COUPLE RELATIONSHIPS AND CONTRACEPTIVE USE IN PERI-URBAN ETHIOPIA

by

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DISSERTATION ABSTRACT

Background

A strong association has been found between intimate relationships and health outcomes. Public health research and programs, however, continue to place emphasis mainly on individual cognitive and behavioral change. Studies of contextual influences also omit examining mutual influences and interdependence across individuals and their social relationships. Dyadic contextual influences are especially pertinent for contraceptive practices because they usually require the cooperation of two individuals in an intimate relationship. Studying the measurement and interdependence of partners' assessment of their marital relationship quality can also help establish associations they may have with a range of contraceptive use outcomes, such as current practice, method used, and continuity of use.

Methods

This research utilizes partners' assessments of their marital quality collected from a probability sample of couples from a peri-urban community in Ethiopia. The Family Health and Wealth Study (FHWS) is an ongoing study being conducted in several sub-Saharan African settings. This dissertation carries out an exploration of the psychometric properties of four marital quality scales for the female and male partner samples. The re-specified scales are then utilized to examine interdependence in spousal relationships by assessing if the spouse's marital quality scores are associated with each other's scores over time. The Actor Partner

Interdependence Model, a statistical technique to model dyadic interdependence, was adopted to examine these relationships. The associations between female and male partners' marital quality measures and contraceptive use outcomes were then estimated with multivariate logistic and multinomial regression analysis.

Results

This study's analyses did not support the four-factor structure of the marital quality scales and instead a three-factor measure emerged specific for each gender and comprised of domains of trust, commitment and conflict. The measures demonstrated good internal and external validity. The study also found linkages between spouses' marital quality scores, indicating the presence of spousal interdependence. Several marital quality measures were found to be significantly associated with contraceptive use outcomes. Male partners' scores had a positive and stronger association with their own contraceptive behaviors and with their female counterparts' continuity of use.

Conclusions

Understanding marital dynamics can help to improve the health and contraceptive use outcomes of spouses.

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CHAPTER ONE: **INTRODUCTION**

Background

Significance

Human societies are characterized by social relationships, making interdependence and closeness its quintessential feature (Kelley & Thibaut, 1978). Not surprisingly, therefore, a strong association has been found between intimate relationships and health outcomes, and the closer the relationship, the higher this association (Glaser & Newton, 2001; House, Landis, & Umberson, 1988; Berkman & Syme, 1979). Given these connections there has been a growing interest in understanding the role of contextual influences on health. However, the majority of public health research and programs continue to place emphasis on the individual as the unit of interventions, theories and statistical analysis (Lewis, Mcbrideb, Pollakc, Butterfielde, & Emmonse, 2006; Diez-Rouz, 2000). Moreover, often studies on contextual influences omit looking at mutual influences and interdependence across individuals and contexts (Barber, Murphy, Axinn, & Maples, 2000). Such information is critical, as we move beyond determinants to comprehend the processes and mechanisms behind health behaviors and outcomes for more effective interventions.

Contextual factors are especially pertinent in contraceptive use behaviors. Understanding how individuals adopt, consistently use, and engage in contraceptive use decision-making is critical, given its potential to address public health challenges like high fertility, sexually transmitted diseases, including HIV, unintended pregnancy, reduction of maternal mortality, and enhancing maternal

and child health (Tsui & Creanga, 2009; Rutstein, 2005; Marston & Cleland, 2003). This research is especially pertinent in Sub-Saharan Africa as sexually active populations here continue to grapple with high levels of unintended fertility, maternal and child mortality, and HIV infection risk, underlining the need for continued efforts to expand contraceptive acceptance and adoption. While the contraceptive prevalence rate (CPR) is on the rise in many countries in the region, unmet need for contraceptives remains high in many settings (Westoff, 2001).

Historically, women have been the main target of family planning programs and research for a variety of reasons (Becker, 1996; Watkins, 1993). However, the advent of HIV epidemic highlighted the need to focus on contextual influences on contraceptive behaviors. With this shift in orientation, there was a growing recognition, if much delayed, that women do not practice contraceptives in isolation. These behaviors occur within a broader social context, and at the very least, contraceptive use requires the cooperation between two individuals in an intimate relationship. These shifting paradigms are reflected in international forums such as the International Conference on Population and Development 1994 and the Beijing Conference on Women 1995 that explicitly call for the inclusion of men in reproductive health in general, and women's reproductive health in particular (United Nations, 1995). In fact, understanding the impact of male influences on woman's health is viewed as an ongoing challenge for defining current reproductive health frameworks (Dudgeon & Inhorn, 2004).

Dyadic analysis is particularly relevant in the Sub-Saharan African context.

Traditionally, anthropological research from this region portrayed a power-less state of the African woman (Hollos & Larsen, 2003). According to this viewpoint, societies were predominantly patriarchal in this region with men commonly the sole decision-makers. Women were powerless, and through marriage, husbands acquired the productive and reproductive capacity of women (Hakansson & LeVine, 1997). Property was the basis of social and familial power that men controlled (LeVine, 1979). Husbands had the right to demand sexual intercourse and could prevent their wife from using contraceptives (Hakansson, 1994). They were often responsible for desiring and perpetuating larger families as they gained the most socially and economically from having children (Bankole & Singh, 1998). However, another body of research has challenged this disempowered state of the African woman and view reality as more nuanced (Hollos & Larsen, 2003). They identified several avenues for women to assert their desires and authority even within the most traditional marriage settings. For instance, several channels were present both within the household-property complex and its management as well as through 'manipulation' of personal relationships that allowed women to assert and prevail (Oboler, 1994).

Moreover, understanding dyadic relationships is very relevant today. With rapid globalization and urbanization across the world, the last century has seen profound shifts in the organization and structure of marriage. With the rise in the socio-economic status of women, changes in the functions and roles of families in modern economies, rising emphasis on individualism, the emotional functions of marriage are getting heightened importance for the wellbeing of its constituents (Wilcox &

Nock, 2006). Traditional marriage structures with their age and gender hierarchies are now giving way to modern marriages that are more egalitarian and empathetic, with more communication and negotiation of mutual desires and goals between spouses. (Amato, Booth, & Rogers, 2003). While these shifts in marital patterns are more notable in western settings, these trends are visible in other contexts too. Pioneers like W.J. Goode (1963) hypothesized that as western economic systems are adopted in non-western settings, family patterns will change in these societies too. Families based on kinship and lineage systems will disappear, giving rise to a 'nuclear family'. Like the west, changes in family patterns across the world have been more complex than a shift to a universal 'nuclear family' (Cherlin, 2004). Interestingly, however, there is growing evidence that regardless of these complexities, the ideation of the western family, with its emphasis on companionship and romantic love between spouses has spread across the globe, even in settings with little progress towards industrialization (Ghimire, William, Scott, & Arland, 2006; Fuller & Narasimhan, 2008; Cherlin, 2012). Traditional marriage structures with their age and gender hierarchies are now giving way to modern 'compassionate' marriages. Compassionate marriages are characterized as egalitarian and empathic, where spouses communicate and negotiate their mutual desires (Wilcox & Nock, 2006; Amato et al. 2003; Burgess, 1948). While the evidence is mixed, in Africa too, these changes have been noted. For instance, Cherlin (2012) argues that declines in teenage marriages, especially in northern and southern Africa, provide evidence of reduced parental control in marriages.

Given these developments, although increasingly efforts are being undertaken to

understand the role of men and/or couples in reproductive health, and a body of research in this arena has emerged, dyadic analysis has been limited. In fact, couple research has often meant examining the impact of partner characteristics and a few inter-personal variables, such as communication and joint household decision-making on contraceptive use (Link, 2011; Derose & Ezeh, 2010; Upadhyay & Hindin, 2005). However, treating the couple as a unit of analysis and understanding the mutual influence and interdependence between spouses has been underexplored. Moreover, the neglect of couple-level analysis has also meant a lack of research examining the impact of emotional processes and love on reproductive health, especially in non-western settings. Intimate relationships are often a complex interplay of processes such as power dynamics, and other emotional processes like shared intimacy and trust between partners in a dyad, which influences decision-making and outcomes for both parties. The connection between power and contraceptive use, especially condom use, has been established in many studies (Wolfe, Blanc, & Gage, 2000; Hogan, Berhanu, & Hailemariam, 1999; Gage, 1995; Gupta & Weiss, 1993). However, the linkages with other emotional dimensions of relationships like intimacy, trust, conflict and satisfaction are understudied. Basu (2006) talks about how demographic research often overlooks the linkages between love and sex and the complex emotional processes that underlie it. She discusses how relationships have emotional meaning for people. Drawing on anthropological research, she discusses how individuals in love are expected to trust their partners and not worry about their past or current actions, making it hard for them to prevent unwanted pregnancy or infections. Given these emotional processes, she

talks about the inadequacy of explaining sexual behavior "solely on questions of victimhood and empowerment as determinants."

Furthermore, a majority of studies on contraceptive use behaviors have focused on current contraceptive use and have neglected aspects surrounding quality of use, such as the effectiveness of methods adopted and duration of use. These indicators are key measures for assessing declines in fertility and unintended pregnancy, and as fertility desires of couples decline and contraceptive prevalence increases, these measures become increasingly important as determinants of fertility (Bongaarts & Rodriguez, 1991). A 15 country study suggests that total fertility rate (TFR) in these countries would have been 28 to 64 percent lower if unintended births following discontinuation had not occurred, underlining the importance of these measures (Blanc, Curtis, & Croft,2002).

Given these gaps in research, and ongoing changes in the marital context of couples, there is a need to systematically understand how dyadic and emotional processes such as marital quality influence contraceptive use decision-making and outcomes.

Couples and Marital Quality

Measures of marital quality and its related constructs have been the subject of much analysis in family research in North America, an interest spawned with increasing divorce rates and marital dysfunction. Although there are many theoretical orientations and no consensus on the definition of marital quality, there is implicit recognition of the multi-dimensionality and usefulness of the construct. Spanier and Lewis (1979:269) define marital quality "as the subjective evaluation of a married

couple's relationship on a number of dimensions and evaluations." They go on to explain, "the range of evaluations constitutes a continuum reflecting numerous characteristics of marital interactions and marital functioning. High marital quality therefore is associated with good adjustment, adequate communication, a high level of marital happiness, integration, and a high degree of satisfaction with the relationship."

The past decades have also witnessed a growing body of literature on marital quality from non-western settings, indicating an emerging interest in this area of research internationally. For instance, studies have explored marital quality in Ghana (Miller & Kannae, 1999), Cameroon (Gwanfogbe, Schumm, Smith, & Furrow, 1997), India (Allendorf, 2012; Fuller & Narasimhan, 2008; Sandhya, 2009), Nepal (Allendorf & Ghimire, 2013), China (Shek & Cheung, 2008), Taiwan (Xu & Lai, 2004), and Turkey (Fisiloglu & Demir 2000). Not surprisingly, the growing interest has spurred a major discussion on the potential similarities and differences in how marital quality is defined across cultures, and whether it is appropriate to use available western measures to assess marital quality in these diverse settings (Allendorf, 2012; Sandhya, 2009). While the cross-cultural usage of western scales is debated, there is agreement among scholars that, at the very least, their reliability and validity needs to be vigorously assessed before adoption in non-western settings. Spanier's Dyadic adjustment scale is a good example of a scale that has successfully been used in many settings after cross-cultural validations (Allendorf, 2012, Sandhya, 2009; Shek & Cheung, 2009; Xu & Lai, 2004; Fisiloglu & Demir,

2000). Moreover, at a theoretical level, some scholars posit that while social and cultural structures are strong determinants of how marital quality is defined and experienced in any given setting; it is not unreasonable to concur that there are fundamental commonalities in the way human beings experience marriage (Sandhya, 2009).

Studies examining the correlates of marital quality have found married individuals, who share similar socio-economic status and gender role ideologies have higher marital quality (Amato et al., 2003; Burgess, Locke, and Thomes, 1963). These findings have brought the compassionate theory of marriage into focus. The proponents of this theory suggest that the practice and belief in the principles of egalitarianism leads to higher marital quality within relationships. Such marriages are characterized by a high degree of intimacy, affection and empathy, allowing for high-quality and stable marriages (Wilcox & Nock, 2006; Amato et al., 2003). However, other studies have challenged these findings and have highlighted that changes in traditional marriages, shifts in gender roles, work life pressures, often make modern marriages complex and leave some, especially males, dissatisfied (e.g.: Rogers & Amato, 2000). A few studies from Sub-Saharan Africa have also examined the determinants of marital quality. For instance, a study looking at correlates of marital quality among Ghanaian men found that less traditional decision-making and open communication were strong predictors (Miller & Kannae, 1999). Moreover, having a wife in a high status occupation enhanced marital quality by reducing male dominance in decision-making and promoting open communication (Miller & Kannae, 1999). However, another study among Ghanaian women found

women's increased socio-economic status and autonomy as linked with marital instability and divorce (Takyi & Broughton, 2006). A qualitative study among a sample of South African men and women on factors promoting marital quality found that "mutual love and respect" was valued by both men and women (Styen, 1996). Both parties considered open communication, supportive spouses and move towards egalitarian decision-making and household division of labor as promoting greater happiness and satisfaction within marriages (Styen, 1996).

Couples and Contraceptive use

Several studies have established that information obtained at the couple-level is often over and above what is obtained by merely looking at individuals constituting a dyad, highlighting the importance of understanding the relationship context of behaviors. Several such linkages have been identified in the arena of contraceptive use in non-western settings. A key quantitative finding has been the realization that not all couples agree on fertility preferences and contraceptive use (Nzioka, 2002; Bankole & Singh, 1998; Becker, 1996; Koenig, Simmons, & Misra, 1984). Moreover, research has suggested that often a wife's perception of her husband's approval of contraceptive use is sometimes more predictive of actual contraceptive use, than spousal agreement on this issue (Lasee & Becker, 1997). Furthermore, despite low levels of inter-spousal communication on contraception in developing countries, cross-sectional as well as longitudinal data have established the association between spousal communication, fertility intentions and contraceptive use (Link, 2011; Paz, 2004; Becker, 1996). Similarly, in many settings, joint household decision-making or a greater female role in decision-making has been predictive of

contraceptive use (Nanda, Schular & Lenzi, 2013; Bogale, Wondarfrash, Tilahun, & Girma; DeRose & Ezeh, 2010).

Marital Quality and Contraceptive Use

Although the links between marital quality and several health outcomes have been well established, the association between dimensions of relationship quality and contraceptive use are not very consistent. While some dimensions of relationship quality have been positively associated with aspects of contraceptive use, other dimensions have been negatively linked, especially condom use (Coi et al., 2003; Hoffman, Exner, Leu, Erhardt, & Stein, 2003; Cabral et al., 1999). For instance, a study examining the impact of teen relationships on their contraceptive use, found adolescents with similar partners, in more intimate relationships, and who communicated about contraceptives before sex, were more likely to use contraceptives (Manlove et al., 2007). In a longitudinal study, among a sample of low-income women in two southeastern cities of the United States, women who expected to receive considerable emotional support from their partners upon becoming pregnant were more likely than others to report any condom use or dual method use, and were less likely to not use any contraceptives (Wilson & Koo, 2008). However, a study among a sample of African American women found those not using condoms perceived asking their partner to use condoms as implying infidelity or compromising the stability of the relationship (Wingwood & DiClemete, 1998).

Another study among a small sample of adolescents found higher relationship

quality to be associated with more frequent condom non-use (Sayegh et al., 2006). Similarly, several studies have found a link between greater relationship commitment and perceived invulnerability to harm from partner, which in turn was associated with reduced condom use (Agnew, 2000; Buunk & Bakker, 1997). Yet, another study while finding similar linkages between women's commitment to their partners and attitude towards condom use, noted that more committed women felt greater control over condom use decision-making (Harvey et al.., 2006).

However, while there seems to be no clear linkage between aspects of relationship quality and contraceptive use, we see a more consistent association between relationship quality and continuity of use. For instance, several studies in the United States have found positive linkages between aspects of relationship quality and effective contraceptive use. A study among a sample of Hispanic women found that women who perceived their partners to be more committed to the relationship were less likely to discontinue contraceptive use (Kerns, Westhoff, Morroni, & Murp, 2003). Similarly, studies among adolescents have also indicated that females who communicate more freely with their partners and are in more intimate and satisfying relationships, are more likely to consistently and effectively use contraception (Manlove et al., 2007; Jorgensen, King, & Torrey, 1980). Another study among a sample of adolescents in the United States found that inter-personal relationships of adolescent dyads had greater influence over pregnancy risk than peer or family factors. Moreover, aspects like relationship satisfaction and greater inter-personal female power within dyads promoted regular use of effective contraceptives (Jorgensen et al., 1980). A meta-analysis of adolescent contraceptive

use, synthesizing 134 studies, found partner influence to be a major factor promoting contraceptive use for both males and females (Whitley & Schofield, 1986). Another study among a sample of adult women from a inner- city survey, found correlates, such as emotional closeness and partner support were significant factors behind women attempting to use rather than just contemplating condom use. Moreover, the belief that condom use builds trust with partners was a significant predictor of long-term consistent use of condoms (Santelli, Kouzis, Hoover, Burwell, & Celentano, 1996).

In Sub-Saharan African settings, very few studies, mostly qualitative, have attempted to explore the broader relationship context or the emotional processes that impact contraceptive use. A mixed methods study in Malawi investigating reasons behind low condom acceptance among married couples, found that while condom use was acceptable in 'sporadic sex', its use was unacceptable in marriage because sex is considered 'legitimate' and 'natural' within marriage. This was despite several women in the study recognizing and fearing their partner's extra-marital sexual relations was putting them at risk of HIV infection (Chimbiri, 2007). In a qualitative study from Nigeria, men voiced their concern that women who used contraceptives were more likely to be unfaithful to their husbands and ultimately abandon their families. Women on the other hand expressed how they could not afford to ignore their husband's disapproval of contraceptives because they feared this would lead to either denial of sex or their husbands preferring another wife, and might even be grounds for divorce (Bawah, Akweongo, Simmons, & Phillips, 1999). In fact, studies have recognized covert use of contraceptives by women

because of fear of husbands' disapproval (Bawah et al.., 1999; Biddlecom & Fapohunda, 1999). Furthermore, women in traditional marriages, where conjugal ties are weak, have to live under a clear hierarchy, underneath not only their husband's but also other members of the extended family (Chimbiri, 2007). Women in such families often have to keep their contraceptive use hidden from both their husbands and their extended family, making matters more precarious (MacPhail et al., 2009; Oppong, 1977). Clearly, given this evidence, there is a need to understand the dyadic relationship context and emotional processes beyond trust that influence contraceptive adoption and continuous use.

Country Context

Socio-Economic and Health Indicators

Ethiopia is located in northern Africa and is bordered by Eritrea, Djibouti, Somalia, Sudan, South Sudan, and Kenya. It is the second most populated country in Sub-Saharan Africa after Nigeria, and has a population of 87.5 million (World Bank, 2013). Ethiopia is also one of the world's poorest countries, with a per capita income of US $ 370, which is significantly lower than the regional average of US $ 1,257 (World Bank, 2013). Ethiopia is primarily rural, and agriculture accounts for 43% of the gross domestic product (Central Intelligence Agency [USA], 2013). Also, large proportions (84%) of its people live in the densely populated highland settlements, and only 16% of the population lives in urban areas (Central Intelligence Agency [USA], 2013). Ethiopia is also a young country, with children under age 15 constituting 47% of the population, and only 4% of the population is over age 65 (Ethiopian Demographic and Health Survey (EDHS), 2011).

Ethiopia was ranked in the low human development category in 2011, positioned at 173 out of 187 countries and territories (UNDP, Human Development Report 2011). The average life expectancy at birth for an average Ethiopian is 59.7 years (UNDP, 2011). Under 5-child mortality remains high with 77/1000 live births (UNICEF, 2011). 1 in every 67 Ethiopian women has a lifetime risk of maternal death. Adult HIV prevalence was 1.4% in 2011. While majority of Ethiopians have little to no education, with women faring worse than men, remarkable improvements are being made in the education sector. According to the Ethiopian Demographic and Health Survey (EDHS, 2011), although 98% of women over 65 years received no education, this proportion has declined to 11% among females aged 10-14 years. Similarly, among the males, while 89% of males over 65 years received no education, the corresponding proportion was only 13-19% among men aged 10-24 years (EDHS, 2011).

Marriage, fertility and family planning

The median age of first marriage for women in Ethiopia remains low at 16.5 years (EDHS, 2011). The age at first marriage is slightly higher for males at 23.1 years in 2011 (EDHS, 2011). However, interestingly, while there was a small increase in the age at first marriage for females, the age at first marriage declined for males between 2005 and 2011 (EDHS, 2011). Moreover, the proportion aged 15-49 years, who have never been married is substantially higher among males than females, with 44% of men and 27% of women never married (EDHS, 2011). 11% of the population lives in polygynous unions, a percent lower than the 2005 survey (EDHS, 2011).

Although, there is variation in marriage customs across religious and ethnic groups, in most cases, traditionally marriages are arranged by families with very brief engagement periods (Tilson & Larson, 2000). The bride joins the groom's house until the couple set up their own household (Ezra, 2003). Divorce is prevalent, with 45% of first marriages ending in divorce within the first 30 years (Tilson & Larson, 2000). Traditionally, Ethiopian men and women have distinct roles and responsibilities within marriage. The males are traditionally viewed as the breadwinners, who work outside the home (Ezra, 2003). The women, on the other hand, primarily have household responsibilities, with childbearing and child rearing culturally seen as their most significant roles (Ezra, 2003). In fact, the inability to bear children is a major ground for divorce (Tilson & Larson, 2000). However, some studies have also noted shifting marriage patterns, especially in urban areas, as the proportion of educated women in increasing as indicated by higher age at marriage, delay in the birth of the first child, and greater egalitarian role expectations within marriage (Ezra, 2003; Sibanda, Woubalem, Hogan, & Lindstrom, 2003).

Ethiopian women begin childbearing early, 34% of women in the ages 20-49 gave birth by age 18, and 54% gave birth by age 20 (EDHS, 2011). According to the EDHS (2011), the current total fertility rate (TFR) is 4.8 children per woman. This means that an Ethiopian woman who is at the beginning of her childbearing years will give birth to just under five children by the end of her reproductive period if fertility levels remain constant over the childbearing years. There are large variations in the rural urban TFR, while the TFR in rural areas was 5.5 children; it was 2.6 children per woman in urban areas in 2010 (EDHS, 2011). There has been only a slight

decline in TFR between 2000 and 2011. The TFR was 5.5 children in 2000; it came down to 5.4 children in 2005, and was 4.8 children in 2011 (EDHS, 2000, 2005,2011). However, while women consider a family of 4.3 children as ideal sized, the males consider a family of 4.8 children ideal sized, which is closer to the TFR. Moreover, the total wanted fertility rate was 3 children per women, suggesting that the TFR is 60% higher than it would be if all unwanted births were avoided (EDHS, 2011).

Knowledge of contraceptives is very high in Ethiopia, with women (98%) and men (97%) are almost equally likely to have heard of a modern contraceptive method. The government sector is the major provider of contraceptive services, and caters to 82% of the modern contraceptive users. Twenty-seven percent of currently married women are using a modern contraceptive method, with the largest proportion (21%) using the injectable. There has been substantial increase in the uptake of modern contraceptives since the year 2000, when only 6% currently married women were using modern contraceptives (EDHS, 2000). There are large urban-rural differences in the uptake of modern contraceptives, while 52.5% of currently married women were using modern contraceptives in urban areas; only 23.4% were doing so in rural areas (EDHS, 2011). However, unmet need for contraceptives remains high at 25%, with 16% unmet need for spacing and 9% for limiting births (EDHS, 2011). The contraceptive discontinuation rate within a year for all methods is 37%, with the pill at 70%, followed by the condom at 62%, as methods most likely to be discontinued (EDHS, 2011).

Theoretical Premise

This dissertation drew on dyadic theories of interdependence and the compassionate theory of marriage for conceptualizing how marital quality might be associated with contraceptive use.

Interdependence theory: Relationship and family sciences provide several dyadic-level theories that are comprehensive frameworks for understanding couple processes and resulting behaviors and outcomes (Ryff & Singer, 2000). Dyad-level models are very useful because they consider simultaneously the perceptions, motivation and behaviors of both members of a dyad, allowing us to understand both the interpersonal (couple level) as well as the intra-personal level (spousal level) influences. In addition, they recognize that couple relationships are different in their emotional intimacy and interdependence and explicitly model the degree of interdependence between members of a dyad (Lewis et al., 2006; Lewis, DeVellis, & Sleath, 2002; Kelley & Thibaut, 1978).

For the current study, we specifically drew on the Interdependence theory, which came out of social psychology as a dyad-level theory to understand the inter-personal context of social situations (Kelley, Bercheid, Christensen, Harvet, & Huston, 1983; Kelley & Thibaut, 1978). The basic premise of this theory holds that interdependence is the essence of a group. A group is a dynamic whole, and hence a change in any member or subgroup, changes the context for other members of the group (Lewis et al., 2002). Thus, this theory emphasizes the need to understand outcomes and behaviors of partners by assessing how they interact. It emphasizes

the need to take into account both partners perspectives to understand couple interaction. This approach allows us to understand how each partner individually influences, as well as both partners jointly influence, behavior, making it possible to see different patterns of interdependence within and between couples (Lewis et al., 2002). These patterns of interdependence have also been seen as "structural properties of couples", in that different couple relationships have their own structural properties defined by their different levels and patterns of interdependence (Lewis et al., 2002).

This interdependence between couples has been modeled in a variety of ways (Lewis et al., 2006; Cambell & Kashy, 2002; Kenny, 1996). The actor effect occurs when each individual is responsible for his or her outcomes. The partner effect models the influence of one's partner on the individual's outcome. Joint effect refers to outcomes that are influenced both by the individual as well as his/her partner's action. Lastly, mutual joint effects suggest both partners' outcomes are influenced by their own as well as the actions of their partners.

Compassionate Theory of Marriage*:* Compassionate theory of marriage focuses on egalitarianism within marriages. The proponents of this theory suggest that the practice and belief in the principles of egalitarianism leads to higher marital quality within relationships, especially for women. Such marriages are characterized by a high degree of intimacy, affection and empathy, allowing for highly quality and stable marriages (Wilcox & Nock, 2006; Amato et al. 2003; Burgess, Locke, and Thomes, 1963).

