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## Evaluating the measurement reliabilities and dimensionality of developmental idealism measures

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### Abstract

This paper investigates the measurement of developmental idealism. Developmental idealism is a set of beliefs and values stating that modern societies and families are better than traditional ones, that modern families facilitate modern societies, and that modern societies foster modern families. Prior research has shown that developmental idealism is widespread globally but has provided little evidence about whether beliefs concerning developmental idealism can be measured reliably at the individual level. It also has provided little information about the dimensionality and psychometric properties of measures of developmental idealism. Using cross-sectional survey data from Argentina, China, and Egypt, we explore and test the factor structure underlying observed measures for aspects of developmental idealism and estimate the reliability of different models. Theory and data suggest that developmental idealism consists of multiple dimensions, and when family-related items are measuring similar underlying constructs, the measurement reliabilities are high. These results provide evidence that the dimensions of developmental idealism can be measured with a high degree of reliability.

### Keywords

Developmental Idealism; Conceptualization; Measurement Reliability

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## Introduction

In this paper we investigate the measurement properties and dimensionality of questionnaire items concerning developmental idealism. We examine the extent to which beliefs about developmental idealism, which we define below, form one or several dimensions and can be measured reliably at the individual level. We estimate the reliability of such measures using multiple conceptualizations of the factor structure underlying empirical observations. We use survey data from settings in three widely disparate countries: Argentina, China, and Egypt.

Our research is motivated by a large literature describing the international spread and increasing influence of a world culture (Krücken and Drori, 2009; Meyer et al., 1997; Thomas et al., 1987). This world culture endorses individualism, freedom, equality, education, certain family forms, development, and human rights. It has helped to generate many societal changes around the world, including increases in education and the homogenization of school curriculums (Baker and Letendre, 2005; Benavot et al., 1991; Chabbott, 2003; Frank and Meyer, 2007). It has been an important force spreading support for human rights (Cole, 2005; Elliott, 2007; Koo and Ramirez, 2009; Meyer et al., 2010; Tsutsui and Wotipka, 2004; Wotipka and Tsutsui 2008), encouraging family planning and population control (Barrett and Frank, 1999; Thornton 2001, 2005), spreading support for gender equality (Berkovitch, 1999), eliminating female circumcision (Boyle, 2002), changing laws concerning sexual behavior (Frank et al., 2010), and changing marriage and gender relations (Thornton, 2001, 2005). Although the world culture literature has not systematically documented the influence of world culture on individuals, it has documented the effects of world culture on laws, governmental policies and programs, nongovernmental organizations, and school programs and textbooks.

Ethnographic research has shown that the ideas of modernization and development, important elements of world culture, have spread widely and been incorporated in various forms into the cultures of people in many places. These ethnographies have been conducted in various places in Subsaharan Africa, New Guinea, the Middle East, China, Nepal, and India (Abu-Lughod, 1998; Ahearn, 2001; Amin, 1989; Blaut, 1993; Caldwell et al., 1988; Dahl and Rabo, 1992; Deeb, 2006; Ferguson, 1999; Liechty, 2003; Osella and Osella, 2006; Pigg, 1992; Wang, 1999; Yount et al., forthcoming).

Recent research using survey methods has shown that elements of developmental idealism have permeated the lives of ordinary people in many places. Many ordinary people around the world understand the basic ideas of development or modernization as well as developmental hierarchies, and do so similarly to the conceptualizations of the United Nations (Binstock and Thornton, 2007; Melegh et al., 2013; Thornton et al., 2008, 2012a, forthcoming). Many people in everyday life also believe that development is a cause and consequence of many other aspects of life, including freedom, equality, family attributes, and demographic characteristics (Binstock and Thornton, 2007; Mitchell, 2009; Thornton et al., 2008, 2012b, 2012c). This literature argues that the dissemination of these beliefs is an important force for many social changes. It also suggests that variability in such beliefs at the individual level has important implications for individual and family decision-making and behavior.

A small literature also is emerging to document that measures of developmental idealism are reliable and valid. Survey respondents are able to answer questions straightforwardly and distinguish between questions worded in different directions (Thornton et al., 2012b). Latent class analysis reveals that people in Nepal can be divided reliably into three groups according to their beliefs about development and its relationships to family attributes (Mitchell, 2009). Data from Taiwanese students show that variability in views about country development can be measured with levels of reliability that are very similar to a range of frequently used measures of other ideational attributes (Thornton and Yang, 2016, this issue).

Research, however, has not systematically investigated the reliabilities of measures for developmental idealism in general populations in diverse settings. We do not know if there are meaningful differences among individuals or if such individual differences can be measured reliably in surveys. And, if they can be measured reliably, what are their reliability levels? Filling this gap in our knowledge is important because without reliable measures at the individual level, we cannot investigate how developmental idealism correlates with, influences, or is influenced by other individual factors.

The literature on developmental idealism has recognized that it has many aspects, including values about various family attributes and beliefs about how they relate to development. However, the literature has been less clear about whether there are one or many dimensions of developmental idealism within its various aspects, such as beliefs about the relationship between development and family life. The original literature suggested that there might be one overarching dimension concerning beliefs about family and development, but recent research suggests that, in fact, there are multiple dimensions. Allendorf and Thornton (2015), for example, argue that this is the case for survey participants in Nepal.

This paper uses exploratory and confirmatory factor analysis to investigate the dimensionality and measurement reliability of developmental idealism measures used in surveys administered to general populations in Argentina, China, and Egypt – the only three countries where the type of data required to do these analyses has been collected. Representative samples of Argentinians, Chinese, and Egyptians were asked whether they believed that certain family attributes were associated with development. We investigate the dimensionality and reliabilities of these survey items using multiple theory-based conceptualizations of the measurement model.

