The Influence of Developmental Idealism on Fertility

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Abstract

Developmental idealism theory poses a collection of schemas, known as developmental idealism (DI), as an important influence on demographic behavior and change. We test this proposition for fertility behavior – examining if individuals' endorsement of DI influences their subsequent progression to a birth. The assessed DI schemas include beliefs that low fertility is a cause and effect of societal development and a positive attitude towards fertility decline. We use panel data from the Chitwan Valley Family Study (CVFS) collected from 2008 to 2014 in Nepal – a period when fertility declined from about three to nearly two children per woman. Nepali policy emphasized a two-child ideal for achieving national development. Thus, we also examine if DI endorsement is more influential for women with two or more children compared to those with none or only one. DI endorsement did influence women's fertility. High DI endorsement reduced the probability of another birth by over half among women with two or more children. By contrast, endorsement of DI did not affect women's progression to first and second births. This finding suggests the spread of DI culture may well have contributed to fertility decline by motivating many to limit their family size.

The Influence of Developmental Idealism on Fertility

Developmental idealism theory poses a particular collection of values and beliefs, termed developmental idealism (DI), as an important driver of demographic change (Thornton 2001, 2005). In DI culture, societies are seen as moving from traditional to modern through a process of development. Further, elements understood as modern, are viewed as good and causally related to wealth, health, and happiness. DI theory argues that as DI culture spreads around the world, people increasingly adopt behaviors seen as modern because they are viewed as inherently good and related to development, with the result being demographic change at the societal level. Underlying this proposition that the spread of DI is a driver of demographic change is a more fundamental claim that endorsement of DI schemas influences individual demographic behavior.

Fertility may be the most consequential demographic behavior shaped by DI culture. Thornton and colleagues (2012) argue the spread and adoption of DI is an important cause of individuals having small numbers of children and resulting fertility declines. DI schemas that identify low fertility as inherently good and causally related to development spread around the world. As people adopted these schemas, they were motivated to limit childbearing. In turn, large numbers of individual women having fewer children aggregates into fertility declines. Past research already documents widespread declines in ideal numbers of children and connect such childbearing preferences to fertility (e.g. Brauner-Otto 2013; Cleland et al 2020; Günther and Harttgen 2016; Schoen et al. 1999).

To our knowledge, however, no study has tested the claim that DI beliefs – particularly beliefs that low fertility is a cause and effect of societal development – influence individual fertility behavior. A handful of studies use country-level data and historical case studies to link

DI culture to fertility decline at the macro-level (Guend 2011; Thornton and Xie 2016; Watkins and Hodgson 2019), but do not address the individual level. Research rooted in a DI framework documents that DI beliefs relating fertility to development are widespread and correlated with positive attitudes towards low fertility among several populations (Gjonça and Thornton 2019; Kavas and Thornton 2020; Thornton et al. 2012; Thornton et al. 2014), but do not connect those individual beliefs to behavior. Other studies connect individual DI beliefs to marriage and migration behavior (Allendorf and Thornton 2015; Allendorf et al. 2019; Thornton et al. 2022), but not fertility behavior.

Our study is the first to examine if individuals' endorsement of DI beliefs influences their fertility. We test this key proposition of DI theory using groundbreaking panel data collected in Nepal from 2008 through 2014 under the Chitwan Valley Family Study (CVFS). CVFS is the only data source in which administration of DI measures in a baseline survey was followed by long-term tracking of demographic behavior. Using these data, we examine if women with high endorsement of DI schemas about fertility in 2008 were less likely than women with low DI endorsement to progress to a birth by 2014. We also examine if the influence of DI schemas is larger for women with two or more children compared to those with none or only one. Because our data were collected during Nepal's fertility decline, our results also provide insights into Nepal's aggregate trends. As described below, this period corresponds to a national fertility decline from about three to just over two children per woman.

Before proceeding, it is important to note that we do not pose DI culture as the only influence on fertility behavior, nor do we take a position on the veracity of the content of DI. It is well established that there are multiple causes of individual fertility behavior and fertility declines around the globe, including ideational, economic, and demographic factors (Mason

1997). We suggest the spread of DI is one more cause and that addressing its role in fertility variation and change enriches our understanding. We are also aware that the content of DI itself has long been at the center of demography. DI beliefs that fertility is causally linked to development are at the core of demographic transition theory, which has been contested over the decades (Chesnais 1992; Coale and Watkins 1986; Heuveline 2001; Notestein 1953). We are not suggesting these beliefs are true or false, nor the attitudes good or bad. Instead, we suggest these schemas themselves are a powerful force on demographic behavior.

Developmental Idealism and Fertility

DI culture traces its origins to scholars of the Enlightenment in the 1700s and 1800s who observed myriad differences between Northwest Europe and societies elsewhere (Thornton 2005). They analyzed these differences through a developmental paradigm – believing all societies move along a unilinear path from traditional to modern with their own Western societies leading the way. Early scholars also placed variation in family life along this continuum. They ethnocentrically viewed family attributes of their own Western societies, such as nuclear family households and mature ages at marriage, as good and modern. Conversely, they judged family attributes found in non-Western societies, such as extended family households and young ages at marriage, as inferior and traditional. They further concluded that Northwest Europe demonstrated the modern family life that non-Western societies would experience in the future once they developed further. Conversely, non-Western societies provided a contemporary representation of Northwest Europe's traditional past. In other words, these early scholars promulgated the idea that cross-sectional differences across space were a product of development over time.

Fertility entered this scholarly milieu only later (Thornton 2005: 73-80). In the 1700s and 1800s when DI first took shape, differences in marital fertility between Western and non-Western societies were small or undocumented, making it unsuitable for placement along a modern/traditional continuum. In the late 1800s and early 1900s, however, declines in marital fertility in Northwest Europe were first documented. These early fertility declines were interpreted through the existing developmental paradigm; declining fertility was seen as a product of broader social and economic change understood as development or modernization (Davis 1963; Notestein 1953; Thompson 1930). Soon, low fertility was labeled modern and viewed as a crucial driver of development that could prevent the adverse consequences of unchecked population growth (Coale 1964; Ehrlich 1971). In the mid-twentieth century, the international family planning movement and national governments put fertility at the center of policy and programs in Asia, Latin America, and Africa (Connelly 2008; Luke and Watkins 2002; Robinson 2015). Like DI concerning marriage and other family attributes, fertility DI schemas spread through multiple mechanisms, including missionaries, migration, media, and schooling curricula (Thornton, Dorius and Swindle 2015). DI related to fertility received a special boost of media attention, economic incentives, and even forcible coercion, because fears about the evils of population growth were at the center of development and population policy in the latter half of the 20th century (Barber and Axinn 2004; Merchant 2021; Togman 2019).