Conceptual Frameworks for Research Aims

Figure 1.1: Conceptual Framework for Aim 1 and Aim 3

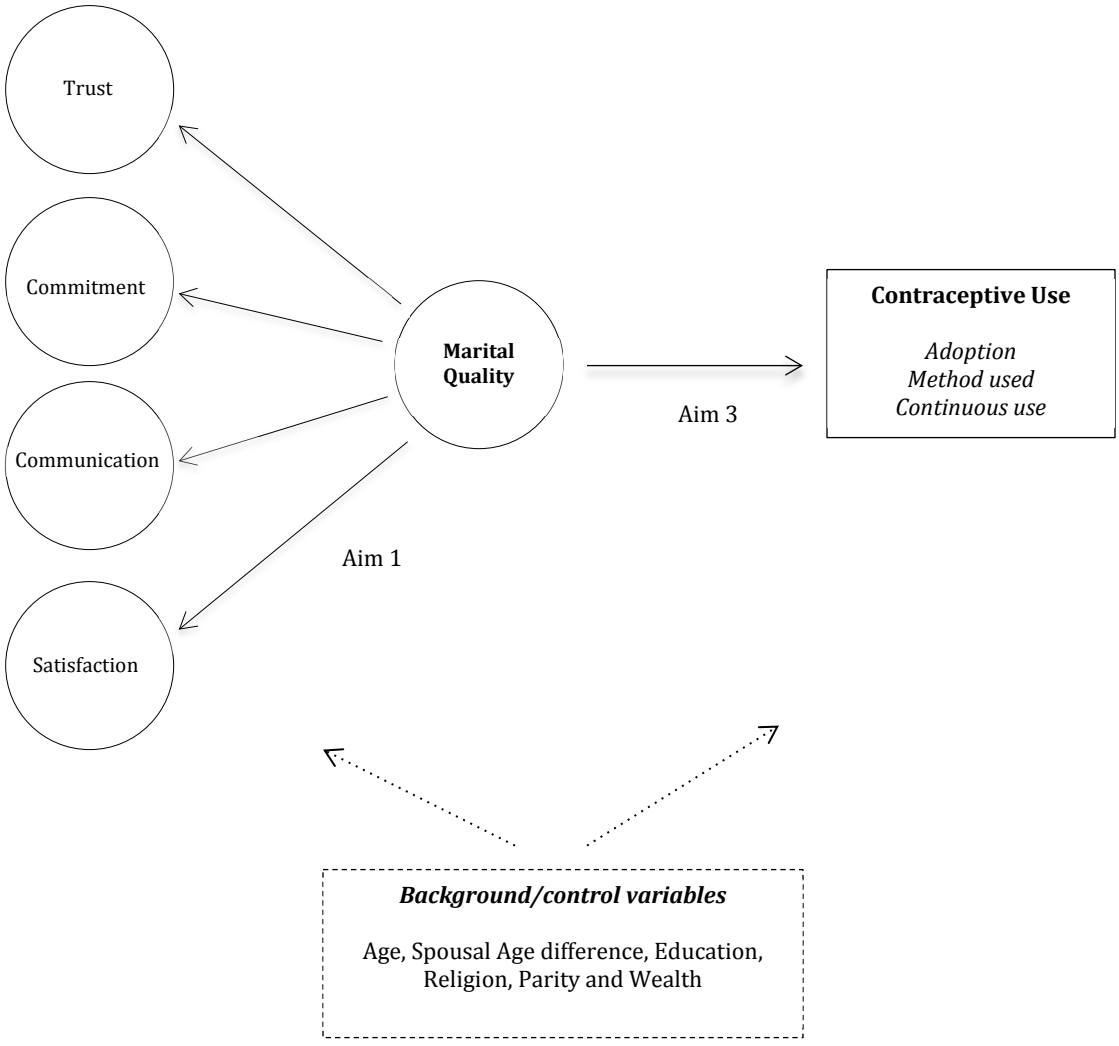
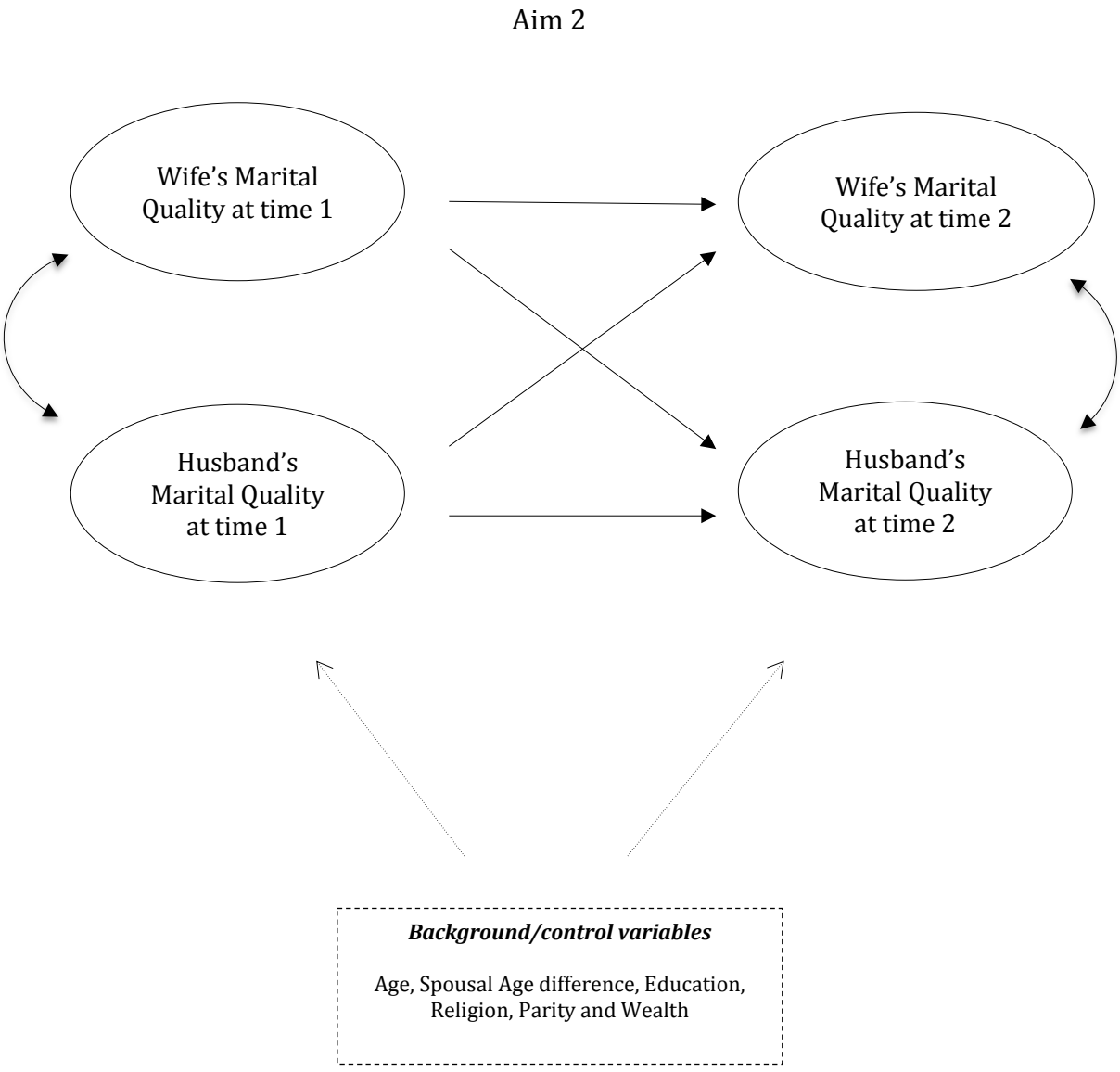


Figure 1.2: Conceptual Framework for Aim 2



Study Aims and Objectives

The study aims and objectives are listed below.

AIM 1

Aim 1 Examine the reliability and validity of the marital quality scales and determine if marital quality is a multi-dimensional latent construct captured by the four scales of trust, communication, commitment and satisfaction among female and male partner samples.

AIM 2

Aim 2: To examine if an individuals' current (follow-up) marital quality report is a function of their previous marital quality report (baseline) as well as their partner's previous marital quality report (Baseline).

AIM 3

Aim 3: To examine the association of female and male partners report of marital quality on their contraceptive use outcomes

Sub-aim 3a: To examine the association between an individual's report of marital quality and their current and future contraceptive use.

Sub-aim 3b: To examine the association of an individual's report of marital quality on the type of contraceptive method they use currently and in the future.

Sub-aim 3c: To examine the association of the female and male partners' report of marital quality on their individual and the female partners' continuous duration of contraceptive use.

Dissertation Overview

This dissertation has been organized around three manuscripts focusing on different aspects of marital quality in a peri-urban Ethiopian community.

Chapter two describes the methodology that was utilized in conducting this study. The study used secondary data and details of the statistical methods implemented to examine each of the study aims are described in detail in this chapter.

Chapter three is the first of three manuscripts included in this dissertation and is titled: *Construction of Marital Quality Measures and Exploring the Emergence of 'Compassionate' Marriages in a Peri-Urban Site in Ethiopia*. Results from the internal consistency, exploratory and confirmatory factor analysis of the 4 marital quality scales is presented in this chapter. In addition, the details of the concurrent validity assessment of the marital quality scales are also provided.

Chapter four is the second of three manuscripts and is titled: *The Mutual Influence of Spousal Marital Quality Overtime: Testing Dyadic Dynamics using the Actor-Partner Interdependence Model*. This chapter examines spousal interdependence by examining the association of female and male partners past marital quality

measures on their current marital quality measures using the actor-partner interdependence model (APIM), a statistical technique designed to model dyadic interdependence. The results of this analysis are presented in this chapter.

Chapter five is the final manuscript and is titled*: Does a Couple's Marital Quality Influence their Contraceptive Use?* This chapter utilized logistic and multinomial regression analysis to examine the association of female and male partners' marital quality scores on a range of contraceptive use outcomes such as current and future use, type of method used and continuity of use. The results of this analysis are presented in this chapter.

Chapter 6, the final chapter provides the overall conclusions that can be drawn from this dissertation. The chapter also discusses the limitation and strengths of the dissertation as well as implications for future research.

Chapter One References

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CHAPTER TWO: **METHODS**

Quantitative methods were used to explore the linkage between marital quality and contraceptive use in a peri-urban community near Addis Ababa, Ethiopia. The specific methods used for each study are described in detail below.

Data and Sampling Design

Data for this study was collected as part of a larger ongoing study called Family Health and Wealth Study (FHWS) spanning five Sub-Saharan African countries that aims to examine individual and family-level health and wealth consequences of family size. The study has followed 500-1000 family cohorts in peri-urban areas in Egypt, Ethiopia, Ghana, Malawi, Nigeria and Uganda. Households were eligible for the study if their occupants included a couple formally married or in a stable union. A probability sample of households, where the wife was of childbearing age (15 to 49 years) and the husband aged 20 to 59 years was selected for the study. The enumeration areas (EAs) were randomly selected and 20 households with eligible couples per EA were targeted for each. A household census was conducted within each EA, followed by systematic selection of households. Occupants were enumerated and eligible couples identified. Both partners of eligible couples were consented; if one or both did not consent to participate in the study, the field team selected another eligible couple from the same household or an adjacent household. In cases where a family head had multiple wives, only one randomly selected wife was interviewed. Across all EAs, couple participation rates were above 95% and interview completion rates were uniformly high. The survey questionnaire, administered separately to husbands and wives, covered a range of questions on

contraceptive use, fertility preferences, and marital quality, among other topics. In Ethiopia, the study was conducted in a peri-urban site near the capital city of Addis Ababa. The first round of the Ethiopian FHWS in 2010 consisted of 998 couples; the second round re-interviewed 728 couples (72.9%) two years later.

Study Site

In Ethiopia, the study was conducted in Sebeta town, located in Sebeta Hawas district in the Oromia region, which is 24 km southwest of the capital city of Addis Ababa. Sebeta is a fast growing town with various investment opportunities ranging from agro-industry to real estate. It has an area of 95-square km and is situated at an altitude of 2356 meters. Sebeta town is subdivided into five kebeles, which are small administrative units. The town has several health centers and clinics, educational institutions, and benefits from 24-hour electricity, water and telephone services.

Measures

Marital Quality Measures

Marital quality measures included in the FHWS consisted of four validated western scales, each measuring different dimensions of relationship quality: trust, communication, commitment and satisfaction. Each scale consists of a series of 5 to 8 statements, to which spouses respond separately. A brief description of the four scales is provided below. The scale items for each of the four scales as used in the FHWS questionnaire can be found in Appendix 1.

a) Commitment Scale*:* The Commitment Scale used in the FHWS is a Subscale adapted from the Sternberg Triangular Love Scale (Sternberg, 1997). The Sternberg Triangular Love Scale is composed of three scales that measure intimacy, passion, and commitment. The Commitment Subscale aims to measure a person's long-term commitment to their partner. The Commitment scale was later adapted to a five item scale (Harvey et al., 2006). For each item, respondents are asked to indicate on a scale of one to nine how true the statement is to them. The higher the score, the more committed the respondent is in her/his relationship.

b) Trust Scale: The Trust Scale used in the FHWS is a scale developed and tested by Larzelere and Huston (1980), which is an adaption of the Dyadic Trust Scale. Larzelere and Huston define trust "as a belief by a person in the integrity of another individual." The scale was conceptualized as a one-dimensional construct and has shown to be associated with love and intimacy. The scale consists of eight items. Respondents are asked, on a scale of one to seven, to indicate how much they agree with each statement. The higher the score, the more trust the respondent perceives in her/his relationship. The positively worded items were reverse coded.

c) Satisfaction Scale*:* The Dyadic Satisfaction Scale is part of a larger scale with four subscales called the Dyadic Adjustment Scale. It was developed by Spanier in 1976 to assess the quality of dyadic relationships (Spanier, 1976). The Dyadic Satisfaction Subscale assesses satisfaction in a relationship. It

consists of ten items assessed on a six point Likert scale. The higher the score, the more satisfied the respondent is with her/his relationship. The negatively worded items were reverse coded.

d) Communication Scale: The communication scale is the Constructive Communication Subscale of the Communication Patterns Questionnaire. It was originally developed by Christensen and Sullaway (1984) and subsequently adapted and validated by Heavey, Larson, Zumtobel, & Christensen (1996) as a seven-item scale. The Constructive Communication Subscale was developed to assess the constructiveness of an individual's communication during conflict with their spouse. The higher the score, the more constructive the respondent reports communication to be with her/his partner during conflict. The negatively worded items were reverse coded.

The marital quality scale was initially conceptualized as a four-factor scale mirroring the four validated western scales described above, but was re-specified as a three-factor scale for the female and male partners separately after assessing the internal structure and validity of the scale by conducting principal components analysis, exploratory and confirmatory factor analysis with the baseline female and male partner samples, and then repeating the confirmatory factor analysis with the follow-up samples. The three sub-scales that emerged included trust, commitment, and conflict. The final overall marital quality scale and the domains of trust, commitment, and conflict were highly reliable with Cronbach's alphas of 0.94 and 0.89 for female and male partners respectively. The scale items were reverse scored

for ease of interpretability, so that higher scores indicate higher overall marital quality, higher trust, higher commitment, and reduced conflict. The final scale scores were derived from the results of the exploratory factor analysis and confirmatory factor analysis conducted in Stata version 12 (StataCorp, 2011). These re-specified scales were used for subsequent analysis presented in chapters 4 and chapter 5. A more detailed description of the procedures followed is provided below under the statistical analysis of aim 1.

Contraceptive Use Measures

FHWS collected information on various contraceptive use behaviors with which the association of marital quality measures was assessed.

a) Partner-specific report of current and future contraceptive use was measured as a binary outcome (no=0/ yes=1) indicating if the female partner reported contraceptive use. For the male partners, the outcome indicated if a contraceptive method was used during their last sexual encounter. Since, 99.55% of the males at baseline and 99.73% of the males at the follow-up reported their last sexual encounter was with either their wife or a long-term partner, this measure was used as an indicator of contraceptive use in marital relationships.

b) Type of method (short-acting, long-acting, and coital-dependent) was measured as a categorical variable coded 0, 1and 2 to indicate whether the female or the male partner respectively reported currently using a short-

acting method (pills, injectable), a coital-dependent method (condoms, traditional methods such as periodic abstinence, withdrawal) or a long-acting method/permanent method (IUD, implant, sterilization).

c) Continuous contraceptive use was measured with two categorical outcomes. The first outcome measured if the female and male partner reported using contraceptives consistently at survey rounds (baseline and follow-up), inconsistent use (used only at baseline or follow-up), or no-use at both survey rounds. The second outcome assessed if the female partner reported using contraceptives continuously for 4 years or more, 2 to 3 years, 1 year or no-use at the follow-up survey.

Background Variables

A range of socio-demographic, household-level, and couple-level variables known to influence marital quality and contraceptive use were included in our analysis such as respondents' age, education, parity, household wealth, religion and spousal age difference. Age and education were measured as continuous variables indicating age and education in years. Parity, which specifies the number of times a woman has given birth, was assessed using the female partners' response on a series of questions about her childbirth history. Household wealth was constructed through a principal components analysis of household assets, and housing characteristics such as ownership of consumer items, and type of dwelling. The index score was then used to divide the households into quintiles that indicate poorest, poor, middle,

richer and richest. Religion was a categorized into Orthodox Christians, Muslims and other religions. Spousal age difference was measured by subtracting the female partners' age from the male partners' age.

Statistical Analysis

Exploratory Data Analysis

To begin, we conducted exploratory data analysis to examine data spread, frequency distributions, outliers, patterns of missing values, and ascertained appropriate treatment of variables. This was followed by univariate analysis to check frequency distributions and summary statistics, such as means and variances for continuous variables and proportions for categorical variables. Scattered plot matrices or box plots were then used to visualize the association between key predictor variables and outcomes of interest. Collinearity was assessed systematically with the help of correlation matrices. Multiple regression models for each outcome were estimated, and variance inflation factors examined.

Data Quality Assessment

Social desirability bias is a potential issue associated with self-reported data. Marital quality measures can be prone to social desirability bias because of the sensitive nature of the subject matter. Several checks to ensure complete privacy and confidentiality of participants were followed during data collection. We also checked for interviewer effects in the marital quality measures in both survey rounds as interviewer effects can be a source of social desirability and are a major

issue in face-to-face surveys (O'Muircheartaigh &. Campanelli, 1998). To assess interviewer effects, we first regressed marital quality measures on background covariates that included age and education of respondent, spousal age difference, spousal educational difference, parity and wealth quintile. We then repeated the analysis but this time included interviewer indicator variables to check for differences in proportion of variance explained in the two models and effect on coefficients. We ran the analysis separately for the female and male partner baseline and follow-up samples. In total 23 interviewers conducted the baseline survey and 26 interviewers conducted the follow-up survey, which included female and male interviewers. The female interviewers exclusively administered survey among the female respondents, while both the male and female interviewers conducted the survey for the male respondents.

To create the indicator variable for interviewers, we collapsed interviewers with less than 10 interviews with other interviewers. The final interviewer variable for the female and male samples consisted of 12 indicators each at the baseline survey. At the follow-up, the final interviewer variable consisted of 15 indicators for the female sample and 18 indicators for the male sample. Table 2.1 provides a detailed description of the differences in R-square estimates between the two regression models at the baseline and follow-up, with covariates only and interviewer indicator variable along with all covariates in the first model. Overall the interviewer effects varied in size by survey, gender and marital quality measures. For the females, the baseline trust measure had the smallest interview effect, with a 0.01 difference in R-

squares values between the two models. Similarly, for the males, the smallest change in R-square (0.03) was in the trust measures at the follow-up survey. The largest changes in R-squares were noted in the baseline conflict measure (0.16) and baseline trust measure (0.18) for the females and males respectively. We then, taking the baseline female conflict and male trust measures, assessed how these larger changes in R-squares with the introduction of the interviewer indicator impacted the coefficients between the two models with and without interviewer indicator. While there were shifts in the value of coefficients between the two models for both these measures, our inferences did not change as can be noted from table 2.2. Given these results, we did not include the interviewer indicator or make any adjustments to account for the interviewer effects in subsequent analyses.

Treatment of Loss to Follow-up

In order to assess potential bias due to loss-to-follow-up at the second round of data collection, we checked for significant differences between couples lost-to-follow-up versus couples who were relocated to identify potential mechanisms of loss and determine appropriate data management strategies (Kristman, Manno, & Côté, 2004). A detailed description of the differences between the female and male partners retained and those lost-to-follow-up are provided in Tables 2.3 and Table 2.4. The couples who remained in the study and those lost-to-follow-up did not vary significantly by the key outcomes of contraceptive use and marital quality (Tables 2.3, 2.4). The proportion of contraceptive users was the same in the retained and lost-to-follow-up samples. Furthermore, contraceptive use (OR: 1:01, CI =0.75 -1.42)

was not associated with a woman being relocated in the second round of data collection after adjusting for covariates such as age, education, wealth quintile, parity, spousal age and educational differences. The marital quality measures also on average did not vary across the samples, with the exception of the female commitment score that was marginally different [mean difference: 0.14 ($p\ value = 0.08$)] between the groups. Moreover, in the multivariate regression analysis, the marital quality measures, other than the females' commitment score (OR: 1.12, 95% CI=0.98-1.27), which was marginally significant, were not associated with the likelihood of the female partner being followed in the second survey round.

However, there were some demographic differences between the two samples. The females in the lost-to-follow-up sample were on average 1.7 ($p\ value < 0.001$) years younger and their male partners 2.25 ($p\ value < 0.001$) years younger than respondents in the follow-up sample. Females with 2 or more children had significantly reduced odds of being lost in the follow-up as compared to women with one or no children (Table 2.2). The two samples did not vary significantly by education levels or wealth quintile. Given these differences between the samples, we generated weights to account for the under-represented group lost during follow-up by constructing a propensity score. A propensity score is the probability that a subject remained in the study (Rosenbaum & Rubin, 1983). This methodology is used to assign weights to subjects who remain in the study to account for the loss of observations for individuals' lost-to-follow-up. We estimated a logistic regression model that predicted the odds of the female partners remaining in the study, using

as predictors, the female respondent's age, spousal age-difference, parity, wealth as a binary variable indicating wealth versus being poorer, and whether they had discussed or considered divorce, separation or terminating their current relationship at baseline. The model indicated a good fit based on the results of the Hosmer-Lemeshow goodness of fit test [Chi-square (8): 680, p value: 0.56]. Table 2.4 provides a detailed description of the model used to generate propensity scores. The husbands were assigned the wife's propensity score weight, because the husbands' re-interview depended on the wife's consent. All longitudinal analysis in chapters 4 and chapter 5 were conducted with the weights.

Analysis of Specific Aims

Aim 1 Analysis

Aim 1 Examine the reliability and validity of the marital quality scales and determine if marital quality is a multi-dimensional latent construct captured by the four scales of trust, communication, commitment and satisfaction among female and male partners in peri-urban Ethiopia.

FHWS baseline data was used to examine characteristics of the four scales. We assessed scale reliability defined as the proportion of variance attributable to the true score of a latent variable through inter-item correlations using Cronbach's alpha (DeVellis, 2003). Cronbach's alpha is the most commonly used assessment measure of internal consistency of scale items and an alpha value of over 0.70 is considered evidence of an internal consistentcy (DeVellis, 2003). Through inter-

item correlations, we assessed the extent to which items measured the same underlying construct (DeVellis, 2003). We used the results of the inter-item correlational analysis to preliminarily determine the reasonableness of assuming a single latent construct underlying the 4 scales.

Following the internal consistency assessment, we first conducted principal components analysis (PCA) on all scale items to determine how many factors underlay the scale items. A range of criteria including theoretical understanding of constructs, eigenvalues >1, percent of variance explained, results of the scree plot and parallel analysis were utilized to assess appropriate number of factors to be extracted. We then examined the structure of the scales and assessed internal validity with exploratory factor analysis (EFA) on all scale items followed by a confirmatory factor analysis (CFA). While both EFA and CFA methodologies define factors based on co-variability and ignore the variance that is unique to the measures, the purpose and methodology of performing them are different (Babyak & Greene, 2010). EFA is an inductive method; the goal primarily is to discover an as-yet unknown set of factors based on the data. In the CFA on the other hand, we hypothesize a model that specifies the relationship between the measured variables and the underlying factor structure. The model fit provides evidence if our hypothesized model is supported by the data (Babyak & Greene, 2010). Hence in our analysis, we first performed the EFA to determine the underlying factor structure and then tested the validity of the factor structure using CFA.

For the EFA, given the ordinal nature of the response options, we used a polychoric

correlation matrix for the analysis. Use of the polychoric matrix is also recommended when the response range is limited and the distribution of the responses is skewed (Hawkins, McCarty, Peipins & Rodriguez, 2012). We conducted the EFA using recommended iterated principal factor estimation methods as implemented in Stata 12 (StataCorp, 2011). Varimax rotation was utilized to rotate the factor loadings. We inspected factor loadings to understand the structure of the scales. We retained items with loading values of 0.40 or higher and items that clearly loaded on a single factor. Items with high uniqueness values (above 0.50) were eliminated. Multiple iterations of the process were performed until a satisfactory solution was attained. Following the EFA, we performed the CFA to confirm statistical fit of the final factor structure. We used maximum likelihood, the most commonly used estimation method in CFA to derive model parameters. We then assessed goodness of fit using recommended statistics such as the chi-squared statistic, root-mean-square-error-of-approximation (RMSEA), comparative fit indices (CFI) and the standardized root mean square residual (SRMR) (DeVellis, 2003).

In the absence of an established gold standard to assess criterion validity of marital quality, we assessed concurrent validity. For scales that lack objective criteria, demonstrating concurrent validity is considered critical (DeCoster, 2000). Concurrent validity reveals if the scale is associated with related measures (DeCoster, 2000). To establish concurrent validity, we tested several associations between marital quality and related couple relationship domains of spousal discussion and concordance on family size, communication and decision-making on

contraceptive use, household decision-making and spousal support in household chores. A set of multivariate logistic regression analyses adjusting for background factors such as age, education, wealth, religion and parity were used to estimate these relationships. In addition to establishing concurrent validity, examination of these associations also allowed us to assess if egalitarian marital patterns were prevalent in our couple sample from peri-urban Ethiopia.

Our results, however, did not support the hypothesized four-factor marital quality structure and instead a three-factor marital quality measure with gender differences comprising domains of trust, commitment and conflict emerged. The measures were internally consistent and demonstrated good internal and external validity as gauged by the results of the EFA, CFA and concurrent validity analysis. The final scale scores were derived from the results of the exploratory factor analysis and confirmatory factor analysis conducted in Stata version 12 (StataCorp, 2011). These re-specified scales were used for subsequent analysis presented in chapter 4 and chapter 5. A more detailed description of the procedures followed for item selection and scale construction is provided in chapter 3.

Aim 2 Analysis

Aim 2: To examine if an individual's current (follow-up) marital quality report is a function of her/his previous marital quality report (baseline) as well as the partner's previous marital quality report (baseline).

We limited our analysis to the sample of couples who participated in both survey rounds because of the longitudinal design of aim 2. In order to address potential

issues of bias due to loss-to-follow-up, differences between the samples were examined and weights derived with propensity score matching were assigned to couples who remained in the sample to account for loss of observations on couples not relocated.

To begin with, we started with exploratory analysis to establish if a couple-level analysis was necessary. At first, we estimated polychoric correlations between the marital quality scales of spouses to assess levels of correlation between the measures. We then conducted dyadic level analysis. In dyadic research the basic assumption of independence requires that after controlling for variation due to the independent variable, the data from each individual in a study be unrelated to the data from every other individual in the study. In most statistical application with dyadic data, this assumption is often violated. The factor scores of members of a dyad are likely to be correlated. If ignored, this non-independence can bias standard errors and tests of non-significance (Kenny, Kashy & Cook, 2006; Kenny, 1996) and hence needs to be addressed in the analysis. The Actor Partner Interdependence Model (APIM) is a commonly used technique to model interdependence in dyadic relationships (Kenny, Kashy & Cook, 2006). The APIM model suggests that a person's score on an independent variable affects their own dependent variable score (actor effect) as well as the dependent variable score of their partner (partner effect). The partner effect directly models the mutual influence that might be present between individuals in a dyadic relationship.

Multi-level modeling was used to operationalize the APIM model. Using multi-level

methods has several advantages over other methods proposed to estimate the APIM. Among its advantages is a greater flexibility in specifying the actor and partner effects to be estimated as well as estimation of interactions between different kinds of variables (Campbell & Kashy, 2002). The APIM model suggests that each individual's report of marital quality at the follow-up is a function of his or her report of marital quality at the baseline as well as his or her partner's report of marital quality at the baseline. For the APIM, the outcome variable has two levels, the dyad and the individual level. However, estimating traditional multi-level models with the common intercept approach has a major disadvantage in the case of dyadic data because it assumes the non-independence in the outcome scores is positive because the non-independence is specified as a variance in these models rather than a correlation (Kenny at al, 2006). Kenny et al. (2006), therefore, recommend an alternate strategy for modeling dyadic non-independence by correlating the error terms, by treating individual scores as repeated measures in the dyad. The non-independence is then estimated as a covariance. In addition, Kenny et al. (2006) provide two approaches for modeling APIM for dyads, where the members can be distinguished by some characteristics (e.g. gender). The interaction approach uses interaction terms between the distinguishing variable and the actor and partner predictor variables to factor in the effects of the distinguishing variable.

As a first step to conducting dyadic research, Kenny (1996) recommends conducting a test of the level of non-independence to identify if the dyad is an appropriate level of analysis. We, therefore, first ran empty multi-level models on overall and

individual marital quality measures at follow-up with no predictors and estimated the intra-class correlation to assess the degree of non-independence in the data. The level of non-independence was assessed using Cohen's (1998) standards, which defines 0.5 as a large correlation, 0.3 as medium and 0.1 as small. Subsequently, we estimated four separate multivariate APIM models for the overall and individual marital quality scores using the interaction approach laid out by Kenny et al. (2006). Since we were exclusively dealing with female and male dyads, we used gender as the distinguishable variable. We included two interactions of gender with actors' marital quality and partners' marital quality measures in the APIM models. The interaction term enabled the estimation of separate actor and partner effects for females and males. A more detailed description of the procedures followed and the results are provided in chapter 4.

Aim 3 Analysis

Aim 3: To examine the association of female and male partners report of marital quality on their contraceptive use outcomes

Sub-aim 3a: To examine the association between an individual's report of marital quality and their current and future contraceptive use.

Sub-aim 3b: To examine the association of an individual's report of marital quality on the type of contraceptive method they use currently and in the future.

Sub-aim 3c: To examine the association of the female and male partners' report of marital quality on their individual and the female partners' duration of continuous contraceptive use.

We first conducted bivariate analysis to assess the significance of relationships between outcomes and key independent variables. Next we estimated multivariate logistic and multinomial regression models based on the nature of the outcome variable. To analyze sub-aim 3a, we used logistic regression because of the binary nature of contraceptive use, the outcome variable. We estimated if baseline marital quality measures were associated with contraceptive use at baseline and follow-up survey for female and male partners. For the analysis of sub-aim 3b, a multinomial regression was used because of the categorical nature of type of method used, the outcome variable. Again, we estimated associations of method type with the marital quality measures for female and male partners at baseline, and then repeated the analysis to estimate longitudinal associations of baseline martial quality with method type reported at the follow-up. To examine sub-aim 3c, we used two categorical outcome measures that included female and male partners' report of consistent use at both survey rounds and females' report of length of continuous contraceptive use. We examined the association of baseline marital quality measures with consistency in contraceptive use at both survey rounds for female and male partners using multinomial regression analysis. Again, multinomial regression analysis was utilized to assess the association between female partners' report of length of continuous use and marital quality, because of the categorical

nature of the outcome variable. We used the female partners' report of use from the follow-up survey and the spouses' marital quality measures from the baseline survey. A more detailed description of the procedures followed and the results are provided in chapter 5.