Our paper proceeds with a discussion of developmental idealism and its theoretical importance. We then discuss our research settings in Argentina, China, and Egypt, after which we discuss our data, the measurement models used, and our analytical methods. We then present our results and end with a conclusion.

## Developmental idealism

Developmental idealism can be traced back to ancient Greece and Rome, followed through centuries of Christian theology, through the Enlightenment, and through much social thought of the 19<sup>th</sup> and 20<sup>th</sup> centuries. Among other things, developmental idealism posits a common

trajectory of development, picturing all societies progressing through the same stages (Harris, 1968; Mandelbaum, 1971; Nisbet, 1969). The rapidity of development was believed to vary, resulting in different societies being at different stages at any given point in time. Societies believed to be low in development were labeled undeveloped or traditional, and societies thought to be developed were labeled modern or advanced. It was generally believed that northwest Europe and its migrant diasporas were the most modern, and other countries were distributed at various inferior levels (Carniero, 1973; Harris, 1968; Thornton, 2001, 2005).

Northwest Europe in the 18<sup>th</sup> and 19<sup>th</sup> centuries had many attributes that varied from those in most other settings. Scholars and other elites labeled many attributes of northwest Europe modern or developed, and the opposite attributes elsewhere as traditional or undeveloped. Industrial and urban societies with extensive education, technology, health, and wealth were called modern or developed, while societies at the other end of the continuum were labeled traditional or underdeveloped. The following aspects of family life associated with many societies outside northwest Europe were labeled traditional: little individualism, extensive family solidarity, high parental control over adolescent children, marriages arranged by parents, young ages at marriage, polygamy, extensive gender inequality, unplanned and high fertility, and large extended households. The following dimensions associated with northwest Europe were labeled modern or developed: great individualism, little family solidarity, low control of parents over adolescent children, marriages arranged by couples through courtship, older ages at marriage, monogamy, gender equality, planned and low fertility, and smaller and more nuclear (or stem) households. Scholars of the era also believed that societal changes along the continuum from undeveloped to modern would produce familial modernity and that the movement away from traditional families to modern ones would foster the formation of modern societies. These approaches and conclusions have been very influential in social thought for centuries (Thornton, 2005).

The ideas and conclusions from this developmental framework form essential components of the cultural model called developmental idealism. They provide policy makers and people in everyday life with new goals to strive towards and new methods for achieving those goals (Thornton 2001, 2005). Most importantly, developmental idealism provides values that suggest that modern societies and modern families, as defined above, are good and should be sought after. It also maintains that modern families and modern societies are causally connected in reciprocal relationships. This schema gives policy makers and ordinary people guidance about family changes that will spur development and about family changes that will result from development.

Over the 20<sup>th</sup> century in northwest Europe and its diasporas, low divorce gave way to high divorce, and relatively low levels of nonmarital sex, nonmarital cohabitation, and nonmarital childbearing gave way to relatively high levels of each of these behaviors. Consequently, low levels of divorce and low levels of premarital sex, cohabitation, and childbearing became associated with traditionality, and high levels of divorce and high rates of sex, cohabitation, and childbearing outside marriage became associated with development. Despite the fact that most family items defined as modern were judged to be good, high levels of divorce, nonmarital sex, nonmarital cohabitation, and nonmarital childbearing have received

widespread opposition, although tolerance and even endorsement have emerged in recent decades in northwest Europe and its diasporas.

Many elements of the developmental model have been heavily criticized during recent decades in many sectors of academia (Böröcz, 2000; Chakrabarty, 2000; Mandelbaum, 1971; Nisbet, 1969; Tilly, 1984; Wallerstein, 1991). Despite these academic criticisms, many ideas associated with developmental idealism continue to be powerful in academia, within governments and non-governmental organizations, including the United Nations, the World Bank, and the International Monetary Fund (Drori and Krücken, 2009; Latham, 2000; Meyer et al., 1997; Nisbet, 1980). In addition, as noted earlier, studies have documented the existence and influence of developmental ideas among lay people in many settings.

We, ourselves, reject the idea that countries, places, people, or family attributes should be labeled as traditional, less-developed, modern, or developed. We do so because these terms imply a hierarchy of value that is based on the Eurocentrism inherent in the ideas of development. Nevertheless, for ease of presentation we use the language of developmental idealism that categorizes some places and family attributes as developed and others as not developed.

The people of the world have had their own cultural models and schemas for a long time. Often, these beliefs and values conflict with developmental idealism. Consequently, the introduction of developmental idealism in a society is usually not followed by simple adoption, but more often is resisted and modified, sometimes resulting in substantial conflict. As a result, the pathways of change and continuity frequently vary across populations. Nevertheless, the spread of developmental idealism has affected many dimensions of marriage and family around the world. In many places, there has been resistance which slowed change, and the resisters have succeeded in keeping many dimensions of local culture, but in almost every place there have been changes, often dramatic, with hybridization being common (Thornton, 2005).

In this paper we focus on one aspect of developmental idealism—beliefs about the association between development and various family behaviors and structures. In our discussion above, we argued that developmental idealism posits that development would change various aspects of family structure and that certain family changes would foster development. However, in our analyses here we examine questions that simply ask individuals about their beliefs concerning associations between certain family elements and development.

