



A Review of Behavioral Economics in Reproductive Health

Prepared for the Center for Effective Global Action (CEGA)

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Acknowledgements

This paper was written with the generous support of the William and Flora Hewlett Foundation, through the Behavioral Economics in Reproductive Health Initiative (BERI) at the Center for Effective Global Action (CEGA). The authors sincerely thank the following individuals for their support and contributions to the paper: Helena Choi and Margot Fahnstock (the William and Flora Hewlett Foundation); Paul Gertler (UC Berkeley); Manisha Shah (UCLA); Pascaline Dupas (Stanford); Lynn Bakamijan; Barbara Hewitt (UK Department for International Development); Willa Friedman (University of Houston); Saugato Datta (ideas42); Michael Vlassoff (Guttmacher Institute); Brant Silvers (Planned Parenthood Global); Louise Fox; and Anna Fruttero (World Bank).

Executive Summary

Behavioral economics has begun to transform the design of public policies, particularly those related to health and economic development. Recent field experiments in the US and UK testing low-cost interventions inspired by psychology have demonstrated outsized impacts on human behavior and development outcomes. Can similar insights be employed to improve family planning and reproductive health? This paper summarizes existing evidence from the field and presents a framework for applying behavioral economics to reproductive outcomes.

Reproductive health remains one of the world's most obstinate development challenges. Each year almost 300,000 women die from childbirth, and four million infants die within the first month of life. Most deaths and complications can be prevented with adequate health services or by avoiding early and unwanted pregnancy, yet use of contraceptives and maternal health services remains low.

We know that access to affordable services is a key determinant of take up, however it is not the only factor at play.

- The **quality of health service delivery** remains low across many areas. Health providers often lack the incentives to provide quality care, contributing to absenteeism, poor facility management, inappropriate care, and burdensome or unnecessary procedures.
- Nearly half of women in developing countries **discontinue contraceptive use** within a year, despite not wanting to become pregnant.
- Women's **education and employment** affects desired family size, contraceptive use, and antenatal care take up, but in developing countries girls often lack access to quality education and face pressure to leave school.
- **Cultural and social influences**, including age at marriage, limit girls' and women's autonomy and intra-household bargaining power and can affect the take up of modern family planning and reproductive health services.
- **Adolescents** have higher risks of pregnancy complications than adult women but are less likely to seek adequate preventive care. They are also more likely to engage in risky behavior, which can contribute to early pregnancy and school dropout rates.

Among a host of other challenges, these factors can prevent women and families from achieving the healthy reproductive outcomes they desire.

Behavioral economics examines why individuals make decisions that potentially compromise their own future wellbeing and the welfare of others. It is a field of research that incorporates psychological insights to examine systematic behavioral biases in decision-making. We categorize these biases into four sets of opposing forces; individuals fall somewhere on a spectrum between these forces (often unknowingly) when making decisions about health.

1. **Illusion ↔ Reality**. People make decisions based on what they *believe* to be true, hinging on their own experiences, reference points, or estimates—rather than what is objectively or measurably true. Couples may choose not to use a modern method because they believe it causes infertility or disease, or because they underestimate the probability of becoming pregnant.
2. **Self ↔ Other**. Individuals are sometimes influenced by others' interests, or by social norms or expectations. For example, even when a woman prefers to deliver in a clinic or hospital, she may

forego the opportunity due to the expectations of her partner, family, or community. Similarly, a couple may not desire a large family, but may have additional children to conform to social identities or norms.

3. **Thinking Fast ↔ Thinking Slow.** Cognition is a limited resource, and people living in poverty often exhibit a depletion of cognitive capacity due to the complexity and unpredictability of daily life. Sometimes individuals select choices that require the least mental energy or cognitive cost (often without realizing it). Busy providers may recommend a contraceptive method because they have prior experience with it, which could result in a different recommendation than processing all of the information available about different methods to make the best decision for their patient’s individual needs.
4. **Today ↔ Tomorrow.** Every day individuals face a trade-off between costs today and costs tomorrow. For example, a woman may delay the cost (or effort/time required) of going to a clinic today, perceiving the cost to be lower tomorrow. However, repeating this decision results in procrastination and it underweights the high costs of pregnancy complications in the future.

Evidence-based tools exist to help individuals make better decisions in the face of these forces. Yet few have been tested in the context of reproductive decision-making. We align the existing set of tools from behavioral economics with challenges in reproductive health, to incite new research at the nexus of these two disciplines.

<i>Tool</i>	<i>Description</i>	<i>Selected Examples¹</i>
Defaults ²	The option an individual will receive if he or she does not make an active choice. A carefully chosen default can help overcome problems like procrastination, complex and confusing choices, social pressures, or the cognitive costs of decision-making.	<ul style="list-style-type: none"> • Offering every woman contraception immediately following childbirth, an abortion, or first menses
Reminders	Reminders can help decrease the cognitive burden required to sequence or complete a complex task.	<ul style="list-style-type: none"> • Text message reminders for contraceptive refills or antenatal care appointments
Framing	The language used to describe a set of choices can shape people’s decision-making. Framing can help when people misperceive risks, by making certain outcomes more salient than others.	<ul style="list-style-type: none"> • Varying education or counseling to present antenatal check-ups as a gain versus avoided loss
Commitment Devices	Pre-committing to a particular decision can help people align their actions with their preferences. This helps with procrastination, social pressures, and present bias.	<ul style="list-style-type: none"> • “Locked” savings programs that tie money to specific school or health outcomes
Labeling	Exploiting an individual’s “mental accounting” to encourage spending on investment goods that will benefit his or her own welfare.	<ul style="list-style-type: none"> • Cash transfers or voluntary savings labeled for health or education expenditures
Micro Incentives	Token rewards, particularly those creating social recognition or salience, can be more motivating than the monetary value of the reward.	<ul style="list-style-type: none"> • Vouchers or in-kind gifts to reward health worker performance or patient compliance

¹ These are not policy or program recommendations but rather illustrations of how a behavioral economics tool *could* be translated into the reproductive health context. These have not been researched or evaluated.

² Defaults may also have negative consequences. See section 5.1 for further discussion.

Social Influences	Harnessing social norms or pressures to encourage beneficial decision-making can be used to overcome biases in decision-making.	<ul style="list-style-type: none"> • Commitments made in public (e.g. for health savings or education) • Social accountability for health service providers (e.g. public report cards)
Timing and Salience of Information	People may process complex information more effectively if the information is presented in a targeted way, at a specific time, or through a particular agent.	<ul style="list-style-type: none"> • Provision of information through trusted sources • Word order on outreach materials
Identity Priming	Increasing the saliency of an individual's gender, race, or role can be used to make certain choices (and their consequences) more salient. ³	<ul style="list-style-type: none"> • Appealing to women as mothers, rather than wives • Appealing to men as providers, rather than boyfriends
Simplification	Making the terms/consequences of a decision more clearly understood, at the correct moment in time, can reduce the biases and cognitive costs of decision-making.	<ul style="list-style-type: none"> • Minimizing paperwork at clinic visits • Streamlining counseling materials or creating heuristics for clinicians

It is the goal of this paper to spark discussion and stimulate new research and innovation in reproductive health and family planning. We do not advocate any of the above interventions, but rather offer them as illustrations for applying behavioral economics to reproductive decision-making challenges.

³ Identity priming may also have negative consequences. See section 5.7 for further discussion.

1. Introduction

Reproductive health is a pressing development challenge, affecting a broad range of economic and social outcomes—from children’s nutrition and education to employment and household income. Emergency reproductive health expenditures can lead to asset depletion, school dropouts, and losses in economic productivity;⁴ and poor reproductive outcomes can affect households over multiple generations, leading to a cycle of poverty. More rapid population-level changes in fertility can result in natural resource depletion, weak investment in human capital, and even conflict (Goldstone, 2002).

Despite its centrality in human development, improving women’s reproductive outcomes remains a major challenge, particularly in low-resource settings. Each year 286,000 women in the developing world die during and following childbirth (WHO, 2014), and four million infants die within their first month of life (Singh, Darroch, Ashford & Vlassoff, 2009). A further ten to twenty million women suffer physical or mental disabilities as a result of complications from pregnancy (Ashford, 2002; Gill, Pande & Malhotra, 2007; Murray & Lopez, 1997). The majority of these deaths and disabilities could be prevented with basic health services, or by avoiding early and unwanted pregnancies (Singh et al., 2009).

While maternal health profoundly affects children, families, and economic welfare, more than fifty percent of women in developing countries who want to avoid pregnancy do not use modern contraceptive methods. More than twenty million women undergo unsafe abortions annually (Singh et al., 2009).

At the same time, hundreds of millions of dollars are committed each year to improve access to reproductive services in developing countries. In 2012, donors at the London Summit on Family Planning pledged 2.6 billion dollars to provide women and girls with greater access to contraceptives. Most funds are directed at increasing the reach and quality of reproductive services, for example by offering vouchers and subsidies, building the capacity of health workers, increasing the geographic coverage of health providers, and educating women and communities about available options (Mwaikambo, Speizer, Schurmann, Morgan & Fariyal, 2011). Yet addressing the affordability and supply of services may not solve the whole puzzle (Hussain, Bankole & Singh, 2007).

Every day, households and individuals make decisions that directly impact reproductive outcomes. These decisions can be influenced by many factors, including social norms, myths and misinformation, impulsivity and procrastination. An adolescent may choose a modest economic benefit in the short term, while foregoing a much larger benefit—for herself and her children—in the long term. A woman may allow her decision-making to be influenced by social pressure, even when aware of the risks of her choice. Why do people make decisions that conflict with their long-term goals, values, and welfare?

Behavioral economics (BE) is a field of research that examines the systematic behavioral biases that affect human decision-making. Many of these biases are predictable and well characterized, and they often can be modulated or overcome, for example through careful framing of options or information. Insights from

⁴ Kruk et al., 2009; Dzakpasu, Powell-Jackson & Campbell, 2013; Powell-Jackson and Hanson, 2012; Ye et al., 2012; Grepin and Klugman, 2013

BE also can be used to create an “enabling” environment in which people make choices that are better aligned with their aspirations, objectives, and perceived welfare.

The purpose of this review is to summarize opportunities for the application of BE to reproductive health and family planning, with a focus on low-income women and girls in Sub-Saharan Africa and South Asia. It begins with a brief introduction to behavioral economics and an overview of key challenges in family planning and reproductive health. We consider three primary actors in reproductive health (RH): girls and women, their partners and families, and their health service providers. Communities also have profound influences on individual decision-making; these are discussed within the context of social pressure and norms.

While this review primarily focuses on decisions related to the use of reproductive health services (e.g. contraceptives, antenatal care visits, and delivery at a facility), services are but one of many contributors to improved health outcomes. Therefore, we also examine decision-making related to other determinants of reproductive health, including schooling, employment, and marriage.

In the final sections, we describe four sets of opposing forces in human decision-making that can affect reproductive outcomes. For each set, we classify the constellation of cognitive biases and preferences that affect our decisions, and summarize the evidence of these biases in the RH context. We also discuss the tools (interventions) used in economics and psychology to address these biases, citing evidence of effectiveness where available. However, we note that there has been relatively little application of behavioral economics to RH challenges in developing countries.