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Table 2.1

Comparison of R-square Values from Marital Quality Regression Models With and Without Interviewer Indicator Variable, Baseline and Follow-up Survey Data

	Baseline				Follow-up			
	Females		Male		Females		Male	
Outcome Scales	Co-variates[1]	Inter-viewer[2]	Co-variates[1]	Inter-viewer[2]	Co-variates[1]	Inter-viewer[2]	Co-variates[1]	Inter-viewer[2]
Trust	0.03	0.04	0.02	0.20	0.03	0.05	0.02	0.05
Commitment	0.02	0.09	0.02	0.10	0.03	0.07	0.01	0.17
Conflict	0.04	0.20	0.03	0.15	0.04	0.17	0.02	0.09

1: Model predictors: Age, education, parity, wealth quintile, spousal age and educational difference

2: Model predictors: Interviewer indicator in addition to the covariates listed above

Table 2.2

Comparison of the Coefficients of the Association of Baseline Female Conflict and Male Trust Scores with Socio-Demographic Variables with and without Interviewer Indicator Variable

	Female Conflict Baseline				Male Trust Baseline			
	Covariates only		Covariates + Interviewer		Covariates only		Covariates + Interviewer	
Predictors	Coefficients (SE)	P Value	Coefficients (SE)	P- Value	Coefficients (SE)	P Value	Coefficients (SE)	P- Value
Age in Years	0.007(0.01)	0.43	0.006 (0.01)	0.48	0.007 (0.01)	0.33	0.006 (0.01)	0.35
Schooling in Years	0.046(0.01)	0.01**	0.051(0.01)	0.01**	-0.001(0.01)	0.88	-0.001(0.01)	0.91
Age difference	-0.004(0.01)	0.63	-0.003(0.01)	0.619	0.004(0.01)	0.63	0.005(0.01)	0.52
Education difference	0.028(0.01)	0.02**	0.036(0.01)	0.001**	-0.014(0.01)	0.18	-0.007 (0.02)	0.43
Parity								
1 child	-0.029(0.11)	0.79	0.032 (0.10)	0.75	-0.015(0.09)	0.87	0.028(0.08)	0.74
2 child	-0.063 (0.13)	0.62	0.109 (0.12)	0.34	0.097(0.11)	0.36	0.023(0.10)	0.83
3 child	-0.174 (0.18)	0.28	-0.129(0.15)	0.38	-0.011(0.13)	0.94	-0.040(0.12)	0.75
4 or more	0.080(0.18)	0.66	0.150(0.17)	0.37	0.251(0.15)	0.10	0.174(0.14)	0.21
Wealth quintile								
Poorer	0.243(0.12)	0.05	0.212 (0.11)	0.06	0.142(0.10)	0.17	0.131(0.09)	0.17
Middle	0.265(0.13)	0.04**	0.328 (0.12)	0.01**	0.236(0.11)	0.03**	0.259(0.10)	0.008**
Rich	0.101(0.14)	0.47	0.193 (0.13)	0.13	0.268(0.12)	0.02**	0.366(0.108)	0.001**
Richer	0.191 (0.15)	0.21	0.239 (0.14)	0.09	0.321(0.13)	0.01**	0.405 (0.12)	0.001**

Table 2.3
Mean Differences on Key Variables at Baseline between Female and Male Partners (n=725) Who Remained in the Sample with Those Lost in Follow-up (n=261)

Variable	Female Mean Difference (CI)	Male Mean Difference (CI)
Marital Quality scales (MQ)		
Overall MQ	-1.13 (CI: -4.04, 1.72)	-0.23 (CI: -2.23, 1.74)
Trust	-0.02 (CI: -0.16, 0.12)	-0.01 (CI: -0.11, 0.09)
Commitment	-0.14 (CI: -0.30, 0.02)*	-0.02 (CI: -0.16, 0.12)
Conflict	0.04 (CI: -0.13,0.21)	-0.05 (CI: -0.13, 0.03)
Age	-1.73 (CI: -2.61, -0.84)**	-2.25 (CI: -3.38, -1.11)**
Education	0.33 (CI: -0.33,0.98)	0.01 (CI: -0.65, 0.67)

**p value <0.05; * p value < 0.10

Table 2.4

Logistic Regression Results of Female and Male Partners' Probability of Follow-up with Selected Key Study Variables (n=986)

Variables	Female *OR (CI)*	Male *OR (CI)*
Contraceptive Users[1]	1.06 (0.74-1.15)	1.12 (0.81-1.52)
Marital Quality (MQ)[1]		
Overall MQ	1.01 (0.98-1.11)	1.01 (0.98-1.02)
Trust	1.08 (0.93-1.24)	0.98 (0.85-1.14)
Commitment	1.12 (0.99-1.26)*	1.02 (0.83-1.26)
Conflict	0.99 (0.88-1.13)	1.23 (0.95-1.61)
Parity (Ref group: no child)[2]		
1 child	1.32 (0.70-1.74)	
2 child	1.88 (1.23-2.87)**	
3 child	3.46 (1.83-6.54)**	
4 or more children	2.70 (1.45-5.04)**	
Wealth Quintile (Ref group: poorest) [2]		
Poorer	1.10 (0.91-1.90)	
Middle	0.85 (0.55-1.34)	
Rich	0.94 (0.60-1.46)	
Richer	1.10 (0.70-1.72)	

**p value <0.05; * p value < 0.10

[1] Model adjusted for age, education, spousal age-difference, spousal educational-difference, parity, religion, wealth quintile

[2] Unadjusted Models

Follow-up: n= 725; Lost-to-follow: n=261

Table 2.5
Logistic Regression Results of the Female Partners' Probability of Follow-up with Selected Key Predictors to Generate Propensity Scores (n=986) [1]

Variables	OR (CI)
Age in Years	1.02(0.99-1.06)
Age Difference in Years	1.02 (0.99-1.04)
Education in Years	0.87 (0.63-1.20)
Wealthy	1.38 (0.99-1.92)*
Parity	
1 child	1.12 (0.82-1.82)
2 child	1.86 (1.04-2.7)**
3 child	3.04 (1.50-6.19)**
4 or more children	2.14 (1.01-4.51)**
Considered Divorce	0.80 (0.66-0.97)**

**p value <0.05; * p value < 0.10
[1] Follow-up n= 725; Lost-to-follow n=261

CHAPTER THREE: **MANUSCRIPT ONE**

Construction of Marital Quality Measures and Exploring the Emergence of 'Compassionate' Marriages in a Peri-Urban Site in Ethiopia

Background

Relevance of Marital Quality

The impact of social relationships on health is well documented, with the strength of this association increasing in intimate relationships (Glaser & Newton, 2001; House, Landis & Umberson, 1988; Berkman & Syme, 1979). Across studies, marital relationships have been associated with critical physical and mental health consequences for individuals. (Ducharme & Kollar, 2012; Proulx, Helms & Buehler, 2007;Myers & Diener, 1995). For instance, age-adjusted all-cause mortality has consistently been higher among unmarried versus married individuals across epidemiologic studies (Drefahl, 2012; Va et al., 2011; Johnson et al., 2000; Ben-shiomo et al., 1993; Umberson, 1992; Hu & Goldman, 1990). In other research, unmarried and socially isolated individuals have exhibited higher rates of cardio-vascular diseases, proneness to accidents and psychiatric disorders as compared to their married counterparts (Glaser & Newton, 2001; Anson, 1989; House et al., 1988). Furthermore, marriage significantly affects the mental health of spouses. In a meta-analysis examining 93 studies, marital quality and psychological well-being were positively related both concurrently and over time, with higher levels of marital quality associated with greater individual well-being (Proulx, Helms &Buehler, 2007).

Beyond marital status, the quality of a marriage has also been linked to health outcomes (Gallo, Mathews, Troxel & Kuller; 2003; Johnson, Backlund, Sorlie, & Loveless, 2000). Among married individuals, those in distressed marriages have

poorer health outcomes, when compared to their counterparts in non-distressed marital relationships (Burman & Margolin, 1992). A study comparing the cardiovascular risk profiles of married women with various levels of marital satisfaction, single and divorced women; found women in relationships with higher levels of satisfaction, had lower biological, lifestyle, and psychosocial risk factors when compared with women in the comparison groups (Gallo et al. 2003). Similarly, a study reviewing 64 research studies, found negative aspects of marital functioning adversely affecting cardio-vascular, endocrine and other physiological mechanisms directly (Glaser & Newton, 2001). The study also found indirect effects of marital functioning on health outcomes through pathways like depression and health habits (Glaser & Newton, 2001). Moreover, marital strain, studies indicate, can have a cumulative effect on health over time (Umberson et al., 2006). In addition, moving beyond the dyad, marital quality is also associated with the health and well-being of family members. Research among children as well as adolescents attests to the positive impact parental marital quality has on their physical, mental and behavioral outcomes (Jeong & Chun, 2010; Finger, Hans, Bernstein & Cox, 2009; Pendry & Adam, 2007; Gerard, Krishnakumar & Buehler, 2006; Howes & Markman, 1989)

However, despite increasing understanding of the impact social relationships have on health outcomes in developed countries, research in this arena remains under explored in Sub-Saharan Africa. This is especially troublesome as populations in this context continue to grapple with some of the poorest health indicators in the world. While challenges brought about by HIV, have spawned an interest in marital relationships, this research has mostly explored gender power relations or the

structure of marriage (Bove & Valeggia, 2009; Gupta & Weiss, 1993). There remains a paucity of research exploring the meaning and impact of marital quality on the health of individuals, couples and families in Sub-Saharan Africa. Speaking on the relevance of social relations research, Berkman (1995: 245) says, "*..health promotion rests on the shoulders not only of individuals but also of their families and communities.*." Hence, by neglecting this area of research, we are potentially missing an important link in building the health and well-being of individuals and communities in this context.

Conceptualization of Marital Quality

While understanding marital quality, its determinants and consequences has dominated family research field in the west for decades, the definition and measurement of marital quality continue to be debated (Lawrence et al., 2011; Hasserbrauck & Fehr, 2002; Chung, 1990; Glenn, 1990; Sabetalli, 1988; Fincham and Bradbury, 1987; Spanier and Lewis, 1980). The pioneering work done by Burgess and Cottrell (1939), and Terman (1939) laid the foundation of theory development in the field. Historically, two main schools of thought have dominated the conceptualization of marital quality, with the initial thinkers drawing on the founding work on constructs of 'marital satisfaction' or 'marital adjustment' for theorizing on marital quality (Glenn, 1990; Chung, 1990). Proponents following the tradition of 'marital satisfaction' saw marital quality as simply a matter of how married people feel about their marriage and used self-reported global measures of marital satisfaction and happiness as measures of marital quality (Glenn, 1990). The opposing school viewed marital quality as both an aspect of the marital

relationship between spouses and independent feelings of spouses about their marriage (Glenn, 1990; Chung, 1990). For instance, Spanier and Lewis (1980:269) define marital quality "as the subjective evaluation of a married couple's relationship on a number of dimensions and evaluations." They go on to explain, " the range of evaluations constitutes a continuum reflecting numerous characteristics of marital interactions and marital functioning. High marital quality, therefore is associated with good adjustment, adequate communication, a high level of marital happiness, integration, and a high degree of satisfaction with the relationship." These researchers used multi-dimensional measures of marital quality, and Spanier's Dyadic Adjustment scale (1976) is the most popular example of such a measure.

Subsequently, due to several emerging theoretical and methodological concerns, debates arose on the proper definition and measurement of marital quality (Glenn, 1990, Fincham & Bradburv, 1987; Norton 1983). The multi-dimensional conceptualization of marital quality in particular came under severe attack with many researchers advocating for a move back to global measures of 'marital quality' akin to 'marital satisfaction or happiness' (Sabatelli, 1988; Fincham & Bradburv, 1987; Norton 1983). Proponents of this view argue that the use of a multi-dimensional measure generates a measure that is hard to distinguish from its correlates, and other related constructs because of the overlap in item content (Fincham and Bradbury, 1987). Furthermore, they posited, such usage has led to the merging of two different streams of work on 'marital adjustment' and 'marital satisfaction', causing definitional and conceptual ambiguity (Sabatelli, 1988). For

instance, Sabatelli (1988) argues that the blending of constructs of 'marital satisfaction' and 'marital adjustment' into a broader and more inclusive concept of 'marital quality' in Spanier's scale gave rise to a unit of analysis problem, where the dyad and individual are both units of analysis simultaneously and scaled as comparable phenomenon.

Alternately, despite the above debates, advantages of a multi-dimensional construct of 'marital quality' over a global measure are still recognized with the field moving in that direction (Lawrence et al.., 2011; Glenn, 1990). Supporters of a multi-dimensional measure of 'marital quality' argue that such a construct can be conceptualized as a latent variable with an underlying structure (Hassebrauck & Fehr, 2002). Moreover, they contend, a multi-dimensional construct, allows the study of relationship dynamics because it enables exploration of the various domains of marital quality across individuals and couples (Hassebrauck & Fehr, 2002). Currently, contemporary family studies field is moving in the direction of clearly distinguishing between these three key constructs and formalizing their measurement (Lawrence et al., 2011). While 'marital satisfaction' and 'marital adjustment' retain their initial definitions, they are no longer equated with 'marital quality' (Lawrence et al., 2011). Marital satisfaction is defined as a global measure of marital happiness, while marital adjustment is defined as a multi-dimensional construct, broader in scope, that includes both aspects of marital satisfaction and dyadic processes like conflict management (Snyder, Heyman & Haynes, 2005; Lawrence et al., 2011). Marital quality is conceptualized solely as a dyadic process, such as the quality of a couple's conflict management skills, supportive transactions

as well as intimacy (Snyder et al., 2005; Lawrence et al., 2011).

Marital Quality Research in Non-western societies

Although the conceptualization of marital quality has dominated the family research field in the west for decades, interest in this arena is beginning to emerge in non-western settings. The past decades have witnessed a body of literature from non-western settings on marital quality (Allendorf & Ghimire, 2013; Allendorf, 2012; Ng, Loy, Gudmunson & Cheong, 2009; Sandhya, 2009; Fuller & Narasimhan, 2008; Shek & Cheung, 2008; Fisiloglu & Demir, 2000; Gwanfogbe, Schumm, Smith & Furrow, 1997). This interest has spurred a discussion on potential commonalities and differences in the definition, measurement and appropriateness of using available western measures of marital quality cross-culturally (Allendorf, 2012; Sandhya, 2009). Scholars vary on the suitability of using western scales in non-western settings (Allendorf, 2012; Sandhya, 2009). However, there is consensus that when applying such measures in new settings, their reliability and validity should be vigorously assessed. Spanier's Dyadic Adjustment Scale is a good example of a marital quality scale that has successfully been applied cross-culturally after validations in diverse settings (Allendorf, 2012, Sandhya, 2009; Shek & Cheung, 2008; Fisiloglu & Demir, 2000). Moreover, at a theoretical level, a plausible justification for using available western scales cross-culturally is the reasoning that while contextual determinants shape the manner in which marital quality is experienced in any given setting, fundamental commonalities may exist in the way humans experience marriage and are worth exploring (Sandhya, 2009).

Also, the forces of 'globalization' and their impact on marital structures are providing additional impetus to assess variations and commonalities in marital quality cross-culturally. In the western settings with the rise in the socio-economic status of women, changes in the functions and roles of families in modern economies, and a rising emphasis on individualism, the emotional functions of marriage is getting heightened importance for the wellbeing of its constituents (Wilcox & Nock, 2006). Traditional marriage structures with their age and gender hierarchies gave way to modern marriages that are more egalitarian and empathetic, with more communication and negotiation of mutual desires and goals between spouses (Amato et al., 2003).These shifts in the conceptualization of marriage and family has brought the Compassionate theory of marriage into focus. The proponents of this theory postulate that practice and belief in the principles of egalitarianism leads to higher marital quality within relationships. Egalitarian marriages are characterized by a high degree of intimacy, affection and empathy, allowing for high quality and stable marriages (Wilcox & Nock, 2006; Amato et al. 2003; Burgess, 1948).

While majority of the research has focused on studying the nature and changes in marital patterns in the west, there have been scholarly efforts to understand these changes in other contexts. In fact, pioneers like W.J. Goode (1963) hypothesized that as western economic systems get adopted in non-western settings through industrialization, family patterns will change in these societies too. Families based on kinship and lineage systems will disappear; giving rise to a 'nuclear family', where the husband works for wages and the wife takes care of the children. Like in

the west, changes in family patterns across the world have been more complex than any shift to a universal 'nuclear family' (Cherlin, 2004). Interestingly, however, there is growing evidence that regardless of these complexities, the ideology of the western family, with its emphasis on companionship and romantic love between a husband and wife is spreading across the globe, even in settings with very little progress towards industrialization (Cherlin, 2012). Moreover, another highlight of modern families is declining parental control over life-course events like choice of spouse, timing of marriage, and decisions around fertility and child-care (Cherlin, 2012). However, it is important to note that although these changes are occurring in diverse settings, there is large variation in the way these shifts are happening and practices adopted. For instance, a study from India examined the emergence of a form of marriage that has elements of a 'compassionate marriage' but allows simultaneously for the reproduction of traditional forms of social stratification like caste (Fuller and Narasimhan, 2008). Another study from Chitwan valley in Nepal, using retrospective histories, traces shifts in marriage patterns in a predominantly rural setting from arranged marriages to ones based on love and personal choice (Ghimire et al.., 2006).

Although the evidence is mixed, in Africa too, these changes have been noted. For instance, Cherlin (2012) argues that declines in teenage marriage, especially in northern and southern Africa, provide evidence of reduced parental control in early timing of marriages. Other studies exploring the nature of marriages in Sub-Saharan Africa, have also found a trend towards egalitarian and romantic marriages. A study looking at correlates of marital quality among Ghanaian men found that less

traditional decision-making and open communication were strong predictors of marital quality (Miller & Kannae, 1999). Moreover, the study also found that having a wife in a high status occupation enhanced marital quality by reducing male dominance in decision-making and promoting open communication (Miller & Kannae, 1999). Similarly, a qualitative study among a sample of South African men and women on factors promoting marital quality found "mutual love and respect" being valued by both men and women (Styen, 1996). Both parties considered open communication, supportive spouses and move towards egalitarian decision-making as promoters of marital satisfaction and happiness (Styen, 1996). However, there still remains a dearth of scholarly efforts systematically exploring the nature of marital quality in this context. Such research will not only move forward marital quality research in Sub-Saharan Africa, but also allow cross-cultural comparison of marital quality.

In this paper, we assessed the psychometric properties of four independent validated western scales to construct a marital quality measure with data from a sample of married couples living in a peri-urban site in Ethiopia. The scales included as part of this study are: Commitment Subscale from the Sternberg Triangular Love Scale (1986), Dyadic Trust Scale (Larzelere & Huston, 1980), Dyadic Satisfaction Subscale from the Spanier's Dyadic Adjustment Scale (1976), and the Constructive Communication Subscale from the Communication Patterns Questionnaire (Christensen & Sullaway, 1984). These scales were selected based on their demonstrated validity and reliability in the west (Graham, Liu, & Jeziorski, 2006; Sternberg, 1997; Heavey, Larson, Zumtobel & Christiansen, 1996). Moreover,

the selection of these specific scales was also influenced by the larger study focused on fertility regulation and family planning of which these measures are a part. In addition, we assessed the linkages between marital quality measures and nature of spousal relationships, which was gauged by spousal communication and decision-making on fertility and family planning, household decision-making and spousal support in household chores. These analyses in addition to establishing concurrent validity of marital quality measures, allowed us to evaluate if marriages in peri-urban Ethiopia were compassionate in nature.

Research Question

To examine the reliability and validity of the marital quality scales and determine if marital quality is a multi-dimensional latent construct captured by the four scales of trust, communication, commitment and satisfaction among female and male partners in peri-urban Ethiopia.

Methods

Data and Sampling Design

Data for this study was collected as part of a larger ongoing study called Family Health and Wealth Study (FHWS) spanning five Sub-Saharan African countries that aims to examine individual and family-level health and wealth consequences of family size. The study has followed 500-1000 family cohorts in peri-urban areas in Egypt, Ethiopia, Ghana, Malawi, Nigeria and Uganda. Households were eligible for the study if their occupants included a couple formally married or in a stable union.

A probability sample of households, where the wife was of childbearing age (15 to 49 years) and the husband aged 20 to 59 years was selected for the study. The enumeration areas (EAs) were randomly selected and 20 households with eligible couples per EA were targeted for each. A household census was conducted within each EA, followed by systematic selection of households. Occupants were enumerated and eligible couples identified. Both partners of eligible couples were consented; if one or both did not consent to participate in the study, the field team selected another eligible couple from the same household or an adjacent household. In cases where a family head had multiple wives, only one randomly selected wife was interviewed. Across all EAs, couple participation rates were above 95% and interview completion rates were uniformly high. The survey questionnaire, administered separately to husbands and wives, covered a range of questions on contraceptive use, fertility preferences, and marital quality, among other topics. In Ethiopia, the study was conducted in a peri-urban site near the capital city of Addis Ababa. The first round of the Ethiopian FHWS in 2010 consisted of 998 couples; the second round re-interviewed 728 couples (72.9%) two years later.

Measures

Marital quality Measures

Marital quality measures included in the FHWS consisted of four validated western scales, each measuring different dimensions of relationship quality: trust, communication, commitment and satisfaction. Each scale consists of a series of 5 to 8 statements, to which spouses respond separately. A brief description of the four scales is provided below. The scale items for each of the four scales as used in the

FHWS questionnaire can be found in Appendix 1.

a) Commitment Scale*:* The Commitment Scale used in the FHWS is a Subscale adapted from the Sternberg Triangular Love Scale (Sternberg, 1997). The Sternberg Triangular Love Scale is composed of three scales that measure intimacy, passion, and commitment. The Commitment Subscale aims to measure a person's long-term commitment to his/her partner. The Commitment scale was later adapted to a five item scale (Harvey et al., 2006). For each item, respondents are asked to indicate on a scale of one to nine how true the statement is to them. The higher the score, the more committed the respondent is in her/his relationship.

b) Trust Scale: The Trust Scale used in the FHWS is a scale developed and tested by Larzelere and Huston (1980), which is an adaption of the Dyadic Trust Scale. Larzelere and Huston define trust "as a belief by a person in the integrity of another individual." The scale was conceptualized as a one-dimensional construct and has been shown to be associated with love and intimacy. The scale consists of eight items. Respondents are asked, on a scale of one to seven, to indicate how much they agree with each statement. The higher the score, the more trust the respondent perceives in her/his relationship. The positively worded items were reverse coded.

c) Satisfaction Scale*:* The Dyadic Satisfaction Scale is part of a larger scale with four subscales called the Dyadic Adjustment Scale. It was developed by Spanier in 1976 to assess the quality of dyadic relationships (Spanier, 1976).

The Dyadic Satisfaction Subscale assesses satisfaction in a relationship. It consists of ten items assessed on a six point Likert scale. The higher the score, the more satisfied the respondent is with her/his relationship. The negatively worded items were reverse coded.

d) Communication Scale: The communication scale is the Constructive Communication Subscale of the Communication Patterns Questionnaire. It was originally developed by Christensen and Sullaway (1984) and subsequently adapted and validated by Heavey et al. (1996) as a seven-item scale. The higher the score, the more constructive the respondent reports communication to be with her/his partner during conflict. The higher the score, the more constructive the respondent reports . The negatively worded items were reverse coded.

Other measures

The FHWS also collected information on spousal discussion and concordance on family size, communication and decision-making on contraceptive use, household decision-making, spousal support in household chores, and standard socio-demographic information.

- Communication on family size was measured as a binary variable (yes=1/no=0) based on the partner's response to the survey question, "Have you and your spouse ever discussed the number of children you would like to have?"

- Agreement on family size was measured as a binary variable with yes (1) indicating agreement and no (0) indicating disagreement based on the partner's response to the survey question, "Does your spouse want the same number of children that you want, or do they want more or fewer than you want?"
- Communication on contraceptive use was measured as a binary variable with yes (1) indicating communication and no (0) indicating a lack of communication based on the spouse's response to the survey question, "How often do you discuss using contraceptive methods with your wife (yes)/partner(s)?"
- Contraceptive use decision-making was measured as a binary variable where yes (1) indicated joint decision-making and no (0) indicated otherwise based on the spouse's response to the survey question, "Would you say that using contraception is mainly your decision, mainly your partner's decision, or did you both decide together?"
- Household decision-making was measured as a binary variable (yes = joint/ no = not joint) across three domains that included decisions surrounding children's schooling, health and major purchases. The spouse's responded to the survey question, "Who usually makes major decisions concerning your children's education?" The questions for the other domains were similarly worded.

- Husband helps with household chores was assessed as a binary variable (yes=1/no=0) based on the husband's response to the survey question, "Do you help with the household chores?"

Background Variables

A range of standard socio-demographic, household-level and couple-level variables known to influence marital quality were included in our analysis such as respondents' age, education, parity, household wealth, religion and spousal age difference. Age and education were measured as continuous variables indicating age and schooling in years. Parity, which specifies the number of times a woman has given birth, was assessed using the female partners' response on a series of questions on her childbirth history. Household wealth was constructed through a principal components analysis of household assets, and housing characteristics such as ownership of consumer items, and type of dwelling. The index score was then used to divide the households into quintiles that indicate poorest, poor, middle, richer and richest. Religion was a categorized into Christians, Muslims and other religions. Spousal age difference was measured by subtracting the female partners' age from the male partners' age.

Statistical Analysis

We first examined characteristics of the four scales. The means and variances of the items were explored to understand distributional properties of the individual scale items. We assessed scale reliability defined as the proportion of variance attributable to the true score of a latent variable through inter-item correlations

using Cronbach's alpha (DeVellis, 2003). Cronbach's alpha is the most commonly used assessment measure of internal consistency of scale items and an alpha value of over 0.70 is considered evidence of an internal consistentcy (DeVellis, 2003). Through inter-item correlations, we assessed the extent to which items measured the same underlying construct (DeVellis, 2003). We used the results of the inter-item correlational analysis to preliminarily determine the reasonableness of assuming a single latent construct underlying the 4 scales.

Following the internal consistency assessment, we first conducted Principal Components Analysis (PCA) on all scale items to determine how many factors underlay the scale items. A range of criteria including theoretical understanding of constructs, eigenvalues >1, % of variance explained, results of the scree plot and parallel analysis were utilized to assess appropriate number of factors to be extracted. We then examined the structure of the scales and assessed internal validity with Exploratory Factor Analysis (EFA) on all scale items followed by a confirmatory factor analysis (CFA). While both EFA and CFA methodologies define factors based on co-variability and ignore the variance that is unique to the measures, the purpose and methodology of performing them are different (Babyak & Greene, 2010). EFA is an inductive method; the goal primarily is to discover an as-yet unknown set of factors based on the data. In the CFA on the other hand, we hypothesize a model that specifies the relationship between the measured variables and the underlying factor structure. The model fit provides evidence if our hypothesized model is supported by the data (Babyak & Greene, 2010). Hence in our analysis, we first performed the EFA to determine the underlying factor structure

and then tested the validity of the factor structure using CFA.

For the EFA, given the ordinal nature of the response options, we used a polychoric correlation matrix for the analysis. Use of the polychoric matrix is also recommended when the response range is limited and the distribution of the responses is skewed (Hawkins, McCarty, Peipins & Rodriguez, 2012). We conducted the EFA using recommended iterated principal factor estimation methods as implemented in Stata 12 (StataCorp, 2011). Varimax rotation was utilized to rotate the factor loadings. We inspected factor loadings to understand the structure of the scales. We retained items with loading values of 0.40 or higher and items that clearly loaded on a single factor. Items with high uniqueness values (above 0.50) were eliminated. Multiple iterations of the process were performed until a satisfactory solution was attained. Following the EFA, we performed the CFA to confirm statistical fit of the final factor structure. We used Maximum Likelihood, the most commonly used estimation method in CFA to derive model parameters. We then assessed goodness of fit using recommended statistics such as the chi-squared statistic, root-mean-square-error-of-approximation (RMSEA), comparative fit indices (CFI) and the standardized root mean square residual (SRMR) (DeVellis, 2003).

In the absence of an established gold standard to assess criterion validity of marital quality, we assessed concurrent validity. For scales that lack objective criteria, demonstrating concurrent validity is considered critical (DeCoster, 2000). Concurrent validity reveals if the scale is associated with related measures

(DeCoster, 2000). To establish concurrent validity, we tested several associations between marital quality and related couple relationship domains of spousal discussion and concordance on family size, communication and decision-making on contraceptive use, household decision-making and spousal support in household chores. A set of multivariate logistic regression analyses adjusting for factors like age, education, wealth, religion, parity and spousal age difference were used to estimate these relationships. We first conducted the analysis separately on the overall and individual marital quality measures. We followed this with another analysis where we included the three subscales in one regression equation, which we call the combined analysis in the results section. In addition to establishing concurrent validity, examination of these associations also allowed us to assess the prevalence of egalitarian marital patterns among couples in our sample.

Results

Sample Characteristics

After eliminating cases with missing marital quality measures (n= 12), our final analytic sample consisted of 986 female and male partners. Table 3.1 contains a description of background characteristics of the female and male partner samples. The mean age of women in the sample was 28.5 (SD=6.3) years and that of men was 35.2 (SD=8.06) years. The women on average had received 7.1(SD=4.6) years of schooling, while their male counterparts had completed 8.1(SD=4.6) years of schooling. Women reported a mean marital duration of 9.4 years (SD = 8.0), and the

men reported a mean marital duration of 9.2 years (SD=6.8). Mean parity in the sample was 1.17 (SD=1.3) children. The majority of the women (73.4%) and men (75.3%) followed the Ethiopian Orthodox Christian religion.

