) and Ghanaian women (Paper 2 of this dissertation).

Although RA conceptually encompasses a woman's autonomy related to the SRH domains of sexual activity, pregnancy, and pregnancy outcomes, the relationship between RA and pregnancy decision-making has not been previously studied to our knowledge. However, Kumi-Kyereme and colleagues found an association between employment—a relatively common proxy for women's empowerment--and pregnancy decision-making with the highest proportion of self-employed reporting that they had the most say (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). Therefore, we would expect that RA, a specific measure of empowerment related to SRH, would be associated with pregnancy decision-making. We hypothesize that young women with higher levels of decision-making RA are more likely to have the most say in pregnancy decisions rather than partners or others having the most say. Alternatively, we hypothesize that communication RA, a measure of a woman's ability to negotiate SRH with her partner, is associated with a woman and her partner making the decision together as compared to her making it alone. To our knowledge, these relationships have not been explored.

We sought to investigate this relationship among a sample of previously pregnant young women in Ghana. Given importance of stigma and social influence on pregnancy decision-making, this paper will also investigate the role of social context through inclusion of the variables of social approval for adolescent SRH and stigma towards adolescent SRH.

Methods

Data Source

This research was conducted as a secondary analysis within a larger study regarding stigma related to adolescent SRH among young women between the ages of 15 and 24 in Ghana (referred to as the parent study). The original RA-related research questions and associated survey items were embedded within the parent study prospectively during the design phase (Hall et al. 2017). The team employed clustered sampling to purposively recruit participants from four Senior High Schools within the Ghana Educational Service (public, co-education, and female only), two universities (University of Ghana and Kwame Nkrumah University for Science and Technology, and five Ghana Health Service facilities (including antenatal, postnatal, family planning, and child welfare clinics). This sampling frame was used in order to increase the likelihood of including diverse SRH experiences (previous birth, pregnancy status, family planning use, abortion history) in the sample. Using this approach, a total of 1,080 young women between the ages of 15 and 24 were recruited from these facility and community-based sites in Accra and Kumasi, Ghana. While this overall sample did include young women who were sexually inexperienced or had never been pregnant, we only analyze data from women who report having previously been pregnant (regardless of pregnancy outcome; n=523).

The present RA-focused analyses explore the associations between RA within a partnership--as operationalized by Upadhyay, Dworkin, et al (2014) --and who was involved in pregnancy decision-making, a novel SRH outcome. Because of this research question, our analytic sample comprises participants who reported that they were currently in a relationship, reported a previous pregnancy, and were not missing data on key variables of interest (n=380).

The study was approved by institutional review boards at the University of Michigan, Ghana Health Service, University of Ghana, and Kwame Nkrumah University of Science and Technology. Prior to enrolling eligible participants into the study, research assistants obtained written informed consent. Interviewers administered the survey on tablets using Qualtrix Mobile, a secured, web-based data collection and management system. The time to completion of the survey ranged from 30 to 90 minutes. All participants received cell phone calling credit as a token of appreciation for their time.

Measures

Dependent variable

Pregnancy decision-making: Respondents who reported that they had previously been pregnant were asked about their decision-making experience at last pregnancy. Participants were asked: "Who had the most say in the decision about the outcome of your last pregnancy?" Response options included: 1) I had the most say, 2) My partner had the most say, 3) My partner and I decided equally together, and 4) Someone else decided. We operationalized this outcome as a 4-point categorical outcome in multinomial regression models, with 'I had the most say' as the reference. We selected 'I had the most say' as the reference outcome given our hypotheses about RA and the nature of this option as a potentially more empowered position.

Independent variables

For the independent variables of interest, we measured RA using adapted items representing abbreviated sub-scales from Upadhyay, Dworkin, et al's (2014) RA scale (Upadhyay, Dworkin, et al. 2014). Specifically, we adapted items from two of the RA sub-scales - decision-making RA and communication RA. These scales largely reflect RA within the context of a partnership. Items were selected based on their applicability to multiple domains of

SRH including fertility preferences, sexual activity, modern contraceptive use, and pregnancy resolution in our specific Ghanaian context. All items in the survey were translated into Twi by the research team after discussing the intended meaning of each question.

Decision-making RA scale: The decision-making RA scale was created as a continuous variable reflecting the sum of three Likert response statements related to reproductive decision-making power. As previously mentioned, this measure is an abbreviated version of the measure developed by Upadhyay, Dworkin, et al (2014) and is a three-item version of their four-item scale. Each of the following statements included the response options of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4):

- You, not your partner, has the most say about whether you would use a method to prevent pregnancy.
- You, not your partner, has the most say about when you have a baby in your life.
- If you became pregnant but it was unplanned, you, not your partner, would have the most say about whether you would raise the child, seek adoptive parents, or have an abortion

The Cronbach's alpha for our abbreviated 3-item decision-making RA sub-scale in this sample was 0.62, demonstrating acceptable reliability for the scale. The continuously treated scale ranged from 3 to 12 and was maintained as a continuous scale in the models to maximize variance.

Communication RA scale: The communication RA scale was also created as a continuous variable reflecting the sum of three statements adapted from Upadhyay, Dworkin, et al's (2014) sub-scale related to partner communication about reproductive decisions. Each of the following statements included the options of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4):

- My partner would support me if I wanted to use a method to prevent pregnancy
- If I didn't want to have sex, I could tell my partner
- If I really did not want to become pregnant, I could get my partner to agree with me

The Cronbach's alpha for the communication RA sub-scale in this sample was 0.64, demonstrating acceptable reliability. The continuously treated scale ranged from 3 to 12. This measure was maintained as a continuous measure in the models.

Covariates

Social approval for adolescent SRH: One key covariate of interest was a measure of social approval for adolescent SRH. Young women were asked the following question for nine different social groups in their community: "Please indicate how supportive the following places or people in your community are about teens' SRH issues and needs." The social groups were: the overall community, men, women, schools, health care facilities/workers, religious centers/leaders, parents, other family members, and friends. For each of the groups, girls reported whether they were extremely supportive, somewhat supportive, somewhat unsupportive, or extremely unsupportive. Those who reported being extremely supportive or somewhat supportive were given one point while those who reported not being supportive were not provided with any points. These scores were then added to create an additive index that reflected the level of community support for SRH. The Cronbach's alpha for this index was 0.71, demonstrating acceptable reliability of the index, which ranged from a minimum score of zero to a maximum score of nine.

Social stigma around adolescent SRH: The parent study for this research developed a scale to measure stigma towards adolescent sexual and reproductive behaviors and outcomes. The stigma scale items were informed by qualitative interviews with young Ghanaian women

which demonstrated three major domains of stigma in this context: enacted stigma, internalized stigma and stigmatizing lay attitudes. The team then conducted confirmatory factor analysis using a backward elimination approach to develop a final scale that consisted of 20 items (Hall et al. 2017). The final stigma scale, an additive index reflecting the degree to which the respondent agreed with stigmatizing statements, ranged from 0 to 20 with higher scores indicating higher levels of stigma.

Age: Age was treated as a continuous variable. Ages ranged from 15 to 24 years old.

Educational attainment: Educational attainment was treated as a categorical variable and included the following categories: 1) No formal education or primary education (reference group), 2) Some or completed middle school, and 3) Some or completed secondary school or higher education.

Religious affiliation: Religious affiliation was treated as a categorical variable and was asked among all participants. Options included 1) Pentecostal/Charismatic, the predominant religion in Ghana (reference group) and 2) other religious groups.

Employment status: Employment in the past week was treated as a binary measure that indicated that the respondent either had (1) or had not (0) been employed in the past 7 days.

Relationship status: Relationship status was treated as a categorical variable. Categories included those who were married or engaged (reference group), cohabiting with partner (but not married or engaged), in a serious relationship (but not cohabiting), and dating casually or having sex with an acquaintance.

Ethnic group: Ethnic group was measured as a categorical variable indicating the ethnic group to which the respondent belonged. Ethnic groups included Akan (the predominant ethnic

group) and other non-primary ethnic groups. The other ethnic groups included Ga/Dangme, Ewe, and other smaller ethnic groups. The Akan served as the reference group.

City: City was treated as a binary measure indicating whether the respondent was recruited from Accra (reference) or Kumasi.

Recruitment site: Recruitment site was used as the clustering variable for the robust standard errors that were used for the analysis. Recruitment sites included health facilities (n=5), secondary schools (n=4), and universities (n=2) in Accra and Kumasi.

Ever had an abortion: Abortion history was treated as a binary variable reflecting those who had ever (1) and had never (0) had an abortion.