Taken as a whole, the review serves as a framework for addressing the potential decision-making problems that affect RH. Overcoming these barriers could, in some contexts, increase the welfare of girls and women, their families, and the communities in which they live. The review largely excludes interventions that target market failures, such as the cost of reproductive health care or limited access to health facilities, as these are less responsive to the tools of behavioral economics. However, we recognize that in cases where there is no access to affordable health services, addressing only behavioral problems is unlikely to change outcomes, and addressing supply issues is of primary importance.

2. What is Behavioral Economics?

Behavioral economics is a field of research at the nexus of psychology and economics, examining the role of non-traditional decision-making in economic outcomes. More simply stated, it seeks to explain why people make decisions that are inconsistent with what they claim to want, or with the long-term objectives they seek to achieve. Traditional (neoclassical) economics assumes that we make decisions by correctly processing and appropriately using all of the information available to us. Furthermore, we are assumed to act in ways that maximize our own utility, by making decisions (or seeking goods and services) that increase our own welfare. Economists assume that our choices are independent of the framing of different options, and generally unaffected by pressure from others. The notion of a rational individual—one who consistently makes choices that maximize personal wellbeing—therefore relies on strong assumptions.

Of course neoclassical economists recognize that individuals sometimes fail to make choices that improve their lifetime welfare. We make mistakes, ignore available information, or use shortcuts that save us time today but may be costly in the longer run. Sometimes, we are distracted or have limited cognitive resources to allocate to a decision. Traditionally, these deviations from the standard model of decision-making have been treated by economists as random (i.e. “noise”) and therefore unpredictable and on average, unimportant. But this view has been challenged by behavioral economics over the last three decades. Evidence of systematic biases or deviations from rationality have been found in a wide range of laboratory and field experiments, indicating that they are not random (see DellaVigna, 2009, for a review).

The goal of BE is not to reject the neoclassical approach to economics, but rather to strengthen the field, by incorporating psychological insights into our understanding of human decision-making processes (Camerer, Loewenstein & Rabin, 2011). BE allows policymakers to understand how and when to intervene, for example when an individual’s biased decision-making affects the health and welfare of others (Kessler & Zhang, 2014). It provides useful insights in situations where individuals make decisions that are not in their own best interest.⁵

In RH, we often observe instances of such inconsistent or seemingly irrational behavior, in which individuals fail to maximize their own physical health and economic wellbeing. Facility-based delivery can minimize complications and risks that can have long-term consequences for a woman’s health, the health of her baby, and the economic welfare of the family. Yet few women deliver in facilities, even when provided with access. We also observe that people make decisions that are inconsistent with what they say they want. For example, unmet need (women who do not want to get pregnant but are not using a modern contraceptive method) remains high, even where services are available and affordable. These specific challenges will be further explored in the following sections.

2.1 Behavioral economics, public health, and behavior change communications

How does behavioral economics relate to public health? In randomized trials, researchers and practitioners have successfully applied principles from BE—including commitment devices, defaults, and reminders—to improve smoking cessation (Giné, Karla & Zinman, 2010; Volpp et al., 2006), medication adherence (Volpp et al., 2008), exercise and weight loss (Charness & Gneezy, 2009; Acland & Levy, 2011; Volpp et al., 2009), and organ donations (Johnson & Goldstein, 2004). Most of these studies have been implemented in developed countries, although experiments are increasingly being adapted for developing country settings.

⁵ An individual’s own best interest varies in definition, based on his or her own utility function. Objective measures of best interest include, for example, not dying in childbirth. Measures broadly recognized by the global health community as desirable, such as delivery with skilled attendant, antenatal care take up, or avoiding adolescent pregnancy, would also be considered a best interest. However, most measures of “best interest” will rely on stated preferences, rather than on expert consensus.

Box 1. Behavioral Economics: A Brief History

Behavioral economics began gaining traction during the second half of the twentieth century. Early efforts focused on employing new insights from psychology to map individuals' deviations from "rational" behavior and identify departures from the standard economic model (Camerer et al., 2011). In the 1970s, Tversky and Kahneman among others helped institutionalize behavioral economics. Their contributions identified commonly-occurring biases in decision-making, such as the framing of risks and probabilities, which undermined existing assumptions about rational behavior. Behavioral economists used this emerging evidence to address inconsistencies and strengthen the existing economic models (Sent, 2005). DellaVigna (2009) provides one of the clearest overviews of common "non-standard" decision-making patterns. More recently, new insights from behavioral economics have been used to improve individual and policy outcomes. Below are two cases in which insights from behavioral economics successfully helped individuals achieve their stated preferences.

Commitment to Savings

Many individuals struggle to control their spending in the present in order to save for the future. Thaler & Benartzi (2004) designed Save More Tomorrow (SMarT), a commitment savings program designed to overcome this lack of self-control. Interested employees pre-committed to allocate a portion of future salary increases to a retirement account. Not only was participation in the program high – 78 percent – but savings rates among participants increased from 3.5 percent to 13.6 percent in less than four years. Variations of the commitment savings device have been successful globally from the Philippines to Kenya (Ashraf, Karlan & Yin, 2006; Dupas & Robinson, 2013).

Automatic Enrollment

Sometimes, a simple administrative hassle can prevent individuals from making their desired choices. Madrian & Shea (2001) studied the effect of having to sign up for a 401(k) versus being automatically enrolled and having to opt out. They found that 85 percent of employees in the automatic enrollment plan contributed to a 401(k) compared to less than half of employees who had to actively choose to contribute. Automatic enrollment has successfully increased savings in several other countries including the United Kingdom (HMG, 2013) indicating that pro-social defaults can nudge people towards the outcomes they desire.

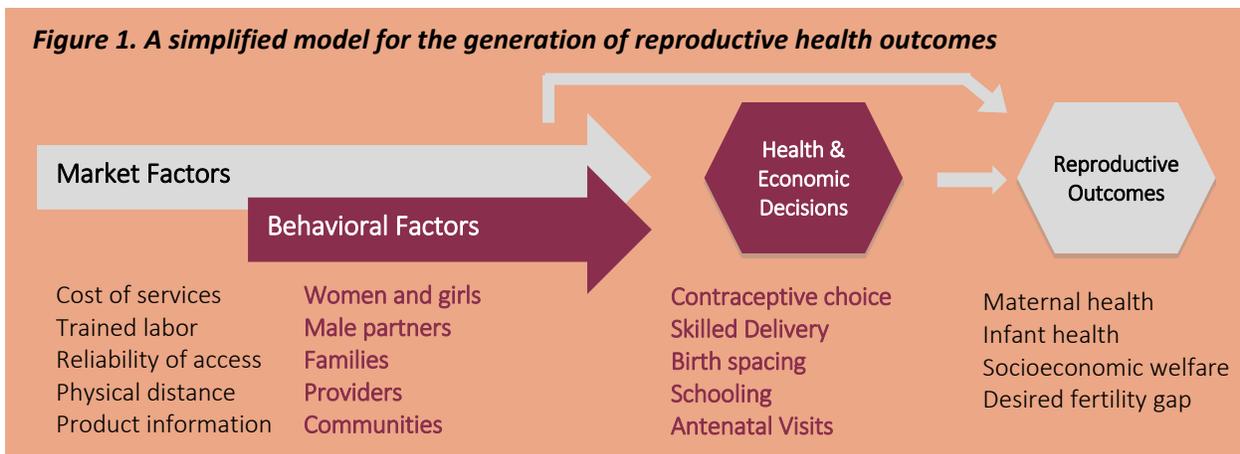
Few of these studies have been carried out in the context of RH. However, the concept of "social and behavior change communication" (SBCC, or BCC for short) has long been an important tool in public health, particularly in the promotion of family planning and other reproductive health interventions. BCC seeks to influence and shape attitudes, behaviors, and social norms in order to improve health outcomes (Bongaarts, Cleland, Townsend & Bertrand 2012). It has roots in marketing, and as a result has adopted several of the assumptions of neo-classical economics—for example that humans are rational and consistent decision-makers, and that they act to maximize their own utility.

BCC also draws, explicitly or implicitly, on models of human behavior from social psychology and sociology. These emphasize the influence of others on an individual’s decision-making, through social learning, social proof, social identity theory, and the theory of key influencers. Researchers also point to the importance of ideational change—the change in a person’s knowledge, beliefs, and values—as a foundation for behavior change (Bongaarts et al., 2012; Cleland, 2001). Accordingly, BCC programs promote individual- and community-level change through provision of information as well as messages intended to encourage pro-social attitudes and norms. In practice, this approach often uses drama and emotion to persuade.

Behavioral economics, in contrast, is used to understand how people make decisions, and how to align decision-making with existing values and long-term desires. It does not seek to modify personal or cultural values, or to impose judgment on which beliefs or preferences are best (Kessler & Zhang, 2014). Rather, it is a tool for identifying the biases and inconsistencies that distort our decision-making. We can then design interventions that help to remove or reduce these obstacles to our own lifetime goals and objectives. Relevant interventions might supply correct information, reframe existing information, streamline choices, or facilitate commitment to a welfare-enhancing decision.

3. Challenges in Reproductive Health

Reproductive health (RH) can be understood as a set of outcomes that are determined (or produced) by an ecosystem of interacting individuals: adolescent girls and women, their male partners and families, health care providers, and other community influencers.⁶ Individuals within this constellation constantly make choices and decisions that affect reproductive outcomes. In addition to these social interactions, there are market factors that affect reproductive health—from physical distance to the nearest service provider to the cost of contraceptives, or access to information about the benefits of a specific product. Collectively, these contribute to reproductive health outcomes, as summarized in Figure 1. For a more complete list of favorable reproductive outcomes, see Table 2 in the appendix.



⁶ For the purpose of this paper, we use the 1994 International Conference on Population and Development definition of reproductive health: *Reproductive health therefore implies that people are able to have a satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so. Implicit in this last condition are the right of men and women to be informed and to have access to safe, effective, affordable and acceptable methods of family planning of their choice, as well as other methods of their choice for regulation of fertility which are not against the law, and the right of access to appropriate health-care services that will enable women to go safely through pregnancy and childbirth and provide couples with the best chance of having a healthy infant.* (UNFPA, 1995).

Reproductive health challenges and outcomes vary widely across countries and regions. The focus of this review is Sub-Saharan Africa and South Asia, though the framework will still be useful for generating hypotheses and solutions in other regions. Because Sub-Saharan Africa and South Asia are so different, we summarize a few key indicators in Table 1 to provide context for the discussion that follows.

Table 1. Reproductive Health Indicators⁷	Sub-Saharan Africa	South Asia
Total Fertility Rate	5.1	2.6
Prenatal Care (% women receiving one, four visits) ⁸	79, 48	72, 45
Birth attended by skilled staff (%) ⁹	50	50
Contraceptive Prevalence Rate (% women 15-49)	24	52
Maternal Mortality, per 100,000 live births	510	190
Adolescent Fertility (births per 1000 women ages 15-19)	108	39
Female Secondary School Enrollment (%)	38	61
Female Labor Force Participation (%)	64	32

Research in RH has focused on correlating fertility outcomes with proximal factors like age at marriage, patterns of sexual activity, and contraception use (Bongaarts, 1978). More recent work has explored the relationship between economic factors and fertility, using observational data to uncover associations and predictors. There is a small but growing literature identifying market interventions with causal impacts on health outcomes. Some work has assessed the impact of behavioral interventions in RH—however, such work examines outcomes like knowledge, attitudes, and self-reported behavior (Mwaikambo et al., 2011), which are not equivalent to outcomes like maternal and infant survival, contraceptive use, and quality of health care. Few studies causally isolate the impact of behavioral interventions on reproductive outcomes.