By the start of the 21st century, DI schemas about fertility had moved well beyond the elite realms of scholars, government officials, and family planning professionals. Low fertility is widely embraced as good with small numbers of children representing a widespread ideal. Apart from Sub Saharan Africa, two to three children are now ideal across the globe (ICF 2024; Sobotka and Beaujouan 2014). In the two Asian giants, which are home to a third of global

population, ideal numbers of children were 2.1 in 2021-22 India (IIPS and ICF 2022) and 1.7 in 2018 China (Chen and Gietel-Basten 2024).

A smaller number of studies further suggest many people believe fertility is causally related to societal development. Large shares of respondents endorsed DI beliefs about fertility in nine population-based surveys administered in Albania, Argentina, China, Egypt, Iran, Malawi, Nepal, Turkey, and the United States (Gjonça and Thornton 2019; Kavas and Thornton 2020; Thornton et al. 2012; Thornton et al. 2014). For example, large majorities in these surveys said a successful family planning program would increase the standard of living or make their country richer in Argentina (84%), China (99%), Egypt (92%), Iran (95%), Nepal (94%), the United States (84%), Turkey (81%), and urban Malawi (88%). In rural Malawi and Albania these items garnered small majorities of 56% and 52% respectively. Endorsement of the reverse causal relationship – that development decreases fertility – was also widespread. Percentages who said development would decrease couples having many children ranged from 62% in Turkey to 95% in China. Majorities of respondents to surveys in the Middle East also endorsed the DI belief that development and fertility are causally related; 95% of respondents in Lebanon, 54% in Saudi Arabia, and 56% in Iraq said families with fewer children would increase if their country became more developed (Thornton et al. 2017).

Study Context

Nepal's history of family planning and fertility decline bears many similarities to India, its larger southern neighbor. The Family Planning Association of Nepal (FPAN) was founded in 1959 and became an associate member of the International Planned Parenthood Federation the following year (Brunson 2016: 79) – just a few years after India initiated the first national family planning program in 1952. In subsequent decades, the Nepali government embraced family

planning as a key strategy for enhancing development and regularly featured family planning goals in the five-year development plans at the center of national policy. The Ministry of Health and FPAN promoted the same family planning message used in India – a small family is a happy family. The depiction of this small, happy family as a nuclear family with one son and one daughter appeared in FPAN's logo, posters, textbooks, and even a national stamp (Brunson 2016).

These family planning messages and their centrality to development (*bikas*) were soon ubiquitous in villages as a two-child ideal took hold in Nepal (Fujikura 2004; Pigg 1992). In 1976, the mean desired number of children was 4.0 (Macura and Cleland 1985). Two decades later, in 1996, the mean ideal number of children had fallen to 2.9 and just over a third of women said two children were ideal (Pradhan et al. 1997). By 2011 – just 15 years later during the period when our data were collected – 63% of women said two children were ideal and the mean ideal was 2.1 (MOHP, New ERA, and ICF 2012).

Changes in contraception became palpable in Nepal in the late 1970s and 1980s. The percent of married women using contraception rose from 3% in 1976 to 29% in 1996 (Acharya 2020) and then to 50% by 2006 (MOHP, New ERA, and Macro 2007). National policy focused on limiting childbearing and initially promoted sterilization as the primary method – first male sterilization through the 1980s and then female sterilization (ibid). Use of temporary methods, primarily injectables and pills, increased dramatically around 2000, but were still used primarily for limiting, rather than spacing, births.

Fertility began declining in the 1980s, but only rapidly in the 1990s. The total fertility rate was stable at around six children per woman from the 1950s through the 1980s when it slowly turned downward (Retherford and Thapa 1999; United Nations 2019). The pace of

decline accelerated rapidly from the 1990s onwards with the total fertility rate falling from 5.0 in the early 1990s to 3.1 in 2006 and then to 2.1 in 2022 (MOHP, New ERA, and ICF 2023). Like India, this decline was achieved primarily through parity-specific limitation (Timaeus and Moultrie 2020). Unlike Sub Saharan Africa and Southeast Asia, there was little increase in the length of birth intervals in Nepal.

In the 2000s, however, there were signs that migration is another key determinant of Nepali fertility. Recent fertility declines may be due, at least in part, to infrequency of sex as husbands migrated temporarily for work (Ban et al. 2012). As noted above, the total fertility rate dropped by one child from 3.1 to 2.1 from 2006 to 2022 (MOHP et al. 2023). Over this same period, the percent of married women using more effective forms of contraception – often termed "modern" methods – remained stable at 43-44% (ibid). Only use of rhythm, withdrawal, and other less effective methods – often termed "traditional" methods – rose from 4% to 15% over the same period. Male migration to India, the Gulf, and elsewhere was at high levels (Government of Nepal 2022; Thornton et al. 2019b). During this period, the main reason for discontinuation of contraception was infrequent sex due to husband being away (MOHP et al. 2011: Table 7.10; MOHP et al. 2023: Table 7.12). Husbands' absences accounted for almost half of contraceptive discontinuation – twice as common as the second reason, which was concern about side effects.

Our study site of Chitwan Valley, located in south central Nepal, exemplifies this national context. In Chitwan, provision of contraception and family planning motivation programs began in the 1970s and rose to substantial levels in the 1990s (Brauner-Otto, Axinn and Ghimire 2007). A two-child ideal also took hold during the same period; 60% of adult residents said two children was ideal in 1996 and 73% did so in 2008 (Jennings and Pierotti

2016). Contraception use rose over the same period and was used primarily for limiting, rather than spacing (Axinn, Ghimire and Barber 2008). Male migration is also at high levels in Chitwan and is likely shaping fertility and contraception (Thornton et al. 2019b).

Hypotheses

We test two main hypotheses based on DI theory and the study context. Our first hypothesis is based on the general proposition of DI theory that endorsement of DI schemas about fertility influence individuals' fertility behavior:

H_1: Compared to women with *low* endorsement of DI schemas in 2008, women with high endorsement of DI schemas in 2008 will be *less* likely to progress to a birth by 2014.

We examine fertility, but not contraceptive use, because it is the central outcome of interest, while contraception is a mechanism. Further, given high levels of male migration and its connection to DI as well, contraception is likely not a straightforward pathway between DI and fertility in this context during our study period.

Our second hypothesis is rooted in the Nepali context. As noted above, Nepali development policy and programs emphasized limiting fertility to two children, but there was little attention to fertility timing. Further, Nepal had a parity-specific fertility decline while childbearing remained universal. Nearly all, 97%, of Nepali women aged 45-49 in 2022 had at least one birth and 92% had at least two (MOHP et al. 2023: 111). Thus, we expect DI schemas to be more influential for women who are at or beyond the two-child ideal and likely limiting their fertility. By contrast, we expect DI schemas are less influential for women who have only one child or no children. For Nepali women contemplating a first or second birth, we expect it is largely a question of when to have a birth, not whether to forgo having a(nother) child altogether. Thus, our second hypothesis is the following:

H_2: The effect of DI endorsement on the likelihood of progressing to a birth by 2014 will be *larger* for women with two or more children (likely limiters) in 2008 than for women with one or no children in 2008 (likely delayers).