Item analysis

Majority of the item ratings were skewed towards higher response categories, indicating larger scores on marital quality measures (Table 3.2). The greatest variability in item responses for both females (SD = 3.2) and males (SD=2.9) was in response to the same question, "We blame, accuse and criticize each other". The lowest variability was also on the same item (How often do you discuss or have you considered divorce, separation or terminating your relationship?) for females (SD= 0.7) and men (SD=0.5).

Reliability analysis

The internal consistency analysis with all marital quality items for the female and male samples was high with Cronbach's alphas of 0.94 and 0.89 respectively, demonstrating high reliability. Moreover inter-item correlational analysis between the original scales showed very high correlation among scales, indicating the possibility of an underlying latent construct. Table 3.3.1 and 3.3.2 provide details of the inter-item correlational analysis for female and male samples respectively. All the scales for the women were highly correlated, with the satisfaction and trust scales most correlated (0.79), and the communication and trust scales least correlated (0.66). Although less so compared to the women, the scales for the men

were also highly correlated. The highest correlation was between the commitment and satisfaction scales (0.66), while the lowest correlation was between the trust and communication scales (0.50).

Principal components analysis (PCA) and Exploratory factor analysis (EFA)

The PCA was used to determine number of factors to extract, and the EFA was implemented to understand the underlying structure of the marital quality items. Details of the final factor structure that emerged from the EFA can be found in Table 3.4. The results of the PCA analysis for the female partners indicated a four or three factor structure. The scree plot showed a break after factor 3 on item loadings, while the parallel analysis indicated a 4-factor solution. The 4-factor solution explained 74% of the variability. We first investigated a 4-factor model based on results from the parallel analysis, examination of the percentage of variance explained, and the a priori conceptualization of a 4-factor model. However, after deleting items based on our evaluation criteria and repeating the analysis, a four-factor solution was deemed no longer viable. We then investigated the three-factor structure. As seen in Table 3.4, the three factors that emerged from this analysis were labeled trust, commitment, and conflict. For the male partners, the same steps were repeated. At first a four-factor structure that explained 68% of the variability was explored. However, the final analysis supported a similar three-factor structure, albeit with different scale items that were also labeled trust, commitment and conflict.

Confirmatory factor analysis (CFA)

The hypothesized model for the CFA was based on the 3-factor structure that emerged from the EFA for the females and male partners. Figure 3.1 and 3.2 displays results (standardized solutions) from the CFA, testing the three-model structure for the females and males respectively. Table 3.5 provides a description of the fit indices used to assess the fit of the CFA model. According to Hu and Bentler (1990), in a model with 15 observed items, a root-mean-square-error-of-approximation (RMSEA) below 0.7, standardized root mean square residual (SRMR) below 0.05, comparative fit indices (CFI) above 0.95 indicate good fit. However, because these fit indicators are often difficult to achieve for larger models, less stringent criteria are deemed adequate to indicate model fit (Marsh et al., 2004). Moreover, it is recommended that the adequacy and appropriate direction of factor loadings are important to consider simultaneously with fit statistics, when assessing model adequacy (Cole, 1987). The adequacy and appropriate direction of the CFA loading also establishes convergent validity (Cole, 1987). All the fit indices with the exception of RMSEA (females= 0.10, Males =0.10) were indicative of decent model fit for the females (CFI = 0.9, SRMR = 0.05) and males (CFI=0.91, SRMR=0.05). Moreover, all the loading coefficients were statistically significant and in the appropriate direction indicating good convergent validity (see figure 3.1&3.2).

Concurrent validity analysis

Overall, the marital quality scale and subscales demonstrated high concurrent validity and were associated with other spousal relationship domains as shown in

Table 3.6. A one-unit change in overall marital quality score increased the odds of spousal discussion on family-size by 22% (OR: 1.22, CI=1.13-1.31). The results were similar for the men albeit attenuated. For each additional point on the overall marital quality scale, male partners had 13% greater odds (OR: 1.13, CI=1.03-1.26) of reporting spousal discussion on family-size. While each of the three subscales of commitment (OR: 1.23, CI =1.09-1.39), trust (OR: 1.24, CI=1.09-1.43) and conflict (OR: 1.28, CI=1.13-1.31) were associated with discussion on family-size for the female partners, only the commitment subscale (OR: 1.19, CI=0.98-1.46) was marginally predictive for the male partners. The results held up in the combined analysis with small variations in the coefficients. For reported agreement on family-size with one's spouse, both the wives (OR: 1.12, CI=1.05-1.20) and husbands (OR: 1.21, CI=1.08-1.35) with higher overall marital quality scores had greater odds of reporting agreement. Among subscales, for the female partners, the trust (OR: 1.21, CI=1.08-1.35) and conflict (OR: 1.21, CI=1.08-1.35) subscales were associated with agreement. For the male partners, a one-unit increase in the commitment score (OR: 1.30, CI= 1.12-1.59) increased the odds of spousal agreement on family size by 30%.

Moreover, a one unit increase in the female partners overall marital quality score (OR: 1.23, CI=1.22-1.46), commitment (OR: 1.29, CI=1.12-1.46), trust (OR: 1.24, CI=1.08-1.40) and conflict (OR: 1.38, CI=1.21-1.56) subscale scores increased the odds of the wife reporting spousal discussion on contraceptive use. For the husbands, an increase in the overall marital quality (OR: 1.17, CI=1.03-1.32) and trust subscale scores (OR: 1.21, CI=1.05-1.40) had the same effect. These results

remained robust in the combined analysis. The odds of reporting joint spousal contraceptive decision-making increased by 16% (OR: 1.16, CI=1.09-1.24) with a unit increase in overall marital quality scores among female partners and by 31% (OR: 1.31, CI=1.15-1.49) among the male partners. While for the women the three subscales of commitment (OR: 1.18, CI=1.04-1.34), trust (OR: 1.18, CI=1.02-1.36) and conflict (OR: 1.28, CI= 1.13-1.43) retained significant associations with communication on contraceptive use, for men, only the commitment (OR: 1.40, CI=1.10-1.79) and conflict (OR: 1.19, CI=1.04-1.36) subscales were statistically significant.

The marital quality scales and subscales were also robustly and statistically associated with household decision-making indicators. The female partners (OR: 1.23, CI=1.15-1.32) and male partners (OR: 1.28, CI=1.13-1.45) had 23% and 28% higher odds respectively of reporting joint spousal schooling decision-making with each unit increase in their overall marital quality score. Similarly, the odds of reporting joint household purchase decision-making increased by 23%(OR: 1.23, CI=1.15-1.32) for female partners with each unit increase in their overall marital quality score, while for the men the odd increased by 25% (OR: 1.25, CI=1.10-1.41). While a one unit increase in overall marital quality score for the women increased the odds of reporting joint health decision-making by 20%(OR: 1.20, CI=1.12-1.28), for the men these odds (OR: 1.12, CI=0.97-1.29) were only marginally significant. Moreover, for the women, the three subscales were associated with household decision-making. For the men, the commitment subscale was significantly

associated with schooling and major purchase decision-making, while the conflict subscale was significantly associated with health-related decision-making.

A one-unit increase in overall marital quality score (OR: 1.22, CI=1.14-1.31), commitment score (OR: 1.16, CI=1.02-1.30), trust score (OR: 1.33, CI=1.16-1.53), and conflict (OR: 1.33, CI=1.17-1.50) increased the odds of female partners reporting husbands' support in household chores. Concurrently, a one unit increase in the male overall marital quality score (OR: 1.15, CI=1.02-1.29), trust score (OR: 1.17, CI=1.01-1.35), and conflict score (OR: 1.35, CI=1.02-1.79) increased the odds of reporting sharing household chores with their wives. These estimates are mirrored in the combined analysis for the female partners, for the men the estimates are only marginally significant.

Discussion

Our results indicate that trusting a partner, commitment in a relationship and dealing with or resolving conflicts are fundamental marital quality domains among the spouses in our sample. Results of the EFA and CFA analysis, confirmed by strength of the associations, directionality of the factor loadings, and the CFA fit statistics demonstrated good internal validity. However, the marital quality factor structure was different from our initial conceptualization. We expected marital quality to be comprised of four domains of commitment, trust, satisfaction and communication, reflecting the validated western scales. However, our results are not supportive of a four-factor structure. The final marital quality structure that emerged for female and male partners was a three-factor one, encompassing

domains of trust, commitment and conflict. Also, the scale items did not mirror the original western scales. Key gender differences were noted in both scale domains and scale items. While for the female partners, trust emerged as the fundamental domain, for the male partners commitment materialized as the key domain. The subscales of commitment and trust were not only more consistent between genders; they also retained several scale items from the original trust and commitment subscales. The subscale of conflict, however, displayed gender differences and deviated from the original scales. While for the female partners scale items primarily from the satisfaction subscale loaded on the conflict subscale, for the male partners, items from the communication subscale loaded on the conflict subscale. The scale items on the conflict subscale reflected a concern for conflict resolution among wives, and dealing with conflict among husbands.

The scales also displayed good concurrent validity and were highly associated in the expected direction with related spousal relationship domains of spousal discussion and concordance on family size, communication and decision-making on contraceptive use, household decision-making and spousal support in household chores. The marital quality measures were positively associated with spouses reporting increased communication, concordance and joint decision-making on fertility preferences, family planning and household decision-making. These positive associations between marital quality and egalitarian and empathetic practices in marital relationships such as improved communication and joint decision-making

between spouses also provide evidence of the presence of features of compassionate marriages among couples in this peri-urban community.

The deviations and commonalities noted in the marital quality measures that emerged in our study setting with the original western scales are not very surprising. Prior research studies have also found similar patterns in marital quality structure in non-western settings (Sandhya, 2009; Shek & Cheung, 2008; Fisiloglu & Demir, 2000). While marital quality differences are expected given the diverse socio-cultural context, the similarities have often been explained as shaped by forces of globalization (Sandhya, 2009, Shek & Cheung, 2008; Fisiloglu & Demir, 2000). With globalization, studies have tracked the adoption of western ideation in diverse contexts; popularizing egalitarian and empathetic marriages with diminished control from extended families (Cherlin, 2012). However, these transitions in marital relations towards western values are not always smooth. For instance, findings from Sandhya's (2009) study highlight how adopting western values is not always straightforward and involves negotiations with existing cultural systems. She explains how marital quality in her contemporary Indian sample was shaped by western notions of individual needs and personal well-being as well as the broader Indian social context. Furthermore, she suggests that the cross-cultural similarities and variations in marital quality lie at this intersection and need further exploration (Sandhya, 2009). Similarly, in Ethiopia too, shifts in traditional marriage structure such as increasing age at marriage, delay in the birth of the first child, egalitarian

role expectations within marriage, especially in the urban areas with the increasing proportion of educated women have been noted (Ezra, 2003; Sibanda et al., 2003).

Similarly, the gender differences apparent in the MQ structure are not surprising given prior research findings. Moreover, studies validating western scales in non-western settings have found both gender differences as well as lack of it (Shek & Cheung, 2008; Fisiloglu & Demir, 2000; Kazak, Jarmas & Snitzer,1988) . In other settings too, while previous studies have highlighted the role greater egalitarianism plays in enhancing MQ for the partners, gender differences in MQ have also been noted. For instance, in western setting it has been noted that changes in traditional marriages, shifts in gender roles, and work life pressures make modern marriages complex and leave spouses, especially the males dissatisfied (Rogers & Amato, 2000). Similarly, a study among Ghanaian women found increased socio-economic status and autonomy increased friction between spouses leading to marital instability and divorce (Takyi & Broughton, 2006). Another study from Taiwan emphasizes the complex relationship between egalitarian gender ideologies and MQ within marriage (Xu & Lai, 2004). Contrary to findings in the west, the study found an indirect relationship between egalitarian gender ideology and MQ mediated by egalitarian role performance. In other words, egalitarian gender ideology did not affect MQ directly but had an indirect influence via egalitarian role performance by spouses within marriage. The authors explain, "*in more traditional societies such as in Taiwan, although married women may endorse egalitarianism within marriages, because of the prevalence and persistence of patriarchal family relationships, they may have lower expectations to fulfill. As a result, their gender beliefs matter little for their*

marital quality directly".

Our study has several limitations that warrant discussion. While probability-sampling methods were used to recruit participants into the FHWS study, but since the study was located in one peri-urban site, with a fairly homogeneous population, the generalizability of the findings is limited to similar settings. Our study was also based on secondary data, which limits the availability of other variables of potential interest for dyadic research. For instance, because of the lack of validated measures of power differentials between couples in the current study, we were unable to examine their probable association with variation in marital quality. These may be critical given that gender differences seem to play a prominent role in the measurement of marital quality in this peri-urban Ethiopian community.

Social desirability bias is a potential issue associated with self-reported data. Marital quality measures can be prone to social desirability bias because of the sensitive nature of its subject matter. Several checks to ensure complete privacy and confidentiality of participants were followed during data collection. We also checked for interviewer effects with the follow-up data, which can be a source of social desirability. Overall the interviewer effects were small, although they were stronger for the males, and they varied by marital quality measures. Given these results, we did not include the interviewer indicator or make any adjustments to account for the interviewer effects in subsequent analyses. Many western studies now utilize interviewer ratings of dyadic interactions along with self-reported data

to overcome issues of social desirability bias (Lawrence et al., 2011). This might be a useful strategy that future research can explore in non-western setting too.

Among key strengths of our study include a large sample size (n=986), with data collected from both partners. We used a variety of validated western measures to understand the underlying marital quality structure among couples in peri-urban Ethiopia. We also conducted an in-depth exploration and utilized rigorous statistical analyses to establish the validity and reliability of marital quality measures in the study setting. To the best of our knowledge, this is one of the first efforts to understand marital quality in Ethiopia. Our study also provides evidence of positive association of marital quality measures with egalitarianism and empathy within marriages, indicating the emergence of compassionate marriages in peri-urban Ethiopia.

Conclusion

Our study highlights the usefulness of adapting existing validated scales in a new context after assessing its psychometric properties. Such applications provide opportunities for cross-cultural comparisons and broadening our understanding of potential fundamental marital quality domains that may be universally shared across context.

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Table 3.1

Descriptive Summary Statistics of Background Variables by Female and Male Partners at Baseline (n=986)

Characteristics	Female	Male
Age in Years (mean/SD)	28.5 (6.3)	35.2 (8.1)
Education in Years (mean/SD)	7.1 (4.6)	8.1 (4.6)
Marital Duration in Years (mean/SD)	9.4 (8.0)	9.2 (6.8)
Parity (mean/SD)	1.2 (1.3)	
Religion (%)		
Orthodox Christian	73.8	75.8
Muslim	13.7	14.2
Others	12.5	10

Table 3.2
Descriptive Statistics of Marital Quality Items by Sex of the Partner (n=986)

Scale Items	*Female Mean (SD)*	*Male Mean (SD)*	*Range*
Commitment Scale (1-9)*			
I expect my love for my current partner to last for the rest of my life	8.48 (1.07)	8.33 (0.97)	1-9
I can't imagine ending my relationship with my current partner	8.44(1.33)	8.33 (0.97)	1-9
I view my relationship with my current partner as permanent	8.39 (1.23)	8.33(1.03)	1-9
I am committed to maintaining my relationship with my partner	8.48 (1.12)	8.32(1.02)	1-9
I have confidence in the stability of my relationship with my partner	8.42(1.20)	8.32(1.08)	1-9
Trust Scale (1-7)*			
My partner is primarily interested in his own welfare	6.24 (1.25)	6.29 (1.03)	1-7
There are times when my partner cannot be trusted	6.38 (1.25)	6.41(0.90)	1-7
My partner is perfectly honest and truthful with me	6.58 (1.17)	6.86 (0.65)	1-7
I feel I can trust my partner completely	6.58 (1.15)	6.84(0.64)	1-7
My partner is truly sincere in his promises	6.65 (1.02)	6.85(0.66)	1-7
I feel that my partner does not show me enough consideration	6.11 (1.57)	6.51(1.33)	1-7
My partner treats me fairly and justly	6.49 (1.29)	6.78 (0.79)	1-7
I feel that my partner can be counted on to help me	6.62 (1.08)	6.82(0.72)	1-7
Satisfaction Scale (1-6)*			
How often do you discuss or have you considered divorce?	5.77 (0.70)	5.86 (0.52)	1-6
How often do you or your partner leave the house after a fight?	5.72 (0.74)	5.75 (0.61)	1-6
How often do you think that things between you and your partner are going well?	5.20 (1.02)	5.81 (0.81)	1-6
Do you confide in your partner?	5.44(1.02)	5.62 (0.80)	1-6
Do you ever regret that you married/live together?	5.70 (0.96)	5.84 (0.67)	1-6
How often do you and your partner quarrel?	4.88 (0.98)	5.18 (0.74)	1-6
How often do you and your partner Òget on each other's nerves?	5.46 (0.90)	5.63 (0.67)	1-6
How often do you kiss/hug/embrace your partner?	3.51 (1.23)	3.60 (1.08)	1-6
Please rate how happy you are in your relationship	5.21 (1.13)	5.34 (0.81)	1-6
Please rate your feelings about the future of the relationship	5.53 (0.88)	5.50 (0.77)	1-6
Constructive Communication Scale (1-10)*			
We try to discuss the problem	9.11 (1.47)	9.30 (1.00)	1-10
We express their feelings to each other	8.82 (1.90)	9.21 (1.17)	1-10
We suggest possible solutions and compromises	9.01(1.61)	9.23 (1.18)	1-10

We blame, accuse and criticize each other	7.37 (3.23)	8.25 (2.86)	1-10
We threaten each other with negative consequences	9.36 (1.58)	9.39 (1.30)	1-10
I call my partner names, swear at him, or attack his character	9.69 (0.95)	9.70 (0.84)	1-10
My partner calls me names, swears at me, or attacks my character	9.65 (1.11)	9.70 (0.90)	1-10

* Possible range of scale item, higher score indicated better marital quality

Table 3.3.1

Inter-correlational Analysis of Original Female Partners' Marital Quality Scales

Original Scales	Commitment	Trust	Satisfaction	Communication
Commitment	1.00			
Trust	0.75	1.00		
Satisfaction	0.78	0.79	1.00	
Communication	0.68	0.66	0.73	1.00

Table 3.3.2

Inter-correlational Analysis of Original Male Partners' Marital Quality Scales

Original Scales	Commitment	Trust	Satisfaction	Communication
Commitment	1.00			
Trust	0.60	1.00		
Satisfaction	0.66	0.65	1.00	
Communication	0.55	0.50	0.62	1.00

Table 3.4

Factor Loadings of Items Selected for Inclusion into Re-specified Subscales from the Exploratory Factor Analysis of Marital Quality items for Female and Male Partners (n=986)

	Females			Males		
Items (Original Subscale)	**Commitment**	**Trust**	**Conflict**	**Commitment**	**Trust**	**Conflict**
Commitment						
I expect my love for my current partner to last for the rest of my life	**0.77**			**0.85**		
I can't imagine ending my relationship with my current partner	**0.81**			**0.87**		
I view my relationship with my current partner as permanent	**0.81**			**0.92**		
I am committed to maintaining my relationship with my current partner	**0.81**			**0.93**		
I have confidence in the stability of my relationship with my current partner	**0.79**			**0.94**		
Trust						
My partner is primarily interested in his own welfare		**0.67**				
There are times when my partner cannot be trusted		**0.73**				
My partner is perfectly honest and truthful with me		**0.86**			**0.79**	
I feel I can trust my partner completely		**0.83**			**0.81**	
My partner is truly sincere in his promises		**0.8**			**0.74**	
I feel that my partner does not show me enough consideration		**0.66**				
My partner treats me fairly and justly		**0.78**			**0.82**	
I feel that my partner can be counted on to help me		**0.79**			**0.78**	
Satisfaction						
How often do you discuss or have considered divorce?						**0.64**
How often do you or your partner leave the house after a fight?						**0.6**
Do you confide in your partner?		**0.72**				
How often do you and your partner quarrel?						**0.72**
How often do you and your partner "get on each other's nerves?"						**0.72**
Please rate how happy you are in your relationship				**0.73**		
Please rate your feelings about the future of the relationship				**0.74**		

Constructive Communication						
We try to discuss the problem			**0.73**			
We express their feelings to each other			**0.6**			
We suggest possible solutions and compromises			**0.69**			
We blame, accuse and criticize each other			**0.74**			
We threaten each other with negative consequences			**0.74**			

Table 3.5

Female and Male Partners' Confirmatory Factor Analysis Fit Indices

Indexes	Shorthand	Female statistic	Male statistic
Chi-square	$\chi 2$	1895.05 (p<.001)	1197.12 (p<.001)
Comparative fit index	CFI	0.90	0.91
Goodness-of-fit index	TFI	0.89	0.89
Standardized RMR	SRMR	0.05	0.05
Root mean square error of approximation	RMSEA	0.11	0.10

Table 3.6

Multivariate Logistic Regression Results of Overall and Individual Marital Quality (MQ) Scales with Associated Measures

		Female		Male	
Outcome	Predictor Scales	Independent[1] OR (CI)	Combined[2] OR (CI)	Independent[1] OR (CI)	Combined[2] OR (CI)
Discuss family size	**Commitment**	1.23 (1.09-1.39)**	1.25 (1.09-1.43)**	1.19 (0.98 -1.46)**	1.27 (1.03.1.57)**
	Trust	1.24 (1.09-1.43)**	1.28 (1.10-1.49)**	1.05 (0.91-1.21)	1.04 (0.89 -1.20)
	Conflict	1.28 (1.13-1.45)**	1.16 (1.03-1.33)**	1.25 (0.95 -1.65)	1.36 (1.02-1.81)**
	Overall MQ	1.22 (1.13-1.31)**		1.13 (1.01-1.26)**	
Agree on Family Size	**Commitment**	1.09 (0.97-1.23)	1.14 (1.00-1.29)**	1.30 (1.06-1.59)**	1.42 (1.15-1.75)**
	Trust	1.26 (1.10-1.44)**	1.30 (1.12-1.50)**	1.09 (0.96-1.26)	1.10 (0.95-1.27)
	Conflict	1.12 (1.01-1.26)**	1.04 (0.92-1.17)	1.28 (0.99-1.64)*	1.44 (1.15-1.75)**
	Overall MQ	1.12 (1.05-1.20)**		1.21 (1.08-1.35)**	
Discuss contraceptive use	**Commitment**	1.29 (1.12-1.46)**	1.22 (1.06-1.41)**	1.03 (0.84-1.25)	1.09 (0.88-1.35)
	Trust	1.24 (1.08-1.40)**	1.22 (1.04-1.44)**	1.21 (1.05-1.40)**	1.22 (1.05-1.42)**
	Conflict	1.38 (1.21-1.56)**	1.24 (1.09-1.44)**	1.04 (0.82-1.33)	1.05 (0.81-1.37)
	Overall MQ	1.23 (1.15-1.32)**		1.17 (1.03-1.32)**	
Jointly decided contraceptive use	**Commitment**	1.18 (1.04-1.34)**	1.23 (0.98-1.30)**	1.40 (1.10-1.79)**	1.58 (1.23-2.03)**
	Trust	1.18 (1.02-1.36)**	1.14 (0.98-1.34)*	1.19 (0.99-1.41)*	1.09 (91-1.32)
	Conflict	1.28 (1.13-1.43)**	1.19 (1.04-1.36)**	1.81 (1.29-2.53)**	2.02 (1.42-2.88)**
	Overall MQ	1.16 (1.09-1.24)**		1.31 (1.15-1.49)**	
Jointly decide children's schooling	**Commitment**	1.23 (1.15-1.32)**	1.21 (1.04-1.40)**	1.50 (1.18-1.89)**	1.61 (1.27-2.04)**
	Trust	1.32 (1.14-1.54)**	1.30 (1.10-1.40)**	1.16 (0.98-1.38)*	1.12 (0.93-1.34)
	Conflict	1.37 (1.20-1.55)**	1.22 (1.06-1.41)**	1.35 (0.96-1.89)*	1.56 (1.10-2.20)**
	Overall MQ	1.23 (1.15-1.32)**		1.28 (1.13-1.45)**	
Jointly decide health related issues	**Commitment**	1.29 (1.13-1.47)**	1.26 (1.09-1.45)**	1.11 (0.84-1.46)	1.25 (0.94-1.67)
	Trust	1.24 (1.07-1.43)**	1.24 (1.06-1.46)**	0.99 (0.79-1.23)	0.95(0.76-1.16)
	Conflict	1.28 (1.23-1.44)**	1.14 (0.99-1.31)*	1.69 (1.19-2.41)**	1.84 (1.27-2.65)**

	Overall MQ	1.20 (1.12-1.28)**		1.12 (0.97-1.29)*	
Jointly decide major household purchases	**Commitment**	1.15 (1.02-1.30)**	1.16 (1.01-1.32)**	1.45 (1.17-1.81)**	1.58 (1.26-1.99)**
	Trust	1.42 (1.23-1.63)**	1.41 (1.21-1.63)**	1.11 (0.95-1.30)	1.08 (0.91-1.27)
	Conflict	1.34 (1.18-1.51)**	1.21 (1.06-1.38)**	1.34 (0.99-1.81)*	1.57 (1.14-2.14)**
	Overall MQ	1.23 (1.15-1.32)**		1.25 (1.10-1.41)**	
Husband helps with household chores	**Commitment**	1.16 (1.02-1.30)**	1.16 (1.01-1.32)**	0.94 (0.74-1.20)	1.02 (0.81-1.29)
	Trust	1.33 (1.16-1.53)**	1.32 (1.14-1.54)**	1.17 (1.01-1.35)**	1.15 (0.99-1.34)*
	Conflict	1.33 (1.17-1.50)**	1.22 (1.07-1.39)**	1.35 (1.02-1.79)**	1.32 (0.99-1.76)*
	Overall MQ	1.22 (1.14-1.31)**		1.15 (1.02-1.29)**	

Independent scores: subscales in separate regression analysis; 2. Combined Scores: subscales in same regression analysis
** p value < 0.05; *p value < 0.10
Models are adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

Figure 3.1: Results of the Female Partners' Marital Quality Confirmatory Factor Analysis

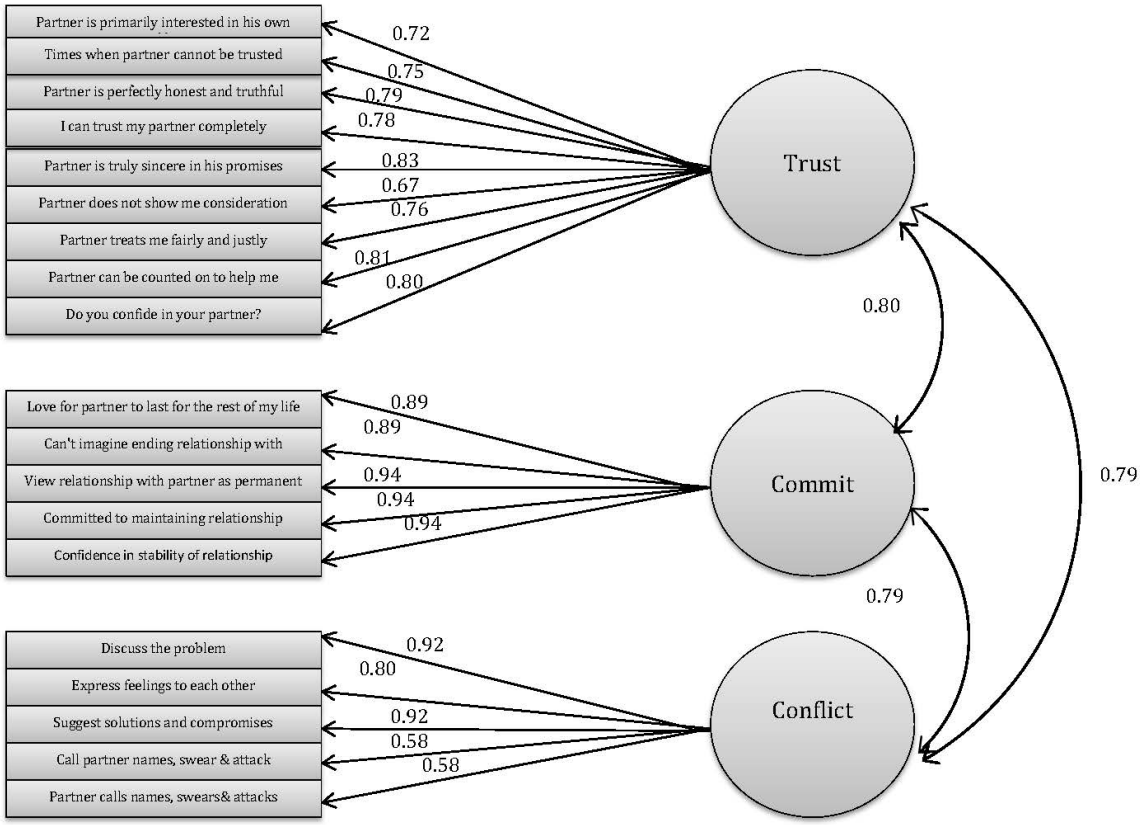
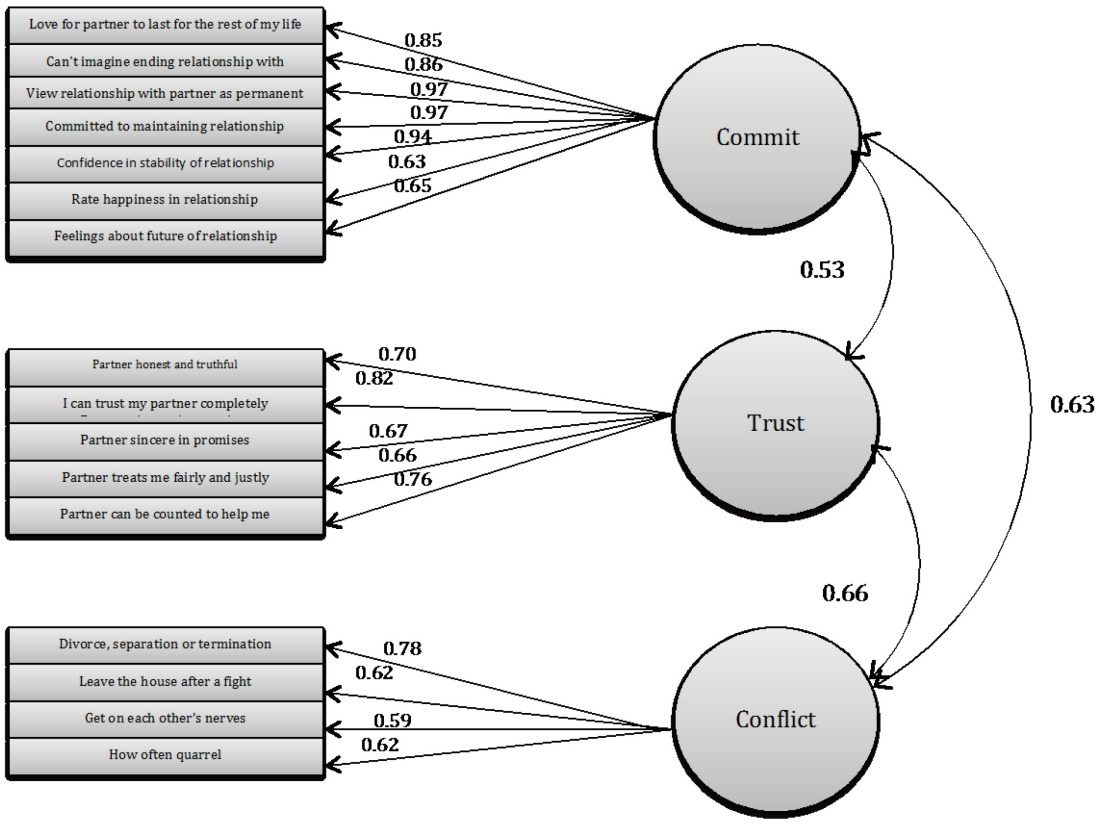


Figure 3.2: Results of the Male Partners' Marital Quality Confirmatory Factor Analysis



CHAPTER FOUR: **MANUSCRIPT TWO**

The Mutual Influence of Spousal Marital Quality Overtime: Testing Dyadic Dynamics using the Actor-Partner Interdependence Model

Background

Human societies are characterized by social relationships, making interdependence and closeness its quintessential feature (Kelley & Thibaut, 1978). Not surprisingly, therefore, a strong association has been found between intimate relationships and health and social outcomes, and closer this relationship, higher this association (Glaser & Newton, 2001; House et al., 1988; Berkman & Syme, 1979). Given these connections there has been a growing interest in understanding the role of contextual influences on health. However, majority of public health research and programs continue to place emphasis on the individual as the unit of interventions, theories and statistical analysis (Lewis et al., 2006; Diez-Rouz, 2000). Moreover, often studies on contextual influences omit looking at mutual influences and interdependence across individuals and contexts (Barber et al., 2000). Such information is critical, as we move beyond determinants to comprehend the processes and mechanisms behind health behaviors and outcomes for more effective interventions.