In the following sub-sections, we briefly describe key challenges in RH that are broadly recognized as being associated with or contributing directly to sub-optimal reproductive outcomes, and are persistent across contexts. The purpose of the section is to provide a brief introduction to the field of global RH and highlight challenges that may be responsive to behavioral interventions. We exclude market factors such as cost, physical access, and information because, although they are persistent challenges and strong determinants of RH outcomes, they are not behavioral in nature. For each factor, we cite evidence of the relationship with RH outcomes and evidence that it remains a challenge across contexts. By articulating possible drivers and facilitators of reproductive outcomes, this overview sketches a research agenda for behavioral economics in reproductive health.

3.1 Quality of Service Delivery

Higher quality of care is associated with lower contraceptive discontinuation rates (Koenig et al., 1997) and is considered an important factor in the take up of reproductive services. In Tanzania, the reported quality of a facility’s services is the characteristic most strongly associated with contraceptive use (Ekouevi et al., 2012). In Bangladesh, patients who deem their care to be of high quality are more likely to initiate and continue a contraceptive method (RamaRao et al., 2003). Across Sub-Saharan Africa,

⁷ Figures from World Bank, World Development Indicators, 2012, unless otherwise noted.

⁸ 2009, World Bank

⁹ 2010, World Bank

structural and process quality is an important predictor of client satisfaction and service use (Donabedian, 1988).

However, quality can be evaluated in different ways, and there is no single statistic that represents the proportion of services, nationally or globally, that meet established standards. Indicators of care quality can be assessed at the facility level, or using clinicians' responses to patient "vignettes," or through real-life observation. In a comparison of these methods, quality was found to be lower when providers were attending patients, compared with their responses to vignettes (Das & Gertler, 2007).

Table 1 shows that South Asia and Sub-Saharan Africa have similar rates of prenatal care and skilled birth attendance, but maternal deaths in Sub-Saharan Africa are nearly triple those of South Asia. Indeed, in Uganda, clinical management of birth complications is only 19 percent (of relevant treatments proposed), and across public health more generally, diagnostic accuracy and adherence to clinical guidelines are only 58 and 50 percent, respectively (World Bank, 2013).

Other evidence confirms that poor quality of care is indeed a pressing problem. In Rwanda, providing incentives for providers to improve their service delivery increased institutional deliveries and preventive care visits, suggesting that poor quality of care is a barrier to health outcomes (Basinga et al., 2011). Health worker absenteeism is a problem in both Sub-Saharan Africa and South Asia, making service unpredictable and especially costly for clients traveling long distances (Chaudhury, Hammer, Kremer, Muralidharan & Rogers, 2006). Complicated and unnecessary procedures are also a deterrent. In Senegal, women may be required to undergo extensive and expensive blood tests before receiving oral contraceptives. In other countries – including Ghana, Cameroon and Kenya – some clinics require that women be menstruating during their visit in order to receive hormonal contraceptives from a provider (Stanback, Thompson, Hardee & Janowitz, 1997).

3.2 Contraceptive Discontinuation

Contraceptive discontinuation among women who want to limit their fertility is a common phenomenon, and is itself a behavior which directly impacts RH outcomes. Low contraceptive uptake in general is an important challenge, but we highlight discontinuation due to the explicit gap between stated preferences and behavior. A comprehensive review of sixty DHS surveys in 23 low-income countries between 1990 and 2009 found that on average, 38 percent of women discontinue their (reversible) contraceptive method by the twelfth month, and 64 percent by the 36th month. Median duration of use was similar (12-19 months) in Bangladesh and East Africa, while in Southeast Asia it was significantly longer (35 months.) Method failure and method-related reasons are the most common cause of discontinuation, and are also linked with increased incidence of unwanted pregnancy (Ali, Cleland & Shah, 2012). Discontinuation rates are especially high among users of short-acting (versus longer-acting) reversible modern methods (Ali et al., 2012; Blanc, Curtis & Croft, 2002; Bradley, Schwandt & Khan, 2009). From the literature, it is not clear which features of short-acting methods are most problematic for women, and this could be an area for rigorous research.

3.3 Education and Employment

Education is one of the strongest predictors of reproductive health. More educated women are more likely to use modern methods of contraception, and among adolescents, rates of contraceptive use are higher for those enrolled in school (WHO, 2010). Higher levels of education are also associated with smaller desired family size and increased sensitivity to the cost of children, greater knowledge of contraception, and improved intra-household communication (Cochrane, 1979).

In particular, girls' secondary education is associated with higher age at marriage, lower mortality rates, and access to better maternal care (Chakraborty, Ilam, Chowdhury, Bari & Akhter, 2003; Gyimah, Takyi & Addai, 2006; Mekonnen & Mekonnen, 2003). It also reduces fertility. Studies of girls' school enrollment find significant causal impacts on early marriage and teen pregnancy in Kenya (Ozier, 2011) and Malawi (Baird, Chirwa, McIntosh & Ozler, 2010). In Nigeria, the introduction of universal primary education rapidly increased access to education, and it is estimated that each additional year of female schooling reduced fertility by 0.26 births (Osili & Long, 2008). In Indonesia, a quasi-experimental analysis of rapid fertility decline in the 1980s showed that 45-60 percent of the decline was attributable to improvements in women's educational attainment and increased wages for both genders (Gertler & Molyneaux, 1994).

Yet girls' educational attainment remains poor in many developing countries. In West Africa, the percent of girls completing secondary school ranges from a low of one percent in Mali to a high of 29 percent in Nigeria (Head, Zweimueller, Marchena & Hoel, 2014). While the gap between boys' and girls' primary school enrollment has almost closed in Sub-Saharan Africa, it remains wide for secondary school (World Bank, 2011), with many girls dropping out at the transition between primary and secondary school (Bruce & Chong, 2006).

Because families often prioritize the education of boys, poor girls have less access to school than girls from more affluent families. Cross-sectional analyses of DHS data have found that girls in poor households are less likely than boys to go to school; but if they live in wealthier households, they are equally likely to go to school (Filmer & Schady, 2008). Girls are more vulnerable to leaving school if they engage in premarital sex (Biddlecom, Gregory, Lloyd & Mensch, 2008), and once they leave school they are more vulnerable to early marriage (Duflo, Dupas & Kremer, 2012; Baird et al., 2010).

3.4 Household and Community Influence

In many contexts, extended family members and communities oppose the use of modern RH services (Frothingham, 1968), presenting a challenge to improving outcomes. For example, take up of maternal care varies significantly by ethnic group in both Nigeria and Ghana, even when controlling for socioeconomic variables (Babalola & Futusi, 2009; Gyimah et al., 2006), suggesting that community identity or tradition plays a role in decision-making. In Turkish communities with norms favoring small families, women are twice as likely to attend prenatal care and have a skilled birth attendant (Celik & Hotchkiss, 2000).

Women's autonomy also plays a role in access to services. Only one quarter of women in Sub-Saharan Africa report that they participate in decisions about their own health care, major household purchases, and visits to their family (Head et al., 2014). Employment plays a role in this: income-earning women

typically hold greater bargaining power over household resources (Gill et al., 2007). For example, in Bolivia, women are more likely to use a modern method of contraception if they independently make decisions on spending (WHO, 2010).

Women with strong decision-making power are also twice as likely to deliver at a health facility (Gill et al., 2007) and more likely to utilize antenatal care (Bloom, Wypij & Gupta, 2001; Furuta & Salway, 2006). Men's support of family planning is also strongly associated with continuation of contraceptive use (Toure, 1996). However, an experiment in Zambia finds that women given family planning vouchers in the presence of their husbands are less likely to use them (Ashraf, Bandiera & Jack, 2013). This suggests the importance of male partners' influence.

Box 2. Focus on Adolescent Risks

For adolescents, the four challenges highlighted in this section are exacerbated and compounded by biological factors, making adolescents particularly vulnerable to poor reproductive health. Adolescence is marked by biological changes in cognitive development and health-related behavior. The unique functioning of the still-developing adolescent brain makes **adolescents more emotionally reactive, impulsive, and likely to engage in risky behavior**. Girls and young women are more likely to enroll late for prenatal care and attend fewer visits than adult women (Gyimah et al. 2006; Walsh, Feifer, Measham & Gertler, 1993). **Motivation to make and keep appointments is lower among adolescents**, and they are more likely to delay care in order to conceal pregnancy (Scholl, Hediger & Belsky, 1994). In Nigeria, women under age 25 are the least likely to attend prenatal care visits and deliver in the presence of medical personnel (Babalola & Fatusi, 2009); and they are more likely to have financial barriers to adequate maternal health, including lack of insurance or transportation. Further, pregnant adolescents have a higher risk of hypertension, anemia, and pre-term labor. An analysis of DHS data from 21 Sub-Saharan African countries suggests that teenagers have worse maternal health indicators, on average, compared with older women (Magadi, Agwanda & Obare, 2007).

Strong **social norms or stigmas concerning girls and sex** are also barriers; in Africa, many girls feel afraid or embarrassed to seek contraceptives and face providers whose attitudes or norms discourage contraceptive provision to youth (Bankole & Malarcher, 2010). Biologically, adolescents are more likely to be influenced by others in their decisions. Laboratory experiments reveal that young people aged 13-22 are more influenced by peers, particularly when engaging in risky behavior and decision-making (Gardner & Steinberg, 2005). Evidence from brain imaging studies suggests that adolescents are more responsive to incentives and socio-emotional contexts than adults (Casey, Jones & Hare, 2008).

These cognitive and emotional differences cause problems for girls who are married at an early age. **Married girls often have difficulty negotiating** with older and more educated partners. When compared with unmarried peers, they are more susceptible to HIV infection (UNFPA, 2013) and have less access to programs that avert maternal mortality (Miller, Lester & Hensleigh, 2004), encourage positive male partner involvement (Barker, 2000), and prevent HIV (Bruce & Clark, 2003).

The media also functions as a community influence. The level of community media saturation is positively associated with use of maternal health services in Nigeria (Babalola & Fatusi, 2009). The introduction of cable television in rural India is associated with improvements in women's autonomy, decreases in the

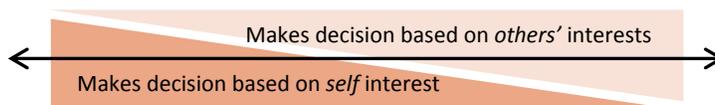
reported acceptability of beating and decreases in reported son preference, as well as increases in female school enrollment and decreases in fertility (Jensen & Oster, 2009). Similarly, women living in areas of Brazil with access to soap operas in which families have fewer children have significantly lower fertility (La Ferrara, Chong & Duryea, 2012).