Data and Methods

We use data from the Chitwan Valley Family Study (CVFS) (cvfs.isr.umich.edu). The CVFS, launched in 1995, features a neighborhood-based sample of households located in Chitwan Valley and includes multiple surveys, household registries, and other data. We use CVFS data collected from 2008 to 2014 in household registries and two household surveys: an original baseline survey and an extended baseline survey.

Data on socioeconomic characteristics were collected in the *original* baseline survey of all CVFS household residents aged 12-59 in 2008. Respondents aged 15-59 were administered this original baseline survey in 2008. Residents aged 12-14 in 2008 were administered the baseline survey on an ongoing basis from 2008 to 2012 after reaching 15 years of age.

Data on DI schemas related to fertility were collected in the *extended* baseline survey of the same individuals interviewed in the original baseline. For respondents aged 15-59 in 2008, the extended baseline interview was typically six to eight months after the original baseline interview. Those aged 12-14 in 2008 were administered the extended baseline survey at the same time they took the original baseline survey – once they reached 15 years of age from 2008 to 2012.

Data on fertility and husband's residence are taken from household registries collected on an ongoing basis from 2008 through 2014. Household registry interviews were administered to any available household member and ascertain births, marriages, and residence for all household members. Registry interviews occurred every three months from 2008 to 2012 and every six months from 2012 onwards. While interview frequency was reduced, the measured timing of

births, marriages, and husbands' residence in the household remained precise to a specific month.

Our analytical sample comprises 1,196 women who completed original and extended baseline interviews, were 15-34 years old at the time of their original baseline interview, not pregnant between the original and extended baseline interviews, not sterilized at the extended baseline, and at risk of pregnancy at any point from the extended baseline interview up through 2014. We operationalize periods at risk of pregnancy as the 45,936 person-months in which these women were married and not sterilized. We identify women as at risk of pregnancy only when married because non-marital fertility is virtually non-existent in Chitwan Valley.

Of the 1,196 women in our analytical sample, only 94 were part of the youth sample aged 12-14 in 2008 and were administered original and extended baseline interviews simultaneously after turning 15. The other 1,102 women were 15-34 years old in 2008 and administered the original and extended baseline surveys a few months apart; 84.3% had a gap of six to eight months between the two interviews.

Our target population is women, rather than couples, because the study design paired with high levels of male migration allowed for only an underpowered sample of 748 couples. Using other CVFS data, however, Jennings and Pierotti (2016) find it is wives' preferences that drive couples' fertility.

Measures

Developmental Idealism about Fertility. Nine questions measuring endorsement of DI schemas about fertility were administered in the extended baseline interviews (Table 1). Seven of these items measure abstract *beliefs* about a causal relationship between development and fertility. Specifically, five items assess if respondents believe fertility decline causes

development. For these five items, respondents were first read an introductory script anchored on "a country where people have very low income, most people live in rural areas, access to healthcare is poor, and most couples give birth to many children." They were then told to "suppose that country introduces a small-family-size program to encourage couples to give birth to just a few children. I will read a list of things this small-family program might change. For each one, please tell me whether it will increase in the future or decrease in the future." Five of the belief items are successive questions referencing five "things" often viewed as aspects of development, namely (reduced) infant mortality, (fewer) visits to local healers (versus medical doctors), wealth, televisions, and education (Items 1-5, Table 1). A sixth item, administered in a different module, assessed the belief in a causal relationship in the reverse direction - that development influences fertility: "If Nepal became richer over time would that increase or decrease couples having many children?" (Item 6, Table 1). The seventh belief item measured expectations of future changes in fertility: "Do you think that, on average, the number of children a woman gives birth to will increase or decrease in Nepal during the next twenty years?" (Item 7, Table 1).

[Table 1 about here]

The other two DI items measure *attitudes* towards fertility in Nepal – specifically, whether fertility decline and low fertility are good or bad. Attitudes towards fertility decline were assessed in a question immediately following the question on expectations for future fertility (Item 7, Table 1): "Suppose on average the number of children a woman gives birth to decreases in Nepal during the next twenty years. Overall, will that be a good thing, a bad thing, or won't it matter?" The attitudinal item on low fertility appeared in a separate module and referenced what

is good for most Nepalis: “Overall, which do you think is better for most people in Nepal today—having one child or having three children?”

We expect all nine fertility DI items are both reliable and stable measures of women’s attitudes and beliefs. Analyses of nearly identical DI items concerning other family behaviors demonstrated substantial reliability across multiple surveys administered in our study site from 2008 to 2011, on par with levels measured in American surveys (Thornton et al. 2019a).

We dichotomized these nine DI fertility items with a 1 indicating an answer consistent with a DI schema and 0 otherwise. Responses consistent with DI include believing a successful family planning program would increase wealth, televisions, and education, but decrease infant mortality and visits to local healers (Table 1). DI beliefs also include believing fertility will decrease in the next twenty years and if Nepal became richer. For the attitudes, DI responses include viewing future fertility decline as good and one child as better for most people. The zeros denote responses that are counter to DI, as well as in-between responses and don’t knows. These in-between responses were not explicitly given, but were recorded during data collection if respondents volunteered “about the same” or “neither,” along with “don’t know.”

Large majorities of our sample gave responses consistent with DI, ranging from 68.3% to 97.7% across the nine items (Table 2). While DI endorsement was generally high, endorsement of DI attitudes was lower than beliefs. The two attitudinal questions garnered the smallest percentages of responses consistent with DI; 68.3% said it’s good if fertility declines in the future and 72.3% said one child is better than three for most people. DI responses to questions measuring beliefs ranged from a substantial majority of 79.8% for those saying fertility will decline in the future in Nepal to a virtually universal 97.7% saying education would increase with a successful family planning program.

[Table 2 about here]

We use three DI measures in our analyses based on these nine DI items. Our main DI measure is an ordinal variable denoting the total number of DI *beliefs* about fertility endorsed by respondents, including 1) zero to five DI beliefs, 2) six beliefs, or 3) all seven. Our other two DI items are measures of *attitudes*. They are the dichotomized versions of the two attitudinal items: 1) it is good if fertility declines in future and 2) one child is better for most people than three children. We use these two attitudes separately because they have a low (polychoric) correlation of .15. As described below, the two attitudes also have markedly different relationships with fertility. Further foreshadowing results, it is important to note the fertility-decline-is-good attitude has a moderately high correlation of .39 with DI beliefs. By contrast, the one-child-is-better attitude has a lower correlation of .23 with DI beliefs.

As noted above, we have conceptual reasons for using separate measures of DI beliefs and attitudes. Past research has not yet examined the influence of DI beliefs on fertility, while other studies have examined the influence of attitudes towards numbers of children, albeit with different theoretical framing (e.g. Brauner-Otto 2013; Schoen et al. 1999). Our measurement strategy allows us to test if DI beliefs influence fertility above and beyond their correlation with DI attitudes about fertility.