Statistical Analysis

The analytic sample for this analysis included those who had ever been pregnant and reported currently being in some kind of relationship (n=380). Since the RA items related largely to autonomy within partnerships, women were only asked the RA questions if they reported being in a relationship. We first described young women's sociodemographic and reproductive background characteristics, social context variables, RA levels, and pregnancy decision-making with descriptive statistics (means with standard deviations for continuous variables, frequencies with proportions for dichotomous/categorical variables). We examined bivariate associations between RA and pregnancy decision-making and between covariates and pregnancy decision-making using one-way ANOVA for continuous variables and chi square tests for categorical or dichotomous variables. We further analyzed associations between RA and pregnancy decision-making using multivariable multinomial regression models, controlling for sociodemographic, reproductive, and social context covariates. Variables were considered for inclusion in the multivariable models if they demonstrated bivariate associations with $p<0.10$. We used a forward

stepwise model building approach through which we first included RA variables (both sub-scales), then added socio-demographic characteristics, and finally social context variables. We controlled for recruitment site-level correlations with inclusion of robust standard errors.

Finally, we were interested in whether or not who was involved in pregnancy decision-making varied by whether or not the decision had resulted in an abortion or live birth. The pregnancy decision-making question referred to the woman's *last* pregnancy, but this survey did not ask about the outcome of the that particular pregnancy. Given this limitation, in order to explore this potential relationship, we analyzed data from a sub-set of 159 women who reported just one previous pregnancy. Women were asked if they had *ever* given birth or *ever* had an abortion and thus we determined that if women in this sub-set reported having an abortion it would be referring to their *last* pregnancy (i.e. the pregnancy in which they report about the decision-making process). We excluded women who reported that the outcome of the last pregnancy was a spontaneous abortion (n=5), resulting in a sample of 154 women. We then stratified by the final outcome and ran descriptive statistics on the pregnancy decision-making outcome. We also calculated the mean decision-making and communication RA scores among each group, though this was further limited to a sub-sample who provided data on the RA measures (n=129).

All analyses were conducted in STATA 14 (College Station, TX). Multivariate results are presented as adjusted relative risk ratios (aRRRs) with 95% confidence intervals (CI) and p-values where $p<0.05$ is considered significant.

Results

The descriptive statistics for the entire sample and for the analytic sample (n=380) are presented in Table IV.1. For the analytic sample, the mean age of the sample was 21.09

(SD=2.09). Approximately a quarter of the sample (26.8%, n=102) had achieved just primary school or had no education at all. A large proportion of participants (61.3%, n=233) reported that they participated in a religion other than the predominant Pentecostal/Charismatic religion. Nearly 58% of respondents in the sample (n=220) reported that they did not work within the past week. More than half of those sampled reported that they were married or cohabiting with their partner; 33% reported being married or engaged (n=125) while another 25% reported cohabitation (n=96). While Akan is the predominant ethnic group in Ghana, 52% of the sample (n=197) reported affiliations with other ethnic groups. Nearly one quarter (24%; n=91) of the sample reported that they had previously had at least one abortion. While both RA scores ranged from 3 (low RA) to 12 (high RA), the mean communication RA score (mean= 9.38; SD=1.73) was higher than the mean decision-making RA score (mean=7.49; SD=1.90). In terms of social context, the mean social approval score was 5.68 (SD=2.22; range 0-9) and the mean stigma score was 13.09 (SD=3.42; range 3-20).

For dependent variable of pregnancy decision-making, the largest proportion of participants reported that they made the last pregnancy decision together with their partner (46.1%, n=175). Approximately 18% (n=69) reported that they themselves had the most say, while nearly 21% (n=78) reported that their partner had the most say. The smallest proportion reported that someone else had the most say in the decision (15%, n=58).

The unadjusted associations are presented in Table IV.2 and compare each of the covariates across the pregnancy-decision making categories: women who reported that they had the most say, their partner had the most say, they decided together equally with their partner, and someone else (besides the woman or her partner) decided the outcome of their last pregnancy. The mean decision-making RA score was highest among women who reported that they had the

most say in the decision (mean=7.73, SD=1.73) and lowest among those who reported that their partner had the most say (mean=6.95, SD=1.84) and this scale was significantly associated with pregnancy decision-making (p=0.032). The mean communication RA score was highest among young women who reported deciding equally together with their partner (mean=9.69, SD=1.62). It was the lowest among those who reported that someone else had the most say (mean=8.97, SD=1.68). The relationship between communication RA and pregnancy decision-making was also significant in the unadjusted models (p=0.021). Social approval for adolescent SRH was highest among the young women who reported that someone else had the most say (mean=6.17, SD=1.89) and lowest among the young women who had the most say (mean=5.13, SD=2.09; p=0.008). Other variables associated with pregnancy decision-making in bivariate analyses at p<0.05 included: age (p<0.001), educational attainment (p=0.021), employment (p=0.005), relationship status (p<0.001), ethnic group (p=0.049), and previous abortion (p<0.001).

Results from the final multivariable multinomial regression model comparing the young women who reported that they had the most say in the decision about the last pregnancy outcome to each of the other three categories (partner had the most say, decided together, and someone else had the most say) are presented in Table IV.3. Decision-making RA was significantly associated with being in the 'I had the most say group' as compared to the 'my partner had the most say' group. For each point increase in the decision-making score, the relative risk of being in the group for whom their partner decided, as compared to decided themselves, decreased by 21% (aRRR=0.79, p=0.006, CI: 0.66-0.93). Communication RA was not associated with pregnancy decision-making in any of the adjusted, multivariable models. Age, employment in the past week, relationship status, previous abortion, and social approval for adolescent SRH

were also associated with pregnancy decision-making at $p<0.05$, although stigma towards adolescent SRH was not.

Table IV.4 presents the results of the exploratory analysis with a sub-set of women with only one prior pregnancy, assessing pregnancy decision-making and RA for those who chose abortion compared to birth using descriptive statistics. While our small sample of those who chose abortion made it difficult to run and interpret statistical tests, preliminary results based upon few women suggest that the pregnancy decision-making profile may be different depending on whether the women had experienced an abortion or gave birth. A larger proportion of those who had an abortion reported having the most say as compared to those who gave birth, and those who chose abortion had higher decision-making and communication RA scores, although the significance of these differences was not statistically testable.

Discussion

Among our sample of young women in this Ghanaian context, we found decision-making RA, but not communication RA, was associated with who was involved in pregnancy decision-making during the most recent pregnancy. Specifically, these young women with higher levels of decision-making RA experienced a reduced likelihood of their partners having the most say about their pregnancy outcome as compared to the women themselves.

Our findings are generally consistent with the few other studies that have explored this topic (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014; Oduro and Otsin 2014; H. Schwandt et al. 2013). In a study conducted in urban Ghana, Kumi-Kyereme and colleagues used a retrospective sampling approach through abortion providers to recruit 401 women who had undergone a prior abortion and found that in the largest proportion of cases, women decided with their partners about the outcome of the pregnancy (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). However,

the Kumi-Kyereme study found that more women reported that they did not seek approval from anyone before receiving an abortion (33%) as compared to the 18% who reported fully autonomous decisions in our study (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). Given the high proportion of decisions that are led by the male partner, future work should assess the nature of this decision-making and the extent to which women are satisfied with this process. In addition, qualitative research would be useful in exploring the nuanced ways in which partners do and do not have the most say and how those influences may be similar or different from situations in which others (family members, friends etc.) lead the decision. Additionally, building upon the exploratory results of the present study, it is important to examine the ways in which women's level of RA affects their ability to navigate these decisions and the effects that these decisions may have on her self-perceived level of RA.

Together, these findings are salient given the potential for public health and clinical interventions that may benefit reproductive rights and empowerment frameworks in reproductive healthcare and education models in order to increase RA as a strategy to increase power and autonomy in pregnancy decision-making. Such strategies, in effect, could decrease negative effects of non-autonomous decision-making that results in maternal mortality and unsafe abortion, thereby improving SRH outcomes.

While we had hypothesized that increased communication RA would be associated with increased likelihood of partners making the decision together, our results from multivariable models did not confirm this hypothesis. The reasons for this null finding are not completely clear from these limited data. It may be that the complexity of the interactions and processes between young women and their partners as related to the construct of RA was not fully captured by our few adapted, abbreviated survey items. Many men report wanting to be involved in pregnancy

decision-making and men are often the first people that young women tell about their pregnancies (Lohan et al. 2011; Loke and Lam 2014). Research on the male role in abortion decisions among young women in India suggests that many men are supportive of the decision and of their female partners. In these cases, the young men themselves sought out the information about and medication for abortion or provided transport to their partners needing surgical abortion (Kedia 2018). Studies in Ghana suggest that the partner reaction to an unwanted pregnancy varies substantially and is often dependent on the type of relationship (H. Schwandt et al. 2013). In cases where women do disclose, men may deny paternity or reject the pregnancy, indirectly influencing pregnancy decision-making (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). Many Ghanaian women (particularly those who are unmarried) report concern about disclosing their pregnancies to their partners and as many as 18% of women report that they do not disclose their pregnancies to their partners at all (H. Schwandt et al. 2013; H. M. Schwandt et al. 2011). In northern Ghana, recent research has described men's level of support for abortion as dependent on whether the male partner thought that the woman had a justifiable reason for wanting an abortion (though each man defined this for himself) (Antobam 2018). Overall, the complexity of the decision-making process and the variation in experiences for women who make the decision together with their partners requires further study, specifically as it relates to the construct of RA. Specifically, investigations of the complexity of the process should include data from the woman and her male partner's perspectives. These dyadic data will present an opportunity to understand RA and pregnancy decision-making from a partnership perspective.