We evaluate how beliefs about the association between development and various family elements fit together into one or several factor structures. Within these different conceptualizations of the factor structure, we estimate the reliabilities of the individual measures of developmental idealism beliefs. Whereas the paper by Thornton and Yang in this volume uses panel data to estimate reliability of measurement, in this paper we estimate reliability using cross-sectional surveys.

## Data and measures

The importance of developmental idealism among ordinary people around the world motivated a multi-disciplinary and international research team that included the present authors to design, implement, and test questionnaires and procedures for measuring developmental idealism in surveys (Thornton et al., 2010). We began by creating questionnaires and interviewing protocols for use in one country without specific consideration of their appropriateness in other places. We used this experience to design, refine, and test questions that could be used in multiple settings around the world, formulating the questions in English, and translating them into other languages. These initial translations revealed issues that necessitated revising the English questionnaire and subsequent translations in other languages. Through this iterative process we created a questionnaire in multiple languages and administered it in several countries.

The data for this paper come from the data collections that we conducted in settings in Argentina, Egypt, and China. These countries represent diverse social and economic circumstances, including life expectancy, fertility levels, educational achievements, and religion. We use data collected in each country through face-to-face interviews in China in 2007 and in Argentina and Egypt in 2008.

Our data collection in Argentina was designed to represent adult residents (ages 18 and older) of urban agglomerates of 500,000 people or more. Such urban areas represent about 60 percent of Argentina's population.

<sup>1</sup> The data from China were collected in a survey designed to represent adults (ages 17 and older) living in Gansu Province. Gansu is located in West-central China, a low-income part of the country, and has a majority Han population with a significant Muslim minority.

<sup>2</sup> Our Egyptian survey was designed to represent two Governorates: Qaliubia Governorate, which is north of Cairo, and Fayoum Governorate which is south of Cairo. We selected these districts to draw from both Upper (Southern) and Lower (Northern) Egypt and to have a diversity of respondents by rural-urban residence, ethnicity, and religious group. Our sample represents women aged 18–54, plus the husbands of the married women.<sup>3</sup>

The questions used in our analyses ask respondents whether certain family attributes are more common in developed countries or in not developed countries. The family attributes about which we asked include age at marriage, arranged marriages, fertility, unmarried childbearing, cohabitation, intergenerational coresidence, divorce, family unity, respect for elders, and gender equality. The wording of the questions for the twelve items used is listed in Table 1. As noted in the table, a third option “about the same” was not read aloud, but was accepted if the respondent volunteered it. For the analysis these three categories were

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<sup>1</sup>The sample in Argentina was drawn using a multi-stage procedure with urban agglomerates and clusters within agglomerates being randomly selected. Households were chosen through a random walk to find whether an individual residing in the household fits a quota of gender and age previously locally established. Because of quota sampling at the last stage, response rates were not calculated.

<sup>2</sup>The sample was selected using a multi-stage procedure, with random selection at all levels. The response rate was 91%.

<sup>3</sup>Households were selected randomly using census data. Female respondents were selected randomly within households. The response rate for this data collection was 98%.

collapsed into two. One category indicates that the response was in agreement with developmental idealism, which is marked in parentheses in Table 1 and was coded “1” for the analyses. Responses inconsistent with developmental idealism, including “about the same”, were coded “0.”

## Construct conceptualization and measurement reliability

### One underlying construct or factor

We began our conceptualization with the understanding that the scholarly and policy literature has generally linked each item in Table 1 with the traditional-modern continuum. As discussed earlier, it associates high age at marriage, self-choice marriage, low fertility, unmarried childbearing, premarital sex, cohabitation, intergenerational residential independence, divorce, lack of family unity, lack of elderly respect, and gender equality with modernity. This conceptualization suggests that the items should fit together in a similar way and therefore form a general underlying construct or factor.

This conceptualization is shown in Figure 1, where we have one underlying developmental idealism construct ( $\eta_1$ ) and twelve empirical measures ( $y_1$  through  $y_{12}$ ). Each of the twelve empirical measures is assumed to be linked to the underlying construct, or latent variable, with its own slope coefficient ( $\lambda_1$  through  $\lambda_{12}$ ). Each observed variable also has its error of measurement ( $\epsilon_1$  through  $\epsilon_{12}$ ). The reliabilities for the observed measures are the square of the standardized lambda coefficients linking the latent and observed variables.

### Several underlying constructs or factors

There are several reasons why the twelve items may not form a general underlying construct, factor, or dimension. First, developmental idealism has been disseminated around the world in different ways and in different contexts. We indicated earlier that the connections between development and divorce, premarital sex, cohabitation, and non-marital childbearing were conceptualized later than the other family attributes. These four items may therefore form an underlying construct separately from the other eight. Also, some of the twelve family attributes have been connected to modernity in different ways in different settings. For example, Latin America has had a long history of experience with consensual unions which has resulted in such attributes as premarital sex, cohabitation, and non-marital childbearing being viewed differently in Argentina than in other parts of the world (Cerrutti and Binstock, 2009; Esteve and Lesthaeghe, forthcoming). Also, a century ago divorce was relatively high in Egypt and was seen by many to be associated with traditionality rather than with modernity (Kholoussy, 2010). Such country-specific considerations may make the twelve empirical measures fit together differently than the single-factor model would suggest. Some items might be seen to be related to development in the ways described in the scholarly literature, while other items do not seem to be connected in this uniform way.

Second, each of the family attributes included in our surveys has its own specific meaning, and differences in meaning may result in them being seen as differentially related to modernity. For example, it is likely that at least some individual survey respondents see low fertility and gender equality as different things and thus potentially related in different ways

to modernity. Similarly, high age at marriage and divorce are likely seen by some as different things and possibly related to development in different ways. Unmarried childbearing, premarital sex, and cohabitation are conceptually more similar and therefore may be seen as more similarly connected to development.