There are also empirical reasons for using separate measures of DI beliefs and attitudes. Exploratory factor analysis indicated all seven DI beliefs measure a single underlying variable, but show mixed results for attitudes (Table 2). In a factor analysis of all nine DI items, the loadings for the seven beliefs are uniformly high, ranging from .67 to .83. Loadings for the two attitudes are substantially lower, .56 for "good if fertility declines in future" and .45 for "one child is better for most people than three children." This .45 loading even falls below the typical

cutoff of .5 for inclusion in a scale. The proportion of variance explained by a first factor is also higher when the two attitude items are dropped. Specifically, the first factor accounts for 49% of total variance when all nine items are included, while it explains 56% of variance with only the seven beliefs (Table 2).

We measure DI beliefs with the three-category ordinal variable to reflect the skewed distribution of DI beliefs and ease interpretation. A more interpretable additive scale, in which one additional unit corresponds to endorsing one more DI belief, is nearly identical to an inductive scale created by the factor analysis. The correlation of the total number of DI beliefs has a .99 correlation with the first factor retained from a factor analysis of the seven DI beliefs. This near-perfect correlation is consistent with the uniformly high loadings of the DI beliefs, which is consistent with the factor analysis giving nearly equal weight to the seven items in an inductive scale. These results support using a more interpretable additive scale, rather than an inductive scale retained from the factor analysis. However, the additive scale is highly skewed. Nearly two-thirds (64.6%) of respondents endorsed all seven DI beliefs and another fifth (20.3%) endorsed six (Table 3). Only 15.1% of women endorsed five or fewer DI beliefs. Further, among the 181 women who endorsed five or fewer DI beliefs, 106 (8.9%) endorsed five and another 40 (3.3%) endorsed four. Only 35 respondents (2.9%) endorsed three or fewer DI beliefs.

Fertility. Our dependent variable is women's monthly hazard of conceiving a pregnancy that later ended in a live birth. For simplicity, we refer to this outcome as a birth. The period of risk starts at the extended baseline interview – generally in 2008 or 2009 – for those already married. For women not yet married at baseline, exposure starts the month of marriage as recorded in the household registry. We considered women to remain at risk of pregnancy until their marriage ended or they were censored when the study period ended in 2014. We treat

progression to a birth as an absorbing state; women do not re-enter the analysis after a birth. Person-months are coded 1 if a conception that later ended in a live birth occurred, and 0 otherwise. By the end of the study period, 40.3% of the sample had a birth (Table 3).

We date the person-month of failure by assuming conception occurred nine months before the live birth recorded in the household registry. There are exceptions, however. A handful of women who married during the study period gave birth eight months after marriage. These seemingly short pregnancies likely reflect preterm births and premarital conceptions. In these cases, the month these women married, which is their first month at risk of pregnancy, is identified as the month of conception.

Likely limiters vs likely delayers. We divide women into two groups based on the number of children at baseline to test our second hypothesis that the influence of DI is greater for women who or at or beyond the two-child ideal. "Likely limiters" comprise the 405 women with two or more children at baseline, while "likely delayers" comprise the 791 women with one child or no children at baseline.

Controls. We include several control variables that are likely associated with both DI endorsement and fertility (Table 3). Controls fixed at the time of the original baseline interview were socio-economic characteristics, including education, distance from the urban center, caste/ethnicity, and non-family work experience. Education is an ordinal variable with cutoffs at key transition points in the Nepali school system – zero to six years denoting primary school or less, seven to ten years denoting secondary school, and eleven or more years denoting at least some tertiary schooling. Caste/ethnicity is a categorical variable distinguishing high caste Chhetri-Bahuns, low caste Dalits, Hill Janajati, and Terai Janajati. Hill Janajati refer to several groups indigenous to the Himalayan foothills, such as Gurung and Tamang. Terai Janajati refers

to Tharus and other groups indigenous to the plain that runs along the southern border of Nepal. Work experience is a categorical variable denoting if the woman ever worked outside the family and, if so, whether she ever received a salary. Salaried jobs, like teaching or working in an NGO, represent the highest paying jobs with smooth income streams and greater status. Unsalaried non-family work typically includes agricultural labor and informal sector employment (Brauner-Otto, Yang and Ng 2023).

[Table 3 about here]

Other controls adjust for the number and gender of women's children, as well as time-varying characteristics. We include dummies for the exact number of women's children at baseline, as well as a dummy indicating if the children were all daughters. Time-varying controls comprise study time, the woman's age in single years, and whether she was living with her husband. Study time denotes the person-months at risk and varies from one to 71. The living with husband variable is also precise to the month. Husbands were co-resident in just over half of person-months due to high levels of migration.

Analytical Strategy

We take a discrete time hazard approach and use logistic regression models with person-months as the unit of analysis. Estimates from these discrete time methods are quite similar to those from continuous time models (Yamaguchi 1991). Further, while using person-months as the unit of analysis inflates the sample size, it does not deflate standard errors. We present results as average marginal effects. For dichotomous and ordinal DI variables, the average marginal effects are simple differences in predicted probabilities of a birth between a particular category of the independent variable and the reference category. Since raw probabilities of a birth in one person-month are tiny, we transform them into the probability of a birth in 60 person-months, or

five years, for interpretability. Specifically, if the predicted probability of a birth in one person-month is π_1, we transformed it into π_{60}, the probability of a birth in 60 person-months, where $\pi_{60} = 1 - (1 - \pi_1)^{60}$. We use delta tests to assess if these transformed average marginal effects differ significantly from zero (Long and Freese 2014).

We present three models for the full sample, as well as for likely limiters and delayers separately. These three models include different configurations of the DI variables along with complete sets of controls. All three DI variables, including DI beliefs and the two DI attitudes, are included in a first model. A second model includes only DI beliefs and a third model only DI attitudes. We present all three models to show how marginal effects for DI beliefs and the good-if-fertility-declines attitude shift slightly when adjusting for the other. As noted above, the good-if-fertility-declines attitude has a moderately high correlation with DI beliefs, while the one-child-is-better attitude does not.

To test our second hypothesis, we compare average marginal effects of DI between likely limiters and delayers using delta tests (Long and Mustillo 2021). We calculate second differences for these two groups, subtracting the marginal effects of DI for likely limiters from those for likely delayers. We also recalculate the effects of DI as relative risk ratios and test differences in these ratios between likely limiters and delayers. For example, we divide the predicted probability of a birth for those who said fertility decline is *good* by the same probability for those who said fertility decline is *not* good. We then subtract this ratio for limiters from the same ratio for delayers and test if this difference differs significantly from zero. The relative risk ratios are a better representation of group differences because fertility is much higher among likely delayers than likely limiters; 56% of women with one child or no children at baseline had a birth during the study period versus 10% of women with two or more children at baseline. In turn, identical

differences in *absolute* marginal effects – a reduction of say .05 – between the two groups are far from identical in *relative* terms. For instance, a reduction of .05 across the study period would have reduced limiters fertility by half (.05/.104), but delayers fertility by only a tenth (.05/.556).