4. Behavioral Economics and Reproductive Health: The Intersection

How can behavioral economics be used to address these persistent challenges in RH? In this section, we provide a framework for examining reproductive health through a behavioral economics lens. We outline factors that can affect individuals' reproductive outcomes—focusing on behavioral channels, rather than economic or market channels. We present these behavioral factors as a series of opposing forces that influence how individuals navigate decisions:

- Illusion ↔ Reality
- Self ↔ Other
- Thinking Fast ↔ Thinking Slow
- Today ↔ Tomorrow

Figure 2. Illustrative Spectrum, Self ↔ Other



For each decision, women, men, and health providers are somewhere on a spectrum between these two forces (see Figure 2 for illustration). For each set of forces, we list specific behavioral biases that may affect where on the spectrum an individual falls. Where possible, we provide examples of these decision-making problems in the context of RH. In Table 2 at the end of the section, we provide a summary of the gaps in evidence around the existence of these phenomena in RH. In the final section of the paper, we will discuss applications of behavioral economics to these problems, highlighting tools that have been successful in other contexts.

4.1 Illusion ↔ Reality

In the field of family planning, it is well documented that individuals' and communities' beliefs can differ from objective facts and affect decision-making. Within the framework of behavioral economics, we can unpack this, exploring how beliefs about probabilities, or about our own knowledge, affect decision-making. Below we list several behavioral phenomena associated with beliefs and perceptions and explore how they can lead to suboptimal decisions about reproductive health.

4.1.1 Beliefs about facts

Individuals often believe things that are objectively incorrect, which affects decision-making. This is a common challenge in RH. Studies have found that myths and misinformation among women, their partners, and their communities discourage appropriate and sustained use of contraceptives (Nettleman, Chung, Brewer, Ayoola & Reed, 2007). Qualitative research in Kenya suggests that some women believe that contraception results in infertility, future contraceptive failure, device expulsion or shift, cancerous growths, and birth defects (Alaii, Nanda & Njeru, 2012). In a randomized experiment in the US, Delavande

(2008) found that misinformation related to side effects and effectiveness of contraception led women to choose an option that did not best align with their stated preferences.

Myths and misinformation can also affect decision-making on the provider side; providers in the US context show gaps in knowledge about the intra-uterine device (IUD) and its appropriateness for a broad range of populations (Harper et al., 2012). Misconceptions among providers about IUDs lead them to provide either no information, or inaccurate information, to their patients (Rubin, Fletcher, Stein, Segall-Gutierrez & Gold, 2011).

Lack of information is not itself a behavioral phenomenon; in fact, standard economic models often recognize that individuals do not have full and symmetric information. However, in some cases individuals have access to objective information (for example, from a doctor) yet still rely on their own beliefs to make decisions. In behavioral economics, this general concept is known as *overconfidence* in the quality of one's judgments. In reproductive health, individuals frequently overestimate their own knowledge of the truth.

People also tend to overestimate the likelihood of good outcomes, making decisions that are overly optimistic (Weinstein, 1980). Such beliefs have been linked with riskier sexual behaviors (Downs, Bruine de Bruin, Murray & Fischhoff, 2004). For example, women obtaining abortions displayed what the researchers describe as "magical thinking" – many women believed they were lucky, and therefore at a lower risk of pregnancy (Frohworth, Moore & Maniaci, 2013). Similarly, twenty percent of young women in a US study believed that they would not get pregnant because they are non- or sub-fecund (Polis & Zabin, 2012). This phenomenon is known as *over-placement*.

Overestimating the probability of a good outcome does not always lead to suboptimal outcomes. Individuals are also overly optimistic about their self-efficacy (their confidence in their ability to perform a task), which can be beneficial. For example, self-efficacy has been identified as a positive determinant of health workers' motivation (Franco, Bennett, Kanfer & Stubblebine, 2004). In South Africa, a study found that individuals who report high levels of optimism about the future and self-efficacy also report higher levels of condom use at first intercourse (Hendriksen, Pettifor, Lee, Coates & Rees, 2007).

4.1.2 Beliefs about probability

Seminal work by Tversky and Kahneman (1974) demonstrates that people believe in the "law of small numbers" when they draw conclusions about the likelihood of events. These often-faulty estimates of probability derive from personal experience, which is necessarily limited. Individuals may incorrectly believe that their experiences represent the larger population, leading to two different phenomena. First is the *gambler's fallacy*, which occurs when we know the probability of an outcome, like the fifty percent chance of heads when a coin is flipped. If we flip a coin twenty times, and heads always appear, we tend to assume that we are "due" for tails in the next flip. The outcomes so far have diverged from the expected probability, so we expect a "balancing" outcome (Croson & Sundali, 2005; Odean, 1999), when in fact the probability remains fifty percent, irrespective of the outcomes of earlier tosses.

In reproductive health, the gambler's fallacy may affect decision-making about family size. Women may have a preference for male children, or feel pressure from male partners and extended family to have a

boy. If their initial children are daughters, they may decide to conceive again—expecting that they are now more likely to deliver a son, even though the probability remains the same for each birth.

When people do not know the probability of an outcome, they often form an estimate based on their own past experience or experience of others in their lives. This phenomenon, known as *over-inference*, leads us to expect high probability of an outcome occurring after it has occurred several times (Benartzi, 2001; Barber, Odean & Zhu, 2009). In a study of women obtaining abortions, many subjects believed they were invulnerable, infertile or even just lucky, which were sometimes based on their own past experience not becoming pregnant (Frohwrith et al., 2013).

A related concept is *loss aversion*, or the finding that individuals are more sensitive to losses than to gains of the same magnitude (Kahneman, Knetsch & Thaler, 1990). For example, a person may react more strongly to a one-dollar surcharge than a one-dollar discount. There is little evidence of this phenomenon occurring within the reproductive health context, however the insight could be useful in testing different approaches to the framing of information (see section 5.2.)

4.1.3 Beliefs about preferences

Like many features of behavior, preferences can change over time. However, we often carry the flawed belief that tastes or preferences are fixed over time. Making decisions based on the assumption that today's preferences will still hold tomorrow is known as *projection bias* (Loewenstein, O'Donoghue & Rabin, 2003). Little research has been done to identify projection bias in the RH context, or its role in decision-making, but it may be relevant for fertility decisions. In the present, a couple may prefer a large family. In the future, their preferences may change due to evolving social norms or socioeconomic circumstances, but they are unable to predict this in the present.

4.2 Self ↔ Other

A second set of competing forces are our own interests and our interest in others. The standard economic model assumes that individuals are purely self-interested, and therefore make decisions that maximize their own welfare.¹⁰ The model also assumes that individuals understand and fully take into account the incentives of others, particularly those of information providers.

A behavioral economic model, in contrast, acknowledges that our decisions may reflect benefits to others. We may be influenced by persuasion or by the pressure to conform (DellaVigna, 2009). As mentioned earlier, the field of reproductive health has long recognized that an individual's decisions are influenced by social and cultural norms and pressures, and many programs have sought to change harmful norms at the community level (Daniel & Nanda, 2012; Sinha & Yoong, 2009). In this section, we categorize the channels through which individuals' decisions are affected by others. In addition, we explore the many identities that individuals hold, and how these lenses of the self can affect decision-making.

¹⁰ The standard economic model assumes self-interest, but not that one's self-interest is necessarily independent from others' interests.

4.2.1 Persuasion

Laboratory experiments have demonstrated that individuals can be persuaded by others to deviate from their own preferences. People also routinely underestimate the incentives of others to sway their decision-making (DellaVigna & Gentzkow, 2009). In the context of family planning, spouses or family members may be motivated to persuade an individual to make fertility decisions that differ from their own preferences. For example, husbands, extended family, and neighbors who value large families sometimes use contraceptive misinformation, such as exaggerated side effects, as a form of ‘persuasion’ to discourage contraceptive use (Rutenberg & Watkins, 1997).

4.2.2 Social norms and pressure

Social norms and pressure are similar to persuasion, in that they can alter individuals’ behavior or preferences. Elster (1989) defines social norms as a deviation from rationality, whereby individuals’ actions are not purely motivated by a desired outcome, but rather confounded by what others are doing. Social norms are shared by others, and are sustained partly by approval or disapproval, including sanctions or feelings of shame, exclusion, anxiety or guilt (Elster, 1989; Ostrom, 2000). For example, contraceptive use can be discouraged by local norms related to family size and wives’ obligations to provide children (Rutenberg & Watkins, 1997).

Cultural understanding of gender identity and what is “appropriate” behavior for a woman can also influence sexual and reproductive health behavior (Jewkes, Levin & Penn-Kekana, 2003). Community norms that value boys more than girls also result in families prioritizing the education of male children, viewing girls’ education as an unnecessary or costly. Similarly, girls can be pressured into certain types of work, feeling that formal or higher-paying jobs are reserved for men. In Sierra Leone, only seven percent of girls believe that women should earn money at all (Shahnaz & Khan, 2013).

Health care providers may be influenced by social norms that disapprove of the behavior of their patients. They may not present certain information or services to adolescents or unmarried women. A qualitative study in Ghana found that providers often cite moral concerns as justification for not providing younger women with the contraceptive options of their choice (Stanback & Twum-Baah, 2001). Another study in Uganda identified social and cultural norms as a reason health workers are reluctant to provide sexual and reproductive health information to adolescents (Kiapi-Iwa & Hart, 2004).

Providers may also be biased against offering post-abortion care and safe abortion services, even where legal. As a result, providers’ norms can directly lower the quality of care. In Kenya, a small study revealed that providers were not always offering pain relief to women seeking an abortion, because they believed that the women deserved to be punished (Solo, 2000). Providers objecting to abortion also commonly fail to inform women of their rights to the procedure (Cook, Dickens & Horga, 2004). These biases can discourage or prevent women from using legally protected services.

4.2.3 Perception of social norms

While social norms can act directly on individuals’ decision-making, they can also act indirectly. Social norms can affect individuals’ behaviors without any threat of consequence for violating them, but rather just an inclination to behave in the way one perceives to be “normal.” For example, in many settings, maternal mortality has been historically ‘normalized’ as an unavoidable risk of women becoming

pregnant, and this—combined with low female status—often means that husbands and communities are unready to respond quickly when there are complications during delivery (Thaddeus & Maine, 1994).

In some cases, we may assume that certain behaviors are common in our peer group or community—even when they are rare. We may then change our own behaviors to fit this perception (Bertholet, Faouzi, Studer, Daepfen & Gmel, 2013). This phenomenon, known as the misperception of social norms, is closely related to overconfidence (wherein individuals hold incorrect beliefs.) In the case of social norms, individuals re-align their behavior to conform to what they perceive to be the norm.

In RH decision-making, there is limited research on the misperceptions of social norms. However, in a survey in Uganda, youth estimated that more than half of women nationwide were prostitutes (Banks & Munshi, 2012), which could affect their own decisions about sex. The widespread belief about young women and prostitution could contribute to negative stereotypes about youth in Uganda, resulting in provider bias.

4.2.4. Altruism and reciprocal fairness

How else might an individual consider others in the process of decision-making? In some cases, we may positively or negatively value the allocation of resources to others. For example, we might make a decision that reciprocates the generosity or selfishness of another, in an effort to achieve fairness. We may even be willing to sacrifice our own welfare to avoid decreasing the welfare of others—independent of others' behavior. This is known as *altruism* (Andreoni, Harbaugh & Vesterlund, 2008). Both *reciprocal fairness* and altruism result in a decision made to affect someone other than the decision-maker.