Contextual factors are especially pertinent in contraceptive use behaviors. Historically, women have been the main target of family planning programs and research for a variety of reasons (Becker, 1996; Watkins, 1993). However, the advent of HIV epidemic highlighted the need to focus on contextual influences on contraceptive behaviors. It brought into emphasis the apparent but often ignored reality that women do not practice contraception in isolation; contraceptive use occurs in a social context, with the dyad being the most proximate. Signaling this trend, international forums such as International Conference on Population and

Development 1994, and Beijing Conference on Women 1995, declared the need to increase male participation and responsibility in the practice of family planning (United Nations, 1995).

Dyadic analysis is particularly relevant in the Sub-Saharan African context. Traditionally, anthropological research from this region portrayed a power-less state of the African woman (Hollos & Larsen, 2003). According to this viewpoint, societies were predominantly patriarchal, with men the sole decision-makers. Women were power-less, and through marriage, husbands acquired the productive and reproductive capacity of women (Hakansson & LeVine, 1997). Property was the basis of social and familial power, which was controlled by men (LeVine, 1979). Husbands had the right to demand sexual intercourse and could prevent their wife from using contraceptives (Hakansson, 1994). They were often responsible for desiring and perpetuating larger families as they gained the most socially and economically from having children (Bankole & Singh, 1998). However, another body of research has challenged this disempowered state of the African woman (Hollos & Larsen, 2003). They posit that reality is often nuanced. According to these researchers, women found avenues to assert their desires and authority even within the most traditional settings (Oboler, 1994).

Moreover, understanding dyadic relationships is very relevant today. With rapid globalization and urbanization across the world, the last century has seen profound transformation in the organization and structure of marriage. While these changes have been prominent in the developed world, these shifts are becoming increasingly

visible in the Sub-Saharan African context too (Chimbiri, 2002; Steyn, 1996). With the rise in the socio-economic status of women, changes in the functions and roles of families in modern economies, rising emphasis on individualism, the emotional functions of marriage is getting heightened importance for the wellbeing of its constituents (Wilcox & Nock, 2006). Traditional marriage structures with their age and gender hierarchies are now giving way to modern marriages that are more egalitarian and empathetic, with more communication and negotiation of mutual desires and goals between spouses (Amato et al., 2003).

Given the above-mentioned developments, increasingly efforts are being undertaken to understand the role of men and/or couples in reproductive health, and a body of research in this arena has emerged but dyadic analysis has been limited. Couple research has focused on examining the impact of partner characteristics, and a few inter-personal variables such as communication and joint household decision-making on contraceptive use (Link, 2011; DeRose & Ezeh, 2010; Upadhyay & Hindin, 2005). However, treating the couple as a unit of analysis and understanding the mutual influence and interdependence between spouses has been underexplored.

Moreover, the neglect of couple-level analysis has also meant a lack of research examining the impact of emotional processes and love on reproductive health. Basu (2006) talks about how demographic research often overlooks the linkages between love and sex, and the complex emotional processes that underlie it. She discusses how relationships have emotional meaning for people. Drawing on anthropological

research, she discusses how individuals in love are expected to trust their partners and not worry about their past or current actions, making it hard for them to prevent unwanted pregnancy or infections. Given these emotional processes, she talks about the inadequacy of explaining sexual behavior "solely on questions of victimhood and empowerment as determinants."

Given these gaps in research, and ongoing changes in the couple marital context, there is a need to systematically understand how spouses mutually influence each other through dyadic processes, and ultimately impact mutual health behaviors such as contraceptive use. As a step towards this goal, in this paper we analyzed how spouses influence each other's marital quality over-time using two waves of couples' data from peri-urban Ethiopia.

Research Question

This study aims to answer the following key question:

Is an individual's current report of marital quality a function of their previous marital quality report as well as their partner's previous marital quality report?

Methods

Theoretical Premise

We drew on the theory of Interdependence to conceptualize this study. Interdependence theory came out of social psychology as a dyad-level theory to understand the inter-personal context of social situations (Rusbult & Van Lange, 2003; Kelley et al., 1983; Kelley & Thibaut, 1978). The basic premise of this theory

holds that interdependence is an essence of a group. A group is a dynamic whole, and a change in any member or subgroup, changes the context for other members of the group. Thus, this theory emphasizes the need to understand outcomes and behaviors of partners by assessing how they interact. It emphasizes the need to take into account both partners perspectives to understand couple interaction. This approach allows us to understand how each partner individually influences, as well as both partners jointly influence, behavior, making it possible to see different patterns of interdependence within and between couples (Lewis et al., 2006). These patterns of interdependence have also been viewed as "structural properties of couples", in that different couple relationships have their own structural properties defined by their different levels and patterns of interdependence (Lewis et al., 2006).

Data and Sampling Design

Data for this study was collected as part of a larger ongoing study called Family Health and Wealth Study (FHWS) spanning five Sub-Saharan African countries, that aims to examine individual and family-level health and wealth consequences of family size. The study has followed 500-1000 family cohorts in peri-urban areas in Egypt, Ethiopia, Ghana, Malawi, Nigeria and Uganda. Households were eligible for the study if their occupants included a couple formally married or in a stable union. A probability sample of households, where the wife was of childbearing age (15 to 49 years) and the husband aged 20 to 59 years was selected for the study. The enumeration areas (EAs) were randomly selected and 20 households with eligible couples per EA were targeted for each. A household census was conducted within

each EA, followed by systematic selection of households. Occupants were enumerated and eligible couples identified. Both partners of eligible couples were consented; if one or both did not consent to participate in the study, the field team selected another eligible couple from the same household or an adjacent household. In cases where a family head had multiple wives, only one randomly selected wife was interviewed. Across all EAs, couple participation rates were above 95% and interview completion rates were uniformly high. The survey questionnaire, administered separately to husbands and wives, covered a range of questions on contraceptive use, fertility preferences, and marital quality, among other topics. In Ethiopia, the study was conducted in a peri-urban site near the capital city of Addis Ababa. The first round of the Ethiopian FHWS in 2010 consisted of 998 couples; the second round re-interviewed 728 couples (72.9%) two years later.

Measures

Key independent and Dependent measures are listed below:

Marital Quality Measures

Spouses' overall and individual marital quality scores from the baseline survey were the key independent measures, and their overall and individual marital quality scores from the follow-up survey were the key dependent measures. Marital quality measures included in the FHWS consisted of four independent validated western scales capturing dimensions of trust (Larzelere & Huston, 1980), commitment (Harvey et al., 2006; Sternberg, 1997), constructive communication, (Heavey et al.; 1996; Christensen & Sullaway; 1984) and satisfaction (Spanier, 1976) in a relationship.

The marital quality scale was initially conceptualized as a four-factor scale mirroring the four validated western scales, but as chapter 3 showed it was re-specified as a three-factor scale for the female and male partners separately after assessing scale reliability and validity by conducting exploratory and confirmatory factor analysis with the baseline sample, and then repeating the confirmatory factor analysis with the follow-up sample. The final overall marital quality scale consisting of three sub-scales of trust, commitment, and conflict were highly reliable with Cronbach's alpha of 0.94 and 0.89 for female and male partners respectively. Some scale items were reverse scored for ease of interpretability, so that higher score indicates higher overall marital quality, higher trust, higher commitment, and reduced conflict. The final scale scores for the baseline and follow-up marital quality measures was derived from the results of the confirmatory factor analysis from the baseline and follow-up survey conducted in Stata version 12 (StataCorp, 2011). Scores from the confirmatory factor analysis were used for this analysis because we needed comparable scores from the 2 survey rounds.

Background Variables

A range of socio-demographic, household-level and couple-level variables known to influence marital quality were included in our analysis such as respondents' age, education, parity, household wealth, religion and spousal age difference. Age and education were measured as continuous variables indicating age and schooling in years. Parity, which specifies the number of times a woman has given birth, was assessed using the female partners' response on a series of questions about her

childbirth history. Household wealth was constructed through a principal components analysis of household assets, and housing characteristics such as ownership of consumer items, and type of dwelling. The index score was then used to divide the households into quintiles that indicate poorest, poor, middle, richer and richest. Religion was a categorized into Orthodox Christians, Muslims and other religions. Spousal age difference was measured by subtracting the female partners' age from the male partners' age.

Statistical Analysis

We limited our analysis to the sample of couples who participated in both surveys because of the longitudinal design of the study. We first conducted exploratory data analysis. We examined the data spread, frequency distributions, outliers, and patterns of missing values to ascertain the appropriate treatment of the variables. This was followed by univariate analysis to check frequency distributions and summary statistics, like means and variances for continuous variables and proportions for categorical variables. We estimated polychoric correlations between the marital quality scales of spouses to assess levels of correlation between the measures.

In order to assess potential bias due to loss-to-follow-up at the second round of data collection, we checked for significant differences between couples lost-to-follow-up versus couples who were relocated to identify potential mechanisms of loss and determine appropriate data management strategies (Kristman et al., 2004). The couples who remained in the study and those lost-to-follow-up did not vary

significantly by the key outcome marital quality. The marital quality measures on average did not vary across the samples, with the exception of the female commitment score that was marginally different [mean difference: 0.14 ($p\ value = 0.08$)] between the groups. Moreover, in the multivariate regression analysis, the marital quality measures, other than the females' commitment score (OR: 1.12, 95% CI=0.98-1.27), which was marginally significant, were not associated with the likelihood of the female partner being followed in the second survey round. However, there were some demographic differences between the two samples. The females in the lost-to-follow-up sample were on average 1.7 ($p\ value < 0.001$) years younger and their male partners 2.25 ($p\ value < 0.001$) years younger than respondents in the follow-up sample at baseline. Females with 2 or more children had significantly reduced odds of being lost in follow-up as compared to women with one or no children (please see chapter 2). The two samples did not vary significantly by education levels or wealth quintile. Given these differences between the samples, we generated weights to account for the under-represented group lost during follow-up by constructing a propensity score. A propensity score is the probability that a subject remained in the study (Rosenbaum & Rubin, 1983). This methodology is used to assign weights to subjects who remain in the study to account for the loss of observations for individuals' lost-to-follow-up. We estimated a logistic regression model that predicted the odds of female partners remaining in the study, using as predictors, the female respondent's age, spousal age-difference, parity, wealth as a binary variable indicating wealth versus being poorer, and whether they had discussed or considered divorce, separation or terminating their

current relationship. The model indicated a good fit based on the results of the Hosmer-Lemeshow goodness of fit test [Chi-square (8): 680, p value: 0.56]. The husbands were assigned the wife's propensity score weight, because the husbands' re-interview depended on the wife's consent. A more detailed account of the procedures followed to generate propensity scores is provided in chapter 2.

We then conducted dyadic level analysis. In dyadic research the basic assumption of independence requires that after controlling for variation due to the independent variable, the data from each individual in a study be unrelated to the data from every other individual in the study. In most statistical application with dyadic data, this assumption is often violated. The factor scores of members of a dyad are likely to be correlated. If ignored, this non-independence can bias standard errors and tests of non-significance (Kenny, Kashy & Cook, 2006; Kenny, 1996) and hence needs to be addressed in the analysis. The Actor Partner Interdependence Model (APIM) is a commonly used technique to model interdependence in dyadic relationships (Kenny, Kashy & Cook, 2006). The APIM model suggests that a person's score on an independent variable affects their own dependent variable score (actor effect) as well as the dependent variable score of their partner (partner effect). The partner effect directly models the mutual influence that might be present between individuals in a dyadic relationship.

Multi-level modeling was used to operationalize the APIM model. Using multi-level methods to operationalize the APIM model has several advantages over other methods proposed to estimate the APIM. Among its advantages is a greater

flexibility in specifying the actor and partner effects to be estimated as well as estimation of interactions between different kinds of variables (Campbell & Kashy, 2002). This model suggests that each individual's report of marital quality at the follow-up is a function of his or her report of marital quality at the baseline as well as his or her partner's report of marital quality at the baseline. However, estimating traditional multi-level models with the common intercept approach has a major disadvantage in the case of dyadic data because it assumes the non-independence in the outcome scores is positive because the non-independence is specified as a variance in these models rather than a correlation (Kenny at al, 2006). Kenny et al. (2006), therefore, recommend an alternate strategy for modeling dyadic non-independence by correlating the error terms, by treating individual scores as repeated measures in the dyad. The non-independence is then estimated as a covariance. In addition, Kenny et al. (2006) provide two approaches to modeling APIM for dyads, where the members can be distinguished by some characteristics (e.g. gender). The interaction approach uses interaction terms between the distinguishing variable and the actor and partner predictor variables to factor in the effects of the distinguishing variable.

As a first step to conducting dyadic research, Kenny (1996) recommends conducting a test of the level of non-independence to identify if the dyad is an appropriate level of analysis. We, therefore, first ran an empty multi-level model with no predictors and estimated the intra-class correlation to assess the degree of non-independence in the data. The level of non-independence was assessed using Cohen's (1998) standards, which defines 0.5 as a large correlation, 0.3 as medium and 0.1 as small.

Subsequently, we estimated four separate multivariate APIM models for the overall and individual marital quality scores using the interaction approach laid out by Kenny et al. (2006). Since we were exclusively dealing with female and male dyads, we used gender as the distinguishable variable. We included two interactions of gender with actors' marital quality measures and partners' marital quality in our APIM models. The interaction terms enabled the estimation of separate actor and partner effects for females and males.

Results

Socio-Demographic Characteristics

Table 4.1.1 provides socio-demographic characteristics of the female and male samples at baseline. Male partners on average were older than their spouses. The mean age of women in the sample was 28.5 (SD=6.3) years and that of men was 35.2 (SD=8.1) years at the baseline survey. Mean schooling also varied between the spouses, the men (mean: 8.9, SD=4.6) on average accumulated 2 additional years of schooling as compared to their females (mean: 7.1, SD=4.6). The majority of the women (73.8%) and men (75.8%) followed the Christian orthodox religion. Mean parity in the group at baseline was 1.2 (SD=1.3) children.

Marital Quality Measures

The distributions of the marital quality measures were skewed towards higher response categories. We attempted to transform the variables for greater symmetry of distribution, but because the transformation did not improve the data spread, we retained the original variable distributions for the analysis.

Table 4.1.2 provides a description of the baseline and follow-up female and male partners' marital quality measures. As expected, there was almost no change in the overall and individual marital quality measures of both spouses between the surveys. Interestingly, while the female scores on all measures indicated a slight decrease in marital quality between the two time points, for the males the opposite was true. The overall marital quality mean female score at the baseline was 0.022 (SD=3.01, range: 19.85-1.88), and at the follow-up was 0.006 (SD=0.006, range: -20.10-2.77), with a mean score difference of -0.02 between the two surveys. The male partners' overall marital quality scores at the baseline was -0.001 (SD= 1.42, range: -13.42-1.02), and at the follow-up was 0.003 (SD=1.60, SD=-15.56-1.19). The mean score difference between the two surveys was 0.002.

Table 4.2 provides polychoric correlation coefficients between the individual and couples' marital quality scores. As expected the individuals' marital quality measures were highly positively correlated with each other. The individuals' (actor) and partners' marital quality scores were also correlated indicating the need to account for it in the statistical analysis. There was a positive correlation of 0.72 between actors' trust and commitment scores, 0.82 between trust and conflict scores. Similarly, the positive correlation between actors' commitment and conflict score was 0.72. The positive correlation between actor and partners' trust scores was 0.11, commitment scores were 0.18, and conflict scores were 0.15. In addition, the positive correlation between actor and partners' trust and commitment score was 0.15, and between trust and conflict was 0.13. Similarly, the positive correlation between actor and partners' commitment and conflict score was 0.20.

Table 4.3 contains intra-class correlations between the marital quality measures of spouses. As per the empty model or model without any predictors, the overall and individual marital quality scores of spouses' were non-independent warranting dyadic treatment of the data. The level of non-independence ranged from low to medium as per Cohen's Standards and was higher for the male partners. The lowest level of non-independence was in the female partners' overall marital quality measures (ICC = 0.09), and the highest was in the male partners' conflict scores (ICC =0.43).

Overtime Actor-Partner Effects on Marital Quality Measures

Table 4.4 and Figures 4.1-4.4 provide the actor-partner effects of marital quality measures over time. The final APIM analytic sample consisted of 725 dyads. The overall marital quality score and the individual marital quality measures at baseline had significant over time actor effects at the follow-up for both female and male partners. Interestingly, the over time actor effects on all marital quality measures were stronger for male partners (Table 4.4, Figure 4.1). The largest female and male partner difference in actor effects was seen in the commitment scores. While a unit change in the male commitment score at baseline was associated with an increase of 0.52 points (p value < 0.001) in his commitment score at the follow-up, for the females this increase was 0.17 points (p value $= 0.003$). The smallest difference was seen in the conflict scores. While a unit change in the male conflict score at baseline was associated with an increase of 0.41 points (p value < 0.001) in his

commitment score at the follow-up, for the females this increase was 0.33 points (p value < 0.001).

With regard to partner effects, surprisingly, while all female marital quality measures had significant partner effects on their spouses rather, only the male conflict score had a partner effect on the females. Although the coefficients of male partner effects on their wives were larger than their female counterparts, with the exception of the conflict measure, none were statistically significant at the 0.05 levels. A unit increase in the females' overall marital quality score at baseline significantly increased the male partners' overall marital quality score by 0.08 units (p value $= 0.003$) at the follow-up. A unit increase in the females'commitment score at baseline significantly increased the male partners' commitments score by 0.13 units (p value $= 0.008$) at the follow-up. Similarly, a unit increase in the females' baseline trust and conflict scores significantly increased the male partners' trust scores 0.06 units (p value $= 0.03$) and conflict score by 0.03 units (p value $=$ 0.03) at the follow-up . For the males, a unit increases in the male conflict score at baseline increased the female conflict score by 0.55 points (p value $= 0.05$) at the follow-up.

In terms of the co-variance parameters, the largest covariance of the residual variance (Rho) was found in the overall marital quality measure (Rho=0.24, p value $= 0.05$), while the trust measure had the smallest rho (Rho=0.19, p value $= 0.05$). The rho indicates that even after controlling for baseline marital quality scores and background variables, the male and female over time marital

quality scores continue to correlate. Moreover, the small Rhos indicate that there is greater homogeneity in marital quality scores within couples versus between couples.

Discussion

In this dyadic analysis, we found that the baseline overall and individual marital quality scores had strong actor effects and influenced both the female and male individual scores over time. Interestingly, the male partners had stronger actor effects than the females. However, most importantly, our study found linkages between wives' and husbands' baseline and over time marital quality scores, indicating partner effects. Surprisingly, greater number of female marital quality measures had significant partner effects on their husband rather than vice versa. The female partners overall marital quality and commitment scores at baseline had significant effects on their husbands' scores at the follow-up. While the coefficients of male partner effects on their wives were larger than their female counterparts, with the exception of the conflict measure, none were statistically significant at the 0.05 levels.

Our study findings underscore the need to expand our understanding of inter-dependence between spouse's interaction, communication, and decision patterns. Future studies should explore how this interdependence impacts individual and dyadic health behaviors and outcomes. Clearly, looking at female and male partners separately is not adequate, and more dyadic studies are needed to understand the

nuances of couple processes and relationships. Such information might especially be useful in improving our understanding of why some female partners/couples are more successful in adopting and consistently using modern contraceptives, while others are not so successful.

Also, noteworthy were the gender differences in partner effects. The significant female partner effects on the male partners overall marital quality, commitment, and marginally on their trust scores over time are slightly counter-intuitive. Given prevailing gender norms, we would have expected the male partners to show greater influence over the females. These findings highlight the complex emotional processes that underlie couple relationships that remain under studied. These findings may also be reflective of changing marriage patterns, with a preference for more egalitarian relationships, and increasing male involvement and empathy in peri-urban Ethiopia that has been noted in Ethiopia and other settings (Amato et al., 2003; Erza, 2003; Chimbiri, 2002; Steyn, 1996). In Ethiopia, limited available studies have highlighted the shifting traditional marriage patterns in urban areas with the increase in the proportion of educated women as indicated by increasing age at marriage, delay in the birth of the first child, and greater egalitarian role expectations within marriage (Erza, 2003; Sibanda et al., 2003). Furthermore, from a programmatic perspective, the mutual influence of spouses, and the apparent greater female emotional influence on males can be tapped to improve reproductive health outcomes. Basu (2006) has highlighted the plausible positive role love can

play in reproductive health outcomes through its potential to "invert gender hierarchy and reduce inequalities".

Our study has several limitations that warrant discussion. While probability-sampling methods were used to recruit participants into the FHWS study, but since the study was located in one peri-urban site, with a fairly homogeneous population, the generalizability of the findings is limited to similar settings. Our study was also based on secondary data, which limits the availability of other variables of potential interest for dyadic research. For instance, because of the lack of validated measures of power differentials between couples in the current study, we were unable to examine their probable association with variation in marital quality. These may be critical given that gender differences seem to play a prominent role in the over time association of marital quality.

In addition, social desirability bias is a potential issue associated with self-reported data. Marital quality measures can be prone to social desirability bias because of the sensitive nature of the subject matter. Several checks to ensure complete privacy and confidentiality of participants were followed during data collection. We also checked for interviewer effects with the follow-up data. Overall the interviewer effects were small, although they were stronger for the males, and they varied by marital quality measures. Given these results, we did not include the interviewer indicator or make any adjustments to account for the interviewer effects in subsequent analysis. Many western studies now utilize interviewer ratings of dyadic interactions along with self-reported data to overcome issues of social desirability

bias (Lawrence et al., 2011). This might be a useful strategy that future research can explore in non-western setting too.

Also, in the follow-up sample, only 728 couples remained in the study. We had to limit our longitudinal analysis to these couples, who were on average older and had more children than the couples lost from the sample. There were however no significant differences in the marital quality and contraceptive measures observed for the two groups. We utilized propensity score matching to account for couples lost in the follow-up. However, while this methodology allowed us to account for the lost observations, it is important to acknowledge that this weighting procedure is only as good as the propensity score model.

At the same time, this study has several strengths. To the best of our knowledge, this study is a pioneering research effort to understand the over-time spousal influence on each other's marital quality using the actor-partner interdependence model. Findings from our study fill an important research gap by broadening our understanding of interdependence in spousal relationships. Moreover, these associations were explored longitudinally to manage causal issues of temporality. We also used a multi-dimensional measure of marital quality and explored the interdependence between spouses in each of these domains.

Conclusion

We gain more information by conducting dyadic analysis, information that we miss if we conduct analysis separately on females and males. Moreover, understanding

the interdependence in spousal relationships can greatly increase our knowledge of the emotional processes within marriage, and ultimately enable the tapping of couple mechanisms that potentially can improve reproductive health behaviors and outcomes.