We also report results for an alternative set of models run for the sample of women aged 18 and above at the baseline survey. As noted above, our measure of education is fixed at the baseline survey. Women who took the baseline survey when they were young and unmarried likely went on to complete further schooling before they married and were at risk of a birth. In turn, our education measure likely includes some censoring and does not fully control for women's schooling. To address this limitation, we estimated the equations again limiting the sample to women for whom education was unlikely to have changed. Specifically, we dropped the 246 respondents aged 15 to 17 at the time of their baseline interview, limiting the sample to 950 women aged 18 and above at baseline.

Finally, it is important to note that while we theorize women's endorsement of DI has a causal influence on fertility, our analysis is limited by the potential of endogeneity. The association between DI and fertility that we identify could be inflated by correlations with other factors associated with both fertility and DI. The inclusion of controls ameliorates, but does not solve, this problem. Unfortunately, we are not aware of an exogenous source of variation in DI that can be used to provide stronger evidence of a causal relationship. The theorized causal relationship is bolstered by appropriate temporal ordering with endorsement of DI measured before fertility.

Results

Average marginal effects from logistic regression models of the hazard of a birth are presented in Table 4. These marginal effects are based on the transformed predicted probabilities

of a birth over five years (60 person-months) of exposure, rather than the original metric of one person-month. For instance, an average marginal effect of -.10 for a particular category indicates that the probability of a birth over five years of exposure is .10 lower for that category than the reference category. For continuous variables of age and distance from the urban area, the average marginal effect is the change in the probability of a birth over a five-year period for one additional unit of age or distance. Model 1 is a full model with all controls and all three DI measures – DI beliefs, the good-if-fertility-declines attitude, and the one-child-is-better attitude. Model 2 is a DI beliefs only model – it includes DI beliefs and all controls, but neither DI attitude. Model 3 is a DI attitudes only model – it includes both DI attitudes and controls, but not DI beliefs. All three models are shown for the full sample of women, women with no children or one child at baseline (likely delayers), and women with two or more children at baseline (likely limiters) respectively.

[Table 4 about here]

For the full sample of all 1,196 women, there is little to no effect of DI beliefs on fertility. The average marginal effects for endorsing all seven and six DI beliefs are -.01 and -.03 respectively, indicating the probability of a birth in five years is .01 and .03 lower for women who endorse six and seven DI beliefs respectively compared to women who endorse five or fewer DI beliefs (Table 4, Model 1). These effects are tiny and not statistically significant. In Model 2, the average marginal effects for DI beliefs increase slightly to -.04 and -.05 when DI attitudes are dropped from the model (Table 4, Model 2). The marginal effects are slightly larger in Model 2 because the good-if-fertility-declines attitude has a sizable polychoric correlation of .38 with DI beliefs. The magnitude of the marginal effects for DI beliefs remains small though and they are still not statistically significant.

Among the full sample of women, one DI attitude has a sizable negative effect on fertility, while the other DI attitude does not. The marginal effect for the one-child-is better attitude is a statistically significant -.09, indicating the probability of a birth is reduced by .09 among women who view one child as better than three (Table 4, Model 1). By contrast, the average marginal effect for the good-if-fertility-declines attitude is a statistically insignificant -.02, indicating there is little to no difference in the fertility of women who view fertility decline favorably versus those who do not (Table 4, Model 4). These average marginal effects remain identical when DI beliefs are dropped from the model (Table 4, Model 3).

These small to nonexistent effects of DI beliefs in the full sample of women mask notable differences by the number of children women had at baseline. DI beliefs have sizable effects on likely limiters with two or more children, but virtually no effect on likely delayers with none or one. Among likely delayers, the average marginal effects of DI beliefs is zero (.00) for women who endorsed six DI beliefs and .05 for women who endorsed all seven DI beliefs (Table 4, Model 4). When DI attitudes are dropped from the model, these marginal effects change to -.02 and .01 respectively (Table 4, Model 5). These tiny and statistically insignificant effects indicate endorsement of DI beliefs is unrelated to the probability of a first and second birth.

By contrast, DI beliefs have sizable and statistically significant effect on likely limiters. Among women with two or more children, the average marginal effects of DI beliefs are -.08 for six beliefs and -.11 for all seven (Table 4, Model 7). When DI attitudes are dropped from the model, these estimates remain nearly identical with lower p-values; the average marginal effect for six beliefs declines by a hundredth to -.07 and the effect for seven beliefs remains -.11 and is statistically significant at the .05 level (Table 4, Model 8). Thus, endorsing all seven DI beliefs

lowers women's probability of third and higher order births by .11 compared to those endorsing five or fewer DI beliefs.

The good-if-fertility-declines attitude shows similar, albeit muted, differences between likely delayers and limiters. Among likely delayers, the good-if-fertility declines attitude has average marginal effects of -.03 in the full model with DI beliefs (Table 4, Model 4) and -.02 in the model with just DI attitudes (Table 4, Model 6). These tiny and statistically insignificant effects suggest there were little to no differences in the probability of a birth among women with one or no children. Among likely limiters, the marginal effect of a favorable attitude towards fertility decline is modest, but palpable in magnitude and nearly statistically significant. Specifically, among these women with two or more children at baseline, the average marginal effect of the good-if-fertility-declines attitude is -.04 in the full model with DI beliefs (Table 4, Model 7) and a slightly larger -.06 with a p-value of .08 in the model without DI beliefs (Table 4, Model 9).

For the other DI attitude – one child is better than three children – this pattern is reversed. Endorsing the DI attitude reduces likely delayers probability of a birth, but not likely limiters. Among women with one child or no children, the average marginal effect of the one-child-is-better attitude is a statistically significant -.10 in models with and without DI beliefs (Table 4, Models 4 & 6). Thus, the probability of a first or second birth is lower by .10 among women who said one child is better for most people than three. By contrast, there is little to no difference in the likelihood of another birth among women with two or more children. Among likely limiters, the average marginal effect of the one-child-is-better attitude is a statistically insignificant -.01 in models with and without DI beliefs (Table 4, Models 7 & 9).

Differences Between Likely Delayers and Limiters

These differences in the average marginal effects of DI in separate models for likely limiters and delayers are striking, but the estimates may not differ significantly and are not an adequate test of our second hypothesis that the effects of DI are larger for women with two or more children. Thus, in Table 5, we provide a more rigorous comparison of likely limiters and delayers, featuring delta tests of whether second differences between the two groups differ significantly from zero. These estimates are all based on one model run for the full sample of 1,196 women – this single model includes all three DI measure and all controls, as well as interaction terms for all variables with a dummy denoting if the woman is a likely delayer (versus likely limiter). The predicted probabilities from this model are again transformed to refer to five years (60 person-months) of exposure, rather than the original metric of one person-month. Using these transformed probabilities of a birth we calculate absolute and relative second differences between likely delayers and limiters and use delta tests to examine if these second differences differ from zero.