Research in Ghana and in other contexts has found that mothers, in particular, can be a source of social support in deciding about the outcome of an unplanned pregnancy (Oduro and

Otsin 2014; Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014; Izugbara, Otsola, and Ezeh 2009). Similar research in Kenya suggests that where parents are involved, the safety of the abortion procedure also increases (Izugbara, Otsola, and Ezeh 2009). Though our study did not specifically indicate the extent to which mothers specifically were involved in the decision, it is possible that this result reflects a similar phenomenon in Ghana. In qualitative research among young Ghanaian women, Challa and colleagues found that young women's mothers were often a source of financial, informational, and logistical support regarding SRH (Sneha Challa et al. 2017). Therefore, it is plausible that the involvement of some young Ghanaian women's mothers may also increase the safety of women's abortion and child-bearing experiences. This hypothesis requires further exploration.

We also assessed several social context variables in order to understand the extent to which broader social influences may affect pregnancy decision-making. In our study, social approval was measured as the number of community groups that were supportive of adolescent SRH including overall community, men, women, schools, health care facilities/workers, religious centers/leaders, parents, other family members, and friends. Our results demonstrated that social approval for adolescent SRH within these young women's communities (measured as more groups being supportive) was associated with pregnancy decision-making. Young women who reported more of these groups of people as being supportive were more likely to have had someone else make the pregnancy decision. It is possible that the experience of engaging others in the decision-making process may serve as social support; or alternatively, young women perceiving more supportive environments and community norms may be more likely to engage others in their decisions and attain social support.

Similarly, we had hypothesized that social stigma towards adolescent SRH would be associated with pregnancy decision-making (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014; Sneha Challa et al. 2017). We expected that when perceived SRH stigma was high, women would be less likely to have the most say in the pregnancy decisions as compared to others; however our null finding did not support this notion. A potential explanation may include the possibly opposing roles of abortion stigma and the stigma of early and unwed motherhood as they relate to pregnancy decision-making. In the previously referenced qualitative studies, abortion was seen as a means of avoiding the stigma of 'inappropriate' entry into motherhood among sexually active, unmarried adolescents (Kumi-Kyereme, Gbagbo, and Amo-Adjei 2014). In these cases, young women may not disclose their pregnancies to others and may undertake abortions autonomously to avoid others knowing and stigmatizing them. In fact, estimates suggest that non-disclosure of pregnancy termination to male partners may be as high as 18% (H. M. Schwandt et al. 2011). Similarly, stigma related to abortion may prevent young women choosing that route or discussing it with a partner or family member. Unfortunately, the stigma measure we used in this study encompassed stigma associated with a broad range of SRH outcomes, including abortion, childbearing, pregnancy, contraceptive, and family planning service use (Hall et al. 2017). Future work should more specifically measure abortion-related stigma and stigma related to unwed motherhood and test how these specific types of stigma play a role in pregnancy decision-making.

Limitations

This study has a number of limitations. As mentioned above, the study did not account for the outcome of the last pregnancy, limiting our ability to draw conclusions or understand the differences in the patterning of decision-making power based on the final outcome of the

pregnancy. Future research should collect and stratify the bivariate and multivariable analyses by the pregnancy outcome in order to understand the role whether RA affects decision-making differently depending on the final outcome. In addition, given the relatively small number of women who had been previously pregnant and the categorical nature of the outcome of interest, we had to collapse many of our categorical variables so ensure sufficient sample size. This reduction in variance reduces the extent to which we can understand the nuance of the relationships. Furthermore, the sampling of the study population was not random and therefore, the results are limited in the extent to which they can be generalized beyond young women in urban Ghana. Additionally, these data may include retrospective recall bias. All women who had previously been pregnant were asked these questions, regardless of the time since their pregnancy. Therefore, it is possible that their memories of the decision-making process may have been inaccurate. In addition, pregnancy decision-making is a highly sensitive topic and as such, these data may suffer from response bias. In fact, several studies report that in most cases, women and couples make SRH decisions together (S Challa and Silverman 2018). The extent to which this reflects the true experience remains to be seen. Finally, these data are limited by the cross-sectional nature of the data. These data do not allow for the inferences to tease out the temporality of the relationships: whether higher levels of RA affect subsequent pregnancy decisions or whether pregnancy decisions can affect a woman's level of RA. While it is possible that women with higher levels of RA are better able to navigate their pregnancy outcomes, the reverse is also true. In this case, women who autonomously navigate pregnancy decisions may build their level of RA.

Implications

This study provides an important contribution to our understanding of RA by extending the discussion to a novel outcome of interest, with implications for programs, policy, and future research directions. Program and policy interventions should foster safe spaces for women to contemplate and enact their autonomous decisions, while also allowing space for social support and positive engagement of key players in the decision, including intimate partners. For example, in research related to male involvement in contraceptive decision-making, Ghanaian women reported that the exclusion of men from the health facility creates a space for them to discuss their options with clinicians and other women (Ganle et al. 2016). This level of information sharing and confidentiality with one's provider should be maintained in order to increase opportunities for women's empowered decision-making. While partners and others may be invited to participate in some components of the reproductive health visit, opportunities for women and their clinicians, health educators, and support staff to discuss independently should be maintained, both in antenatal care and in abortion clinics. However, since men are an often excluded but vital part of reproductive outcomes, partner communication interventions should promote open and equitable discussion of SRH issues. In doing so, male partners may be able to better support their partners in pregnancy decision-making and limit reproductive coercion.

Future research using qualitative methods could help further investigate the nuanced nature of the decision-making process including the complex ways in which autonomy is defined and applied and how RA and pregnancy decision-making may be affected by the social context including social morality and social stigma. In the previously referenced qualitative study in England, Hoggart (2012) reports that beyond the influence of the direct relationship of her sexual partner, her family, and her partner's family, the "social moral framework" also influences the decision and restricts the extent to which she can make autonomous decisions. She notes that this

is particularly relevant in cases where the woman's personal value system does not align with the social framework (Hoggart 2012). This finding has been echoed by Karp and colleagues, whose qualitative research in African contexts has shown that poverty and gender norms (both community level factors) are major barriers to what her team calls "reproductive empowerment" (Karp et al. 2018). Future research should investigate this notion in depth, and in non-Western contexts. Finally, this paper scratches the surface of the potential effects of RA on SRH outcomes. While work has demonstrated associations between RA and contraceptive use as well as RA and pregnancy decision-making, additional work can explore associations between RA and a broader range of outcomes across the SRH continuum. These may include, for instance, condom use, sexual debut, unintended pregnancy, abortion, facility-based delivery and antenatal care, allowing the field to ultimately better understand the role of RA in affecting women's health and well-being. Our study among young Ghanaian women contributes to building this body of evidence by demonstrating that increased RA is associated with women having the most say in the outcome of their pregnancies. Interventions to build young women's RA, therefore may not only increase levels of contraceptive use (thereby avoiding unintended pregnancy) but also provide them with the confidence and skills that they need to have final say about their health, their bodies, and their lives.