The realization of these considerations in the worldviews of individuals would produce multiple underlying constructs or dimensions rather than the single underlying construct shown in Figure 1. Figure 2 shows three underlying constructs, or latent variables ( $\eta_1$ ,  $\eta_2$ , and  $\eta_3$ ), but there might be more or fewer. The Figure 2 conceptualization is just one example of a three-factor model in that it shows four measures for each of the underlying factors, but that number could vary. Also, we show correlations among the three latent factors ( $c_{12}$ ,  $c_{13}$ , and  $c_{23}$ ), with these correlations possibly ranging from negative one to positive one.

We use the assumptions of classical test reliability to estimate the models in Figure 1 and Figure 2 because we have multiple indicators of each of the underlying constructs. If the Figure 1 assumption of the observed variables all being measures of the same underlying construct is met, the estimates of the lambdas ( $\lambda$ ) and the reliabilities are unbiased.

However, if the observed variables in Figure 1 do not all measure exactly the same underlying construct, the use of the conceptualization in Figure 1 would produce underestimates of the lambdas and reliabilities. Similarly, if each of the observed variables linked to a specific underlying factor in Figure 2 does not measure exactly the same underlying construct, the use of the Figure 2 conceptualization would produce underestimates of the lambdas and reliabilities.

### **One underlying construct or factor for each measured item**

In Figure 3, we conceptualize each observed indicator of developmental idealism to be reflecting its own underlying construct or dimension. In Figure 3, as in Figure 2, we allow each of the underlying constructs to be correlated with a value of “c,” but because of the large number of such correlations, we do not show them explicitly in the figure. As before, these correlations can range from negative one to positive one. If all the correlations among the underlying constructs in Figure 3 are equal to one, Figure 3 reduces to Figure 1. Similarly, if the correlations among the first four underlying factors in Figure 3 are equal to one, then the first four underlying factors in Figure 3 would reduce to the first underlying factor in Figure 2.

Unfortunately, without making very strong assumptions, it is impossible to estimate Figure 3 because we have many more unknowns than knowns and the model is under-identified. Consequently, we are required to use the models of Figures 1 or 2 even if we suspect that Figure 3 is true and the correlations between factors are less than one.

One important consequence of using Figures 1 or 2 when Figure 3 is true is an underestimation of the lambdas and reliabilities. Furthermore, the underestimation bias increases as the correlations between factors in Figure 3 decrease. This is true because if Figure 3 is correct, the correlation ( $r_{12}$ ) between two observed variables ( $y_1$  and  $y_2$ ) is the



product of  $\lambda_1$  times  $\lambda_2$  times  $c_{12}$ . The product of the two lambdas would, thus, equal  $r_{12}$  divided by  $c_{12}$ . However, if we estimate the reliabilities of  $\lambda_1$  and  $\lambda_2$  through Figures 1 or 2, the product of the two lambdas would simply equal  $r_{12}$  rather than  $r_{12}$  divided by  $c_{12}$ . Any departure of  $c_{12}$  from one would thus bias the estimated lambdas downward. For example, if  $c_{12}$  in the real world equals 0.5, the product of the two lambdas ( $\lambda_1$  times  $\lambda_2$ ) estimated from Figures 1 or 2 would be one-half as large as it was in the real world.

We approached these issues of conceptualization by first examining the matrix of tetrachoric correlations among the twelve family measures (Appendix A). We then did a series of exploratory factor analyses consisting of one-, two-, three-, and four-factor models. The one-factor model is consistent with Figure 1, while the two-, three-, and four-factor models are consistent with Figure 2.

The correlation matrix and exploratory factor analyses revealed that a one-factor model and a two-factor model did not provide good fits to the data (results not shown). This suggested that we needed to identify three or four underlying factors or dimensions. Our three-factor exploratory factor analysis is summarized in Appendix B.

We also estimated a confirmatory factor model with three factors and a confirmatory factor model with four factors using methods available in the statistical modelling program MPlus. We estimated both three-factor and four-factor confirmatory models because some of the factor loadings in the three-factor model were relatively low, suggesting that there may be four rather than three factors in the data. We also examined the possibility that some of our observed variables loaded on two rather than just one factor.

Table 2 provides standardized factor loadings (lambdas) and correlations among the factors for both the three- and four-factor models. Table 2 also reports several goodness of fit measures, including Chi-square, Cronbach's alpha, Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). We followed the suggestions of Hu and Bentler (1999) and aimed for RMSEA values at 0.06 or below and CFI values at 0.95 or higher.

Because of the cultural differences across Argentina, China, and Egypt and their experiences with the introduction of developmental idealism, we did not hypothesize measurement invariance across the three countries. Nevertheless, we found the factor structures across the three countries to be similar in many ways, a finding that led us to test whether the factor loadings were the same for the three countries.

## Results

### Univariate distributions

As shown in Table 1, substantial majorities of respondents in each of the three countries gave the developmental idealism answer for each of the following six family attributes: married children living with their parents or in-laws; females marrying before the age of eighteen; elderly parents living with adult children; arranged marriages; couples having many children; and equality between women and men. That is, substantial majorities

believed that intergenerational co-residence, young age at marriage, arranged marriage, and high fertility were associated with lack of development and that gender equality was associated with development. The percentages giving such responses ranged from 67 to 88 in Argentina, from 60 to 92 in China, and from 86 to 97 in Egypt. These results suggest that beliefs in the association of these family attributes with development have been widely disseminated in our research settings.