We find sizable, statistically significant differences in the effects of DI beliefs between likely delayers and limiters (Table 5). We illustrate this main point by building the comparison of the transformed predicted probabilities – the probability of a birth with five years of exposure. Among likely delayers, the predicted probability of a birth is .61 among those endorsing five or fewer DI beliefs, .59 among those endorsing six DI beliefs, and .64 among those endorsing all seven. The absolute differences in these predicted probabilities are tiny, comprising -.02 (.591-.606) between women endorsing six beliefs versus five or fewer and .03 (.639-.606) between women endorsing all seven beliefs versus five or fewer. Among likely limiters, the predicted probabilities of births are much lower; .20 among those endorsing five or fewer beliefs, .12

among those endorsing six DI beliefs, and .09 among those endorsing all seven. The absolute differences in these predicted probabilities are sizable, comprising differences of -.08 (.085 – .197) between women endorsing six beliefs versus five or fewer and -.11 (.085 – .197) between women endorsing all seven beliefs versus five or fewer. In turn, the absolute second differences – that is the differences between likely delayers and limiters in the absolute differences in probabilities of a birth by DI beliefs – are also sizable. The second difference between likely delayers and limiters for the (first) differences in the effects of six DI beliefs (vs five or fewer DI beliefs) is .06 (-.015 – -.077) and the second difference for seven DI beliefs is .15 (.033 – -.112). This second difference of .06 for six DI beliefs is not statistically significant (p=.50). The second difference of .15 for seven DI beliefs has a (two-tailed) p-value of .09, making it statistically significant with a one-tailed test, but not a two-tailed test.

In relative terms, the effects of DI beliefs are nonexistent for women with no children or one child, but substantial for women with two or more children. Further, given the large differences in birth probabilities between likely delayers and limiters, a relative measure provides a better comparison. Relative risk ratios for likely delayers are nearly one, the ratio indicating no difference in the probability of a birth. Specifically, among likely delayers, the relative risk ratios are 0.98 (.591/.606) for six DI beliefs versus five or fewer and 1.05 (.639/.606) for all seven DI beliefs versus five or fewer. For likely limiters, the relative risk ratios are well below one, indicating substantial reductions in birth probabilities among women endorsing more DI beliefs. Specifically, among limiters, the relative risk ratios are 0.61 (.120/.197) for six DI beliefs and 0.43 (.085/.197) for all seven DI beliefs. In other words, endorsing six DI beliefs lowers the probability of a birth by over a third and endorsing all seven DI beliefs lowers the probability by over half. In turn, the second differences – that is the

difference in the relative risk ratios between delayers and limiters – are also large. For six DI beliefs the difference in relative risk ratios is 0.37 (0.975 – 0.608) and for seven DI beliefs it is 0.62 (1.054 – 0.430). The second difference of 0.37 for six DI beliefs is not statistically significant (p = .170), but the even larger difference of 0.62 for seven DI beliefs is significant (p = .001).

The differences in effects of DI *attitudes* between likely delayers and limiters are more modest in magnitude and not statistically significant. We begin the description of the attitudinal results with the good-if-fertility-declines attitude. Among delayers, the probability of a birth is .61 among women who said it is good if fertility declines and .65 among those who did not. The absolute difference in these delayer probabilities is -.04 (.613 – .649) and the relative risk ratio is 0.94 (.613/.649). Among limiters, the probability of a birth is .14 among those who said it is good if fertility decline and .10 among those who did not. The absolute difference in these limiter probabilities is -.04 (.103 – .142) and the relative risk ratio is 0.72 (.103/.142). In turn, the absolute second difference between delayers and limiters is nearly zero or .003 (-.037 – -.039) to be more precise. The (second) difference in the relative risk ratios is 0.22 (0.944 – 0.724). In relative terms, the difference between delayers and limiters is modest in size, but not statistically significant (p = .35).

Group differences in the effects of the one-child-is-better-than-three attitude are smaller and not statistically significant. Among likely delayers, the predicted probability of a birth is .59 among women who said one child is better and .71 among those who did not. The absolute difference in these delayer probabilities is -.12 (.590 – .709) and the relative risk ratio is 0.83 (.590/.709). Among likely limiters, the predicted probability of a birth is .12 among those who said one child is better and .12 otherwise. The absolute difference in these limiter probabilities is

-.01 (.117 – .123) and the relative risk ratio is 0.95 (.117/.123). In turn, the (second) difference between delayers and limiters in these absolute differences is -.11 (-.119 – -.006). This second difference is non-trivial in size and is statistically significant with a one-tailed test (p = .05). However, the differences in the relative risk ratios, which is the better measure given the magnitudes of the birth probabilities, is smaller and not statistically significant. The (second) difference in the relative risk ratios is -.12 (0.832 – 0.954) with a p-value of .70.

Sensitivity Check

Our findings are not substantially biased by censoring in education. We found consistent results when we limited the sample to the 950 women aged 18 and above at baseline, dropping the 246 respondents aged 15 to 17 at the time of their baseline interview who likely went on to complete further schooling. Results for likely limiters are identical because none of the 405 limiters were dropped in this additional analysis; all 246 respondents aged 15 to 17 at baseline had no children or one child. When we limited this sample of likely delayers to the 545 women aged 18 and above at baseline, the predicted probabilities and average marginal effects differed by a few hundredths at most. For example, the predicted probability of a birth for those who said one child is better than three children declined by two hundredths from .65 for all 791 delayers to .63 for the 545 delayers aged 18 and above at baseline. Similarly, the predicted probability for those who said one child is *not* better declined by four hundredths from .61 for all 791 delayers to .57 for the 545 aged 18 and older. While point estimates shift slightly, the substantive takeaways remain identical.

Discussion and Conclusion

Endorsement of DI beliefs about fertility did influence women's fertility behavior, but only among those with two or more children. Among these women who were at or beyond the

two-child ideal, the probability of a birth was reduced by over half among those who endorsed all DI beliefs compared to those who endorsed only a few. By contrast, DI beliefs had no effect on women with none or one child, indicating endorsement of beliefs relating fertility to development was unrelated to progression to first and second births. This main finding supports our first hypothesis that DI influences fertility, as well as our second hypothesis that the influence of DI is larger for women with two or more children who are likely limiting their childbearing. In fact, differences between these two groups were so stark as to provide qualified support for the first hypothesis with DI beliefs influencing only women who were likely stopping childbearing altogether. Results for a correlated DI attitude – that fertility decline in Nepal would be good – were similar. This DI attitude had a sizable effect on women with two or more children – reducing the likelihood of a third or higher order births by almost a third – and no effect on women with one child or none.