For example, in Zambia, men on average want 0.8 more children than their wives, and they wield greater decision making power (Ashraf, Field & Lee, 2010). However, altruism could surface if a husband sacrifices his own desire to have additional children, in order to increase the welfare of his wife.

In the case of reciprocal fairness, individuals respond in kind to others' actions—even when there is no expected material gain from their reciprocal action (Falk & Fischbacher, 2006). The high rates of teacher and health worker absenteeism may be partially explained by this phenomenon. Teachers do not feel the school system is fair – because of unfair wages or heavy teaching burdens – so they reciprocate with inattention or absence (Mullainathan, 2005). Similarly, an experimental study in Malawi finds that when HIV positive individuals have an opportunity to give money to other community members, as part of a game, they tend to decline—ostensibly due to earlier marginalization (Chao & Kohler, 2007).

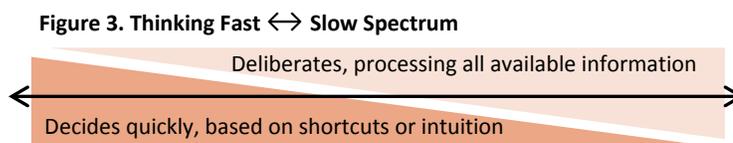
4.2.5 Identity

Akerlof and Kranton (2000) first postulated the idea that a person's *identity*, or sense of self, affects economic outcomes and decision-making. As a result, two individuals who appear to have the same background may make different decisions depending on how they primarily (or in the moment of decision) identify themselves – for example by gender, race, ethnicity, religion, class or another characteristic. For example, Asian women's performance on quantitative tasks is higher when their Asian identity is primed, as opposed to when their female identity is primed. This demonstrates that how an individual self-identifies can affect their motivation and decision-making (Shih, Pittinsky & Ambady, 1999).

In the context of health, providers of care may have several identities – as community members, educators, wives, and Christians or Muslims. These can each affect how clients are viewed, and ultimately how and when care is provided. To our knowledge, this concept has not been tested in the field by researchers. However, appealing to a particular identity of a provider—or that of a mother, male partner, or youth—could result in decision-making that is better aligned with long-term goals.

4.3 Thinking Fast ↔ Thinking Slow

The standard economic model assumes that individuals use all relevant information available to them when making a decision. However, cognition—which includes the ability to attend, process information, form memories, or solve problems—is a limited resource. Shah, Mullainathan, and Shafir (2012) have demonstrated that people living in poverty (or other states of high uncertainty) exhibit a scarcity of cognitive capacity, because significant resources are allocated to the complex and unpredictable dilemmas of daily living. As a result, even in the event of an individual having access to all relevant information, he or she may not be able to process it quickly and effectively enough to form coherent and optimal decisions.



4.3.1 Mental shortcuts

To deal with cognitive overload, individuals systematically use *heuristics* ('rules of thumb' or decision-making shortcuts) when making complex decisions. For example, consumers are more likely to choose brands they recognize, rather than process information about all available choices (Gigerenzer & Gaissmaier, 2011). Heuristics may be used by women and couples in RH decision-making, although evidence is lacking. However, the use of job aids and decision tools for health care providers is a common form of heuristic used in RH (see section 5.8.). The pitfall is when people use suboptimal heuristics to simplify their decision-making, or think too fast.

Relying on habits to make decisions is another sort of mental shortcut. *Habit formation* occurs when an individual repeats a behavior or choice in a consistent environment, until it becomes nearly automatic. Once a habit is formed, greater cognitive capacity is required to change the behavior and make a different decision (Lally et al., 2010). Habit formation can encourage positive behaviors. A study in South Africa found that condom use at sexual debut was correlated with a two-fold increase in condom use at most recent sexual encounter—suggesting that early usage might become habitual (Shafii et al., 2004).

4.3.2 Limited attention

Attention is an important component of decision-making, and it is also a limited resource (Datta & Mullainathan, 2014). A lack of attention can prevent decision-makers from using all of the information available to them. In developing countries, a primary consumer of attention is resource scarcity – the lack of money or other resources to cover basic living expenses. When money is not available, each new expense or debt becomes all the more urgent and insistent. A scarcity of resources impedes an individual's ability to focus on decisions that are not related to money (Shah et al. 2012; Ashton, 2014b). For example, in areas where water-borne illness is common, families might focus on pressing daily

expenses, like food, while failing to procure periodic water treatments (Banerjee & Duflo, 2011). In the RH context, a woman who is concerned about the health needs of her children may not have the time to carefully consider all her contraceptive options and the pros and cons of each (Bruce, 1990; Bertrand, Hardee, Magnani & Angle, 1995).

People also perceive obvious or evident information as more salient, and as a result they may be inattentive to obscure or buried information (Brown, Hosain & Morgan, 2010; Chetty, Looney & Kroft, 2009), even when it is available without cost (Lacetera, Pope & Sydnor, 2012; Ashton, 2014b). For example, a woman may know which contraceptives are available in her community, since this information may be readily visible. But she may not process the side effects of each option, or consider how to maximize the effectiveness of a given service.

When the attention required to complete a task is too great, an individual may fail to follow through with an intended action. In some cases, even seemingly modest “hassles” may prevent follow-through. This is at odds with the standard model, which assumes that cost is always the major barrier to inaction. In a traditional economic model, women might avoid clinic visits because of lost wages, or time spent in transit. However, a cumbersome application process can limit uptake of social programs such as food stamps or the opening of bank accounts (Bertrand, Karlan, Mullainathan, Shafir & Zinman, 2009). While the time or money required to complete the application is minimal, there may be a high attentional cost.

This “hassle factor” phenomenon could affect health decision-making in a number of ways—for example, requiring patients to complete extra forms at a clinic may deter future visits. Providers may decide not to prescribe a long-term contraceptive method, because it requires completing extra paperwork. These seemingly trivial processes can absorb attentional resources, reducing the quality of decision-making. Indeed, in several developing countries, women report that they have discontinued use of contraceptives because of method inconvenience (Ali et al., 2012).

Similar to *limited attention* is the problem of *complexity*. In some cases, the act of making a decision is simply too cognitively burdensome. Providers and health educators tend to offer excess and non-essential information about contraceptives, making it difficult for women to discern the most relevant trade-offs and make the best decisions (Steiner, Trussell & Bourne, 2007). As a result, complexity – closely related to limited attention – may lead to suboptimal choices, or even prevent patients from making decisions at all.

4.3.3 Intuition

When making decisions, individuals typically have two modes of thinking: the automatic process (System 1) and the controlled process (System 2). Decision-making under System 1 is generally rapid, unconscious, non-logical, and implicit. It requires minimal effort. The controlled process (System 2) is slow, conscious, logical, and explicit—and it therefore requires more effort. Behavioral economists refer to these two systems as *intuition* and reasoning (Thaler, 1981; Kahneman, 2003). Intuition is the belief that a person holds to be true, even without conscious reasoning. It is associated with mood, a temporary feeling or state.

How does intuition affect decision-making related to health? Healthcare providers may rely on their intuition to quickly diagnose and treat a patient. In the US, several studies have found that intuition influences nurses' decision-making processes (Traynor et al., 2010; Hams, 2000). Intuition may also be systematically biased, if it is a function of patients' observable or most salient characteristics.

4.4 Today ↔ Tomorrow

Our final spectrum is preferences for now versus later. The standard neo-classical economic model assumes that peoples' preferences are time-consistent. So a decision-maker today should make the same choice whether she faces the consequences tomorrow, or two years from now. However, there is substantial evidence that individuals have inconsistent time preferences.

4.4.1 Present bias

In general, a benefit delivered now (such as a prize of \$100) is worth more than the same benefit delivered tomorrow. We essentially pay a price for waiting, so the value of the benefit tomorrow is "discounted" relative to its value today. But in laboratory experiments, people tend to discount the value of a deferred benefit more steeply in the immediate future, and less so in the distant future (Thaler, 1981). So a weeklong delay in receiving your \$100 prize seems very costly if the reward is due this month. But if the reward is due in a year, the weeklong delay no longer seems as costly.

People who apply different discounting rates in the immediate future versus the distant future are known as *present biased*. Their decision-making tends to be inconsistent over time. As a result, their future selves may have more (or fewer) resources than intended by their current selves.

Time-inconsistent preferences have been documented in many laboratory and field experiments, and have been particularly useful in explaining why individuals fail to save for retirement (Benartzi & Thaler, 2007), exercise (DellaVigna & Malmendier, 2006), quit smoking (Volpp et al., 2006), lose weight (Volpp, 2009) or meet deadlines (Ariely & Wertenbroch, 2002). In essence, present-biased individuals tend to consume too few investment goods (e.g. retirement savings, education, exercise) and too many leisure goods (e.g. feasts, movies, cigarettes). With respect to investments, they underestimate the benefits of extra consumption in the future. The opposite occurs for leisure goods: they are willing to pay the immediate costs of consumption, but they underestimate the future costs to health and welfare.

Present bias may explain several challenges in reproductive health, although this has not been empirically tested. Present-biased couples may perceive the extra costs of birth control—including the time traveling to a clinic, the risk of someone in the community finding out, or the burden of discussing with a partner—as greater than the future costs of raising an unplanned child. A family may feel that the extra income earned today, by an out-of-school daughter, is worth more than the extra income she will earn later in life, as a result of her schooling. In contexts where families earn a bride price for their daughters, the price tends to increase with the education level of the girl (Kaufman, Wet & Stadler 2001). However, families may be tempted to marry their daughters early, to meet immediate financial pressures, rather than waiting to earn a higher price once the girl is educated.

Related to intertemporal choices is the phenomenon of *procrastination*. If an action involves an immediate cost, an individual may delay it. However, because costs always seem greater in the present

(to a present-biased individual) this effect is often repeated, further delaying the action (O’Donoghue & Rabin, 1999). Procrastination may contribute to low take up of antenatal care or family planning services, but this has not been demonstrated empirically. There is some evidence that procrastination in seeking abortion services contributed to unwanted pregnancy among adolescents in South Africa (Varga, 2002).

Time preferences can also manifest as *status quo bias*, which is an exaggerated preference toward the status quo. Individuals with status quo bias tend to make decisions that do not require a significant change from their current choice. This occurs when people believe that the cost of leaving the status quo outweighs the benefits (Samuelson & Zeckhauser, 1988). Health care providers in the US are reluctant to insert IUDs when they lack experience (Rubin et al., 2011). The underlying mechanism may be a status quo bias. IUDs may be beneficial to the client and may improve the provider’s quality of care. However, the investment – or upfront cost – of learning about IUDs may seem greater than the eventual benefits of improving care quality. There has been little research on the willingness of providers to learn new procedures and protocols, but this could have implications for quality of care.

Box 3. Measuring Preferences

Measuring individual’s **risk, time, and social preferences** is a key component of determining possible behavioral phenomena or biases that affect decision-making and tools to address them. Researchers have designed lab experiments, several of which have been used in field research, aimed at quantifying individuals’ preferences. Holt and Laury (2002) assess risk preferences using a **lottery choice experiment** that provides different hypothetical and actual payoffs to quantify changes in relative risk aversion based on the different possible payoffs. Another experiment measures **status quo bias** using a simple questionnaire in which a participant chooses their preferred option from a series of alternative action with different framings (Samuelson & Zeckhauser, 1988). Thaler (1981) measured discounting rates – preference for immediate rather than future benefits – using a lottery game in which payouts varied based on time.