Tables for Chapter IV

Table IV.1: Descriptive statistics- RA and pregnancy decision-making

	Among entire sample				Among analytic sample (n=380)			
Variable	**n or mean**	**% or SD**	**min**	**max**	**n or mean**	**% or SD**	**min**	**max**
Who had the most say in the decision about the outcome of your last pregnancy?	523				380			
I had the most say	99	18.9%			69	18.2%		
My partner had the most say	92	17.6%			78	20.5%		
My partner and I decided equally together	205	39.2%			175	46.1%		
Someone else	127	24.3%			58	15.3%		
Age (n=1,063)	19.94	2.69	15	24	21.09	2.42	15	24
Educational attainment	1064				380			
None or primary	178	16.7%			102	26.8%		
Middle/JSS/JHS	441	41.5%			151	39.7%		
Secondary/SSS/SHS or higher	445	41.8%			127	33.4%		
Religion	1063				380			
Pentecostal/Charismatic	407	61.7%			147	38.7%		
Religion other than Pentecostal/Charismatic	656	38.3%			233	61.3%		
Employment in the past week	1063				380			
Not employed	781	73.5%			220	57.9%		
Employed	282	26.5%			160	42.1%		
Relationship status	662				380			
Married or engaged	163	24.6%			125	32.9%		
Cohabiting with partner	138	20.9%			96	25.3%		
In a serious relationship but not cohabiting	226	34.1%			101	26.6%		
Dating casually/having sex with an acquaintance	135	20.4%			58	15.3%		
Ethnic group	1062				380			
Akan	553	52.1%			183	48.2%		
Other ethnic groups	509	47.9%			197	51.8%		
City	1064				380			
Accra	528	49.6%			162	42.6%		
Kumasi	536	50.4%			218	57.4%		

Ever had an abortion	1058				380			
No	947	89.5%			289	76.1%		
Yes	111	10.5%			91	24.0%		
Decision-making RA scale (n=661)	7.75	2.02	3	12	7.49	1.90	3	12
Communication RA scale (n=654)	9.62	1.77	3	12	9.38	1.73	3	12
Social approval for adolescent SRH (n=1021)	5.78	2.26	0	9	5.68	2.22	0	9
Social stigma towards adolescent SRH (n=990)	13.12	3.82	1	20	13.09	3.41	3	20

Table IV.2: RA and pregnancy decision-making bivariates (n=380)

	I had the most say in the decision (n=70)		My partner had the most say in the decision (n=78)		My partner and I decided equally together (n=174)		Someone else besides myself or my partner (n=59)		n	F or chi2	p
	mean or n	SD or %	mean or n	SD or %	mean or n	SD or %	mean or n	SD or %			
Age	20.91	2.40	20.52	2.48	21.81	2.08	19.92	2.51	381	12.57	<0.001
Educational attainment										14.92	0.021
None or primary	19	27.1%	26	33.3%	41	23.6%	16	27.1%	102		
Middle/JSS/JHS	37	52.9%	32	41.0%	61	35.1%	21	35.6%	151		
Secondary/SSS/SHS or higher	14	20.0%	20	25.6%	72	41.4%	22	37.3%	128		
Religion										2.1636	0.539
Pentecostal/Charismatic	28	40.0%	36	46.2%	65	37.4%	21	35.6%	150		
Religion other than Pentecostal/Charismatic	42	60.0%	42	53.9%	109	62.6%	38	64.4%	231		
Employment in the past week										12.798	0.005
Not employed	41	58.6%	47	60.3%	87	50.0%	45	76.3%	220		
Employed	29	41.4%	31	39.7%	87	50.0%	14	23.7%	161		
Relationship status										86.3	<0.001
Married or engaged	13	18.6%	27	34.6%	80	46.0%	5	8.5%	125		
Cohabiting with partner	17	24.3%	26	33.3%	48	27.6%	6	10.2%	97		
In a serious relationship but not cohabiting	17	24.3%	18	23.1%	38	21.8%	28	47.5%	101		
Dating casually/having sex with an acquaintance	23	32.9%	7	9.0%	8	4.6%	20	33.9%	58		
Ethnic group										7.86	0.049
Akan	38	54.3%	28	35.9%	84	48.3%	34	57.6%	184		
Other ethnic groups	32	45.7%	50	64.1%	90	51.7%	25	42.4%	197		
City										6.14	0.105
Accra	34	48.6%	40	51.3%	64	36.8%	23	39.0%	161		
Kumasi	36	51.4%	38	48.7%	110	63.2%	36	61.0%	220		
Ever had an abortion*										59.5	<0.001
No	29	42.0%	56	72.7%	152	87.9%	49	84.5%	286		
Yes	40	58.0%	21	27.3%	21	12.1%	9	15.5%	91		

Decision-making RA scale*	7.73	1.73	6.95	1.84	7.65	1.84	7.46	2.19		2.96	0.0323
Communication RA scale*	9.26	1.78	9.10	1.93	9.69	1.62	8.97	1.68		3.28	0.0209
Social approval for adolescent SRH*	5.13	2.09	5.34	2.41	5.94	2.17	6.17	1.89		3.97	0.0084
Social stigma towards adolescent SRH	12.84	3.35	13.42	3.59	12.94	3.32	13.46	3.55		0.8893	0.828

Used one-way ANOVA for continuous variables and chi-squared tests for categorical & dichotomous variables
**p<0.05*

Table IV.3: Final multinomial regression model- RA and pregnancy decision-making (n=380)

Reference category: I had the most say

			95% CI	
	aRRR	**P**	**LB**	**UB**
MY PARTNER HAD THE MOST SAY (VS I HAD THE MOST SAY)				
Communication RA scale	0.98	0.779	0.87	1.11
Decision-making RA scale*	0.79	0.006	0.66	0.93
Age*	0.82	0.002	0.73	0.93
Educational attainment				
None or primary	*REF*			
Middle/JSS/JHS	0.58	0.162	0.28	1.24
Secondary or more	1.53	0.272	0.72	3.29
Employment in the past week				
No	*REF*			
Yes	1.26	0.154	0.92	1.74
Relationship status*				
Married or engaged	*REF*			
Cohabiting with partner	0.84	0.775	0.26	2.76
In a serious relationship but not cohabiting	0.54	0.310	0.17	1.76
Dating casually or having sex with an acquaintance*	0.10	0.000	0.07	0.15
Ethnic group*				
Akan	*REF*			
Other ethnic groups*	2.27	0.005	1.28	4.03
Ever had an abortion*				
No	*REF*			
Yes*	0.32	0.027	0.12	0.88
Social approval for adolescent SRH	1.13	0.189	0.94	1.35
Stigma	1.08	0.200	0.96	1.22
MY PARTNER AND I DECIDED EQUALLY TOGETHER (VS I HAD THE MOST SAY)				
Communication RA scale	1.08	0.418	0.90	1.30
Decision-making RA scale	1.07	0.382	0.92	1.25
Age	1.06	0.232	0.96	1.17
Educational attainment				
None or primary	*REF*			
Middle/JSS/JHS	0.58	0.071	0.32	1.05
Secondary or more	1.78	0.112	0.873	3.65
Employment in the past week*				
No	*REF*			
Yes*	1.76	0.000	1.32	2.35

Relationship status*				
Married or engaged	*REF*			
Cohabiting with partner	0.63	0.205	0.31	1.29
In a serious relationship but not cohabiting	0.70	0.429	0.29	1.70
Dating casually or having sex with an acquaintance*	0.08	0.000	0.03	0.25
Ethnic group				
Akan	*REF*			
Other ethnic groups	1.00	0.992	0.45	2.21
Ever had an abortion*				
No	*REF*			
Yes*	0.07	0.000	0.02	0.22
Social approval for adolescent SRH	1.21	0.058	0.99	1.47
Stigma	1.06	0.433	0.91	1.25
SOMEONE ELSE HAD THE MOST SAY IN THE DECISION (VS I HAD THE MOST SAY)				
Communication RA scale	0.92	0.290	0.78	1.08
Decision-making RA scale	0.97	0.692	0.81	1.15
Age	0.93	0.137	0.84	1.02
Educational attainment				
None or primary	*REF*			
Middle/JSS/JHS	0.47	0.206	0.15	1.51
Secondary or more	2.01	0.277	0.57	7.11
Employment in the past week				
No	*REF*			
Yes	0.68	0.274	0.34	1.36
Relationship status*				
Married or engaged	*REF*			
Cohabiting with partner	0.98	0.980	0.19	5.15
In a serious relationship but not cohabiting*	5.14	0.002	1.80	14.69
Dating casually or having sex with an acquaintance	1.82	0.191	0.74	4.45
Ethnic group				
Akan	*REF*			
Other ethnic groups	0.89	0.808	0.36	2.20
Ever had an abortion*				
No	*REF*			
Yes*	0.12	0.048	0.01	0.99
Social approval for adolescent SRH*	1.35	0.002	1.11	1.64
Stigma	1.07	0.167	0.97	1.19

*$p<0.05$

Table IV.4: Exploratory descriptive analysis of RA and pregnancy decision-making including final pregnancy outcome (n=154)

	Abortion as final outcome (n=20)		Birth as final outcome (n=134)	
Pregnancy decision-making	**n**	**%**	**n**	**%**
I had the most say	11	55%	18	13%
Partner had the most say	2	10%	15	11%
Decided equally together	3	15%	69	51%
Someone else had the most say	4	20%	32	24%
Reproductive autonomy	**mean**	**SD**	**mean**	**SD**
Decision-making RA score	8.14	2.25	7.63	2.00
Communication RA score	10.21	1.42	9.58	1.61

Chapter V: Discussion

Conceptualization, measurement, and promotion of women's RA in global contexts is an important and evolving field in SRH research and program implementation (Edmeades, Meija, et al. 2018). At the 2018 International Conference on Family Planning (ICFP) in Kigali, scientific presentations and discussion reflected critical dialogue about how to best conceptualize, measure, and promote constructs related to RA, including "reproductive empowerment, "contraceptive autonomy", "reproductive decision-making", and "reproductive choice" (Edmeades, Hinson, et al. 2018; Karp et al. 2018). Though the specificity of measurement has improved from traditional measures of "empowerment" over the last two decades, these inconsistent and varied conceptualizations and measures continue to complicate the field's ability to measure RA-related indicators and outcomes and compare across contexts (Edmeades, Meija, et al. 2018).