Results for the second DI attitude – one child is generally better for most people than three children – showed a reverse pattern that is not consistent with our second hypothesis. Endorsement of one child being better than three affected the fertility of likely delayers, but not likely limiters. Specifically, the likelihood of a first or second birth was reduced by almost a fifth among women who said it is better for most Nepalis to have one child versus three. However, the differences in the effect of this attitude did not differ significantly between likely delayers and limiters. This item also stood out with exceptionally low correlations with the other DI schemas. These results are likely due to the strong focus on the two-child ideal in national policy, which may have made two children, and *only* two children, synonymous with development. The strength of this focus may also explain the low correlation between this attitude and the other DI

items; the focus on a two-child ideal was so overwhelming that the choice between backup numbers of one or three became less salient to broader views on development and fertility.

These differences between likely delayers and limiters also reinforce the importance of context in shaping how and when DI is influential (Allendorf and Thornton 2015, 2019). The substantial effect of DI on women who already had two or more children is consistent with women limiting childbearing once they were at or beyond the two-child ideal of Nepali policy. By contrast, the finding of little to no effect of DI beliefs on women with no children or one child is consistent with our expectation that these schemas are less relevant to women focused on timing of births. In fact, the absence of an effect suggests DI may have been irrelevant when Nepali women were deciding when to have a child, but not contemplating forgoing a(nother) birth altogether.

We expect similar findings in other contexts, like India, with a focus on limiting fertility and fertility decline driven by parity-specific targeting. These links likely differ in other contexts, however, where family planning programs targeted timing or where competing schemas may override DI schemas. For example, in China, where timing was explicitly part of the "later, longer, fewer" family planning agenda, DI schemas may influence women of all parities (Thornton and Xie 2016). Among Palestinians in Israel, DI schemas relating fertility to development may have little to no influence on fertility because they are overpowered by competing schemas that promote large families as a means of reproducing the Palestinian nation (Kanaaneh 2002). Further, one reason fertility in Sub Saharan Africa has declined comparatively little may be that DI schemas are less influential when individuals are not targeting a specific number of children, but instead postponing fertility decisions as they move in and out of

relationships (Timaeus and Moultrie 2020). DI schemas may be particularly influential in Nepal, India, and other parity-specific fertility regimes with little divorce and remarriage.

More broadly, these findings support a key proposition of DI theory that endorsement of DI beliefs relating fertility to development do influence individuals' fertility behavior. Given that these data were also collected at a time when Nepal's fertility was rapidly declining, the results further suggest that adoption of DI likely played an important role in large numbers of women limiting their fertility – which aggregated into fertility decline. This first test of a key link in DI theory has greater significance when paired with previous research demonstrating such DI schemas are widespread in several population around the world (Thornton et al. 2012). Together these findings provide support for a central contention of DI theory that the spread of DI schemas was an important driver of fertility decline beyond Nepal – as increasingly large number of individuals adopted and acted upon their DI beliefs.

This study may also be the only individual-level test of this key theoretical proposition in a time and place when fertility was declining to a level of two children per woman. Collecting panel data over a long period of time is always challenging, but the number of places where such data collection could be fielded are now largely limited to Sub Saharan Africa and a handful of other contexts. Future studies that test the influence of DI schemas on fertility in Sub Saharan Africa would be highly valuable. As noted above, however, Sub Saharan African's fertility context differs from much of the rest of the world in substantial ways. Thus, such studies could assess these links in contexts with high levels of fertility postponement and repartnering, as well as more collective responsibility for children outside the immediate family (Mason 2001; Timaeus and Moultrie 2020). Sub Saharan African studies would not be well suited to replicating this study in other parity-specific fertility regimes though.

Future studies should also test if DI influences fertility behavior in low fertility contexts, including East Asia, Latin America, and Europe, as well as contemporary Nepal and India. A fertility rate of around two children per woman is the focus of demographic transition theory and the family planning movement of the 20th century, but two children per woman is not a natural or inherent end point for low fertility. Fertility declined below two children per woman in many places (Billari and Kohler 2004; Guzzo and Hayford 2023; Jones 2019). DI theory suggests that DI culture is also an important factor shaping childbearing decisions in these low fertility contexts, both Western and non-Western (Allendorf, Young-DeMarco and Thornton 2023). Specifically, the labelling of high fertility as traditional, harmful, and inferior and low fertility as modern, beneficial, and good presents a continuum in which the lower the number of children the greater the modernity. Further, the emphasis on freedom as a fundamental value within DI culture presents childbearing and resulting parenthood as subject to individual choices. The extent to which individuals view one child or childlessness as tied to societal progress and even greater modernity may well influence individual fertility behavior and fluctuations in fertility levels over time.

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Table 1. English translations of survey questions measuring endorsement of developmental idealism about fertility.

#	Question	DI response	Non-DI response
1	If a small-family-size program became successful in the future, will the fraction of children dying before their first birthday increase or decrease?	Decrease	Increase
2	If a small-family-size program became successful in the future, will sick people visiting a local healer**,** rather than visiting a medical doctor, increase or decrease?	Decrease	Increase
3	If a small-family-size program became successful in the future, will the wealth of the people in that country increase or decrease?	Increase	Decrease
4	If a small-family-size program became successful in the future, will families having television in their homes increase or decrease?	Increase	Decrease
5	If a small-family-size program became successful in the future, will being educated increase or decrease?	Increase	Decrease
6	If Nepal became richer over time would that increase or decrease couples having many children?	Decrease	Increase
7	Do you think that, on average, the number of children a woman gives birth to will increase or decrease in Nepal during the next twenty years?	Decrease	Increase
8	Suppose on average the number of children a woman gives birth to decreases in Nepal during the next twenty years. Overall, will that be a good thing, a bad thing, or won't it matter?	Good thing	Bad thing; Won't matter
9	Overall, which do you think is better for most people in Nepal today—having one child or having three children?	One child	Three children

Note: Items 1 through 5 were preceded by the following introductory script: "Let us talk about a country where people have very low income, most people live in rural areas, access to healthcare is poor, and most couples give birth to many children. Suppose that country introduces a small-family-size program to encourage couples to give birth to just a few children. I will read a list of things this small-family program might change. For each one, please tell me whether it will increase in the future or decrease in the future once the small-family-size program becomes successfully implemented in that country."

Table 2. Percent giving responses consistent with fertility DI schemas and results of exploratory factor analysis (n=1,196).

#	DI fertility schema	%	Loading with beliefs & attitudes	Loading with beliefs only
1	Infant mortality will decrease with small family program	88.5	.67	.67
2	Wealth will increase with small family program	93.1	.72	.72
3	Local healer visits will decrease with small family program	94.1	.76	.77
4	Families with TVs will increase with small family program	97.0	.83	.86
5	Being educated will increase with small family program	97.7	.82	.83
6	Fertility will decline if Nepal becomes richer	86.9	.73	.71
7	Fertility will decline in future	79.8	.71	.67
8	Good if fertility declines in future	68.3	.56	-
9	One child is better for most people than three children	72.3	.45	-
		Eigenvalue	4.44	3.93
		Proportion of variance explained	.49	.56
		Correlation of factor with additive scale	.97	.99
		Cronbach's alpha	.67	.67

Table 3. Descriptive statistics.