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Table 4.1.1

Descriptive Summary Statistics of Key Variables by Female and Male Partners at Baseline (n=728)

Characteristics	Female	Male
Age in Years (mean/SD)	28.5 (6.3)	35.2 (8.1)
Education in Years (mean/SD)	7.1 (4.6)	8.1 (4.6)
Parity (mean/SD)	1.2 (1.3)	
Religion (%)		
Orthodox Christian	73.8	75.8
Muslim	13.7	14.2
Others	12.5	10.0

Table 4.1.2

Descriptive Summary Statistics of Female and Male Overall and Individual Marital Quality Measures at Baseline and Follow-up (n=728)

	Baseline	**Follow-up**	
Marital Quality (MQ) *(mean/SD) (range)			**Mean Difference**
Female Overall MQ	0.022 (3.01) (-19.85-1.88)	0.006 (3.78) (-20.10-2.77)	-0.016
Male Overall MQ	-0.001 (1.42) (-13.42-1.02)	0.003 (1.60) (-15.56-1.19)	0.002
Female Trust	0.012 (1.00) (-6.13-0.56)	0.005 (1.15) (-5.90-0.57)	-0.007
Male Trust	-0.0002 (0.42) (-4.13-0.16)	0.0019 (0.46) (-4.66-0.20)	0.002
Female Commit	0.002 (0.90) (-5.57-0.47)	-0.002 (1.35) (-6.85-0.87)	-0.004
Male Commit	-0.0008 (0.84) (-6.59-0.62)	0.0012 (0.94) (-7.06-0.89)	-0.002
Female Conflict	0.008 (1.30) (-8.14-0.84)	0.003 (1.55) (-7.36-1.31)	-0.005
Male Conflict	-0.0003 (0.35) (-3.12-0.25)	0.0004 (0.39) (-3.73-0.28)	0.0001

*Scores from Confirmatory Factor Analysis

Table 4.2

Polychoric Correlation Coefficients between Individual and Spouses' Baseline Marital Quality Measures

	Trust *(Actor)*	Commit *(Actor)*	Conflict *(Actor)*	Trust *(Partner)*	Commit *(Partner)*
Trust (Actor)	1.00				
Commit (Actor)	0.72	1.00			
Conflict (Actor)	0.82	0.72	1.00		
Trust (Partner)	0.11	0.15	0.13	1.00	
Commit (Partner)	0.15	0.18	0.20	0.72	1.00
Conflict (Partner)	0.13	0.20	0.15	0.82	0.72

Table 4.3

Intra-class Correlation (ICC) from Empty Models[1] of Female and Male Partners' Overall and Individual Marital Quality Measures at the Follow-up Survey

	Female Partners	Male Partners
Outcome	ICC [2]	
Overall Marital Quality follow-up	0.09	0.19
Trust follow-up	0.20	0.39
Commit follow-up	0.19	0.26
Conflict follow-up	0.16	0.43

[1]Model without any predictors

[2] corr (e)/[corr (e) + sd (e)]

Table 4.4

The Actor-Partner Interdependence Model Demonstrating the Association between Spouses' Overall and Individual Marital Quality (MQ) Scores Over Time (n=1450, dyads: 725)

	Actor Effects		***Partner Effects***	
	Wife	Husband	Wife	Husband
Predictor	Adjusted[1] β (SE)	Adjusted[1] β (SE)	Adjusted[1] β (SE)	Adjusted[1] β (SE)
Overall MQ Baseline	0.22 (0.06)**	0.50 (0.07)**	0.08 (0.02)**	0.20 (0.18)
Trust Baseline	0.13 (0.06)**	0.47 (0.06)**	0.06 (0.03)**	0.21 (0.15)
Commit Baseline	0.17 (0.06)**	0.52 (0.08)**	0.13 (0.03)**	0.12 (0.10)
Conflict Baseline	0.33 (0.08)**	0.41 (0.06)**	0.03 (0.02)**	0.51 (0.12)**

* * p value < 0.05; *p value < 0.10

[1]Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference
Models weighted with propensity scores

Figure 4.1: The Actor-Partner Interdependence Model Demonstrating the Association between Spouses' Overall Marital Quality Scores Over Time

* * p value < 0.05; *p value <0.10

Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

E: Residual variance; Rho: Covariance of the residual variance

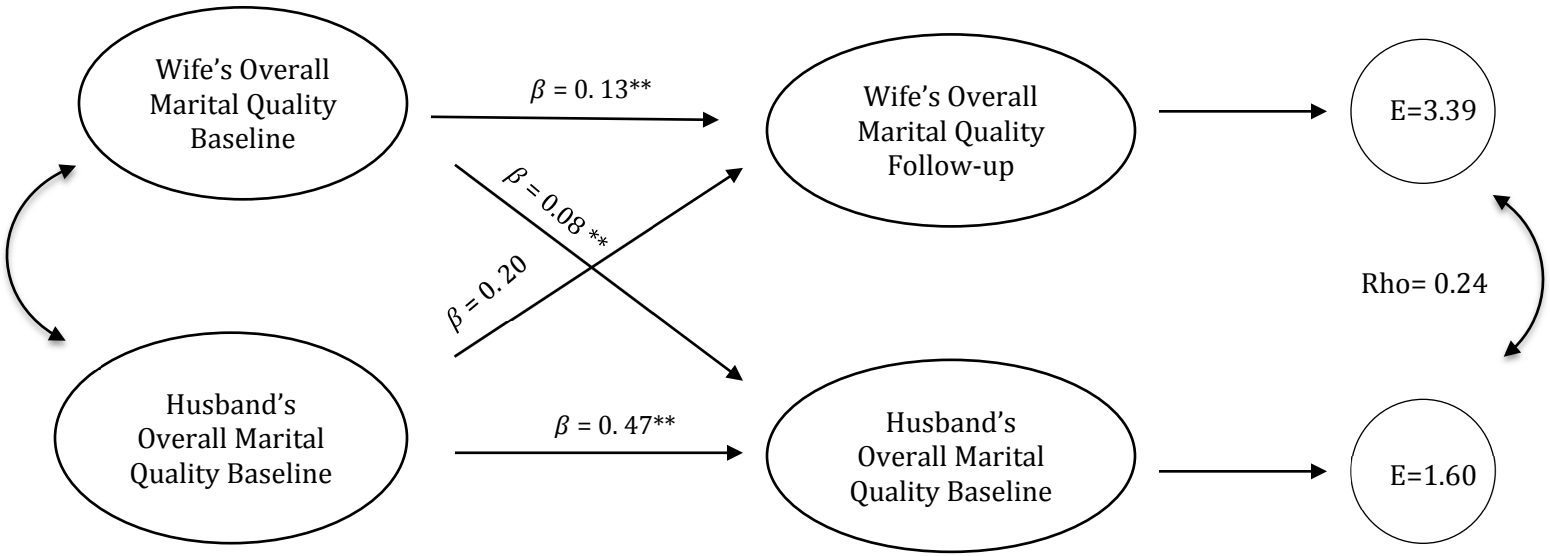


Figure 4.2: The Actor-Partner Interdependence Model Demonstrating the Association between Spouses' Trust Scores Over Time

* * p value <,0.05; *p value < 0.10

Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

E: Residual variance; Rho: Covariance of the residual variance

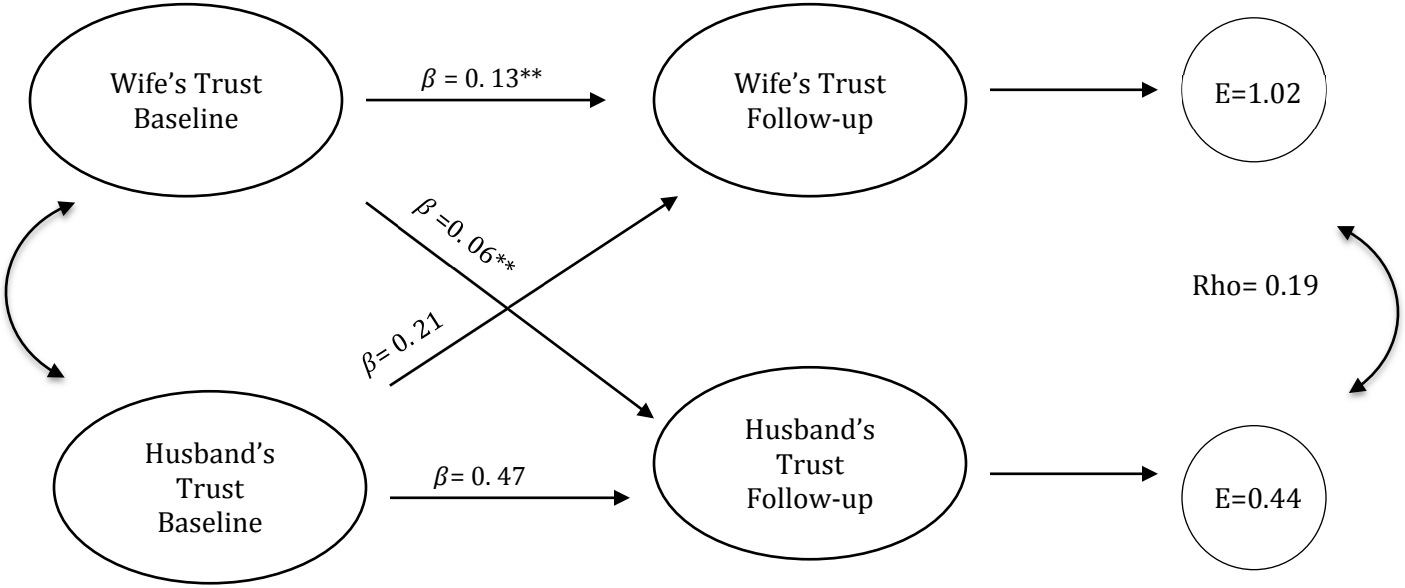


Figure 4.3: The Actor-Partner Interdependence Model Demonstrating the Association between Spouses' Commitment Scores Over Time

* * p value < 0.05; *p value < 0.10

Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

E: Residual variance; Rho: Covariance of the residual variance

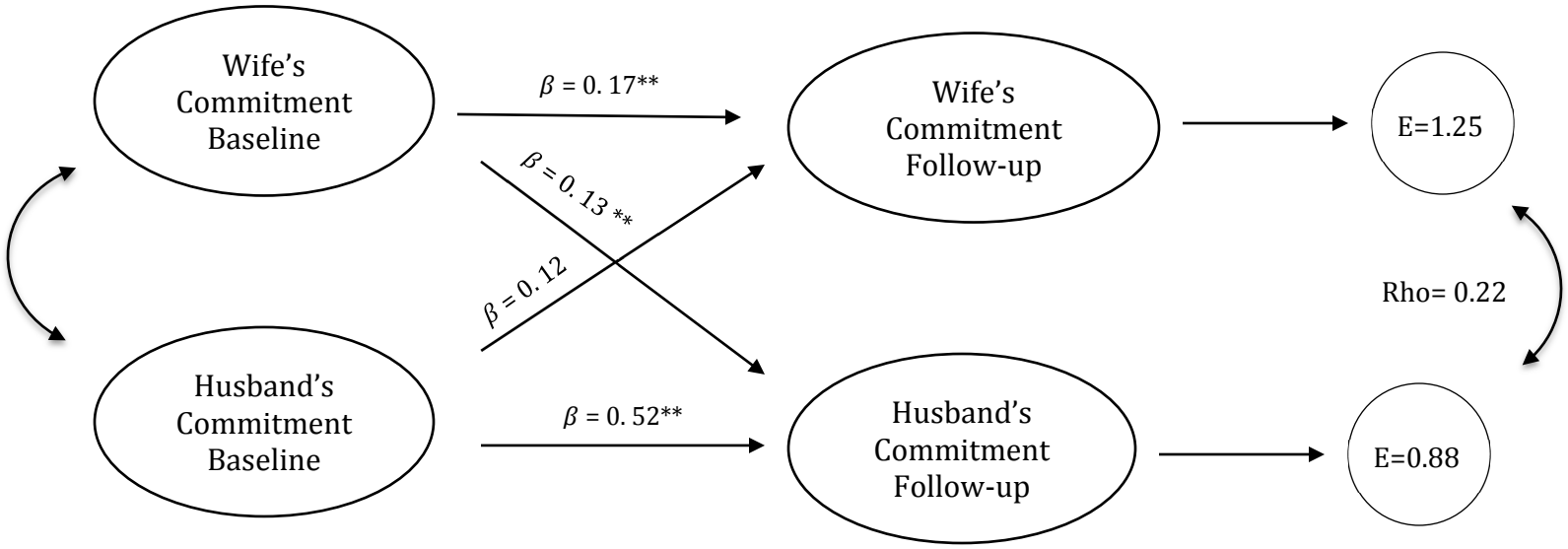
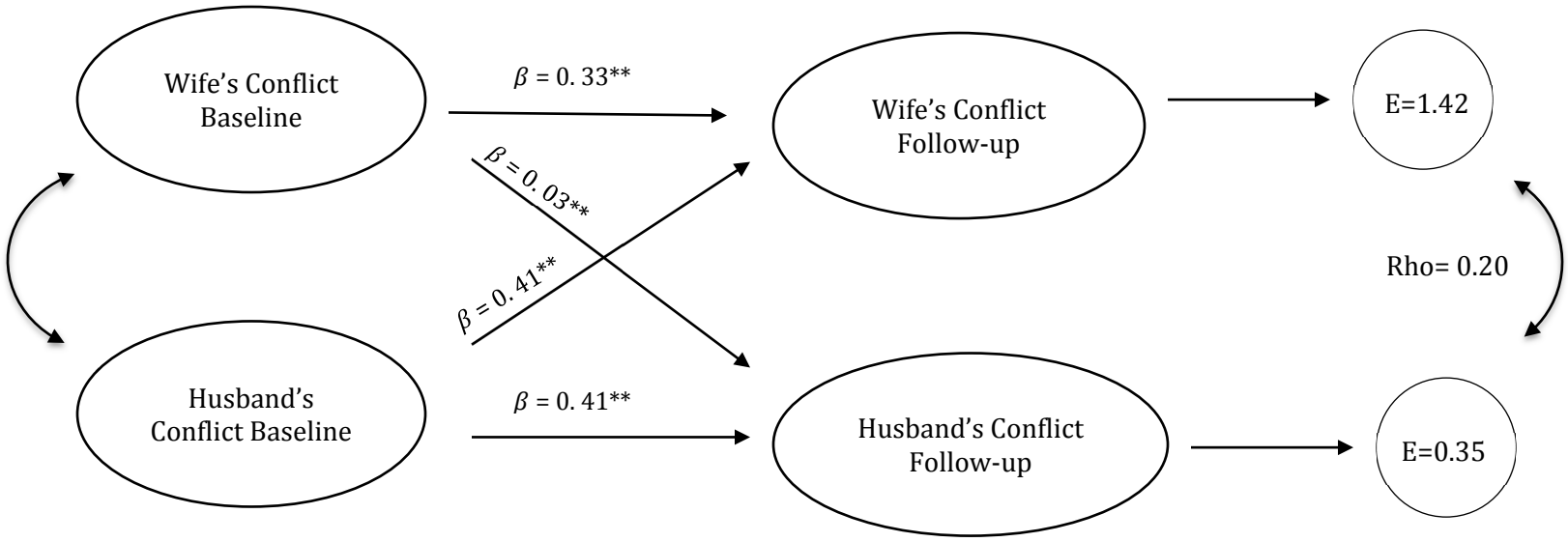


Figure 4.4: The Actor-Partner Interdependence Model Demonstrating the Association between Spouses' Conflict Scores Over Time

* * p value < 0.05; *p value <0.10
Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference
E: Residual variance; Rho: Covariance of the residual variance



CHAPTER FIVE: **MANUSCRIPT THREE**

Does a Couple's Marital Quality Influence their Contraceptive Use?

Background

In western settings contraceptive adoption and continuous use have been found to be associated with relationship quality (Manlove et al., 2011; Manlove, Ryan & Franzetta, 2007, 2003; Manning, Longmore, & Giordano, 2000). This association, however, between relationship quality and contraceptive use is not consistent across studies. While some dimensions of relationship quality have been positively linked with aspects of contraceptive use, other dimensions have been negatively connected. Moreover, this linkage appears to vary over the relationship trajectory, and with contraceptive method type. For instance, research with teenage samples has found that adolescents in intimate relationships with higher levels of communication were more likely to adopt contraceptive methods (Manlove et al., 2007, 2003). Similarly, in a longitudinal study among a sample of low-income adult women in two southeastern cities of the United States, women who expected to receive emotional support from their partners upon becoming pregnant were more likely than their counterparts to report condom use or dual method use, and were less likely to not use any contraceptive method (Wilson & Koo, 2008). Also, studies have found greater contraceptive use among couples in relationships characterized as romantic, and with higher levels of commitment and intimacy (Manlove et al., 2011; Manning, Longmore, & Giordano, 2000).

Alternately, specific contraceptive methods, especially condoms, have been negatively associated with higher relationship quality across samples (Sayegh et al., 2006; Woodrome et al., 2006; Katz et al., 2000). Research has consistently found

condoms to be commonly used in short-term or casual relationships as opposed to established or long-term relationships (Wingood & DiClemente, 1998; Seidman, Mosher, & Aral, 1992; Catania et al.., 1989). In fact, studies have noted declining condom use as commitment and intimacy increase over the trajectory of a relationship (Ku, Sonenstein, & Pleck, 1994; Langer, Zimmerman & Katz, 1994).

Along these lines, research suggests that use of condoms is reduced in relationships with greater commitment because of perceived invulnerability to harm from the partner (Agnew, 2000; Buunk & Bakker, 1997). Similarly, a study among African American women in the United States found that the women saw asking their partners to use condoms as admitting infidelity, and compromising the stability of their relationship (Wingwood & DiClemete, 1998). Alternately, another study, while finding similar linkages between women's commitment to their partners and attitude towards condom use, also discovered that nonetheless the more committed women felt greater control over condom use decision-making (Harvey et al., 2006). Similarly, a study among a nationally representative United States adolescent sample tracked a more nuanced association between contraceptive use and relationship commitment (Kusunoki & Upchurch, 2011). According to the study, the likelihood of condom and hormonal method use increased in casual relationships if the female was familiar with the male partner. This usage, however, declined as commitment and duration of the relationship increased. For the men, on the other hand, the opposite was true with familiarity in less committed relationships reducing condom use (Kusunoki & Upchurch, 2011).

Although the directionality of association between relationship quality and contraceptive adoption remains unclear, a more robust relationship between relationship quality and continuous contraceptive use has been noted in several studies. Research in the United States has found positive linkages between aspects of relationship quality and effective and continuous contraceptive use. A study among a sample of Hispanic women found that the women who perceived their partners to be more committed were less likely to discontinue contraceptive use (Kerns et al., 2003). Similarly, research among adolescent samples has also indicated that females in more intimate and satisfying relationships, with higher levels of communication with their partners, were more likely to use contraceptives consistently and effectively (Manlove et al., 2007; Jorgenson et al., 1980). Similarly, relationship satisfaction and greater inter-personal female power within dyads promoted regular use of effective contraceptives in another study (Jorgensen et al., 1980). In addition, the belief that condom use builds trust with partners was a significant predictor of long-term continuous condom use in another study (Santelli et al., 1996).

Despite these findings in Western context, in Sub-Saharan African settings, interest in understanding the relationship context of contraceptive use is just emerging. Current couple research there has primarily focused on understanding the impact of partner characteristics and inter-personal variables such as couple communication, and household decision-making on contraceptive use (Link, 2011; Bogale et al., 2011; DeRose & Ezeh, 2010; Paz, 2004; Lasee & Becker, 1997). Research on the linkages between emotional processes within marriage and the potential role

relationship quality may have on contraceptive use behaviors is sparse (Basu, 2006). Most of the current research is limited to exploring the association of condom use with partnership type or relationship trust, and lacks in-depth analysis of the impact different domains of relationship quality have on a variety of contraceptive use behaviors, and use of methods beyond condoms (Westercamp et. al, 2010; Maharaj, 2005; Benefo, 2004; Maharaj & Cleland, 2004). Moreover, there is limited understanding of the mechanisms that promote greater couple communication, more egalitarian decision-making and gender relations within marriages, which are known to be associated with contraceptive use (Link, 2011; Derose and Ezeh, 2010; Upadhyay & Hindin, 2005; Soldan, 2004). Hence, exploring and analyzing the role of relationship quality in non-western contexts has the potential to enhance and expand our understanding of the pathways in the marital relationship context that encourage positive contraceptive use behaviors.

Like in the West, across African samples, condom use has been found to be more common with casual partners (Westercamp et al., 2010; Maharaj, 2005; Maharaj & Cleland, 2004; Macaluso et al., 2000). In fact, frequently suggesting condom use in a steady relationship is considered taboo and seen as a sign of infidelity. For instance, a mixed methods study in Malawi investigating the reasons for low condom acceptance among married couples, found that while condom use was acceptable in 'sporadic sex', study participants considered its use within marriage unacceptable (Chimbiri, 2007). Similarly, a study in Zimbabwe found mistrust to be a major barrier preventing contraceptive use among married couples, and that condom use was more prevalent among couples who freely communicated with each other

(Muhwava; 2004). In a qualitative study from Ghana, the male participants were concerned that women who used contraceptives were more likely to be 'unfaithful' and abandon their families. The females on the other hand expressed their inability to ignore their husbands' disapproval of contraceptives because of consequences such as denial of sex, husband preferring another wife, or even abandonment (Bawah et al., 1999). In fact, across African samples, women speak of covertly using contraceptives fearing their husbands' disapproval (Macphail et al., 2009; Oppong, 1977).

Clearly, this limited evidence highlights the important role couple relationship context and relationship quality plays in determining contraceptive use behaviors. Moreover, like in other parts of the world, African marriages are also witnessing dramatic changes, making it pertinent to understand the impact these ongoing changes in the relationship context are having on contraceptive use. Many scholars have posited that factors such as declines in fertility and practices such as arranged marriages, individuals marrying at later ages, and increased popularity of contraception in Sub-Saharan Africa, are all indicative of shift taking place in traditional marital patterns there (Cherlin, 2011; Locoh and Mouvagha-Sow, 2008; Goode, 1963). In addition, from the limited available studies exploring the nature of marriages in Sub-Saharan Africa, there are indications of a move away from traditional patriarchal marriages to more egalitarian marriages; characterized by greater relationship empathy, communication, and negotiation of mutual spousal desires, especially in the urban areas (Miller and Kannae, 1999; Styen, 1996). Given these shifts in the nature of marriages and marital relationship context,

understanding couple mechanisms that promote or inhibit contraceptive use can be useful in improving family planning programs and reducing unmet need for contraceptives.

In this study, we have undertaken a comprehensive analysis of the affect marital quality domains such as trust, commitment, and conflict have on a range of contraceptive use outcomes such as current use, type of method used, and continuity of use among a sample of female and male partners from peri-urban Ethiopia. Also, we analyzed these relationships cross-sectionally and longitudinally using two waves of the data, to allow temporal associations and address issues of causality.

Research Questions

This study aims to answer the following key research questions:

1. Does reporting higher marital quality increase the likelihood of spouse's reporting current and future use of contraceptives as compared to their counterparts with lower scores?
2. Does reporting higher marital quality scores increase the likelihood of spouse's reporting a coital-dependent (methods that require active male participation such as condom, traditional methods like withdrawal and rhythm) or long-acting/permanent contraceptive method (Implants, IUDs and Sterilization) versus a short-acting method (Injectable, Pill) use as compared to their counterparts with lower scores at baseline and over time?
3. Does reporting higher marital quality scores increase the likelihood of

spouse's reporting more consistent contraceptive use across survey rounds, versus non-use, or inconsistent use as compared to their counterparts with lower scores?

4.

   a. Do females who report higher marital quality scores at baseline have a higher likelihood of greater length of continuous contraceptive use at the follow-up as compared to their counterparts with lower scores?
   b. Do females with male partners who report higher marital quality scores at baseline have a higher likelihood of greater length of continuous contraceptive use at the follow-up as compared to their counterparts with a spouse who reports lower scores?

Methods

Data and Sampling Design

Data for this study was collected as part of a larger ongoing study called Family Health and Wealth Study (FHWS) spanning five Sub-Saharan African countries that aims to examine individual and family-level health and wealth consequences of family size. The study has followed 500-1000 family cohorts in peri-urban areas in Egypt, Ethiopia, Ghana, Malawi, Nigeria and Uganda. Households were eligible for the study if their occupants included a couple formally married or in a stable union. A probability sample of households, where the wife was of childbearing age (15 to 49 years) and the husband aged 20 to 59 years was selected for the study. The enumeration areas (EAs) were randomly selected and 20 households with eligible

couples per EA were targeted for each. A household census was conducted within each EA, followed by systematic selection of households. Occupants were enumerated and eligible couples identified. Both partners of eligible couples were consented; if one or both did not consent to participate in the study, the field team selected another eligible couple from the same household or an adjacent household. In cases where a family head had multiple wives, only one randomly selected wife was interviewed. Across all EAs, couple participation rates were above 95% and interview completion rates were uniformly high. The survey questionnaire, administered separately to husbands and wives, covered a range of questions on contraceptive use, fertility preferences, and marital quality, among other topics. In Ethiopia, the study was conducted in a peri-urban site near the capital city of Addis Ababa. The first round of the Ethiopian FHWS in 2010 consisted of 998 couples; the second round re-interviewed 728 couples (72.9%) two years later.

Measures

Key independent measure

Marital Quality Measures

Marital quality measures included in the FHWS consisted of four independent validated western scales capturing dimensions of trust (Larzelere and Huston, 1980), commitment (Harvey et al., 2006; Sternberg, 1997), constructive communication, (Heavey et al.; 1996; Christensen and Sullaway; 1984) and satisfaction (Spanier, 1976) in a relationship. The marital quality scale was initially conceptualized as a four-factor scale mirroring the four validated western scales,

but as chapter 3 showed it was re-specified as a three-factor scale for the female and male partners separately after assessing scale reliability and validity by conducting exploratory and confirmatory factor analysis with the baseline sample, and then repeating the confirmatory factor analysis with the follow-up sample. The final overall marital quality scale with the sub scales of trust, commitment, and conflict were highly reliable with Cronbach's alpha of 0.94 and 0.89 for female and male partners respectively. Some scale items were reverse scored for ease of interpretability, so that higher score indicate higher overall marital quality, higher trust, higher commitment, and reduced conflict. The final scale scores were derived from the results of the exploratory factor analysis with baseline data conducted in Stata version 12 (StataCorp, 2011).

Key Dependent Measures

Contraceptive use Outcomes: Four contraceptive outcomes were used for the analysis described below.

1) Partner-specific report of contraceptive use was measured as a binary outcome (no=0/ yes=1) indicating if the female partner reported using contraceptives. For the male partners, the outcome indicated if a contraceptive method was used in their last sexual encounter. Since, 99.5% of the males at baseline and 99.7% of the males at the follow-up reported their last sexual encounter was with either their wife or long-term partner, this measure was used as an indicator of contraceptive use in marital relationships.

2) Type of method (short-acting, long-acting, and coital-dependent) was measured as a categorical variable coded 0, 1 and 2 to indicate whether the female or the male partner respectively reported using a short-acting method (pills, injectable), a coital- dependent method (condoms, traditional methods such as periodic abstinence, withdrawal) or a long-acting method/permanent method (IUD, implant, sterilization).

3) Continuous contraceptive use was measured with two categorical outcomes. The first outcome measured if the female and male partner reported using contraceptives consistently at survey rounds (baseline and follow-up), inconsistent use (used only at baseline or follow-up), or no-use at both survey rounds. The second outcome assessed if the female partner reported using contraceptives continuously for 4 years or more, 2 to 3 years, 1 year, or no-use at the follow-up survey.

Background Variables

A range of socio-demographic, household-level, and couple-level variables known to influence contraceptive use were included in our analysis such as respondents' age, education, parity, household wealth, religion and spousal age difference. Age and education were measured as continuous variables indicating age and education in years. Parity, which specifies the number of times a woman has given birth, was assessed using the female partners' response on a series of questions about her childbirth history. Household wealth was constructed through a principal

components analysis of household assets, and housing characteristics such as ownership of consumer items, and type of dwelling. The index score was then used to divide the households into quintiles that indicate poorest, poor, middle, richer and richest. Religion was a categorized into Orthodox Christians, Muslims and other religions. Spousal age difference was measured by subtracting the female partners' age from the male partners' age.

Statistical Analysis

We first conducted exploratory data analysis. We examined the data spread, frequency distributions, outliers, and patterns of missing values to ascertain the appropriate treatment of the variables. This was followed by univariate analysis to check frequency distributions and summary statistics, like means and variances for continuous variables and proportions for categorical variables.

For the longitudinal associations we limited the analysis to the sample of couples who participated in both survey rounds. In order to assess potential bias due to loss-to-follow-up at the second round of data collection, we checked for significant differences between couples lost-to-follow-up versus couples who were relocated to identify potential mechanisms of loss and determine appropriate data management strategies (Kristman et al., 2004). The couples who remained in the study and those lost-to-follow-up did not vary significantly by the key outcome of contraceptive use. The proportion of contraceptive users was the same in the retained and lost-to-follow-up samples. Furthermore, contraceptive use at baseline (OR: 1:01, CI =0.75 - 1.42) was not associated with a woman being relocated in the second round of data

collection after adjusting for covariates such as age, education, wealth quintile, parity, spousal age and educational differences. The marital quality measures also on average did not vary across the samples, with the exception of the female commitment score that was marginally different [mean difference: 0.14 ($p\ value = 0.08$)] between the groups. Moreover, in the multivariate regression analysis, the marital quality measures, other than the females' commitment score (OR: 1.12, 95% CI=0.98-1.27), which was marginally significant, were not associated with the likelihood of the female partner being followed in the second survey round. However, there were some demographic differences between the two samples. The females in the lost-to-follow-up sample were on average 1.7 ($p\ value < 0.001$) years younger and their male partners 2.25 ($p\ value < 0.001$) years younger than respondents in the follow-up sample at baseline. Females with 2 or more children had significantly reduced odds of being lost in follow-up as compared to women with one or no children. The two samples did not vary significantly by education levels or wealth quintile. Given these differences between the samples, we generated weights to account for the under-represented group lost during follow-up by constructing a propensity score. A propensity score is the probability that a subject remained in the study (Rosenbaum & Rubin, 1983). This methodology is used to assign weights to subjects who remain in the study to account for the loss of observations for individuals' lost-to-follow-up. We estimated a logistic regression model that predicted the odds of female partners remaining in the study, using as predictors, the female respondent's age, spousal age-difference, parity, wealth as a binary variable indicating wealthier versus being poorer, and whether the female

partner had discussed or considered divorce, separation or terminating their current relationship. The model indicated a good fit based on the results of the Hosmer-Lemeshow goodness of fit test [Chi-square (8): 680, p value: 0.56]. The husbands were assigned the wife's propensity score weight, because the husbands' re-interview depended on the wife's consent. Please see chapter 2 for a more detailed description of the procedures followed.

Following the exploratory data analysis, we conducted bivariate analysis to assess the significance of relationships between outcomes and key independent variables. Next we estimated multivariate logistic and multinomial regression models based on the nature of the outcome variable. Logistic regression was used to analyze the association of contraceptive use with marital quality measures because of the binary nature of the variable. Subsequent outcomes, including method type, continuous use between the two survey rounds, and length of continuous use were analyzed using multinomial logistic regression because of the categorical nature of these outcomes. We estimated the associations of contraceptive use and method type with the marital quality measures at baseline, and then repeated the analysis to estimate longitudinal association of baseline martial quality with contraceptive use and type at the follow-up survey. We also examined the association of baseline marital quality measures with consistency in contraceptive use between survey rounds for female and male partners. To assess the association between female partners' report of length of continuous use and marital quality, we used the female partners' report of use from the follow-up survey, and the spouses' marital quality measures from the baseline survey.