In China and Egypt, substantial majorities (between 78 and 88 percent) associated unmarried childbearing, unmarried cohabitation, and premarital sex with development. This means that in these two countries the separation of sex, cohabitation, and childbearing from marriage is widely seen to be associated with development.

However, urban Argentineans do not necessarily see these attributes as being associated with development. Although further research is needed to document the reason for this, we expect that it is related to the long history in Latin America of sex, consensual unions, and childbearing outside marriage being a component of the Latin American family system. In Argentina, although with a lower prevalence than in the rest of the region, these behaviors were mainly confined to impoverished sectors in the poorest regions of the country. More recently, consensual unions and unmarried childbearing have become common across all social strata, as is also the case in other parts of Latin America, and these family behaviors have been characterized as modern (Cerrutti and Binstock, 2009; Esteve and Lesthaeghe, forthcoming). In this context, it is likely that some respondents have contrasting views concerning whether sex, unmarried cohabitation, and unmarried childbearing are more common in so-called developed or in not developed countries.

For three family attributes—family unity and loyalty, respect for elders, and marriages breaking up—there was little consensus across study sites on the distribution between developed and non-developed places. For each of these items, Argentineans mostly gave answers conflicting with the developmental model. Chinese respondents also gave responses contrary to this model for the items about family unity and loyalty and respect for elders. They seemed to associate these two attributes with development, contrary to the developmental model. In accordance with the developmental model, Chinese respondents associated marital instability with development.

Egyptians, on the other hand, associated family unity and loyalty and respect for elders with not being developed, consistent with the developmental model. Yet, contrary to the developmental model, they associated marital instability with lack of development. We expect that the Egyptian views on marital instability are associated with the fact that Egypt historically had high divorce rates and Western countries had low divorce rates, which caused Egyptians to associate divorce and with lack of development (Kholoussy 2010). This result supports the idea that the global development model can be interpreted differently in local contexts.

### **One or several factors**

We mentioned earlier that the correlation matrix of the various survey items and exploratory factor analyses revealed that neither one- nor two-factor models provided good fits to the

data. These results provide evidence that even within one aspect of developmental idealism—beliefs about the relationships between development and family attributes—there are not one but multiple dimensions. That is, instead of developmental idealism simply being a broad global construct in the minds of individual respondents, people link the various aspects of development to family attributes in different ways. However, as we discuss later, there is a general tendency for the specific dimensions of developmental idealism beliefs to correlate together into a loosely connected overarching model.

### Three- and four-factor models

We now shift to Table 2 and our confirmatory factor analyses of the twelve measures using three- and four-factor models. We focus first on the indicators of the goodness of fit for both the three-factor and four-factor models in each of the three study settings. As shown in Table 2, the chi-square values for both the three- and four-factor models in each of the three settings are quite large relative to their degrees of freedom. This means that we must reject the hypothesis that our models adequately fit the data within sampling error.

However, it is difficult with large samples and simple models to estimate a parsimonious model that fits the data within the bounds of sampling error. This point led us to turn to CFI and RMSEA measures. For our settings in China and Egypt, the CFI measures for both the three- and four-factor models are approximately 0.98 and the RMSEA measures are approximately 0.05, representing acceptable levels of fit as suggested by the criteria of Hu and Bentler (1999). The CFI measures for Argentina are 0.85 and 0.88—somewhat lower than the acceptable level of fit—and the Argentina RMSEA measures are .06—within the acceptable fit level suggested by Hu and Bentler (1999). These results suggest that even though the two models do not entirely represent the empirical data, the China and Egypt data provide uniformly acceptable fits, while the Argentina fits are acceptable only with the RMSEA measure.

### Factor structures and measurement reliabilities

The factor loadings (lambdas) associated with both the three- and four-factor models are similar across study sites. This led us to conduct formal tests of whether the loadings are identical in the three sites. These tests of statistical significance reject the null hypothesis that the loadings are identical (results not shown).

Our confirmatory factor analysis results are shown in Table 2. The first grouping of family variables are listed under the factor labelled “Collective Family Behaviors” in both the three- and four-factor models. Collective Family Behaviors consist of five variables labelled “Married Children live w/ Parents”; “Young Marriage Age”; “Elderly Parents live w/Adult Children”; “Arranged Marriage”; and “High Fertility.” The loadings for these five variables are very similar in the three- and four-factor models. In addition, the loadings for this factor are relatively high in both Egypt and China, although somewhat higher in Egypt (0.61 to 0.86) than in China (0.46 to 0.78). The loadings for the first three variables listed in Collective Family Behaviors are also reasonably high in Argentina (0.53 to 0.78), but the loadings for Arranged Marriage and High Fertility are especially low in Argentina (0.07 to .32). These two low loadings suggest that in Argentina they are measuring different

underlying constructs than the other three variables in Collective Family Behaviors. This suggests that dropping Arranged Marriage and High Fertility from this factor in further analyses in Argentina would be wise.

Factor 2 is labelled “Family Cohesiveness” and only has two family items within it, labelled “Family Unity/Loyalty” and “Elder Respect.” The loadings for these two variables are relatively high, and, as with Collective Family Behaviors, are similar in the three- and four-factor models. In each country, the loadings range from .53 to .85, depending on country and item. Unlike the magnitudes for Collective Family Behaviors, there do not seem to be consistent differences across countries in the magnitude of the loadings.