Experimental games – including **prisoner’s dilemma, ultimatum, dictator, and public goods games** – have also been designed to determine individuals’ social preferences, particularly around altruism and spite (Andreoni & Miller, 2002; Andreoni, Harbaugh & Vesterlund, 2008). For example, David Levine (1998) used an ultimatum game involving two players. The first was given a sum of money and offered the second player a portion of it. The second player could then accept or reject the offer. Based on the results, Levine relatively accurately modeled reciprocal fairness and the distribution of altruism and spite within a given population. These commonly used behavioral games, in addition to several others, provide important insights into individuals’ decision-making processes that can help improve and increase the take up of reproductive health services.

4.4.2 Emotions and visceral drives

Some biases in decision-making are likely influenced or modulated by *emotions* and *visceral drives* (Loewenstein, 2000). For example, visceral factors such as arousal (Loewenstein, Nagin & Paternoster, 1997) and hunger (Read & van Leeuwen, 1998) can increase impulsive behavior (Camerer, Loewenstein & Rabin, 2011). The change in preferences resulting from emotions or drives is termed the “hot-cold empathy gap” (Loewenstein, 1996). When we are in a “cold state” (i.e., when our drives are satiated), we

are less likely to be influenced by our physical needs. Conversely, in a “hot state” (i.e., when our drives are not satiated), we are more likely to attend to these needs.

In reproductive health, failure to use family planning in an aroused (“hot”) state is a common occurrence. While a couple may intend to delay pregnancy in a “cold state,” those intentions may not be acted upon in the state of sexual arousal. In a study in the US, males in an aroused state had more favorable feelings toward unprotected sex than those who were not aroused (MacDonald et. al, 2000). This is particularly problematic for adolescents, who may lack the cognitive ability to effectively control impulses. They are more likely to act impulsively and engage in risky behavior when in a “hot state.”

4.4.3 Sensation seeking

In addition to visceral drives, our decisions can be influenced by the extent to which we receive rewards, or value, from sensation-seeking. This phenomenon is defined as a willingness to take risks to experience new and varied sensations. Sensation-seeking individuals show a preference for risky behaviors, even when they are aware of probable losses in future. While individuals of all ages have different levels of sensation-seeking, this preference peaks in adolescence (Zuckerman, 1979).

Much of the brain development during adolescence is in the region of the brain that perceives risk and reward and regulates behavior and emotion. This could help to explain adolescents’ higher potential for risk-taking, recklessness, and behavioral problems (Steinberg, 2005). In the US, sensation-seeking among adolescents has been linked to riskier sexual behavior including more sexual partners and lack of contraceptive use (Sheer & Cline, 1994; Donohew et al., 2000). Overall, cognitive development seems to be an important explanatory factor for the link between adolescence and risk-seeking, although it is important to note that there are multiple contributing factors (Arnett, 1992; Kelley, Schochet & Landry, 2004).

Table 2. Selected Gaps in Evidence: Behavioral Phenomena in Reproductive Health

Question	Opposing Forces
Does the <u>gambler’s fallacy</u> (belief a family is “due” for a son) contribute to higher-than-desired family size?	Illusion ↔ Reality
Do individuals with greater <u>projection bias</u> make systematically different RH decisions?	Illusion ↔ Reality
Do adolescents correctly perceive <u>social norms</u> about sexual and reproductive behavior? Does the correctness of this perception affect their behavior?	Self ↔ Other
Do individuals (or couples) use <u>heuristics</u> when selecting contraceptives?	Thinking Fast ↔ Thinking Slow
Are there contexts in which the <u>hassle factor</u> of visiting a provider is a key deterrent?	Thinking Fast ↔ Thinking Slow
Are <u>present-biased</u> individuals less likely to use contraceptives, attend antenatal care visits, or stay in school?	Today ↔ Tomorrow
Does <u>status quo bias</u> affect health service provider quality?	Today ↔ Tomorrow
Is procrastination a contributing factor to contraceptive discontinuation?	Today ↔ Tomorrow

5. Behavioral Economics Toolbox

In the previous section, we discussed a number of behavioral phenomena that may influence decision-making about reproductive health. Here, we describe several “tools” that leverage insights from psychology and economics to address these issues. In some cases, the behavioral phenomenon itself can be harnessed as an intervention. We summarize the evidence, where available, of each tool’s effectiveness, and explore possibilities for applications in reproductive health.

5.1 Defaults and Reminders

The default is defined as the option that an individual will receive if he does not make an active choice. Defaults are most useful in the presence of *status-quo bias*, *habits*, *complexity*, or *limited attention*. Individuals gravitate toward the option that is presented by default, even when another available choice might have been more beneficial. Thus the setting of a default option can have significant consequences.

While default effects can be negative, for example when defaults are set through convenience or as a barrier to action (Just & Wansink, 2009), the careful design of a default can have positive consequences (Johnson & Goldstein, 2003; Abadie & Gay, 2006). Choice architecture is the careful design or presentation of the choices available to individuals to ensure that they can end up making (relatively) beneficial decisions—even when susceptible to behavioral biases. Appropriate defaults have been shown to mitigate the effects of *status quos bias* and choice avoidance (Choi et al., 2004) – for example through automatic enrollment in 401(k) pensions plans, which can improve savings behavior (Madrian & Shea, 2001).

While choice architecture has not been thoroughly tested in the context of RH, establishing pro-social defaults may help providers overcome gaps in knowledge or biases toward the most familiar medical practices and procedures. Defaults can be implemented through heuristics, like checklists based on hierarchies of contraceptive efficacy and side effects that are applied regardless of a patient’s age or marital status. Approaches like these may increase the quality of care and encourage greater patient take up of services, where needed.

Default interventions can also help patients with *limited attention* by reducing the cognitive burden or *complexity* of acting on a decision about health care or contraception, but this has not been tested. Just as organ donations have increased in opt-out European countries (Johnson & Goldstein, 2003; Abadie & Gay, 2006), women may be more likely to take up a contraceptive method if it is offered as a default. However, any such intervention will need to be carefully designed to avoid unwittingly creating coercive targets or perverse incentives for providers.

Reminders, like defaults, can reduce cognitive costs of making and following through on decisions. Automated technologies, such as Glow Caps (pill bottles that light up when not opened) and mobile phone messages, have been shown to increase drug adherence (Datta & Mullinathan, 2014)—although a randomized experiment in the US found that daily text message reminders did not increase oral contraceptive adherence (Hou et al., 2010). Nevertheless, there is evidence that tailoring reminders to make them more timely or salient can be effective. In one context, weekly SMS reminders were more

effective than daily reminders in improving ART adherence, although the length of the message did not matter (Pop-Eleches et al., 2011).

Even a program that seeks to create prosocial defaults can have negative effects if not well designed. It is particularly important to consider cultural context when designing default options as they may be influenced by or interact with a community's social norms with unintended consequences. Additionally, any use of defaults should be careful to avoid coercion or limitation of a woman's reproductive choice.

5.2 Framing

Framing effects occur when different depictions of the same decision outcome result in different choices. Tversky and Kahneman's (1981) seminal experiment, which varied the framing of epidemic outcomes, demonstrated that presenting an equivalent problem in two different ways can produce different results. Positive framing, or value-increasing choices (i.e. with options presented as sure gains and losses), result in people making less risky choices. Negative framing, or value-decreasing choices (i.e. with options presented as the likelihood or probability of gains and losses), result in riskier choices. In general, framing is a useful tool for addressing problems like the *gambler's fallacy* and *over-inference*, which result from our poor ability to estimate probabilities, or separate belief from fact.

Where framing causes individuals to make suboptimal choices, a simple change in the frame can serve as an intervention. For example, discussion of the risks of treatment or care options is common in the practice of medicine and health promotion. Yet presentations of risks can influence patients to select particular care options or behaviors (Edwards et al., 2001). An area for further research is the testing of different framings for reproductive decisions, which might reduce the communication gap between clients and providers, mitigate the negative effects of provider biases, and ultimately help girls and women achieve better reproductive health outcomes.

5.3 Commitment Devices and Labeling

Individuals displaying *present bias* have inconsistent time preferences, and as a result they may exercise choices that have future consequences, but are not aligned with their long-term goals. One of the best established tools for this problem is the pre-commitment device, which nudges people to commit to a choice in advance, or to postpone decision-making to a future period (so that exercised choices are truly representative of their preferences.)

Commitment devices have been rigorously tested in a broad range of contexts, and they have outsized impacts of relevance to policymakers and health professionals. In the financial sector, Thaler and Benartzi (2004) developed Save More Tomorrow (SMarT), which automates contributions to a voluntary retirement savings program. The rate of contribution automatically increases as the employee's salary increases, promoting pro-social savings behavior.

Other versions of this idea are savings accounts with restricted withdrawal dates, to prevent spending on impulse purchases, or accounts that are tied to a targeted goal. Tied accounts have been used to help smokers quit (Gine et al., 2010) and increase women's intra-household decision making power (Ashraf et al., 2010). Time-limited vouchers are another tool; these coupons lock individuals into making beneficial purchases, often in advance of actual use. In Kenya, farmers are offered discounts for fertilizer which are

only redeemable post-harvest, when households are flush with cash (Duflo, Kremer & Robinson, 2009). The vouchers serve both as a reminder to buy fertilizer, and as a commitment device—because the fertilizer is purchased when the family has money, but well before it is actually needed in the field. An ongoing experiment in India is testing the use of commitment contracts to encourage doctor visits among hypertensive patients (Bai, Handel, Miguel & Rao, 2013).

There has been little research on the design or effect of commitment devices in the RH context. Conditional cash transfer (CCT) programs have been effective in increasing the use of contraception, delaying marriage, and increasing the use of antenatal care and facility-based delivery (Ashraf et al., 2010; Baird et al., 2010). And while these may address *present bias*, they are not commitment devices, per se—but rather financial incentives for behavior change.

Labeling is a related technique for encouraging spending on investment goods with long-term benefits. Labeling exploits the concept of mental accounting—our model for sequencing and tracking outcomes in the future. This tool is often incorporated in savings or cash transfer programs. For example, locked savings boxes that are labeled (mentally) as “savings for health expenses” have increased women’s investment in preventive health in rural Kenya (Dupas & Robinson, 2013). In Bolivia and the Philippines, mobile text message reminders to save money, emphasizing a specific goal or purchase, were twice as effective in increasing savings rates compared to more general reminders (Karlan et al., 2010).

CCTs may also have a labeling effect, when money from the transfer is perceived as already allocated to expenditures for a child, for example. There is some evidence of this effect from evaluations in developed countries (Kooreman, 2000; Fraker, Martini & Ohls, 1995), and there is also suggestive evidence from low-income countries—where children’s school attendance is continued, even in the absence of conditions (Schady et al., 2008). In Morocco, a government labeled cash transfer (LCT) program—not conditional on school attendance but explicitly labeled as an education support program—was as effective as conditioning on improving school attendance (Benhassine et al., 2014).