Although the *measurement* of RA is limited to decision-making and power within intimate partner relationships, *conceptually*, the construct of RA reflects constraining and supportive influences on women's autonomy at multiple levels of the social-ecological framework. Since RA reflects women's reproductive empowerment, this broader conceptualization improves on other measures of reproductive decision-making more typically used in global settings. Two of these scales include the sexual relationship power scale (SRPS) and gender equitable men scale (GEM), both of which measure very specific influences on women's reproductive health and empowerment (J Pulerwitz, Gortmaker, and DeJong 2000; Julie Pulerwitz and Barker 2008). The SRPS reflects power dynamics within intimate partner

relationships including relationship control and decision-making dominance (J Pulerwitz, Gortmaker, and DeJong 2000). Alternatively, the GEM scale measures gender equitable and gender inequitable attitudes among men and reflects personal beliefs and social norms (Julie Pulerwitz and Barker 2008). While both scales have been developed and implemented in global contexts, each comes with limitations as the conceptualization of these constructs is much more specific to decision-making power within a relationship and gender norms. Although the current measure of RA focuses on autonomy within an intimate partnership as well, the RA construct theoretically encompasses multiple levels including intimate partner dynamics, gender equitable attitudes, social constraints, structural barriers, religious influences and personal qualities including self-efficacy. For this reason, this dissertation sought to expand the conversation of RA to global contexts rather than focusing solely on existing measures.

Through this work, I explored the validated RA scale's application to a population of young Ghanaian women and its associations with SRH outcomes of public health priority. The Ghanaian context presented an interesting place to test these relationships as it is a highly religious context and has liberalized abortion laws, theoretically reducing structural constraints on RA. In addition, the more communal context of Sub-Saharan African countries was an ideal setting to test the effects of social approval of adolescent SRH and social stigma towards adolescent SRH.

Specifically, I addressed the following research aims in this dissertation, to: 1) examine the association between (a) socio-demographic, (b) reproductive history, and (c) social context factors and RA among young women in Ghana (Paper 1); 2) investigate the relationship between RA and modern contraceptive use at last sex (Paper 2); and 3) investigate the relationship between RA and pregnancy decision-making (Paper 3).

Taken together, findings from the three papers advance the global conversation on conceptualization and measurement of reproductive empowerment-related measures and their influence on critical SRH outcomes. In paper 1, which assessed the applicability of the previously validated measure of RA to a new Sub-Saharan African context and population of young Ghanaian women, I found that the RA measures had acceptable, though not excellent, reliability. Each RA sub-scale had a Cronbach's alpha of approximately 0.60 compared to the alphas of 0.74 (communication RA) and 0.65 (decision-making RA) in the United States. This demonstrates that while appropriate and relevant in this population of young Ghanaian women, measurement of RA in this population and context could be improved. Consistent with my conceptual framework presented in the introduction of this dissertation, I suggest that a more comprehensive and globally applicable conceptualization of RA requires the inclusion of multiple levels of influence on reproductive decision-making including social context factors. Qualitative research on reproductive choice from Nigeria, Ethiopia, and Uganda buttresses this argument. These findings, including the perspectives of more than 120 individuals across the three countries, demonstrate that there are multiple external influences on reproductive goals including social expectations surrounding childbearing soon after marriage and economic deprivation (Karp et al. 2018). In addition, the reproductive empowerment framework, recently developed by the International Center for Research on Women (ICRW), has echoed the call for inclusion of more distal factors in measures of reproductive empowerment (in addition to the more commonly included factors of individual agency and immediate relational agency) (Edmeades, Hinson, et al. 2018; Edmeades, Meija, et al. 2018). Based on the findings of this dissertation and the results of the scholars referenced above, I suggest additional rigorous psychometric approaches to refine and adapt the RA sub-scales to the Sub-Saharan African

context. This work should include in-depth qualitative research in order to understand how women (including young and unmarried women) understand constraints and facilitators of their RA at all levels of the social-ecological framework. This is important so that the measure of RA would reflect the broad, multi-level conceptualization of RA. The results of these qualitative data could help develop a bank of additional items related to RA across multiple levels, perhaps including and testing some measures from the SRPS and GEM scale, among others. Given the results of this dissertation, particular attention should be given to the roles of religion and culture as they relate to RA. We would then test these items in a survey and conduct factor analysis (using an exploratory or confirmatory approach dependent on results of the qualitative work) in order to expand the existing scales to accommodate these multiple levels. Furthermore, given the importance of gender norms in this context, I suggest that the updated scales also re-consider inclusion of the self-efficacy and the equitable gender role attitude dimensions of RA. These sub-domains may be important components of RA within this context.

Further, my results regarding the factors associated with the two RA scales were in many ways, similar to results among the sample of American women. In both studies (Upadhyay et al and this dissertation's paper one), communication RA (but not decision-making RA) was associated with level of educational attainment. In addition, reproductive experiences appeared to be associated with RA in similar ways across contexts. Upadhyay et al (2014) reported significantly lower RA (both sub-scales) among young women recruited from abortion clinics while our results demonstrated lower decision-making RA among women who had previously been pregnant. These findings suggest that RA is associated with a similar set of factors in global contexts, generating evidence of its utility and comparability across country contexts. While not assessed in the American sample, our results showed associations between social

context (measured as social approval for adolescent SRH) and communication RA. This finding provides additional support for the notion of inclusion of multi-level factors into the scale.

In terms of the construct validity of the measures, the results from papers two and three demonstrated that RA was significantly associated with modern contraceptive use at last sex and pregnancy decision-making (who had the most say) among these young women. In papers two and three, decision-making RA was associated with these outcomes. Communication RA was not associated in either study. Compared to the American population and other studies that have noted variability in associations between decision-making and SRH outcomes, this finding was surprising (Upadhyay, Dworkin, et al. 2014; Edmeades, Meija, et al. 2018). One possible explanation of these differences would be the covert use of family planning services and lack of disclosure of unwanted pregnancy, thereby inhibiting conversation with partner. Future work should quantify covert use and non-disclosure and include these variables in their analyses. The field will need to also consider in which cases covert use may or may not be considered as an empowered outcome.

Beyond the findings of this dissertation, this field of research calls scholars to grapple with the meaning of empowered decision-making. Although many scholars are studying the ways in which social context and partner dynamics affect women's control of their reproductive decisions, there is little understanding of the benefits of joint decision-making as compared to women making decisions alone. Scholars, program implementers, and policy-makers in this field will need to consider in which cases joint decision-making is an empowered outcome and when partner involvement in joint decision-making may be coercive. To date, this remains an area that needs additional exploration and consideration. A woman-centered approach will be key in generating understanding and consensus around understanding which cases are

empowered joint decisions and whether and when joint decision-making may be preferable to fully autonomous decision-making without partner influence.

Strengths and Limitations

As highlighted above, findings from this dissertation contribute meaningfully to the global conversation on the conceptualization and measurement of reproductive empowerment/ autonomy. Several other scientific reports have suggested the need for adaptation and application of the reproductive empowerment measures generally, and the RA scale specifically, to global settings (Edmeades, Meija, et al. 2018; Mandal, Muralidharan, and Pappa 2017). In addition to the recent application of the scale in a community in Kenya (presented at ICFP), this dissertation is one of the first to respond to this gap. While most research on RA and related measures has been limited to married, adult women (Edmeades, Meija, et al. 2018), I have assessed the extent to which the scale applies to a population of young women, many of which are not married. Thus, our results extend this conversation to the applicability of this construct to women who arguably face the largest barriers to enacting autonomous reproductive decisions including stigma from the community and health facility, inequitable power dynamics with male partners, and the powerful role of immediate family members. I also demonstrate the critical importance of including social context factors in order to refine the scale and make it more appropriate to the lives of these young women.

Several limitations of this dissertation are noteworthy. As previously described, the participants in the larger survey study were young women drawn from facility and community-based sites and were not randomly selected from across Ghana. While the community- and clinical-based recruitment approach increased variability of the sample in terms of reproductive experiences, the external validity of the findings was limited. For example, one cannot

extrapolate these results to more rural settings, to other regions of Ghana, nor to older women. In appendix 4, however, I compare characteristics of all women included in the Stigma Survey to those of women age 15 to 24 surveyed in the nationally representative 2014 Ghana Demographic and Health Survey (GDHS). In this appendix, we note that the characteristics of the women in the Stigma Study are particularly similar to urban young women sampled in the GDHS. Exceptions to this include employment status and previous pregnancy, which were not measured consistently across the surveys. This consistency suggests that our sample of women is relatively similar others in the Ghanaian context and reduces our concerns about external validity.