The third factor in our three-factor model is labelled “Individualistic Family Behaviors” and contains five family items labelled “Nonmarital Childbearing,” “Nonmarital Cohabitation,” “Premarital Sex,” “Gender Equality,” and “Marital Dissolution.” Here we note especially high loadings for the first three family variables in this factor. Loadings for Nonmarital Childbearing, Nonmarital Cohabitation, and Premarital Sex range from 0.72 to 0.99 across the three items within the three settings. However, the loadings for Gender Equality and Marital Dissolution are much lower, being in the 0.26 to 0.50 range across the three countries.

The relatively high loadings for the first three variables and the relatively low loadings for the last two variables in Individualistic Family Behaviors motivated us to remove Gender Equality and Marital Dissolution from that factor and put it into another factor labelled “Gender Relations,” thereby creating a four-factor model. We see from Table 2 that the loadings for the Nonmarital Childbearing, Nonmarital Cohabitation, and Premarital Sex items in the four-factor model are very similar to the loadings for these same items in the three-factor model.

The loadings for our new fourth factor, Gender Relations, range from a low of 0.34 to a high of 0.74, depending on the item and country. These are moderate loadings, indicating either that the items are measured with less reliability or that they measure different underlying constructs.

To evaluate the sensitivity of our factor loadings to different specifications of the model, we estimated additional three- and four-factor models. We adjusted the models to take into account the modification indices in the factor analyses showing where the biggest departures from the models in Table 2 occurred. These modification indices pointed towards estimating three-factor models that allowed Gender Equality and Elder Respect to be linked with more than one of the three factors. However, allowing these variables to be indicators of more than one underlying factor only marginally improved the fit of the models and affected, as expected, the factor loadings for these two variables. The loadings for the other ten variables, however, were hardly affected with these alternative specifications for Gender Equality and Elder Respect. This finding suggests that our factor loadings are robust to different specifications of the overall model.

Of particular importance are the especially high factor loadings for Nonmarital Childbearing, Nonmarital Cohabitation, and Premarital Sex in the Individualistic Family

Behaviors factor in both the three- and four-factor models. The loadings of 0.72 to 0.99 indicate reliabilities of at least 0.5 for all variables and approaching one in some instances. Such high reliabilities indicate that these three items are measuring the same underlying construct or dimension (as assumed in Figure 2) and are doing so with great reliability. These results suggest that respondents in Argentina, China, and Egypt see these three particular behaviors as quite similar phenomena and related to development in quite similar ways. Such findings are not surprising, as each item is directly connected to marriage and its role in regulating sexual expression and childbearing. Furthermore, when we have such closely related family attributes, our measurement of their perceived association with development is very reliable.

The high loadings for our three items in Individualistic Family Behaviors have important implications for our interpretations of the more moderate loadings in Collective Family Behaviors, Family Cohesiveness, and Gender Relations (in our four-factor model). The more moderate loadings for the family items in the other three factors are due to either their having more moderate reliabilities or their measuring somewhat different things, or both. Our data do not allow us to adjudicate this issue empirically.

However, there are excellent reasons to expect that the variables in “Collective Family Behaviors” are not measuring exactly the same underlying construct. That is, the conceptual model for this factor may be closer to Figure 3 than Figure 2. That is, Married Children Live w/Parents, Young Marriage Age, Elderly Parents Live w/Adult Children, Arranged Marriage, and High Fertility are conceptually distinct and do not reflect the same underlying construct, contributing to lower loadings of these variables in Collective Family Behaviors. Similar reasoning applies to the variables in Family Cohesiveness and the variables in Gender Relations.

The fact that some of the variables within factors are not closely measuring the same underlying constructs, of course, has implications for scale construction for analyses relating the factors to other variables such as education, age, and gender. When the factor loadings for specific variables are sufficiently low, researchers may want to drop those variables from the factor. Arranged Marriage and High Fertility in Argentina would be candidates for dropping from Collective Family Behaviors in such substantive analyses.

Moreover, we see no reason to expect that the three family dimensions of Individualistic Family Behaviors—Nonmarital Childbearing, Nonmarital Cohabitation, and Premarital Sex—should be measured more reliably than the dimensions in the other factors. These three variables provide an estimate of reliabilities of items measuring the same underlying construct, and we expect that these estimates would apply to the other family items, if we were able to utilize measures that fit closer to Figure 2 than Figure 3. Furthermore, even with the violation of the assumptions of Figure 2, we still obtain reasonably high factor loadings for the variables in Collective Family Behaviors, Family Cohesiveness, and Gender Relations. Our data thus provide considerable evidence of a high degree of measurement reliability for the various items.

Our estimates of Cronbach's alpha for the four factors in our four-factor model are provided in the bottom panel of Table 2. As expected, even with only three variables, the Cronbach alphas for Individualistic Family Behaviors are high, ranging from 0.84 to 0.96 across the three countries. The Cronbach alphas for the other three factors, as expected, given our earlier results, range from a low of 0.40 for Gender Relations in Egypt to a high of 0.85 for Collective Family Behaviors in Egypt.

Finally, we address the correlations among the various factors. Focusing on the estimates in our four-factor model, we find almost uniformly high inter-factor correlations in our Egyptian setting. With the exception of the relatively low correlation between Family Cohesiveness and Gender Relations, the inter-factor correlations range from 0.61 to 0.85. This means that in Egypt, people who believe that one set of family items is associated with development also believe the other family items are associated with development.