Results

Sample Characteristics and Distribution of Key Variables

Socio-Demographic

Tables 5.1.1 – 5.1.4 provide detailed description of the socio-demographic characteristics and distribution of key variables in the sample. The mean age of the female partners at the baseline was 28.5 (SD=6.3) years (Table 5.1.1). The males on average were older than their female counterparts; their mean age at the baseline was 35.2 (SD=8.1) years. The females on average had attended school for 7.1 years (SD = 4.6) at the baseline. The women in the follow-up sample were slightly less educated with an average of 7.0(SD = 4.6) years of schooling. The males on average had more schooling than their female partners at baseline (Mean 9.0, SD = 4.6). The mean parity among couples at the follow-up was 2.3 (SD =1.7) children.

Contraceptive use

Table 5.1.1 provides a description of contraceptive use and type of method used at baseline and follow-up surveys. At baseline, 76.7% of the female partners were contraceptive users, and this proportion remained unchanged at the follow-up (76.8 %). Among the males, 74.9% were users at baseline; this proportion decreased to 71.4 % at the follow-up survey. In terms of type of method used, short-acting methods, especially the injectable was most popular. At baseline, 70.1 % of the female partners were using short-acting methods; this proportion (66.2%) went down at the follow-up. At follow-up, levels of long-acting methods use increased to 19.1% from 15.8% among the females.

Table 5.1.2 provides descriptive statistics of female and male partners' report of consistent contraceptive use at survey rounds. 68.7% of the females reported using a method at both survey rounds, while the corresponding proportion among the males was 59.0%. Similarly, while 6.1% of the females were non-users at both surveys, the proportion of men reporting non-use at survey rounds was much higher at 13.9%.

Table 5.1.3 provides descriptive statistics of length of continuous contraceptive use reported by the female partners at the follow-up survey. At the follow-up survey, 24.6% of the female partners reported using a method continuously for over 3 years, 27.0% reported using a method for over a year to 3 years, 25.1% reported use for a year or less, and 23.3% reported not-using any method.

Marital Quality Scores

Table 5.1.4 provides a description of the marital quality scores at baseline. At the baseline, mean overall marital quality score for the female sample was 17.47 (SD= 2.15, range: 3.20-18.80). For the male partners, the mean overall marital quality score at baseline was 14.94 (SD=1.22, range: 4.28-16.51). The mean baseline commitment score for the female partners was 5.48 (SD=1.42, range: -2.68–9.99, the mean trust score was 3.14 (SD=0.99, range: -2.67- 5.05), and the mean female conflict score was 8.85 (SD=1.20, range: -1.18–10.45) Similarly, for the males, the mean baseline commitment score was 4.68 (SD=0.70, range: -3.57–7.26), the mean trust score was 6.90 (SD=1.00, range: 0.17-9.14), and the mean conflict score was 3.37(SD= 0.54, range: -0.63–5.57).

Marital quality and Current contraceptive use

Table 5.2 provides a description of the association of marital quality measures with the female and male partners report of contraceptive use at baseline and over time. The association of marital quality measures with contraceptive use was stronger for the male partners than their female counterparts. For the females, only the trust score in the unadjusted analysis was marginally associated with contraceptive use. Interestingly, a unit increase in the females' trust score in the unadjusted model was marginally associated with a reduction in use by 18% (OR: 0.82, CI: 0.65-1.02). However, these relationships did not hold in the multivariate or over time analysis. The male trust score was significantly associated with contraceptive use at baseline as well as over time. A one-unit change in the male partners' trust score at baseline increased the odds of reporting use by 17% (OR: 1.17, CI= 1.01-1.35) in the adjusted models. Similarly, a one-unit increase in the husbands' trust scores at baseline increased the odds of use at the follow-up by 35% (OR: 1.35, CI= 1.13-1.60) after adjusting for covariates. In addition, the husbands' overall marital quality score was marginally associated with use (OR: 1.11, CI = 0.98-1.25) at the baseline and significantly associated with use (OR: 1.16, CI = 1.01-1.34) at the follow-up in multivariate models.

Marital Quality and Type of Method

Table 5.3 provides a description of the association of marital quality measures with type of method used. There were significant associations between female marital quality measures and the type of method used at baseline and over time. The female partners' commitment score was associated with the type of method used at

baseline, and her trust score was associated with method type over time. A one-unit increase in the female partners' commitment score increased the relative risk of coital-dependent method use versus short-acting method use by 29% (RRR: 1.29, CI=1.01-1.65) in the adjusted model at baseline. Similarly, a one-unit increase in the female partners' baseline trust score increased the relative risk of coital-dependent method use versus short-acting method use by 43% (RRR: 1.43, CI=1.04-1.97) in the adjusted model. For the male partners, these associations were different, the trust scores (RRR: 0.82, CI =0.67-1.03) marginally reduced the risk of coital-dependent method use versus short-acting method use at baseline.

The risk of using long-acting versus short-acting methods was marginally associated with the females' commitment score and males' trust score in adjusted models at the baseline. A unit increase in the females' commitment score marginally increased the risk of using long-acting versus short-acting method use at baseline by 20% (RRR: 1.20, CI =0.97-1.48). For the males this relationship was different, a unit increase in the males' trust score decreased the risk of using long-acting versus short-acting method at baseline by 22% (RRR: 0.78, CI =0.58-1.04).

Marital Quality and Continuous Use

Consistent use at survey rounds

Table 5.4 provides a description of the association of marital quality with female and male partners' report of consistent use at the two survey rounds. Interestingly, while both female and male partners' marital quality measures were significantly

associated with consistent use, the association was in the opposite direction. A unit increase in the female partners' commitment score at baseline significantly increased the relative risk of reporting non-use both survey rounds by 50% (RRR: 1.50, CI =1.07-2.01) versus consistent use in the adjusted model. Similarly, the females' overall marital quality score increased this relative risk by 16% (RRR: 1.16, CI =1.00-1.33) in the adjusted models. For the males on the other hand, a unit increase in the males' trust score significantly reduced the relative risk of reporting non-use versus consistently using at both rounds by 26% (RRR: 0.71, CI =0.58-0.89) in the multivariate analysis. Moreover, a unit increase in the males' trust score reduced the relative risk of using only at baseline versus consistently using both survey rounds by 29% (RRR: 1.16, CI =1.00-1.33) in the adjusted model.

Length of continuous use

Table 5.5 provides a description of the association of marital quality with length of continuous use reported by the female partner. The female and male partners' marital quality scores were statistically significantly associated at the 0.05 level or better with the females' reported length of use. The association of the female partners overall marital quality, trust, and conflict scores with length of use was not consistently in the same direction. While a unit increase in these scores at baseline decreased the relative risk of reporting continuous use for a year versus two to three years of use, a unit increase also decreased the relative risk of reporting continuous use for 4 or more years versus two to three years of use. The strongest association between length of use and marital quality measures was seen in the

females' trust score. A one-unit increase in the females' trust score at baseline significantly decreased the relative risk of reporting continuous use for a year versus two to three years of use by 23 % (RRR: 0.77, CI= 0.60-0.97) at the follow-up after adjusting for covariates in the multivariate model. Furthermore, a one-unit increase in the females' trust score at baseline also decreased the relative risk of reporting continuous use for four or more years versus two to three years of use by 23% (RRR: 0.77, CI= 0.60-0.97) in the adjusted model.

The effect of the male marital quality scores at baseline on female partners' reported length of use was stronger than the females' own marital quality measures. The male partners' trust score had the most robust association with the female partners' reported length of continuous use. A one-unit increase in the males' trust score decreased the relative risk of reporting non-use versus two to three years of continuous use by 57% (RRR: 0.43, CI= 0.19-0.95) in the adjusted model. A one-unit increase in the males' trust score at baseline also significantly decreased the relative risk of reporting continuous use for a year versus two to three years of use by 59 % (RRR: 0.41, CI=0.18-0.90) at the follow-up in the multivariate analysis. Similarly, a one-unit increase in the males' commitment score decreased the relative risk of reporting non-use versus two to three years of continuous use by 32% (RRR: 0.68, CI= 0.49-0.93), and continuous use for a year versus two to three years of use by 28 % (RRR: 0.72, CI= 0.55-0.99) in the adjusted models.

Discussion

Our study findings suggest that dimensions of marital quality are associated with key contraceptive use outcomes such as current use, type of method used, and continuity of use in peri-urban Ethiopia. Moreover, these associations are relevant for both female and male partners, although there were significant gender differences in the nature of these associations. The relationships appeared more robust for the male partners. Also, the male partners' marital quality scores were more highly associated with the female partners' reported length of continuous use rather than the latter's own scores.

While female marital quality scores were not significantly associated with reporting contraceptive use, for their male partners, there was a positive and robust relationship between marital quality measures and reporting use. The male trust score at baseline were positively associated with reporting use at baseline as well as over time at the follow-up. Currently available research suggests a complex relationship between marital quality and current use. Whereas some aspects of marital quality have been positively associated with contraceptive use, others have been negatively linked, especially use of methods such as condom use (Wilson and Koo, 2008; Manlove et al., 2007, 2003; Sayegh et al., 2006; Woodrome et al., 2006).

In addition, the female and male partners' marital quality scores were associated with type of method used, albeit again differently. Unlike the case of current use, these associations were stronger for the female partners. The female partners'

commitment score at baseline and trust score over time significantly increased the relative risk of using coital-dependent versus short-acting methods. Interestingly, however, this association was different for the male partners. Higher trust scores marginally reduced the odds of reporting coital-dependent method use versus short-acting method use at baseline. While the reasons for these gender differences are unclear, findings from the female sample are aligned with what we expected. In marriages where partners report higher marital quality, we would expect increased spousal communication and increased male participation in contraceptive use decision-making.

These results perhaps are reflective of improved female perception of being able to communicate and negotiate for male participation in contraceptive use. Hence, women feel more confident negotiating for the use of methods such as periodic abstinence, withdrawal and condoms. Some earlier studies from western setting have noted similar nuanced associations between contraceptive method use and relationship quality, especially condoms. For instance, a study found that despite adverse beliefs connected with condoms and difficulty in negotiating use, more committed women felt greater control over condom use decision-making (Harvey et al., 2006). Similarly, another study found the likelihood of condom and hormonal method use increased in casual relationships for the female if she was familiar with the male partner, but this was not the case among the males (Kusunoki & Upchurch, 2011).

Continuity of contraceptive use, both in terms of consistency of use between survey rounds and the females' reported length of continuous use at the follow-up were associated with marital quality scores for the spouses. Once again, the gender differences in the nature of these relationships were noteworthy. In terms of consistency of use, while the females' commitment score at baseline had the undesirable affect of significantly increasing the relative risk of non-use at both survey rounds versus use at both rounds, the males' trust score had the opposite effect. An increase in the male partners' trust score reduced the relative risk of non-use at both survey rounds as well as non-use at baseline compared to use at both survey rounds. In terms of length of use, there seemed to be ceiling to the relative risk ratios for female marital quality with increased length of use. A one-unit increase in overall marital quality, trust and conflict scores decreased the risk ratios of shorter use (1 year) versus longer use (2 to 3 years). However, a one-unit increase in the overall marital quality, trust and conflict scores decreased the relative risk of using for 4 years or more versus 2 to 3 years of use. The male partners' marital quality measures had a stronger impact on the females' reported length of continuous use. Increases in the male partners' overall marital quality, trust, commitment, and conflict scores decreased both the relative risk of the wife's non use and use for a year versus 2 to 3 years of use. Prior studies have also noted a robust association between aspects of marital quality and continuity of contraceptive use in western samples, although gender differences have not been reported (Manlove et al., 2007; Kerns et al., 2003; Jorgenson, 1980).

The opposite effect of marital quality measures on contraceptive use outcomes by gender is perplexing and needs further exploration. One plausible reason for these gender differences may be the faster adoption of compassionate attitudes within marriage among male partners because of greater exposure and access to information potentially available to them in such settings. The female partners, on the other hand, if they were to have a preference for egalitarianism within marriage may be unable to assert themselves without their husbands' support. While it was not assessed in the current study, another potential reason for these gender differences may be greater social desirability bias among males found in prior studies from similar settings. For instance, a study in India found that while the husbands' portrayed a more liberal picture of their wives' autonomy in survey responses, they tended to display more conservative attitudes when interviewed in-depth (Jejeebhoy, 2002). Another study in Malawi examining couple agreement on a range of issues from household wealth to discussion on family size and contraceptive use found that for many questions, when the responses of the spouses lacked concordance, husbands were more likely to answer 'yes' and wives 'no' when 'yes' was the more 'desirable' response (Miller, Zulu & Watkins, 2001).

Our study has several limitations that warrant discussion. While probability-sampling methods were used to recruit participants into the FHWS study, but since the study was located in one peri-urban site, with a fairly homogeneous population, the generalizability of the findings is limited to similar settings. Our study was also based on secondary data, which limits the availability of other variables of potential interest for dyadic research. For instance, because of the lack of validated measures

of power differentials between couples in the current study, we were unable to examine their probable association with variation in marital quality. These may be critical given that gender differences seem to play a prominent role in the association of marital quality and contraceptive use measures in this peri-urban Ethiopian community.

In addition, social desirability bias is a potential issue associated with self-reported data. Marital quality measures can be prone to social desirability bias because of the sensitive nature of the subject matter. Several checks to ensure complete privacy and confidentiality of participants were followed during data collection. We also checked for interviewer effects with the follow-up data. Overall the interviewer effects were small, although they were stronger for the males, and they varied by marital quality measures. Given these results, we did not include the interviewer indicator or make any adjustments to account for the interviewer effects in subsequent analysis. Many western studies now utilize interviewer ratings of dyadic interactions along with self-reported data to overcome issues of social desirability bias (Lawrence et al., 2011). This might be a useful strategy that future research can explore in non-western setting too.

Also, in the follow-up sample, only 728 couples remained in the study. We had to limit our longitudinal analysis to these couples, who were on average older and had more children than the couples lost from the sample. There were however no significant differences in the marital quality and contraceptive measures observed for the two groups. We utilized propensity score matching to account for couples

lost in the follow-up. However, while this methodology allowed us to account for the lost observations, it is important to acknowledge that this weighting procedure is only as good as the propensity score model.

At the same time, this study has several strengths. To the best of our knowledge, this study is a pioneering research effort to understand the role marital quality plays on a range of contraceptive use decision-making and behaviors in Ethiopia using data from male and female partners. Findings from our study fill an important research gap by broadening our understanding of the influence couple relationship context has on contraceptive use. In fact, marital quality could be a potential pathway that links established association between contraceptive use and spousal communication and household decision-making, a linkage that future research could explore. Our study also utilized a range of marital quality sub-scales and contraceptive use measures, which allowed us to explore the impact of different marital quality domains on a range of contraceptive use behaviors. Moreover, these associations were explored at baseline and longitudinally to manage causal issues of temporality.

Conclusion

These findings show marital quality and contraceptive use behaviors for peri-urban Ethiopian couples are associated, although the structures of these relationships are complex and gendered. Broadening our understanding of couple relationship dynamics can potentially enhance our knowledge of critical couple mechanisms that

family planning programs can tap into to improve contraceptive use outcomes among spouses.

Chapter Five References

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Table 5.1.1
Descriptive Statistics of Outcome and Background Variables at Baseline and Follow-up Surveys by Spouse

	Baseline (n=986)		Follow-up (n=728)	
Variables	***Wife***	***Husband***	***Wife***	***Husband***
Age in Years *(mean/SD)*	28.5(6.3)	35.2(8.06)	30.4 (6.3)	37.5 (9.1)
Education in Years *(mean/SD)*	7.1(4.6)	8.9 (4.6)	6.9(4.6)	8.9 (4.6)
Parity *(mean/SD)*	1.2 (1.3)		2.27 (1.70)	
Percentage of Contraceptive Users *(n)*	76.7 (751) [1]	74.9 (729)	76.8 (514) [2]	71.4 (520)
Percentage of Contraceptive Users by Method Type *(n)*	**100.0 (751)**	**100.0 (729)**	**100.0 (514)** [2]	**100.0 (520)**
Short-acting Method	70.1(525)	75.2(542)	66.2 (337)	71.5 (372)
Coital-dependent Method	14.2(106)	11.8 (85)	14.7 (75)	11.9 (62)
Long-acting Method	15.6 (118)	13.0 (94)	19.1 (97)	16.5 (86)

[1]n=977; [2]n =670

Table 5.1.2

Descriptive Statistics of Female (660) and Males' (n=725) Report of Consistent Contraceptive Use at Survey Rounds

	Female		Male	
Contraceptive Use	Frequency (#)	Percentage (%)	Frequency (#)	Percentage (%)
User both rounds	432	65.6	428	59.0
Non user both rounds	52	7.9	101	13.9
User only at baseline	102	88.9	112	15.5
User only at follow-up	73	11.1	84	11.6

Table 5.1.3

Descriptive Statistics of Wife's Report of Length of Continuous Contraceptive Use at the Follow-up Survey (n=663)

Contraceptive Use	Frequency (#)	Percentage (%)
Non User	154	23.3
User for ≤ 1 year	166	25.1
User for > 1 ≤ 3 years	179	27.0
User for > 3 years	163	24.6

Table 5.1.4

Descriptive Statistics of Spouses' Overall and Individual Marital Quality (MQ) Variables at Baseline (n=986)

Predictor Scales	Wife	Husband
MQ overall score (mean/SD)	**17.50 (2.12)**	**14.95 (1.18)**
(range)	(3.20-18.80)	(4.28-16.51)
Commitment score (mean/SD)	**5.51 (1.07)**	**4.68 (0.72)**
(range)	(-1.29-9.99)	(-3.56-7.15)
Trust Score (mean/SD)	**3.14 (0.97)**	**6.90 (0.98)**
(range)	(-2.39-4.92)	(0.17-9.14)
Conflict Score (mean/SD)	**8.84 (1.24)**	**3.38 (0.52)**
(range)	(-1.18-10.43)	(0.24 -5.57)

Table 5.2

Multivariate Logistic Regression Results of Spouses' Overall and Individual Marital Quality (MQ) Measures at Baseline on Contraceptive use at Baseline and Follow-up Surveys

Predictor Scales at Baseline	Wife Baseline (n=977)		Wife Follow-up[2] (n=663)		Husband Baseline (n=986)		Husband Follow-up[2] (n=728)	
	Unadjusted OR (CI)	*Adjusted[1] OR (CI)*	*Unadjusted OR (CI)*	*Adjusted[1] OR (CI)*	*Unadjusted OR (CI)*	*Adjusted[1] OR (CI)*	*Unadjusted OR (CI)*	*Adjusted[1] OR (CI)*
MQ Overall	0.97(0.88-1.05)	0.94 (0.86-1.03)	0.98 (0.87-1.07)	0.95 (0.86-1.08)	1.09 (0.98-1.21)	1.11 (0.98-1.25)*	1.15 (1.02-1.30)**	1.16 (1.01-1.34)**
Trust score	0.91 (0.77-1.07)	0.91 (0.76-1.07)	0.82 (0.65-1.02)*	0.84 (0.67-1.05)	1.14 (1.02-1.31)**	1.17 (1.01-1.35)**	1.31 (1.13-1.52)**	1.35 (1.13-1.60)**
Commit score	0.95 (0.83-1.09)	0.95 (0.82-1.10)	1.02 (0.85-1.21)	1.00 (0.85-1.17)	1.04 (0.83-1.31)	1.02 (0.82-1.27)	0.86 (0.65-1.14)	0.81 (0.60-1.08)
Conflict score	0.98 (0.85-1.10)	0.94 (0.82-1.08)	1.00 (0.85-1.16)	1.00 (0.79-1.08)	0.91 (0.70-1.19)	0.95 (0.71-1.26)	0.99 (0.73-1.34)	1.09 (0.75-1.51)

* * p value < 0.05; *p value < 0.10

[1]Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

[2] Models weighted with propensity scores

Table5.3

Multinomial Logistic Regression Results of Spouses' Overall and Individual Marital Quality Scores at Baseline on Type of Contraceptive Method Used at Baseline and Follow-up Surveys

		Wife Baseline (n=751)		**Wife Follow-up[2] (n=509)**		**Husband Baseline (729)**		**Husband Follow-up[2] (520)**	
Outcome	Predictor Scales Baseline	*Unadjusted RRR (CI)*	*Adjusted[1] RRR (CI)*	*Unadjusted RRR (CI)*	*Adjusted[1] RRR (CI)*	*Unadjusted RRR (CI)*	*Adjusted[1] RRR (CI)*	*Unadjusted RRR (CI)*	*Adjusted[1] RRR (CI)*
Ref Group: Short-acting									
Coital-dependent									
	MQ Overall	1.18 (1.03-1.35)**	1.15 (1.00-1.33)*	1.09 (0.94-1.23)	1.05 (0.89-1.25)	0.97 (0.88-2.09)	0.89 (0.72-1.11)	0.96 (0.70-1.31)	0.83 (0.61-1.13)
	Trust	1.01 (0.82-1.24)	0.98 (0.78-1.23)	1.41 (1.07-1.87)**	1.43 (1.04-1.97)**	0.88 (0.72-1.09)	0.82 (0.67-1.03)*	1.01 (0.69-1.47)	0.89 (0.58-1.34)
	Commit	1.35 (1.07-1.70)**	1.29 (1.01-1.65) **	1.07 (0.84-1.37)	1.14 (0.73-1.33)	1.36 (0.88-2.09)	1.23 (0.77-1.97)	0.96 (0.71-1.31)	0.91 (0.62-1.33)
	Conflict	1.27 (1.01-1.70)**	1.25 (0.97-1.60)*	0.99 (0.80-1.14)	0.93 (0.74-1.16)	0.99 (0.66-1.49)	1.02 (0.64-1.61)	1.14 (0.65-2.00)	0.97 (0.52-1.80)
Long-acting									
	MQ Overall	1.09 (0.98-1.20)	1.07 (0.96-1.20)	0.98 (0.79-1.27)	1.00 (0.90-1.11)	0.91 (0.79-1.19)	0.88 (0.73-1.04)	0.96 (0.74-1.22)	0.94 (0.71-1.24)
	Trust	0.96 (0.79-1.16)	0.94 (0.7-1.15)	0.92 (0.75-1.15)	0.98 (0.79-1.23)	1.00 (0.79-1.27)	0.97 (0.76-1.25)	0.89 (0.62-1.04)	0.82 (0.63-1.08)
	Commit	1.22 (0.99-1.49)*	1.20 (0.97-1.48)*	1.08 (0.79-1.26)	1.09 (0.86-1.40)	0.83 (0.63-1.09)	0.78 (0.58-1.04)*	0.80 (0.58-1.12)	1.14 (0.84-1.53)
	Conflict	1.16 (0.96-1.40)	1.15 (0.94-1.40)	0.96 (0.85-1.11)	0.97 (0.81-1.16)	0.93 (0.63-1.37)	0.91 (0.61-1.36)	0.91 (0.64-1.30)	0.91 (0.63-1.30)

* * p value <0.05; *p value <0.10

[1]Model adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

[2] Models weighted with propensity scores

Table 5.4

Multinomial Logistic Regression Results of Spouses' Overall and Individual Marital Quality (MQ) Scores at Baseline on Contraceptive Use Across Surveys

		Wife[1] (n=660)		Husband[1](n=725)	
Outcome	*Predictor scales Baseline*	Unadjusted RRR (CI)	Adjusted[2] RRR (CI)	Unadjusted RRR (CI)	Adjusted[2] RRR (CI)
Ref Group: User both rounds					
	MQ overall				
Non user both rounds		1.12 (1.00-1.25)*	1.16 (1.00-1.33)**	0.84 (0.73-0.97)**	0.84 (0.69-1.03)*
User only at baseline		1.01 (0.90-1.14)	1.01 (0.89-1.14)	0.89 (0.74-1.07)	0.86 (0.72-1.03)
User only at follow-up		1.05 (0.94 -1.17)	1.06 (0.93-1.17)	0.99 (0.80-1.22)	1.04 (0.81-1.34)
	Trust				
Non user both rounds		1.32 (0.98-1.71)*	1.38 (0.97-1.75)*	0.74 (0.60-0.91)**	0.74 (0.58-0.94)**
User only at baseline		1.12 (0.83-1.53)	1.10 (0.79-1.53)	0.73 (0.60-0.89)**	0.71 (0.58-0.89)**
User only at follow-up		1.12 (0.90-1.39)	1.12 (0.86-1.45)	0.85 (0.70-1.04)	0.87 (0.69-1.10)
	Commit				
Non user both rounds		1.38 (1.05-1.81)**	1.50 (1.07-2.01)**	0.97 (0.57-1.08)	1.08 (0.77-1.49)
User only at baseline		1.01 (0.77-1.33)	1.01 (0.76-1.34)	1.58 (0.96-2.10)*	1.66 (0.99-2.80)*
User only at follow-up		1.26 (0.92-1.73)	1.32 (0.90-1.93)	1.15 (0.80-1.65)	1.29 (0.81-2.05)
	Conflict				
Non user both rounds		1.17 (0.95-1.43)	1.22 (0.94-1.58)	1.10 (0.73-1.28)	1.01 (0.62-1.63)
User only at baseline		1.01 (0.84-1.24)	1.01 (0.83-1.23)	0.98 (0.79-1.45)	0.87 (0.58-1.30)
User only at follow-up		1.01 (0.86-1.26)	1.03 (0.85-1.26)	1.21(0.79-1.85)	1.16 (0.74-1.83)

** p value < 0.05; *p value < 0.10

[1] Models weighted with propensity scores

[2]Models adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

Table 5.5

Multinomial Logistic Regression Results of Spouses' Overall and Individual Marital Quality (MQ) Scores at Baseline on Wife's Continuous Contraceptive Use (n=663) at the Follow-up Survey

		Wife[1]		Husband[1]	
Outcome	Predictor scales Baseline	Unadjusted RRR (CI)	Adjusted[2] RRR (CI)	Unadjusted RRR (CI)	Adjusted[2] RRR (CI)
Ref Group: User 2 to 3 years					
	MQ overall				
Non User		0.98 (0.89-1.07)	0.98 (0.89-1.07)	0.77 (0.62-0.94)**	0.76 (0.62-0.94)**
User for 1 year		0.92 (0.85-0.99)**	0.91 (0.84-0.99)**	0.77 (0.62-0.95)**	0.77 (0.62-0.94)**
User for ≥ 4 year		0.91 (0.84 -0.98)**	0.91 (0.84-0.99)**	0.82 (0.66-1.00)*	0.82 (0.66-1.02)*
	Trust				
Non User		0.99 (0.75-1.30)	0.98 (0.74-1.30)	0.45 (0.20-0.98)**	0.43 (0.19-0.95)**
User for 1 year		0.78 (0.62-0.99)**	0.77 (0.60-0.97)**	0.42 (0.19-0.91)**	0.41 (0.18-0.90)**
User for ≥ 4 year		0.75 (0.60-0.96)**	0.77 (0.60-0.97)**	0.50 (0.23-1.12)*	0.48 (0.20-1.09)
	Commit				
Non User		0.96 (0.72-1.28)	0.95 (0.70-1.28)	0.69 (0.51-0.95)**	0.68 (0.49-0.93)**
User for 1 year		0.81 (0.62-1.05)	0.78 (0.60-1.02)*	0.73 (0.54-0.99)**	0.72 (0.55-0.99)**
User for ≥ 4 year		0.78 (0.60-1.00)**	0.77 (0.59-1.02)*	0.78 (0.57-1.08)	0.75 (0.55-1.08)
	Conflict				
Non User		0.91 (0.75-1.12)	0.92 (0.75-1.12)	0.44 (0.20-0.97)**	0.43 (0.20-0.96)**
User for 1 year		0.82 (0.68-0.98)**	0.81 (0.67-0.97)**	0.38 (0.18-0.82)**	0.39 (0.18-0.84)**
User for ≥ 4 year		0.80 (0.66-0.95)**	0.81 (0.67-0.98)**	0.52 (0.23-1.16)**	0.58 (0.25-1.34)

** p value < 0.05; *p value < 0.10

[1] Model weighted with propensity scores

[2]Models adjusted for respondent's age, education, religion, parity, wealth-quintile, and spousal age difference

CHAPTER SIX: **CONCLUSION**

This dissertation has pursued an in-depth analysis of marital quality in a peri-urban community in Ethiopia. We examined the psychometric properties of marital quality scales validated in the west for adoption in a peri-urban site in Ethiopia. We subsequently inspected interdependence in marital quality measures of spouses over time and analyzed the association between marital quality and a range of contraceptive use outcomes for female and male partners such as current use, type of method used, and continuity of use. The following paragraphs summarize the key findings and conclusions of each individual component of this dissertation followed by an overall conclusions, and discussion of limitations and strengths of the study.

Overview of Chapter Three

Chapter three focused on the reliability and validity of four marital quality scales validated in the west and examined their transferability to the study setting after an in-depth analysis of their psychometric properties.

Our results indicate that trusting a partner, commitment in a relationship and dealing with or resolving conflicts are fundamental marital quality domains among female and male partners in peri-urban Ethiopia. The results of the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) based on inspection of the strength of the association, directionality of the factor loadings, and the CFA fit statistics demonstrated good internal consistency and validity. The scales also displayed good concurrent validity and were highly

associated in the expected direction with related domains of fertility and family planning communication and decision-making, and household decision-making for the female and male partner samples.