In a related limitation, each paper included a different sub-sample based on the research questions of interest and the data available for each analysis. Those missing data on important variables were omitted from the analysis. When we compared those excluded from the analysis to those included for each paper (presented in Appendices 1 through 3), we noted significant differences on key variables. This demonstrates that missingness was not at random, limiting the inferences possible from our results and the generalizability of the results. In addition, data were cross-sectional, which limits our understanding of temporality and potential causality of associations between RA and SRH outcomes, as well as the sociodemographic and reproductive factors that may shape RA but also may result from it. Indeed, SRH experiences including family planning service use and abortion have the potential to increase women's knowledge and confidence in their ability to negotiate reproductive decisions in the future. In addition, our survey measured current RA but then asked about previous reproductive experiences. Like empowerment, RA is not necessarily a stable trait, but rather a complex and dynamic phenomenon. Depending on when "last sex" and "last pregnancy" occurred, the current RA measure may not have adequately described RA at the time of these events.

In terms measurement limitations, I included modified, abbreviated versions of RA scales developed by Upadhyay and colleagues (Upadhyay, Dworkin, et al. 2014). I selected items that reflected multiple SRH domains so that I could explore associations with multiple outcomes. However, lack of inclusion of the full scales may have potentially affected reliability and validity of the measures and biased the results. In addition, I omitted the freedom from coercion sub-scale from our survey. Reproductive coercion and intimate partner violence are arguably conceptually distinct, unique phenomenon that have often been conceptualized and examined independently in SRH research. They also may require a different set of interventions and approaches compared to communication and decision-making. I therefore focused my analysis, instead, on the scales that could be affected by community and partner engagement and norms change, within the larger study's focus of the social context of SRH. Despite this rationale for omitting the freedom from coercion scale, inclusion of the measure would have provided an opportunity to better understand the role of reproductive coercion in affecting SRH outcomes in this context. In addition, the mean RA scores for both sub-scales were rather high and there was little variability in the scores as evidenced by the relatively small standard deviations. This could reflect a more empowered position of the young women included in the survey, many of whom were sampled from health facilities and schools. Alternatively, this relatively low variability and the high mean scores could reflect bias within the data. Young women may have been reporting what they thought the researchers would deem ideal, resulting in a social desirability bias and not reflecting their true levels of RA. Alternatively, given the focus on SRH stigma within the survey, it is possible that the positioning of the RA questions within the survey may have affected the way that the study participants responded to the questions. In order to understand which of these explanations is likely to have occurred, we would need to conduct additional

research. Nonetheless, this may be an important limitation of this work. Finally, the survey did not include the important measure of the outcome of the last pregnancy for our third paper. The approximations of this measure resulted in insufficient sub-samples to measure outcomes. A more comprehensive analysis would have tested effect modification based on pregnancy outcome by stratifying our models to understand associations between RA and pregnancy decision-making based on final outcome. While I conducted exploratory analysis to understand possible ways in which these relationships might differ, the small sample limited my ability to say anything conclusive.

Program and Policy Implications

The results of this dissertation have implications for program implementation, policy, and future research. In accordance with my conceptual model, programs and policies to promote RA should be focused at the individual, interpersonal, and social/structural levels. At the individual level, implementers can develop interventions to promote women's reproductive knowledge and improve their self-efficacy to access reproductive services that they need, which hypothetically should improve RA and subsequently outcomes. Edmeades and colleagues at the International Center for Research on Women (ICRW) have highlighted the importance of such interventions in order to build agency required for autonomous decision-making (Edmeades, Meija, et al. 2018).Specifically, their model suggests building women's comprehensive knowledge, improving their physical and mental health, enhancing self-efficacy, and fostering critical consciousness(Edmeades, Hinson, et al. 2018). They also draw attention the importance of tailoring and adapting interventions so that they are appropriate for various stages across the life course (Edmeades, Hinson, et al. 2018).

While not the focus of this dissertation, RA is likely closely tied to gender norms and expectations within communities, especially where patriarchal notions of masculinity include dominance over household decision-making. As mentioned in the introduction, these structural norms affect interpersonal dynamics between partners and families. In order to address these norms and promote gender equality, interventions that include the role of these norms may be more useful in promoting RA. Gender transformative interventions, interventions that "seek to reshape gender relations to be more gender equitable through approaches that free both women and men from the impact of destructive gender and sexual norms" are a promising approach to increase women's status and RA (Dworkin, Fleming, and Colvin 2015). In other contexts, gender transformative interventions that question masculinities and femininities have demonstrated associations with gender equitable attitudes towards household decision-making and increases in contraceptive use (Fleming et al. 2018; Shattuck et al. 2011). While the effects of these interventions on RA have not been evaluated, nor did I specifically examine gender roles here, it is plausible that these interventions could increase levels of RA. Higher levels of RA are an important end in itself as well as a potential pathway through which these interventions might result in higher levels of contraceptive use and improved SRH outcomes. This all requires further research to understand fully.

At the structural level, policies to support young women's autonomy are urgently needed. Access to safe abortion services is not available in many countries around the world. In Ghana, while safe abortion services are legal, many women may not know about their availability. In order to promote autonomous decision-making, public health and policy campaigns can help increase public awareness and use by women when needed. In addition, many African countries have laws against early marriages to girls under age 18 but they are not always equally enforced

(Svanemyr et al. 2015). Since large age differences are associated with less equitable power dynamics in a relationship, the enforcement of these laws has the potential to improve women's RA and ability to negotiate their needs in more equitable relationships. Emerging research is demonstrating the constraining role of economic deprivation on women's reproductive choices (Karp et al. 2018). Macro-level economic development as well as micro-loan interventions may increase women's agency and ability to lead reproductive decisions but require further investigation.

Finally, from a perspective of RA and empowerment, program evaluations should incorporate RA and 'autonomy-adjusted' SRH outcome measures to determine the success of a program. These measures would reflect concordance between a woman's stated preference and her behavior rather than looking at her behavior alone and would better reflect the reproductive rights paradigm. For example, rather than relying on contraceptive prevalence rate (CPR) to determine whether a program was effective, Senderowicz and colleagues (2018) advocated for the use of an 'autonomy-adjusted' measure that additionally accounts for women's desire to use a method (Senderowicz, Langer, and Sawadogo 2018). In this case, modern contraceptive use among women who report not wanting to use a method would not be considered a program success. By incorporating these measures into program evaluations, programs can more meaningfully incorporate women's rights and choices into determining the value and effects of programs aimed at increasing autonomy across all levels.

Future Research Directions

The results from this dissertation provide several directions for future research in order to further refine the RA measure and to contribute to the evidence base around RA and SRH outcomes, especially in global contexts. While other researchers in the field are developing new

measures of reproductive empowerment, reproductive choice, and contraceptive autonomy, my findings suggest that the adaptation of existing tools and revision of the RA scale to improve application in global contexts is a feasible, efficient, and useful way to advance the science on RA and its measurement and application. Using the information gleaned through a review of the literature and qualitative research, additional items to capture the individual level and the social/structural level should be incorporated, perhaps through more sophisticated psychometric research approaches, including confirmatory factor analysis. On the other hand, creation of additional scales and measures will continue to introduce variability into the field and potentially limit the ability to synthesize results and draw conclusions about this important phenomenon across contexts.

Future research should explore associations between RA and a broader range of outcomes spanning the full SRH continuum, including pregnancy intention, coitarche, modern contraceptive use, condom use, intimate partner violence, abortion, pregnancy decision-making, antenatal care, facility-based delivery, and unintended pregnancy, among others. Such a comprehensive body of evidence will enable policy makers and program implementers to understand whether and where RA may be an intervenable target through which to improve SRH outcomes and overall wellbeing.

Longitudinal studies are needed to determine the temporality of the relationship between RA and SRH outcomes. For example, interaction with the health system may increase women's knowledge and confidence in their ability to use and negotiate contraceptive methods. Thus, reproductive experiences and health encounters may increase RA, and increased RA in turn, may likely improve health care seeking and outcomes (reflected in some findings of this dissertation). Understanding the likely bi-directional nature of these complex relationship will provide

evidence for where and how to best intervene. In addition, investigation of potential mediators and effect modifiers of these relationships is urgently needed. For instance, relationships between RA and SRH outcomes can be stratified by key sociodemographic factors including religion/religiosity, educational attainment, relationship status/quality, and pregnancy outcome. Testing the role of mediators and effect modifiers will allow us to understand how these relationships may differ based on sub-population experiences. In addition, the results may provide more insight into pathways through which RA affects these important outcomes.