Inter-factor correlations in our Chinese setting are lower than in Egypt, but are still substantial. With the exception of the correlation between Family Cohesiveness and Gender Relations, the inter-factor correlations range from 0.20 to 0.63. This suggests that in China there is also a substantial tendency for the dimensions of developmental idealism to be seen as linked, although perhaps not as much as in Egypt. Such linkage is particularly strong in our China setting between Collective Family Behaviors and Family Cohesiveness and between Collective Family Behaviors and Gender Relations. Those Chinese who see the elements of Collective Family Behaviors to be associated with development also see the elements of Family Cohesiveness and the elements of Gender Relations to be associated with development. Of course, since our three-factor model included Gender Equality and Marital Dissolution in Individualistic Family Behaviors, the separation of these two variables into Gender Relations in the four-factor model results in a very high correlation between Individualistic Family Behaviors and Gender Relations (a high correlation that is also evident in the other two countries).

The inter-factor correlations in Argentina are, in general, somewhat lower than those in China and Egypt. Nevertheless, Gender Relations is moderately correlated with Collective Family Behaviors and Family Cohesiveness, as well as Individualistic Family Behaviors. This indicates that although the two elements of Gender Relations may be represented as a separate factor, they are moderately correlated with the other factors.

The fact that in each country there are moderate to high correlations among the four factors suggests that there is a moderate to high degree of linkage of the various components of developmental idealism. This degree of linkage appears to be highest in Egypt and lowest in Argentina, with China in the middle. This means that even though there is not a single overarching dimension or construct across the twelve items that we measured, there is an overall tendency for the various dimensions to be related. That is, there is a tendency toward similarity among the various measured items, even though the various items are different enough to be divided into three or four empirical dimensions.

We summarize this overall level of linkage by calculating Cronbach's alpha for a one-factor model consisting of all twelve family items, which are respectively 0.67, 0.78, and 0.88 for

Argentina, China, and Egypt. The Cronbach's alpha for Egypt is especially high, again indicating that individual Egyptians who believe that one family attribute is related in the expected way to development also believe that other family attributes are related to development in the expected way. This also indicates that researchers wanting to have an overall indicator of an individual Egyptian's view of the relationship between family attributes and development could use the one-factor model. A similar approach could be used in the other two countries, but with a bit less clarity in China and with somewhat less clarity in Argentina.

## Conclusion

The main questions for this paper concerned the factor structure and reliability of empirical measures of one aspect of developmental idealism—beliefs about the connections between development and family attributes. Do various measures of this belief aspect of developmental idealism combine into one dimension? And, how reliably can the differences between individuals' views concerning the association between development and family attributes be measured?

The data indicate that the twelve belief items we ascertained do not reflect a single—or even two—underlying dimensions or factors. Instead, they reflect three or four relatively coherent dimensions or factors. This result is consistent with the findings of Allendorf and Thornton (2015) for Nepal.

The data also indicate that when family items are measuring the same underlying construct or dimension, the measurement reliabilities are very high. This result is demonstrated by the high reliabilities for the items Nonmarital Childbearing, Nonmarital Cohabitation, and Premarital Sex in Individualistic Family Behaviors which have loadings ranging from 0.73 to 0.87 in Argentina, from 0.77 to 0.99 in China, and from 0.90 to 0.97 in Egypt (four-factor model). Similarly, Cronbach's alphas for the factor combining these variables range from 0.84 to 0.96 (four-factor model). As we indicated in our discussion of Figure 2, for such high loadings to occur, these three items are not only measuring the same thing, but are doing so very reliably.

The loadings and Cronbach's alphas for the other factors also are substantial, but smaller than for Individualistic Family Behaviors. Although we cannot know whether these lower loadings are the results of lower reliabilities or the various indicators measuring different underlying constructs, we believe that the latter explanation is much more likely. The variables grouped in Collective Family Behaviors, Family Cohesiveness, and Gender Relations are much less similar to each other than are the items in Individualistic Family Behaviors. This finding strongly implies that they are not measuring exactly the same underlying construct. Furthermore, we see no reason why the items in those three factors should be measured with less reliability than the items in Individualistic Family Behaviors. Our tentative conclusion, therefore, is that the items in Collective Family Behaviors, Family Cohesiveness, and Gender Relations are very reliably measured but are measuring somewhat different things. Additional research is needed to confirm or refute this conjecture. Such research should be a high priority.

Nevertheless, even though the items in these three factors are not measuring the same thing, the loadings for most variables in each of them are relatively high. This finding also suggests substantial reliability for these family items. It also means that these factors form a coherent set of measures for differentiating between the beliefs of people. This conclusion also is supported by the fact that the Cronbach's alphas for these three factors range from 0.40 to 0.85. If we had additional items with similar inter-item correlations, these alphas would be larger.

Our research also has identified sets of varying numbers of items that fit together into three or four fairly coherent factors or dimensions. We have already commented on how the three items in Individualistic Family Behaviors (in the four-factor model) make a very coherent and reliable factor or scale. The two items in Family Cohesiveness also make a fairly coherent scale, while the two items in Gender Relations make a somewhat less coherent set. The five items in Collective Family Behaviors also make a fairly coherent scale in our settings in China and Egypt but not in Argentina. However, if two of the items in this factor in Argentina were removed, the three remaining items would make a fairly coherent scale.

Of course, we could combine all twelve indicators into a single scale, drawing from across all family aspects. As noted earlier, such a scale would have Cronbach alphas of 0.67, 0.78, and 0.88 in the three countries respectively. Such a twelve-item, one-factor model would thus capture a wide range of evaluations of family associations with development.