However, the marital quality factor structure was different from our initial conceptualization. We expected marital quality to be comprised of four domains of commitment, trust, satisfaction, and communication, mirroring the four validated western scales. Our results were not supportive of a four-factor structure. The final marital quality structure that emerged for female and male partner samples was a three-factor structure, encompassing domains of trust, commitment and conflict. Also, the scale items did not mirror the original western scales. Key gender differences were noted in both scale domains and scale items. While for the female partners, trust emerged as the fundamental marital quality domain, for the male partners commitment materialized as the key domain. The subscales of commitment and trust were more consistent between genders, and these subscales also retained several scale items from the original trust and commitment scales. The subscale of conflict, however, displayed larger gender differences and deviated from the original scales. While for the female partners, scale items primarily from the satisfaction subscale loaded on the conflict subscale, for the male partners, items from the communication subscale loaded on the conflict sub-scale. The scale items on the conflict subscale reflect a concern for conflict resolution among wives and dealing with conflict among husbands.

These deviations and commonalities of the marital quality scale and subscales that emerged in our peri-urban Ethiopian sample compared to the original western-origin scales are not surprising. Prior research studies validating available western marital quality scales in non-western settings have also found similar patterns in marital quality structure across context (Shek & Cheung, 2008; Fisiloglu & Demir, 2000). Moreover, prior studies validating western scales in non-western context have found gender differences as well as the lack of them (Shek & Cheung, 2008; Fisiloglu & Demir, 2000) .

In fact, the utilization of available western scales in non-western settings is debated among researchers in the field (Allendorf, 2012; Sandhya, 2009). Proponents against using available western measures in non-western settings argue that by employing this strategy, studies bypass important information on how and why conceptions of marital quality vary by context (Allendorf, 2012). The alternate view, while acknowledging that marital quality differences are expected given diversity in socio-cultural context, also argues that it might not be unreasonable to assume that fundamental commonalities exist in the ways humans experience marital quality regardless of their context (Sandhya, 2009; Fisiloglu & Demir, 2000). The goal of marital quality research is then to parse out these effects and understand the role socio-cultural context has on shaping marital quality, as well as establishing the essence of marital quality shared across cultures. Moreover, the rapid globalization societies are witnessing worldwide is giving additional impetus to this school of thought. In fact, Cherlin

(2012) has tracked the adoption of western ideation in diverse contexts; popularizing egalitarian and empathetic marriages with diminished control from extended families.

The results from our concurrent validity analysis also indicate an association between marital quality and tendencies towards greater reporting of spousal communication and agreement on family size and contraceptive use decision-making and a preference for joint household decision-making, indicating increased empathy and shifts towards greater egalitarianism within marriage among couples in peri-urban Ethiopia. Also, while gender differences noted in scale domains and items between female and male partners are counterintuitive in the presence of egalitarian tendencies within marriage, they are perhaps reflective of the prevailing gender norms that continue to place different role expectations for female and male partners in marriages in peri-urban Ethiopia (Ezra, 2003). Other studies have also traced how transitions in marital relationships towards egalitarianism are not always smooth (Sandhya, 2009; Amato et.al, 2003). For instance, findings from Sandhya's (2009) study highlight how adopting western values is not always straightforward and involves negotiations with existing cultural systems. She explains how marital quality in her contemporary Indian sample was shaped by western notions of individual needs and personal well-being as well as the broader Indian social context. Furthermore, she suggests that the cross-cultural similarities and variations in marital quality lie at this intersection and needs further exploration (Sandhya, 2009).

Overall, our study findings highlight that although it is not unreasonable to assume that fundamental commonalities exist in the way humans experience marriage, contextual factors exert an important influence in shaping these experiences generating cross-cultural variation in marital quality. Hence, while it is relevant and useful to use validated scales across settings to enable cross-cultural comparison and enhance our knowledge of fundamental marital quality domains across populations, it is also critical to reassess the psychometric properties of available measures in new settings before adoption. Similarly, it is also important to be sensitive to gender differences when adopting scales in female and male populations, especially in settings where gender roles are continue to be different.

Overview of Chapter Four

Chapter four highlights the interdependence in couple relationships by investigating how spouses influence each other's marital quality over-time using FHWS baseline and follow-up couples' data from peri-urban Ethiopia. We used the Actor Partner Interdependence Model (APIM), a commonly used technique to model interdependence in dyadic relationships to examine these relationships (Kenny, Kashy & Cook, 2006; Kenny 1996). The APIM model suggests that a person's score on an independent variable affects her/his own dependent variable score (actor effect) as well as the dependent variable score of the partner (partner effect). The partner effect directly models the mutual influence

that might be present between individuals in a dyadic relationship.

Our study findings indicate that both female and male partners' overall and individual marital quality scores at baseline exert strong actor effects on their scores over time. Interestingly, the male partners had stronger actor effects than their female counterparts. However, most importantly, our study found linkages between wives' and husbands' baseline and over time marital quality scores, indicating partner effects and the presence of spousal interdependence in peri-urban Ethiopia. Surprisingly, the female marital quality measures had more robust partner effects on their husband than vice versa. These stronger female partner effects on their male partners are slightly counter-intuitive. Given prevailing gender norms, we would have expected the male partners to show greater influence over the females. These findings highlight the complex emotional processes that underlie couple relationships that remain under studied. These results may also be reflective of changing marriage patterns in peri-urban Ethiopia, with a preference for more egalitarian relationships, and increasing male involvement and empathy within marriage. In Ethiopia, limited available studies have highlighted the shifting traditional marriage patterns in urban areas with the increase in the proportion of educated women as indicated by increasing age at marriage, delay in the birth of the first child, and greater egalitarian role expectations within marriage (Ezra, 2003; Sibanda et al., 2003).

Overall, our study findings underscore the need to expand understanding of the interdependence in spousal interactions, communication, and decision-making

patterns. Future studies should explore how this interdependence impacts individual and dyadic health behaviors and outcomes.

Overview of Chapter Five

This chapter highlights the effect marital quality domains such as trust, commitment, and conflict have on a range of contraceptive use outcomes such as contraceptive use, type of method used, and continuity of use among a sample of female and male partners from peri-urban Ethiopia. In western settings contraceptive adoption and continuous use have been found to be associated with relationship quality (Manlove et al., 2011; Manlove, Ryan & Franzetta, 2007, 2003; Manning, Longmore, & Giordano, 2000). Despite these findings in the Western context, in Sub-Saharan African settings, these relationships have been underexplored. We are aware of only one study that examined the association between female and male partners' relationship quality on the female partners' contraceptive use outcomes in Peri-urban Ghana (Muntifering, 2011). To fill this important gap, we analyzed the association between marital quality and contraceptive use outcomes both cross-sectionally and longitudinally using FHWS baseline and follow-up data, to allow for temporal associations and address issues of causality.

Our study findings suggest that dimensions of marital quality are associated with key contraceptive use outcomes of contraceptive use, type of method used, and continuity of use in peri-urban Ethiopia. Moreover, these associations are

relevant for both female and male partners, although there were significant gender differences in the nature of these associations. In general, these relationships appeared more robust for the male partners. Also, male partners' marital quality scores were highly associated with the female partners' length of contraceptive use.

For contraceptive use, the martial quality measures were predictive of male use but not female use. For the females, only the trust score at baseline was marginally associated with contraceptive use and had the negative effect of reducing the odds of current use. However, for the males, these relationships were robust and in the opposite expected direction. The male trust score was associated with increased odds of use at both baseline and over time. Currently available research suggests a complex relationship between marital quality and current use. While some aspects of marital quality have been positively associated with contraceptive use, others have been negatively linked, especially use of methods such as condoms (Wilson and Koo, 2008; Manlove et al., 2007, 2003; Sayegh et al., 2006; Woodrome et al., 2006).

In addition, the female and male partners' marital quality scores were associated with type of method used, albeit again differently. Unlike the case of current use, these associations were stronger for the female partners. The female partners' commitment score at baseline and trust score over time significantly increased the relative risk of using coital-dependent versus short-acting methods. Interestingly, however, this association was different for the male partners.

Higher trust scores marginally reduced the odds of reporting coital-dependent method use versus short-acting method use at baseline. While the reasons for these gender differences are unclear, findings from the female sample are aligned with what we expected. In marriages where partners report higher marital quality, we would expect increased spousal communication and active male participation in contraceptive use. These results perhaps are reflective of improved female perception of being able to communicate and negotiate for male participation in contraceptive use. Hence, women feel more confident negotiating for the use of methods such as periodic abstinence, withdrawal and condoms. Some earlier studies from western setting have noted similar nuanced associations between contraceptive method use and relationship quality, especially with regard to condom use. For instance, a study found that despite adverse beliefs connected with condoms and difficulty in negotiating use, more committed women felt greater control over condom use decision-making (Harvey et al., 2006). Similarly, another study found the likelihood of condom and hormonal method use increased in casual relationships for the female if she was familiar with the male partner, but this was not the case for the males (Kusunoki & Upchurch, 2011).

Continuity of contraceptive use, both in terms of consistency of use between survey rounds and females' reported length of continuous use at the follow-up, were associated with marital quality scores for both the spouses. Once again, the gender differences in the nature of these relationships were noteworthy. In terms of consistency of use, while the females' commitment score at baseline had

the undesirable affect of significantly increasing the relative risk of non-use versus use at both rounds, the males' trust score had the opposite effect. An increase in the male partners' trust score reduced the relative risk of non-use at both survey rounds as well as non-use at baseline compared to use at both survey rounds. In terms of length of use, there seemed to be ceiling to the relative risk ratios for female marital quality measures with increased length of use. A one-unit increase in overall marital quality, trust and conflict scores decreased the risk ratios of shorter use (1 $year$) versus longer use (2 to 3 years). However, a one-unit increase in the overall marital quality, trust and conflict scores decreased the relative risk of longest use (4 $years\ or\ more$) versus shorter use (2 to 3 years). The male partners' marital quality measures had a stronger impact on the females' reported length of continuous use. Increases in the male partners' overall marital quality, trust, commitment, and conflict scores decreased both the relative risk of the female partners' non-use and shorter use (1 $year$) versus longer use (2 to 3 years). Prior studies have also noted a robust association between aspects of marital quality and continuity of contraceptive use in western samples, although gender differences have not been reported (Manlove et al., 2007; Kerns et al., 2003; Jorgenson, 1980).

The opposite effect of marital quality measures on contraceptive use outcomes by gender is perplexing and needs further exploration. One plausible reason for these gender differences may be the faster adoption of compassionate attitudes within marriage among the male partners because of greater exposure and access to information available to them in such settings. The female partners, on

the other hand, if they were to have a preference for egalitarianism within marriage may be unable to assert themselves without their husbands' support. Although it was not assessed in the current study, another potential reason for these gender differences may be greater social desirability bias among males found in prior studies from similar settings. For instance, a study in India found that while the husbands' portrayed a more liberal picture of their wives' autonomy in survey responses, they tended to display more conservative attitudes when interviewed in-depth (Jejeebhoy, 2002). Another study in Malawi examining couple agreement on a range of issues from household wealth to discussion on family size and contraceptive use found that for many questions, when the responses of the spouses lacked concordance, husbands were more likely to answer 'yes' and wives 'no' when 'yes' was the more 'desirable' response (Miller, Zulu & Watkins, 2001).

Overall, our study findings indicate that marital quality and contraceptive use outcomes for peri-urban Ethiopian couples are associated. However, the structure of these relationships is complex and gender differences reflected in the results are especially noteworthy. Broadening our understanding of couple relationship dynamics can potentially enhance our knowledge of critical couple mechanisms that family planning programs can tap into to improve contraceptive use outcomes among spouses.

Overall Conclusion of the Dissertation

Several important conclusions can be drawn from the findings presented in this dissertation. Firstly, this dissertation provides additional evidence of the relevance and usefulness of using available validated scales across settings after assessing their psychometric properties. Despite the vast contextual differences between peri-urban Ethiopia and the United States, where the marital quality scales originated, with some re-specification, the scales were relevant for the peri-urban couples in Ethiopia. These findings highlight fundamental commonalties may exist in the way humans experience love and are worth exploring. Moreover, since undoubtedly contextual factors have an influence on marital quality, such cross-cultural measures also provide an opportunity to parse out these different contextual effects and potentially allow the identification of fundamental marital quality domains across populations. A future challenge to advance cross-cultural marital quality research would be to find cost-effective strategies to incorporate marital quality scales in large-scale surveys given challenges such as the availability of multiple measures, large number of scale items and more importantly the critical need to assess the psychometric properties of the scale in new settings before their application.

The findings from this dissertation also support the existence of emotional interdependence in spousal relationships even in a peri-urban site in Ethiopia. These results once again highlight the critical importance of focusing on dyads to expand our knowledge of couple processes and their potential impact on health outcomes. In addition, the greater emotional effect of the female partners on

their male counterparts may point to the existence of patterns of female and male dominance in different relationship domains and are worth exploring in future research. Also, the greater female influence has practical implications and can potentially be used by health programs to improve outcomes. Basu (2006) has highlighted the plausible positive role love can play in reproductive health outcomes through its potential to "invert gender hierarchy and reduce gender inequalities".

This dissertation expands information on the association between female and male partners' marital quality measures and their linkages with related couple relationship domains important for contraceptive use decision-making, as well as actual reported contraceptive use. The positive association of female and male partners' marital quality measures with related couple relationship domains important for contraceptive use decision-making, but the gendered structure of associations with actual contraceptive use points to the complex nature of these relationships and should be explored in future studies. A next step to further this research and understand these complex patterns would potentially be to conduct dyadic analysis to separate out the individual and couple effects of marital quality measures on contraceptive use and related domains.

Lastly, this dissertation drew on dyadic theories of interdependence and theory of compassionate marriage as frameworks for understanding dyadic emotional processes (Wilcox & Nock, 2006; Kelley & Thibaut, 1978). These frameworks

were useful for making sense of the study findings. Our study results highlight the interdependence between spouses' marital quality measures over time. Tendencies towards a preference for greater empathy and egalitarianism within marriage in peri-urban Ethiopia are also reflected in the results. However, many of these relationships were gendered and need further exploration to fully comprehend the patterns of spousal interdependence in relationships as well as the nature and definition of 'compassionate' marriages for females and males and how this potentially impacts important individual and couple health and social outcomes.

Limitations and Strengths

This dissertation research has several limitations that warrant discussion. While probability-sampling methods were used to recruit participants into the FHWS study, but since the study was located in one peri-urban site, with a fairly homogeneous population, the generalizability of the findings is limited to similar settings. Our study was also based on secondary data, which limits the availability of other variables of potential interest for dyadic research. For instance, because of the lack of validated measures of power differentials between couples in the current study, we were unable to examine their probable association with variation in marital quality. These may be critical given that gender differences seem to play a prominent role in the measurement and association of marital quality and contraceptive use measures in this peri-urban Ethiopian community.

In addition, social desirability bias is a potential issue associated with self-reported data. Marital quality measures can be prone to social desirability bias because of the sensitive nature of the subject matter. Several checks to ensure complete privacy and confidentiality of participants were followed during data collection. We also checked for interviewer effects with the follow-up data. Overall the interviewer effects were small, although they were stronger for the males, and they varied by marital quality measures. Given these results, we did not include the interviewer indicator or make any adjustments to account for the interviewer effects in subsequent analysis. Many western studies now utilize interviewer ratings of dyadic interactions along with self-reported data to overcome issues of social desirability bias (Lawrence et al., 2011). This might be a useful strategy that future research can explore in non-western setting too.

Also, in the follow-up sample, only 728 couples remained in the study. We had to limit our longitudinal analysis to these couples, who were on average older and had more children than the couples lost from the sample. There were however no significant differences in the marital quality and contraceptive measures observed for the two groups. We utilized propensity score matching to account for couples lost in the follow-up. However, while this methodology allowed us to account for the lost observations, it is important to acknowledge that this weighting procedure is only as good as the propensity score model.

This study also has several strengths. Our study is a pioneering research effort to understand marital quality domains and dynamics, interdependence in couple

relationships, and the role marital quality plays on a range of contraceptive use decision-making and behaviors in an Ethiopian setting using data from both male and female partners. Findings from our study fill an important research gap and broaden understanding of the influence couple relationship context has on contraceptive use, and potentially other health outcomes. In fact, marital quality may be a potential pathway that links established association between contraceptive use and spousal communication and household decision-making, a linkage that future research can explore. Our study also used a range of marital quality sub scales and contraceptive use measures, which allowed us to explore the impact of different relationship quality domains on a range of contraceptive use behaviors. Moreover, these associations were explored at baseline and longitudinally to manage causal issues of temporality.

Conclusion

Couple relationships are a bedrock of human social organization, and exert a tremendous influence on health and social outcomes, including reproductive and sexual health ones. Understanding spousal interdependence in communication, decision-making, power dynamics and emotional processes can greatly improve our ability to improve contraceptive use outcomes and potentially other health outcome of couples and individuals.

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APPENDICES

Appendix 1: Marital Quality Scales in the Family Health and Wealth Study

NO	QUESTIONS AND FILTERS	CODING CATEGORIES
1. Commitment Scale On a scale from 1 to 9 where 1 is "not at all" and 9 is "extremely" please tell me how true the following statements are to you:		
Q134	I expect my love for my current partner to last for the rest of my life	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q135	I can't imagine ending my relationship with my current partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q136	I view my relationship with my current partner as permanent	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q137	I am committed to maintaining my relationship with my current partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
Q138	I have confidence in the stability of my relationship with my current partner	1 2 3 4 5 6 7 8 9 Not at all Somewhat Moderately Quite Extremely
2. Trust Scale On a scale from 1 to 7 where 1 is "never" and 7 is "all the time" please tell me how much you agree with the following statements:		
Q139	My partner is primarily interested in his own welfare	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q140	There are times when my partner cannot be trusted	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q141	My partner is perfectly honest and truthful with me	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q142	I feel I can trust my partner completely	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q143	My partner is truly sincere in his promises	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree Neither agree nor disagree Mildly disagree Disagree Strongly disagree
Q144	I feel that my partner does not show me enough consideration	1 2 3 4 5 6 7 Strongly agree Mildly agree Agree Neither agree nor disagree Mildly disagree Disagree Strongly disagree

Q145	My partner treats me fairly and justly	1 Strongly agree 2 Mildly agree 3 Agree 4 Neither agree nor disagree 5 Mildly disagree 6 Disagree 7 Strongly disagree
Q146	I feel that my partner can be counted on to help me	1 Strongly agree 2 Mildly agree 3 Agree 4 Neither agree nor disagree 5 Mildly disagree 6 Disagree 7 Strongly disagree

3. Satisfaction Scale

On a scale from 1 to 6 where 1 is "never" and 6 s "all the time" please tell me how often ……

Q147	How often do you discuss or have you considered divorce, separation or terminating your relationship?	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time
Q148	How often do you or your partner leave the house after a fight?	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time
Q149	In general, how often do you think that things between you and your partner are going well?	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time
Q150	Do you confide in your partner?	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time
Q151	Do you ever regret that you married/live together?	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time
Q152	How often do you and your partner quarrel?	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time
Q153	How often do you and your partner "get on each other's nerves?"	1 Never 2 Rarely 3 Occasionally 4 More often than not 5 Most of the time 6 All of the time

4. Communication Subscale

Last, on a scale from 1 to 10 where 1 is "very unlikely" and 10 is "very likely" please tell me what do you do when a problem arises in your relationship.

Q154	We try to discuss the problem	1 Very unlikely 2 3 4 5 6 7 8 9 10 Very likely
Q155	We express their feelings to each other	1 Very unlikely 2 3 4 5 6 7 8 9 10 Very likely
Q156	We suggest possible solutions and compromises	1 Very unlikely 2 3 4 5 6 7 8 9 10 Very likely

Q157	We blame, accuse and criticize each other	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q158	We threaten each other with negative consequences	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q159	I call my partner names, swear at him, or attack his character	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely
Q160	My partner calls me names, swears at me, or attacks my character	1 2 3 4 5 6 7 8 9 10 Very unlikely Very likely

CURRICULUM VITAE

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PROFESSIONAL SUMMARY:

- Areas of interest and expertise: Family planning, reproductive and sexual Health, HIV/AIDS, Sexual violence, gender issues, adolescents, couples, health communication and interventions
- Over 10 years of research and programmatic work experience in international public health
- Extensive experience and training in quantitative and qualitative research methodologies including instrument development, data collection, data management and analysis
- Substantial sexual and reproductive health program experience including program development, supervision and training of field staff, financial and operations management, program monitoring and evaluation.

EDUCATION:

Johns Hopkins Bloomberg School of Public Health — Baltimore, MD
PhD Candidate, Concentration: Population, Family and Reproductive Health — Oct 2013 (expected)

Harvard School of Public Health — Boston, MA
Master of Science, Concentration: Global Health and Population — 2008

Loyola College of Social Sciences, University of Kerala — Trivandrum, India
Master of Arts, Sociology, Specialization: Gender and Urban studies — 1999

Jesus and Mary College, University of Delhi — New Delhi, India
Bachelor of Arts (Honors), History — 1997

EXPERIENCE:

Research Assistant, Center for Communication Programs — Baltimore, MD
Johns Hopkins Bloomberg School of Public Health — June 2010 - Current

- Conducting quantitative data analysis to assess the impact of health communication programs on increased HIV testing over-time in South Africa using survey data
- Conducted qualitative data analysis, prepared report and manuscript for a study researching the factors underlying the use of long-acting and permanent contraceptive methods in Nigeria and Malawi
- Conducted data analysis and disseminated findings for a formative research project to develop a community-based intervention to reduce sexual and gender-based violence in Eastern DRC. Developed a baseline survey drawing on the qualitative research, conducted data analysis for a manuscript currently under preparation
- Collected, monitored data quality, and analyzed data to design a communication strategy for the Urban Health Initiative project in Uttar Pradesh, an intervention aimed at building reproductive health service infrastructure for urban under-served populations

Research Assistant, Gates Institute for Population and Reproductive Health — Baltimore, MD
Johns Hopkins Bloomberg School of Public Health — June 2010 - Current

- Conducting quantitative data analysis, including scale development, multi-level and longitudinal analysis of couples' data from peri-urban Ethiopia to estimate the association of marital relationship quality with contraceptive use, household-decision making, and sexual activity (Dissertation Research)
- Conducted data analysis and prepared manuscript for a qualitative study researching factors underlying the lack of contraceptive use among high parity couples in Malawi

Evaluation Consultant Cambridge, MA
Institute for Community Health, Cambridge Health Alliance Jan 2009 – Aug 2009

Designed the evaluation of a community-based adolescent reproductive and sexual health intervention

- Reviewed program indicators, logic models and research literature; analyzing scales and subscales measuring relevant constructs like gender and sexuality
- Reviewed curriculum and observed program sessions to identify and recommend improvements in program and survey design
- Designed and pilot tested survey instruments

Research Assistant, Prof. S. V Subramanian Boston, MA
Harvard School of Public Health, Society, Human Development and Health Oct 2007 – Aug 2009

- Researched gender differentials in child mortality in India using India's National Family Health survey III with 51,555 eligible respondents. Conducing systematic literature review, data analysis and manuscript preparation as part of the project (Masters thesis)
- Conducted a systematic literature review and prepared manuscript on socioeconomic determinants of adult height

Research Assistant, Prof. Sofia Gruskin Boston, MA
Harvard School of Public Health, International Program on Health and Human Rights June 2008 – Aug 2008

- Conducted a systematic literature review and prepared a bibliography of articles looking at the intersection of violence against women and HIV/AIDS
- Annotated studies on the human rights roles and responsibilities of pharmaceutical companies using established right to health norms and frameworks

Intern, HIV/AIDS Unit New York, NY
United Nations Fund for Women (UNIFEM) Summer 2007

- Researched and prepared an analysis of UNIFEM's global HIV/AIDS programming; wrote a paper on best practices.
- Researched and documented the inclusion of such variables as violence against women and other gender sensitive indicators in program evaluation by HIV/AIDS monitoring bodies such as UNAIDS, UNFPA, CDC and NGOs.
- Assisted in the coordination of UNIFEM's events at the International Women's Summit on HIV and AIDS held at Nairobi, Kenya in July 2007.
- Supported ongoing activities like preparing briefing notes and researching for publications.

Intern New Delhi, India
Creating Resources for Empowerment and Action (CREA) January 2007

- Prepared educational materials and program guides for participants of the Sexuality and Rights Institute
- Researched and prepared a bibliography on sexuality, gender and human rights

Program Coordinator/ Researcher New Delhi, India
Swaasthya Aug 2003-Mar 2006

- Implemented, coordinated and monitored a comprehensive sexual and reproductive health community based program for adolescent girls and women in a low-income urban community in New Delhi.
  - Organized, conducted and participated in program development activities, engaging community members in planning, implementation and program design
  - Supervised and supported the field staff and monitored program progress
  - Coordinated and presented during current and potential donors meetings or visits
  - Managed and supported evaluation survey design, delivery and data collection
  - Researched and coordinated the making of a documentary on the Swaasthya Program
  - Assisted in conducting a costing exercise to estimate the cost of replicating the field program
  - Wrote donor reports, prepared presentations and concept notes for dissemination, and supported grant-seeking and proposal development activities
  - Managed budget and expenditure related to the program
- Designed a pilot program to deliver comprehensive adolescent sexual and reproductive health services in rural Rajasthan by involving relevant stakeholders. Organized and conducted field visits, collected data, organized meetings with local officials and stakeholders as part of the exercise; a WHO funded project

Project Officer New Delhi, India
Swaasthya Sep 2002 – Aug 2003

- Coordinated a strategic assessment of the reproductive health system in Rajasthan involving major stakeholders including representatives from the World Health Organization and Government of Rajasthan
- Conducted and coordinated field visits, and data collection at multiple sites
- Organized, coordinated and presented at dissemination work-shops for high-level government officials
- Prepared donor reports and wrote section of the final report on adolescent friendly sexual and reproductive health services submitted to the WHO

Research Associate New Delhi, India
Voluntary Health Association of India Oct 2001 – June 2002

- Conducted AIDS awareness research among migrant laborers constructing the Delhi Metro Rail System
- Prepared a survey, led focus group discussion, coded and prepared the data and wrote report

Teaching Experience
Johns Hopkins University

Dept. of Population, Family and Reproductive Health, Teaching Assistant (Fall 2012, 2013)

- Course: Couples and Reproductive Health. Responsible for course communication, leading discussion groups, assisting students with their final papers and as needed, grading final papers, and providing support for updating and preparing teaching materials.

Dept. of Sociology, Teaching Assistant (Spring, 2013)

- Course: Medical Sociology. Responsible for course communication, leading and preparing teaching materials for discussion groups, assisting students with their assignments and as needed, grading and student assessment.

Awards and Honors:

- Bill and Melinda Gates Institute for Population and Reproductive Health Dissertation Grant 2012
- Fellowship in Family Planning and Reproductive Health, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health 2010, 2011,2013
- Global Health Travel fellowship, Johns Hopkins Center for Global Health 2010
- Global Health Travel Grant, Department of Global Health and Population, Harvard School of Public Health 2007
- Secured Second Rank, Master of Arts (Sociology), University of Kerala 1999

Publications:

Subramanian S V, Ackerson Leland K, Smith George D, and **John A. Neetu** (2009). Association of Maternal Height with Child Mortality, Anthroprometric Failure, and Anemia in India. *The Journal of the American Medical Association* 301: 1691-1701

Current Debates on Realizing Health and Human Rights: An Annotated Bibliography on the Human Rights Roles and Responsibilities of the Pharmaceutical Industry (2008). Program on International Health and Human Rights, Harvard School of Public Health, Author. Mbabazi Kasara, **Neetu John,** Celso Perez, and Danae Roumis; Collaborators

Transforming the National AIDS Response: Mainstreaming Gender Equality and Women's Human Rights into the " Three Ones";Patricia Made,Author. Nazneen Damji, **Neetu John,** Aida Olkkonen, and Ana Williams; Contributors. United Nations Fund for Women Publication 2006

Reports:

Babalola Stella, **John A Neetu** and Cernigliaro Dana (2011). Community perspectives on sexual and gender-based violence in Eastern DRC. Report prepared for the International Medical Corps. Baltimore, MD: Center for Communication Programs

Babalola Stella and **John A Neetu** (2012) Factors underlying the use of long-acting and permanent family planning methods in Nigeria: a qualitative study. Report prepared for the United States Agency for International Development. Baltimore, MD: Center for Communication Programs

Presentations:

Neetu A. John, Assefa Seme, Meselech Assegid, Amy Tsui (2013). Does a Couple's Marital Relationship Quality Influence Their Contraceptive Use? Paper accepted for oral presentation at the International Conference on Family Planning, Addis Ababa, Ethiopia

Neetu A. John, Stella Babalola, Nancy Yinger (2013). Dynamic interplay of female and male attitudes and their mutual influence on fertility, contraceptive decision-making and use: Evidence from Malawi and Nigeria. Paper presented at the 27th International Population Conference, Busan, Korea

Neetu A. John, Josephine Changole, Frank Taulo, Amy Tsui (2012). Why do high-parity Malawian couples fail to achieve their desired family size? A study identifying the linkages between couple relationship dynamics and the practice of family planning in Malawi. Paper presented at the American Public Health Association Annual Meeting, San Francisco, CA

Professional Development:

Computer Skills: Stata, Nvivo, Refworks, and MS Office
Languages: English, Hindi and Malayalam
Membership: Population Association of America, American Public Health Association, and International Union for the Scientific Study of Population
Other activity: Reviewer for panel and individual abstracts submitted for the International Conference on Family Planning, Addis Ababa, Ethiopia