Additionally, where possible, data collected from both members of a couple should be used to understand these relationships from the perspective of women and their male partners. Several studies have compared husbands and wives responses on decision-making power using matched couples data (S Challa and Silverman 2018; Becker, Hossain, and Thomson 2006; Becker, Fonseca-Becker, and Schenck-Yglesias 2006; Story and Burgard 2012). Overall, these studies have demonstrated that the largest proportion of individuals report having jointly made decisions, though it is unclear exactly what this means that the extent of each partner's involvement. Becker and colleagues report that relative to their husbands, wives report less decision-making power overall (Becker, Fonseca-Becker, and Schenck-Yglesias 2006). In addition, couples data has demonstrated a large amount of discordance in reports on decision-making and contraceptive use (S Challa and Silverman 2018). In research in Bangladesh, Story and Burgard (2012) found that discordant reports of decision-making involvement were negatively associated with women's receipt of reproductive health care services. It is important to understand how this discordance may affect SRH outcomes in Sub-Saharan African contexts as well. ~~In addition, it would be helpful to understand how women and their male partner's attitudes towards traditional gender roles may be related to RA and to SRH outcomes.~~

~~Understanding the intersection between gender norms and RA is essential for developing programmatic implementation approaches. Further,~~ Additional work on RA from the perspective of both partners will allow the field to better assess the importance of partner perspectives and partner characteristics as well as the situations in which joint decision-making is empowered and when women's autonomous decision-making is most empowered. As mentioned above, this remains a critical gap in the body of research on this topic.

Finally, qualitative research would provide a deeper understanding of women's and others' perspectives on and lived experiences with RA and its implications for their health and lives. First, building upon the quantitative finding here that decision-making RA(but not communication RA) is a predictor of SRH outcomes in the Ghanaian setting, complementary qualitative information about the experience of disclosure and conversation that occurs within women's intimate relationships and the decision-making process, the extent to which partners were informed or involved in decisions and reasons for why or why not, and whether women perceive this as representing a more empowered or less empowered status would add a more nuanced understanding to RA and how it shapes outcomes. Similarly, a second research question to be explored using qualitative approaches is the specific nature of role of men in reproductive decisions. Where women report that they decide with their partners, how does this negotiation work? When are men a source of social support, helping women to achieve mutually desirable outcomes, and when are they a coercive influence? How to we incorporate this complexity into our measurement? Furthermore, qualitative research can help the field to understand how women define their most empowered decision-making situation, whether making a decision alone is the most empowered outcome or in which cases joint decision-making is ideal and more empowered. Ultimately, qualitative research (as well as longitudinal

quantitative designs) can help us to better understand the dynamic nature of RA and the experiences that build and diminish RA across the life course. Collectively, a more robust body of scientific evidence to address these remaining questions will build understanding of the extent to which RA is based on intrapersonal as compared to interpersonal and structural/community factors and provide understanding of the role of RA in settings across the globe.

Conclusion

In summary, findings from this dissertation suggest that RA is a relevant and important construct within the Ghanaian context. While the results have contributed new information about the sociodemographic and reproductive factors associated with RA and the relationships between RA and key SRH outcomes, including modern contraceptive use and pregnancy decision-making, this research has identified areas to further improve conceptualization, measurement, and operationalization of RA and related outcomes. Notably, as supported by the social ecological framework used to guide this research, inclusion of multi-level social context variables into a more robust and globally appropriate measure is needed. Collectively, such work can build a comprehensive and rigorous body of evidence necessary to improve clinical services, public health programs and policies to increase RA, ultimately to promote the well-being of women and girls around the world.

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Appendices

Appendix 1: Missing data analysis for paper one

Note: Missing data on this paper includes those not in any kind of relationship (n=330) and those who had never had sex (n=330). Thus, 468 of the missing 550 were dropped for theoretically relevant reasons. The remaining 82 were missing on a combination of age (n=1), religion (n=1), employment status (n=1), ethnic group (n=2), abortion history (n=6), social support for adolescent SRH (n=42), the RA decision-making scale (n=2), the RA communication scale (n=9) and stigma (n=68).

Based on statistical tests comparing the analytic sample to those who were excluded due to missing data, there were significant differences between the two samples on the variables of education, religion, religious attendance, and decision-making RA per the Table A.1 below:

Table A.1: Missing data analysis for paper one comparing analytic sample to those excluded based on missing data

	Analytic sample (n=514)				Intentional exclusion (n=468)				Missing data (n=82)				Test statistic (comparing included to missing)			
	n	%	mean	SD	n	%	mean	SD	n	%	mean	SD	t	p	chi2	p
Age			**20.98**	**2.38**			**18.63**	**2.48**			**20.90**	**2.39**	**0.269**	**0.788**		
Education*															**12.78**	**0.012**
None	35	6.8%			11	2.4%			12	14.6%						
Primary	80	15.6%			30	6.4%			10	12.2%						
Middle	191	37.2%			219	46.8%			31	37.8%						
Secondary	182	35.4%			194	41.5%			2	24.4%						
Higher	26	5.1%			14	3.0%			9	11.0%						
Religion*															**12.47**	**0.029**
Pentecostal	202	39.3%			167	35.7%			38	46.3%						
Catholic	53	10.3%			67	14.3%			15	18.3%						

Anglican, Methodist or Presbyterian	124	24.1%			128	27.4%			14	17.1%						
Other Christian	59	11.5%			52	11.1%			3	3.7%						
Muslim	68	13.2%			52	11.1%			9	11.0%						
None	8	1.6%			1	0.2%			3	3.7%						
Religious attendance*															**11.13**	**0.004**
At least once a week	402	78.2%			382	81.6%			63	76.8%						
At least once a month	95	18.5%			69	14.7%			10	12.2%						
Less than monthly	17	3.3%			17	3.6%			9	11.0%						
Employment in the past 7 days															**0.105**	**0.746**
Not employed	323	62.8%			408	87.2%			50	61.0%						
Employed	191	37.2%			59	12.6%			32	39.0%						
Relationship status															**6.172**	**0.104**
Married or engaged	138	26.9%			3	4.5%			22	26.8%						
Cohabiting with partner	113	22.0%			0	0.0%			25	30.5%						
In a serious relationship but not cohabiting	160	31.2%			39	58.2%			27	32.9%						
Dating casually, having sex or other relationship	102	19.9%			25	37.3%			8	9.8%						
Ethnic group															**0.606**	**0.895**
Akan	264	51.4%			247	52.8%			42	51.2%						
Ga/Dangme	67	13.0%			69	14.7%			8	9.8%						
Ewe	63	12.3%			70	15.0%			10	12.2%						
Other	120	23.4%			82	17.5%			20	24.4%						
City															**0.021**	**0.884**
Accra	240	46.7%			249	53.2%			39	47.6%						
Kumasi	274	53.3%			219	46.8%			43	52.4%						
Ever pregnant															**0.060**	**0.807**

No	133	25.9%			56	40.6%			22	26.8%						
Yes	381	74.1%			82	59.4%			59	72.0%						
Ever had an abortion															**0.483**	**0.487**
No	423	82.3%			459	98.1%			65	79.3%						
Yes	91	17.7%			9	1.9%			11	13.4%						
Decision-making RA*			**7.66**	**1.99**			**7.92**	**2.19**			**8.16**	**2.02**	**-2.10**	**0.0360**		
Communication RA			**9.51**	**1.74**			**10.24**	**1.84**			**9.86**	**1.82**	**-1.65**	**0.099**		
Social approval for adolescent SRH			**5.76**	**2.22**			**5.76**	**2.34**			**6.19**	**1.89**	**-1.35**	**0.1769**		
Stigma towards adolescent SRH			**12.69**	**3.64**			**13.69**	**3.95**			**12.29**	**3.75**	**0.6606**	**0.5091**		

Appendix 2: Missing data analysis for paper two

Note: of those not included in the analysis, 651 were removed because they had never had sex (n=330), were not in a relationship of any kind (n=330), had never used modern contraception (n=161), and/or reported wanting to become pregnant as the reason for not using modern contraception at last sex (n=81). The remaining 88 were missing data on key covariates of interest and were therefore excluded.