5.4 Small Incentives

While financial incentives, as an intervention, are typically associated with neo-classical economic theory, there are cases in which financial incentives can be “behavioral.” When the incentive is small compared with the behavior change it causes—and when it is not enough money to relieve an actual financial constraint or market failure—we classify it as behaviorally motivated. Imagine, for example, a friend who drives to a store all the way across town just to redeem a one dollar coupon on a grocery item. In this case, the experience of receiving an incentive may be more important and relevant than the financial value of the reward itself. This is sometimes the case with conditional cash transfers, but there is no hard line for determining when a CCT is “behavioral,” and when it is not.

Simply the prospect of earning a reward can improve health-related behaviors. In contrast to the case described above of very small, but certain rewards, rewards with very small expected values due to low probabilities may change behavior if the maximum reward is high enough. For example, in the US, patients prescribed an anti-stroke medication were offered a lottery ticket as a reward for taking their pills (Volpp et al., 2008). The lottery offered a very low-probability opportunity to win a small relatively

sum of money—the largest prize was \$100, and each individual had just a 0.1% chance of winning. However, it succeeded in virtually eliminating non-adherence to drug treatment. A similarly small incentive in India—a bag of lentils, equivalent to a half-day’s wages for an agricultural laborer—almost doubled the fraction of women bringing their children to a vaccine camp for immunizations (Banerjee et al., 2013).

Incentives can also overcome behavioral biases (including *status quo bias* and *present bias*) in the context of RH providers. Potential interventions include:

- **‘Pay-for-performance’** contracting mechanisms, which provide modest institutional and provider incentives to improve the quality of care (Basinga et al., 2011; Lagarde, Haines & Palmer, 2007; Eijkenaar et al., 2013; Miller & Babiarz, 2013); and
- **Vouchers for services**, distributed to targeted populations, especially women (Bellows, Bellows & Warren, 2011; Warren et al., 2011). The vouchers’ financial value may be modest, but they can incentivize providers to offer the vouchered services, streamline access to services, and increase women’s confidence in their right to services (Meyer et al., 2011).

The above incentives were not necessarily small enough to be classified as behavioral, but they do offer evidence that incentives can change behavior. Further research would be required to disentangle the behavioral effect of receiving the award from the financial benefit.

One caveat in the use of financial incentives is that dependent on context and size, they have the potential to crowd-out a health provider’s intrinsic motivation with extrinsic motivations, like money (Serra, Serneels & Barr, 2011), although they can also complement providers’ intrinsic motivation and act as a signal regarding expected social norms (Bowles & Polania-Reyes, 2012). Experiments have demonstrated that gifts-in-kind can increase productivity significantly more than monetary gifts; this result is driven by positive reciprocity (Kube, Marechal & Puppe, 2008), or a social preference like *reciprocal fairness*. This might explain why a randomized experiment in Zambia, aimed at increasing community-based provision of services, found non-cash incentives for health extension workers to be more effective than cash (although a combination of the two approaches was found to be even more effective; see Ashraf et al., 2013).

Providers can also be positively motivated by *social norms*, as health worker motivation is at least in part driven by how much social recognition they receive from their communities (Franco et al., 2004). An evaluation of BRAC in Bangladesh found that social prestige or recognition is a key determinant in retaining community health workers (Alam & Oliveras, 2014).

5.5 Harnessing social influences

Behavioral economics does not offer a magic formula for improving decision-making by women, households, and health providers. However, it does offer insights about why and how our choices are influenced by *social norms and pressure*. Social Norms Theory, first used to address college student alcohol use (Perkins & Berkowitz, 1986), focuses on the environment and interpersonal influences to change behavior, rather than focusing on the individual.

Social norms interventions have long been harnessed by the behavior change community as a tool for improving decision-making. For example, the telenovelas of Miguel Sabido in Mexico in the 1970s and radio soap operas in Tanzania in the 1990s portrayed the benefits of contraception and smaller families as positive individual and social goods (Rogers et al., 1999). In this sense, media can be used to correct false beliefs about social norms—for example, providing accurate statistics on regional family size, or condom use. They can also be used to provide information about how an individual's behavior compares to that of peers. Knowing what our peers and community members are doing or thinking can have a strong effect on our own decisions. A woman might overestimate the likelihood that her husband disapproves of contraceptive use; however, information about other husbands in her community might encourage her to engage in communication.

Social commitment

Like the commitment devices described earlier, we can harness social pressure by creating “social commitments.” These are public statements of intention, which leverage social sanctions to reinforce follow-through on a decision. In some cases, social commitment has been shown to reinforce beneficial decision-making, particularly in the context of savings. In an analysis of seventy rotating savings and credit organizations (Roscas), this savings approach was found to be popular and successful—despite its inherent riskiness and inflexibility. Women participate primarily because Roscas provide a socially-enforced commitment to save (Gugerty, 2007).

Investigating further, Karlan (2007) finds that individuals with stronger social connections to others in their Rosca, or savings group, end up with higher savings and higher repayment rates. Social commitment devices are a combination of the commitment devices discussed in the previous section and the social pressure described here. They have been applied to health decision-making in the context of savings: in Kenya, individuals were invited to make deposits into savings account labeled for health expenditures. Those investing in a group setting saved more— and invested more in preventive health—compared with those making deposits on their own (Dupas & Robinson, 2013).

Box 4. Berhane Hewan: Social Commitment + Incentives

A quasi-experimental evaluation of Berhane Hewan, a program aimed at delaying marriage and empowering adolescent girls in Ethiopia, successfully increased educational attainment and delayed marriage among 10-14 year olds. It also increased the use of family planning services among sexually active and married adolescents (15-19 year olds). The program included a public commitment by parents and their daughters to delay marriage for at least the duration of the two-year program. Families were told they would receive a goat upon successful completion of the program, to incentivize participation and offset financial costs of delaying marriage (Erulkar & Muthengi, 2009).

To our knowledge, there has been no other research testing the effectiveness of social commitment related to reproductive health decision-making; this is an area for further research.

Harnessing strong norms

Susceptibility to social pressure can be used to design interventions that counter harmful social norms. For example, policymakers can design and support positive social norms related to contraceptives,

enabling individuals to act in line with their own preferences. A policymaker might change the reference point for contraception within her community, signaling that those who adopt contraceptives are responsible and desire to improve family well-being—which is in direct opposition to the more pervasive belief that contraception is a practice of sexually promiscuous, irresponsible people.

Box 5. PRACHAR: Pro-Social Pressure

In Bihar, India an intervention has been developed to prevent child marriage and increase child spacing. The program, PRACHAR, has a component aimed at influencing community and family members and instigating pro-social pressure to delay marriage. It targets youth aged 15-19 years, as well as their parents and communities. The interventions include training of unmarried adolescents, home visits with parents-in-law, and community education. A retrospective study, with random cluster sampling of participants and a control group, suggests that PRACHAR delayed age at marriage and first birth. It also may have increased the use of contraceptives to delay second pregnancy, including among the most economically disadvantaged groups (Daniel & Nanda, 2012).

In other areas of public preventive health, especially in the context of risky behaviors, the reinforcement of positive social norms is a promising tool for improving individual decision-making (DeJong et al., 2006). And failing to change harmful norms can result in perpetuation of false information or wrong beliefs. In a study in the US, college students were shown to routinely overestimate the drug and alcohol use and risky sexual behavior of their peers (Martens et al., 2006)—and the researchers in this study found a positive association between these perceived norms, and students' actual behavior.

Policymakers can also harness *persuasion* and *altruism* to encourage pro-social behaviors (e.g. healthier, safer, more socially conscious behavior) by providing messages about what is normal among peers, and how individual decisions affect equity within the community. For example, in the context of natural resources, people can be pressured to reduce their own consumption, based on information about peer households' consumption (Allcott, 2011). When *misperception of social norms* leads individuals to make undesirable choices—particularly choices that harm others—a policymaker can correct the misperception, since knowing what others actually do seems to have a stronger effect on what people actually do.

Box 6. Social Norms and Energy Use

In a randomized natural field experiment, a US company called OPOWER sent letters to utility customers **comparing their electricity use to that of their neighbors**. The program reduced energy consumption by 2 percent, which is equivalent to the effect of approximately a 16 percent increase in energy prices. Effects were greatest on households with the highest initial energy consumption (Allcott, 2011).

Accountability through Feedback and Social Pressure

Another important application of social pressure is to generate accountability, which can motivate improved service delivery among health providers or teachers. Creating simple (and anonymous) client feedback mechanisms can help providers feel more accountable to their patients, for the quality of services delivered (Tavrow, 2010).

Efforts to improve accountability more broadly can involve holding public officials responsible to the communities nearest them. This is typically achieved by revealing strategic information about a public official's performance, which elicits a response of pressure within the community. One experiment in Uganda focused on holding public authorities accountable for the provision of essential services to vulnerable populations. This study (Björkman & Svensson, 2009), corroborated by cross-sectional and qualitative case study evidence (Papp, Gogoi & Campbell, 2012; George, 2003; Murthy & Klugman, 2004; Berlan & Shiffman, 2012), suggests that interventions like citizen report cards, which equip communities to hold officials and providers accountable, can increase utilization of services, and in some cases increase quality.

5.6 Timing and Salience of Information

In the case of incorrect beliefs—one of the primary challenges in RH in low-resource settings—we can use the provision of information to correct false expectations or judgments. Information and education, alone, are not behavioral interventions: they are key components of “rational” decision-making in the standard economic model. However, information becomes behavioral when varying the timing or presentation of the *same* information results in different behavior. This concept is well established in the context of marketing.

“Teachable moments” have been proposed by the public health community as events or circumstances which can lead individuals to positive behavior change (Lawson & Flocke, 2009). However, there is little empirical evidence about the effectiveness of using these “moments,” particularly in RH. There is evidence that Nepali women who receive health education immediately after delivering are more likely to use contraception six months later, compared with those who received education three months after delivery (Bolam et al., 1998). It has been also suggested that pregnancy may be a teachable moment for expectant fathers (Bond, 2010), but this has not been tested.

A Cochrane review of the effects of feedback on physician performance and patient health outcomes in OECD countries finds that feedback to doctors is more effective when given promptly, is clearly meant for a specific person, is ‘actionable’, and is non-punitive (Jamtvedt et al., 2006). The improvements due to feedback have not necessarily been large, but they are often greatest where current practice is farthest from the standard of care (Flottorp et al., 2010). Feedback typically has greater effects on the process of care than on health outcomes (Van de Veer et al., 2010).

Studies have also found that the source and presentation of information is important. A growing body of work indicates that information conveyed through social networks is effective at encouraging behavior change (Duflo & Saez, 2003; Bandiera & Rasul, 2006). This relates closely to the earlier discussion of harnessing social influences to improve decision-making. In a randomized experiment in Bangladesh,

conducting community discussions in the homes of opinion leaders, at central points in villages' social networks, was five times more effective at increasing take up of modern contraceptives than conventional field worker visits (Kincaid, 2000). Similarly, the portrayal of information through entertainment or a personal experience may be absorbed better than statistics and facts. For example, Kearney and Levine (2014) find that exposure to *16 and Pregnant*, a popular show on MTV which purports to show the difficulty of being a teen mother in the US, contributed significantly to a sharp decline in teen births.

More generally, behavioral economics suggests that—within the context of oral or written materials—the order of concepts and word choice can impact how information is received. However, to our knowledge, there have been no rigorous evaluations of small word variations in the context of reproductive health. Further research is necessary to identify the optimal timing and presentation of RH education and counseling for adolescents, women, and men.