	All women (n = 1,196) %	Likely delayers (n = 791) %	Likely limiters (n = 405) %	Differs? p-value
Birth by study period end	40.3	55.6	10.4	.00
Fertility DI beliefs				
0-5 beliefs	15.1	12.9	19.5	.00
6 beliefs	20.3	18.2	24.4	
7 beliefs	64.6	68.9	56.1	
Good if fertility declines in future	68.3	68.9	67.2	.54
One child is better for most people than three	72.3	78.1	61.0	.00
Age at study period start (Mean/Std Dev)	24.8/5.0	22.6/4.2	29.0/3.6	.00
Education				
0-6 years	29.9	20.0	49.1	.00
7-10 years	45.0	48.9	37.3	
11-16 years	25.2	31.1	13.6	
Distance from urban area (Mean/Std Dev)	8.6/4.0	8.7/4.0	8.3/4.0	.14
Caste/ethnicity				
Chhetri-Bahun	44.6	46.0	41.7	.33
Dalit	11.2	10.9	11.9	
Hill Janajati	25.1	23.6	27.9	
Terai Janajati	19.2	19.5	18.5	
Non-family work				
Never worked outside family	44.1	44.4	43.5	.92
Unsalaried non-family work only	46.0	45.9	46.2	
Salaried non-family work	10.0	9.7	10.4	
Number of children				
None	45.2	68.4	-	.00
One	20.9	31.6	-	
Two	24.9	-	73.6	
Three or more	9.0	-	26.4	
Has only daughter(s)	17.9	16.2	21.2	.03
Living with husband[a]	51.7	50.9	52.4	.00
Study time[a]	29.5/19.9	24.1/18.7	33.8/19.7	.00

Note: The "differs?" column refers to hypothesis tests of whether distributions differ between likely delayers (women with no children or one children) and likely limiters (women with two or more children). Specifically, the p-values are from two-tailed Z tests of difference in proportions (birth, good if fertility declines, one child better than three, only daughters, living with husband), two-tailed t tests of difference in means (age, distance from urban area, study time), and chi-square tests (DI fertility beliefs, education, caste/ethnicity, work, number of children).

[a] Sample sizes for living with husband and study time are 45,936 person-months for all women, including 20,242 for likely delayers and 25,694 for likely limiters.

Table 4. Average marginal effects for five years of exposure based on logistic regression models of the hazard of a birth.

	All women (Any number of children)			Likely delayers (No children or one child)			Likely limiters (Two or more children)		
	Model 1 AME	Model 2 AME	Model 3 AME	Model 4 AME	Model 5 AME	Model 6 AME	Model 7 AME	Model 8 AME	Model 9 AME
Fertility DI beliefs: 0-5 beliefs (ref)									
6 beliefs	-.03	-.05		.00	-.02		-.08	-.07	
7 beliefs	-.01	-.04		.05	.01		-.11†	-.11*	
Good if fertility declines in future	-.02		-.02	-.03		-.02	-.04		-.06†
One child is better for most people than three	-.09*		-.09*	-.10*		-.10*	-.01		-.01
Age	-.01**	-.01**	-.01**	-.01*	-.01*	-.01*	-.01	-.01†	-.01
Education: 0-6 years (ref)									
7-10 years	.04	.03	.04	.08	.05	.09	-.01	-.01	-.03
11-16 years	.06	.03	.06	.09	.06	.10†	-.03	-.03	-.06
Distance from urban area	.01†	.01†	.01†	.01	.01†	.01	.00	.00	.00
Caste/ethnicity: Chhetri-Bahun (ref)									
Dalit	.15*	.15*	.15*	.16*	.16*	.16*	.03	.02	.02
Hill Janajati	.05	.05	.05	.06	.06	.06	.00	.00	.00
Terai Janajati	.06	.06	.06	.05	.06	.05	.03	.03	.03
Non-family work: Never (ref)									
Unsalaried non-family work only	-.01	-.01	-.01	-.01	-.01	-.01	.00	.00	.01
Salaried non-family work	.06	.07	.06	.05	.06	.05	.00	.00	-.01
Number of children (ref varies)									
None	0	0	0	0	0	0			
One	-.33***	-.33***	-.33***	-.24***	-.24***	-.23***			
Two	-.66***	-.65***	-.66***				0	0	0
Three or more	-.67***	-.66***	-.67***				-.02	-.02	-.01
Has only daughter(s)	.19*	.19*	.19*	.05	.05	.05	.20**	.19**	.22***
Living with husband	.40***	.40***	.40***	.45***	.46***	.45***	.13***	.13***	.13***
Study time	-.01***	-.01***	-.01***	-.01***	-.01***	-.01***	.00	.00	.00
n person-months		45,936			20,242			25,694	
n women		1,196			791			405	

†p<.10 * *p*<.05; ** *p*<.01; *** p<.001; two-tailed tests

Table 5. Comparison of the effects of DI endorsement on likely delayers' and limiters' predicted probabilities of a birth (n women = 1,196).

	Likely delayers (D)	Likely limiters (L)	Second differences (D-L)
Fertility DI beliefs			
Predicted probability of a birth			
0-5 beliefs (a)	.606	.197	
6 beliefs (b)	.591	.120	
7 beliefs (c)	.639	.085	
Absolute differences			
6 beliefs vs 0-5 beliefs (b-a)	-.015	-.077	.062
7 beliefs vs 0-5 beliefs (c-a)	.033	-.112*	.145†
Relative risk ratios			
6 beliefs vs 0-5 beliefs (b/a)	0.975	0.608	0.366
7 beliefs vs 0-5 beliefs (c/a)	1.054	0.430***	0.624**
Good if fertility declines in future			
Predicted probability of a birth			
Not good if fertility declines in future (a)	.649	.142	
Good if fertility declines in future (b)	.613	.103	
Absolute difference (b-a)	-.037	-.039	.003
Relative risk ratio (b/a)	0.944	0.724	0.220
One child is better for most people than three			
Predicted probability of a birth			
One child is *not* better than three (a)	.709	.123	
One child is better than three (b)	.590	.117	
Absolute difference (b-a)	-.119**	-.006	-.113†
Relative risk ratio (b/a)	0.832**	0.954	-0.122

†p<.10 * *p*<.05; ** *p*<.01; *** p<.001; two-tailed tests

Notes: Predicted probabilities are based on a single model with 1) all three DI variables, 2) controls for age, education, distance from urban area, caste/ethnicity, non-family work, has only daughters, living with spouse, and study time, and 3) interaction terms for all DI measures and controls with a dummy denoting likely delayer (versus likely limiter). Predicted probabilities are calculated with all other variables held at observed values and are transformed from the original metric of one person-month to 60 person-months, or five years, of exposure. Due to rounding some differences do not exactly match the differences implied by the raw numbers above.