Based on statistical tests comparing the analytic sample to those who were excluded due to missing data, there were significant differences between the two samples on the variables of religion, city, previous pregnancy, the RA decision-making scale, and social approval for adolescent SRH per Table A.2 below:

Table A.2: Missing data analysis for paper two comparing analytic sample to those excluded based on missing data

	Analytic sample (n=325)				Intentional exclusion (n=651)				Missing data (n=88)				Test statistic (comparing included to missing)			
	n	%	mean	SD	n	%	mean	SD	n	%	mean	SD	t	p	chi2	p
Age			**21.07**	**2.28**			**19.17**	**2.62**			**21.41**	**2.47**	**-1.19**	**0.2348**		
Education															**1.3223**	**0.858**
None	19	5.8%			35	5.4%			4	4.5%						
Primary	49	15.1%			60	9.2%			11	12.5%						
Middle	117	36.0%			291	44.7%			33	37.5%						
Secondary	115	35.4%			246	37.8%			35	39.8%						
Higher	25	7.7%			19	2.9%			5	5.7%						
Religion*															**13.38**	**0.020**
Pentecostal	147	45.2%			231	35.5%			29	33.0%						
Catholic	36	11.1%			87	13.4%			12	13.6%						
Anglican, Methodist or Presbyterian	74	22.8%			166	25.5%			26	29.5%						
Other Christian	37	11.4%			73	11.2%			4	4.5%						
Muslim	27	8.3%			88	13.5%			14	15.9%						
None	4	1.2%			5	0.8%			3	3.4%						
Religious attendance															**0.8438**	**0.656**

At least once a week	253	77.8%			524	80.5%			70	79.5%						
At least once a month	62	19.1%			98	15.1%			14	15.9%						
Less than monthly	10	3.1%			29	4.5%			4	4.5%						
Employment in the past 7 days															**0.0577**	**0.810**
Not employed	206	63.4%			518	79.6%			57	64.8%						
Employed	119	36.6%			132	20.3%			31	35.2%						
Relationship status															**6.3776**	**0.095**
Married or engaged	80	24.6%			51	20.4%			32	36.4%						
Cohabiting with partner	64	19.7%			58	23.2%			16	18.2%						
In a serious relationship but not cohabiting	119	36.6%			85	34.0%			22	25.0%						
Dating casually, having sex or other relationship	62	19.1%			56	22.4%			17	19.3%						
Ethnic group															**3.2086**	**0.361**
Akan	177	54.5%			32	4.9%			44	50.6%						
Ga/Dangme	46	14.2%			90	13.8%			8	9.2%						
Ewe	38	11.7%			93	14.3%			12	13.8%						
Other	64	19.7%			135	20.8%			23	26.4%						
City*															**58.371**	**<0.001**
Accra	178	54.8%			342	52.5%			8	9.1%						
Kumasi	147	45.2%			309	47.5%			80	90.9%						
Ever pregnant*															**18.655**	**<0.001**
No	120	36.9%			80	24.9%			11	12.6%						
Yes	205	63.1%			241	75.1%			76	87.4%						
Ever had an abortion															**0.8762**	**0.349**
No	271	83.4%			608	94.0%			68	79.1%						
Yes	54	16.6%			39	6.0%			18	20.9%						
Decision-making RA*			**8.01**	**2.03**			**7.73**	**1.97**			**6.83**	**1.82**	**4.89**	**<0.001**		

Communication RA			**9.75**	**1.69**			**9.49**	**1.84**			**9.49**	**1.87**	**1.22**	**0.2252**		
Social approval for adolescent SRH*			**5.94**	**2.13**			**5.81**	**2.31**			**5.01**	**2.18**	**3.58**	**0.0004**		
Stigma towards adolescent SRH			**12.37**	**3.72**			**13.51**	**3.87**			**13.02**	**3.37**	**-1.46**	**0.1461**		

Appendix 3: Missing data analysis for paper three

For this paper, of the 684 that were missing from the analysis, 542 women were excluded because they had never been pregnant. A total of 330 women were not in a relationship (and therefore did not receive the RA questions), resulting in the removal of an additional 82 women. This leaves 60 total women who were missing data on key variables of interest and were excluded from the analysis.

Based on statistical tests comparing the analytic sample to those who were excluded due to missing data, there were significant differences between the two samples on the variables of education, religion, and religious attendance per Table A.1 below:

Table A.3: Missing data analysis for paper three comparing of analytic sample to those excluded based on missing data

	Analytic sample (n=380)				Intentional exclusion (n=624)				Missing data (n=60)				Test statistic (comparing included to missing)			
	n	%	mean	SD	n	%	mean	SD	n	%	mean	SD	t	p	chi2	p
Age			**21.09**	**2.42**			**19.15**	**2.76**			**19.15**	**2.58**	**0.454**	**0.6497**		
Education*															**10.51**	**.033**
None	32	8.4%			14	2.2%			12	20.0%						
Primary	70	18.4%			43	6.9%			7	11.7%						
Middle	151	39.7%			263	42.2%			27	45.0%						
Secondary	112	29.5%			271	43.4%			13	21.7%						
Higher	15	4.0%			33	5.3%			1	1.7%						
Religion*															**11.56**	**0.041**
Pentecostal	147	38.7%			230	36.9%			30	50.0%						
Catholic	37	9.7%			88	14.1%			10	16.7%						
Anglican, Methodist or Presbyterian	86	22.6%			172	27.6%			8	13.3%						
Other Christian	43	11.3%			69	11.1%			2	3.3%						
Muslim	59	15.5%			63	10.1%			7	11.7%						
None	8	2.1%			1	0.2%			3	5.0%						
Religious attendance*															**11.937**	**0.003**
At least once a week	299	78.7%			503	80.6%			45	75.0%						

At least once a month	68	17.9%			99	15.9%			7	11.7%						
Less than monthly	13	3.4%			22	3.5%			8	13.3%						
Employment in the past 7 days															**0.178**	**0.673**
Not employed	220	57.9%			528	84.8%			33	55.0%						
Employed	160	42.1%			95	15.2%			27	45.0%						
Relationship status															**6.941**	**0.074**
Married or engaged	125	32.9%			20	9.0%			18	30.5%						
Cohabiting with partner	96	25.3%			18	8.1%			24	40.7%						
In a serious relationship but not cohabiting	101	26.6%			113	50.7%			12	20.3%						
Dating casually, having sex or other relationship	58	15.3%			72	32.3%			5	8.5%						
Ethnic group															**3.212**	**0.360**
Akan	183	48.2%			338	54.3%			32	54.2%						
Ga/Dangme	50	13.2%			91	14.6%			3	5.1%						
Ewe	41	10.8%			95	15.2%			7	11.9%						
Other	106	27.9%			99	15.9%			17	28.8%						
City															**0.0104**	**0.919**
Accra	162	42.6%			340	54.5%			26	43.3%						
Kumasi	218	57.4%			284	45.5%			34	56.7%						
Ever pregnant															**N/A**	**N/A**
No	0	0.0%			211	72.0%			0	0.0%						
Yes	380	100.0%			82	28.0%			60	100.0%						
Ever had an abortion															**0.4171**	**0.518**
No	289	76.1%			614	98.6%			44	80.0%						
Yes	91	24.0%			9	1.4%			11	20.0%						
Pregnancy decision-making															**7.000**	**0.072**

I had the most say	69	18.2%			25	30.1%			5	8.3%						
Partner had the most say	78	20.5%			2	2.4%			12	20.0%						
Decided equally together	175	46.1%			3	3.6%			27	45.0%						
Someone else	58	15.3%			53	63.9%			16	26.7%						
Decision-making RA			**7.50**	**1.90**			**8.17**	**2.15**			**7.81**	**2.00**	**-1.21**	**0.2262**		
Communication RA			**9.38**	**1.73**			**10.04**	**1.72**			**9.57**	**1.95**	**-0.74**	**0.4581**		
Social approval for adolescent SRH			**5.69**	**2.20**			**5.82**	**2.30**			**6.18**	**1.99**	**-1.34**	**0.1804**		
Stigma towards adolescent SRH			**13.07**	**3.42**			**13.13**	**4.10**			**13.36**	**2.98**	**-0.40**	**0.6893**		

Appendix 4: Comparison of sample to 2014 Ghana Demographic and Health Survey (GDHS)

Table A.4: Comparison of full sample to the 2014 GDHS

	Stigma Study Sample (n=1,064)		2014 GDHS All Young Women 15 to 24 (n=3,326)		2014 GDHS Urban Young Women 15 to 24 (n=1,563)	
	n	%	n	%	n	%
None or primary education	178	16.7%	990	29.8%	291	18.6%
Pentecostal religion	407	37.7%	1244	37.4%	566	36.2%
Employed in past week*	282	26.1%	1581	47.6%	716	45.8%
Married/engaged	163	15.1%	782	23.5%	279	17.9%
Akan ethnicity	553	51.2%	1339	40.3%	732	46.8%
Ever pregnant**	522	48.3%	979	29.4%	361	23.1%
Ever had abortion	111	10.3%	303	9.1%	161	10.3%
Had the most say in pregnancy outcome	99	18.9%	Not available		Not available	
Modern contraceptive use at last sex	193	17.9%	584	17.6%	269	17.2%
**based on having an occupation*						
***number of children ever born- dichotomized*						