5.7 Identity Priming

Identity priming, which acts by increasing the saliency of an individual's gender or race (or other group identity), causes individual behavior to conform more closely to the norms of the primed identity (Shih, et al., 1999; Benjamin, Choi & Fisher, 2010). Priming capitalizes on the multiple social identities an individual has (e.g. wife, mother, daughter, etc.), recognizing that choices may be different, even conflicting, depending on which identity is paramount at the time of a decision. As previously mentioned, Shih et al. (1999) show that Asian women's performance on quantitative tasks is higher when their Asian identity is primed, as opposed to when their female identity is primed, suggesting that identity priming could be harnessed to promote healthier behaviors and more beneficial choices.

Priming has not been widely tested in the RH context, but it may be useful because while women are often pressed to conform to cultural or social norms, they also face conflicting incentives as mothers, wives, or daughters. For example, a woman's role as a wife may push her to conform to family size expectations, with the result that she decides not limit the number of children she will have. On the other hand, her role as a mother might motivate her to restrict family size, in order to have sufficient resources to devote to each child's growth and education.

Thus, it is important to realize that the impact of a program may have differing impacts on women, depending on which identity is made salient through the program's implementation. Identity priming can also have unintended effects, and must be designed carefully. With some reproductive health decisions—including those which are infrequent (like delivery in a facility) or those with outsized and fatal consequences (like unsafe abortion or HIV infection)—it may not be advisable to test highly uncertain interventions.

5.8 Simplification

One well-established tool in behavioral economics is simplification. Individuals make better decisions when the information available to them is less complex (Gigerenzer & Gaissmaier, 2011). However, just filtering information through the use of *heuristics* can lead to suboptimal choices (Iyengar & Lepper, 2000). Simplification is about making salient and clear information visible to individuals around the

moment of decision. It can help decision-makers to overcome *limited attention*, as well as *status quo bias* (by lowering the cognitive costs of adopting new information).

The advantages of simplicity in messaging and design have been appreciated in the field of development. In South Africa, one study finds that simplifying the decisions around interest rates and loans—by reducing the number of combinations of interest rates and loan tenures—led to a large increase in uptake. It was just as effective in promoting adoption as a 2.3 percentage point reduction in the interest rate offered to households (Bertrand et al., 2009).

In the context of health, it is clear that simplifying, streamlining, and removing unnecessary steps and requirements can increase the likelihood of making a healthy decision. For example, in Morocco nearly seventy percent of households signed up for piped water when they received help with the administrative steps needed to obtain a connection. This compares with just ten percent of those who were not provided with assistance (Devoto et al., 2011).

Similarly, providers must operate under uncertain conditions, often with little information and significant time constraints. Under these circumstances, diagnosis and treatment can be improved through the use of tools that provide clear and salient information to guide provider decision-making. Recent studies suggest that clinicians are more accurate when they use a decision making shortcut, or filter information, relative to when all information is available (Marewski & Gigerenzer, 2012; Gigerenzer & Brighton, 2009).

Accessible, salient patient counseling aids can also improve care quality, by reducing provision of inaccurate information, or preventing providers from denying service to particular patient populations (Tavrow, 2010). A Cochrane review of health decision aids finds that simpler materials are more effective than complicated materials in improving the knowledge and empowerment of patients. Similarly, communication on the relative effectiveness of different contraceptives was more comprehensible to patients than information on absolute effectiveness of each method (Steiner et al., 2003; O'Connor et al., 2009).

The WHO Global Handbook for Family Planning Providers offers simplified guidance that emphasizes two features found important to women: effectiveness and side effects. Counseling materials emphasize relative effectiveness, visually ranking methods from most to least effective, and include information on side effects; this presentation has been shown to improve patient comprehension of methods (WHO, 2011a). There is also experimental evidence that simplifying and streamlining counseling about contraceptive adoption (Steiner et al., 2006; WHO, 2011a) improves access. Just as with the bank loans and interest rates, reducing the number of options facing a decision-maker can improve the take up of a product or service. It is important to note here that choice simplification does not necessarily mean reducing the choices or information available to a woman; interventions may be designed to make choices easier without compromising a woman's full and informed choice.

Box 7. Simplification through Task Shifting

The WHO has endorsed task-shifting strategies that authorize non-physician providers to deliver essential services. These providers, including midwives, nurses and community based health extension workers, are often closer to rural and marginalized communities (WHO, 2008). A review of the literature suggests that task shifting can mitigate workforce shortages and inadequate provider skill mix (Fulton et al., 2011). It also has the potential to improve health outcomes. Because task-shifting requires fewer trained providers to carry out complex functions, it typically involves a streamlining of services, eliminating medically unnecessary regulations that complicate and lengthen time to obtaining services or products. This can improve clinical decision-making. Task-shifting also restructures the provider-client encounter, aiming to maximize clarity and utility for the client. Often services are integrated, which further simplifies patient and provider decision-making, by reducing the need for referrals and associated follow-ups.

6. Conclusion

The objective of this review has been to explore how insights and interventions inspired by behavioral economics can be applied to achieve better reproductive health and positive life outcomes. We have presented a framework for identifying behavioral biases in RH decision-making, comprised of four sets of opposing forces facing all individuals: illusion and reality, self and other, thinking fast and slow, and today and tomorrow. While these forces are not exhaustive (and there are certainly other behavioral phenomena involved in reproductive decision-making), we aim to streamline the field of behavioral economics, making it more readily applicable to an important field of public health.

We find that few of the BE tools used in public health and policy interventions have been tested in the context of RH. However, evidence of biases in reproductive decision-making does suggest compatibility with the toolkit developed by psychologists and economists. Specific opportunities include:

1. Correcting Wrong Beliefs

The evidence summarized in section 4.1 demonstrates that incorrect beliefs play a strong role in RH decision-making. Yet there is little specific evidence about how information can be presented to change those beliefs. For example, at what point in time are men and women most likely to absorb or accept information about reproductive health? From what source and in what words is the information most effective at changing beliefs and behaviors?

2. Changing Norms

It is evident that women and girls do not make decisions based purely on their own self-interest, but rather are influenced by the interests of those around them. While many RH programs target communities and social norms, we lack specific, proven methods for doing so. Many of the community-scale interventions targeting harmful social norms are costly and multi-faceted. Teasing apart cause and effect, and identifying mechanisms of action, will require more targeted research.

3. Making Family Planning Easy

We know that women and their partners procrastinate, are deterred by administrative hassles, and have scarce attention. How can family planning decisions be made “automatic” without compromising full and informed choice? What is the reproductive health equivalent of the default, which allows women to make the decision they want without ever having to think about that decision? Can labeling play a role in improving adherence to family plans?

4. Motivating Service Providers

Clinic and community health workers in developing countries have scarce cognitive resources, intuitions, and are often overconfident in their own (incorrect) beliefs, leading to substandard quality of care. What non-financial incentives, feedback loops, or social pressures might motivate them to improve the delivery of services? How can the *best* counseling methods also be made the *easiest*?

These are a few of the opportunities for applying BE to reproductive decision-making. And while some of these insights and tools are quite novel, others simply corroborate the effectiveness of strategies already in use by RH practitioners.

At the same time, reproductive decision-making involves unique issues that do not necessarily appear in other domains of economics or health—including power inequalities across gender and age, and the risks of coercion. These challenges mean that earlier work in behavioral economics may not directly translate to RH. For example, while individuals may face willpower problems (like preferences for immediate gratification over future benefits), women’s sexual decision-making and behavior are heavily affected by social pressure and persuasion, as well as coercion. This may not be the case for other domains that have benefitted from behavioral economics.

Nevertheless, there still remains considerable scope for applying the tools of behavioral economics to reproductive health. Major challenges include flawed beliefs and judgments; entrenched gender inequality and adverse social pressures; complex medical regulations and practices that restrict access to care; and time preferences that lead us to procrastinate or act on impulse. The tools of BE may be useful in addressing these problems, particularly in contexts where there is an adequate supply of services, but a need for better take up and quality of care.

Appropriate application of BE will require not only academic expertise, but also experience in the design and delivery of reproductive health services. Ideally, behavioral nudges and interventions can be integrated into existing programs and institutions, generating outsized impacts by making relatively modest tweaks. And while “nudges” are certainly not a silver bullet for improving reproductive outcomes, they can begin to address the decision-making problems that we all face. As public policies begin to leverage insights from psychology and economics, we can expect to generate significant gains in reproductive health and life outcomes, at relatively modest cost.

Table 2. Desirable Reproductive Health Outcomes			
Providers	Individuals		
<i>Improved services to enable better reproductive health and pregnancy outcomes</i>	<i>Improved individual ability to manage fertility and reproductive health</i>	<i>Strengthened female empowerment/decision-making</i>	<i>Improved reproductive health and pregnancy outcomes</i>
<p><u>Reach of services:</u> increased provision to poor, young and otherwise vulnerable populations.</p> <p><u>Provider competency:</u> including increased 'task-shifting' to increase availability of care (i.e. use of providers with lowest medically appropriate level of training).</p> <p><u>Treatment of patients:</u> attention to patient needs; maintenance of patient privacy, respectful and thorough communication, decreased patient waiting times (streamlined access).</p> <p><u>Contraceptive provision:</u> reduction/elimination of contraceptive and other reproductive health commodity stock-outs, and of medically inappropriate protocols or policies restricting access (e.g., parity or spousal permission requirements).</p> <p><u>Abortion and post-abortion care:</u> improved and more extensive provision of safe and legal services.</p>	<p><u>Reduced (adolescent) fertility:</u> reduced unintended pregnancy; delayed sexual debut, marital timing and first birth; increased birth spacing.</p> <p><u>Reduced inequity in access to services</u> by gender, age, wealth, geographic location.</p> <p><u>Increased use of contraception:</u> promote correct knowledge and favorable attitudes toward contraception; improved contraceptive method adherence and continuation (any method); increased use of more effective methods (if desired); increased willingness to pay for contraception; improved contraceptive method satisfaction; reduced unmet need for contraception.</p>	<p><u>Reduced sexual violence:</u> including rape and harmful traditional practices such as female genital mutilation or cutting.</p> <p><u>Increased female agency:</u> related to sexual debut, marital timing, contraceptive choice and use.</p> <p><u>Increased female school continuation and completion.</u></p> <p><u>Increased formal female labor force participation:</u> increased female control over money and income (savings, credit, etc.).</p> <p><u>More equitable within couple relations:</u> increased within-couple communication over sexual and reproductive decision-making; increased female influence over frequency and timing of sexual intercourse, reproductive timing and family size (whether and when to have children, and how many); increased wantedness of sex; increased support from husbands of married girls for girls' health, well-being and decision-making.</p>	<p><u>Reduced morbidity and mortality</u> due to unsafe abortion / unsafe delivery (including fistula).</p> <p><u>Increased family and community planning</u> to ensure women's access to (emergency) obstetric care</p> <p><u>Safe and early care for unplanned pregnancy:</u> increased and earlier use of antenatal care if pregnancy desired; increased and earlier use of early abortion services if pregnancy not desired.</p> <p><u>Increased use of modern sexual and reproductive health services:</u> increased proportion of pregnant women using antenatal care; increased proportion of births assisted by skilled birth attendants; and increased use of (emergency) obstetric care; and promote basic community-based and hospital based maternity care.</p>

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