One also could justify the one-factor model consisting of all twelve measures on the grounds that the twelve measures provide a wide range of developmental idealism items that are not necessarily correlated. They indicate the extent to which individuals view the connection between family attributes and modernity across a wide range of items. This twelve-item scale would serve an analogous purpose to the well-used index of difficulty with activities of daily living (ADL) (Buurman et al., 2011) and the global measure of perceived stress (Cohen et al., 1983), which provide composite measures for disability and stress using diverse items in the scales. In each of these two latter instances, the individual items may be correlated, but that is not an essential element of the measurement structure.

Notably, our research has been limited to settings within Argentina, China, and Egypt and cannot be directly extrapolated to the entire populations of any of these countries. However, we believe that our results within parts of these countries suggest that developmental idealism can be measured reliably elsewhere in these three countries. Such results suggest the usefulness of additional research in national studies in Argentina, China, and Egypt.

We, of course, cannot extrapolate our findings beyond Argentina, China, and Egypt to the rest of the world. Still, we note that our three countries come from widely disparate world regions with different cultural, social, and economic circumstances. This point leads us to expect that comparable data from other countries would indicate similar conclusions concerning the reliability of measurement. However, just as we found differences across Argentina, China, and Egypt in the ways that people conceptualize certain dimensions of developmental idealism, we expect that research in other countries will reveal additional



different country-specific conceptualizations. We recommend the collection of additional data to evaluate these issues in a wide range of countries.

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## Appendix A

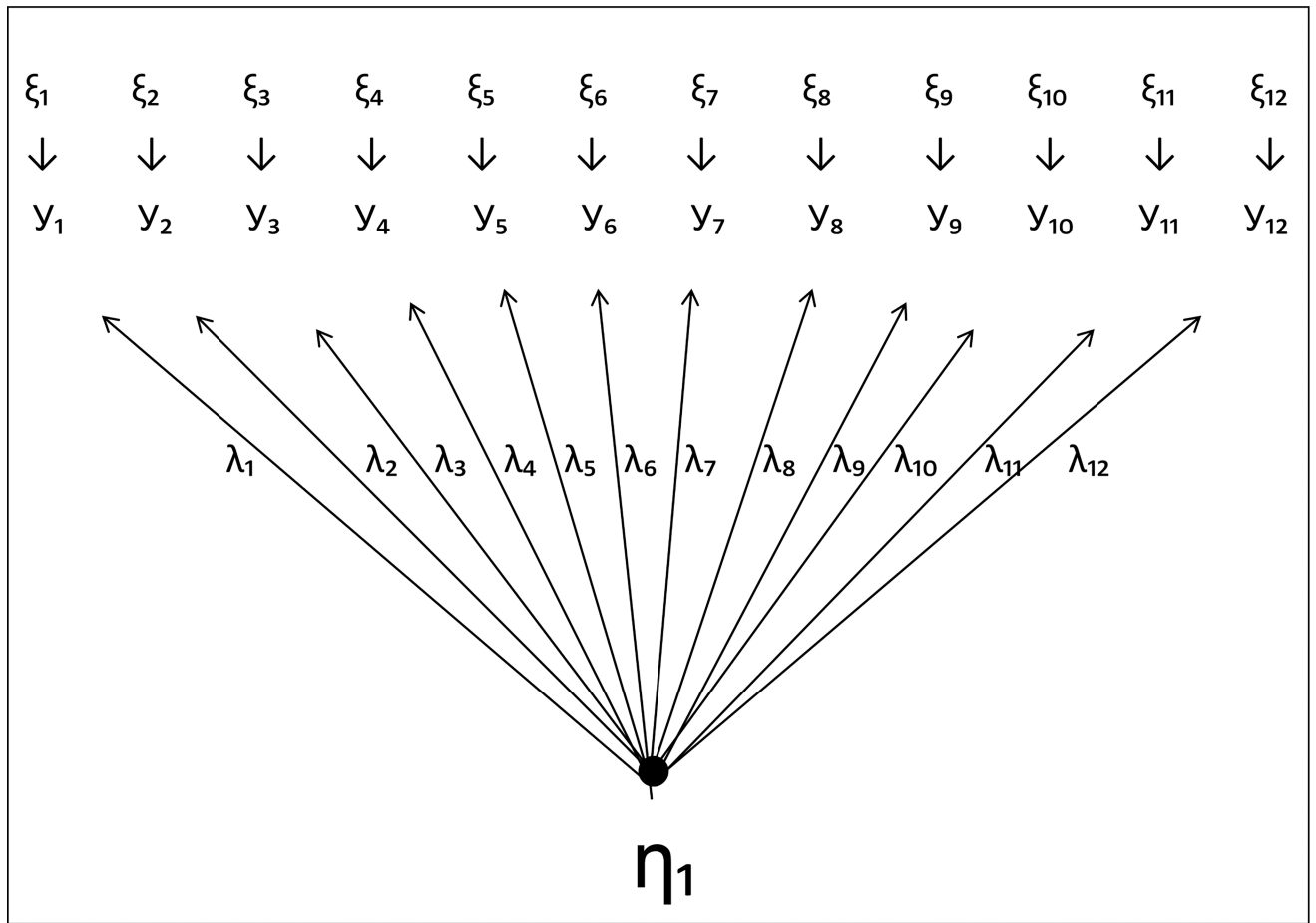
Tetrachoric Correlations of Beliefs Where Certain Family Attributes are More Common

	Married children live w/parents	Young Marriage Age	Elder parents live w/adult children	Arranged Marriage	High Fertility	Family unity/loyalty	Elder Respect	Nonmarital childbearing	Nonmarital cohabitation	Premarital sex	Gender Equality
<b>Argentina</b>											
<i>Married Children live w/ Parents</i>											
<i>Young Marriage Age</i>	.44										
<i>Elderly Parents live w/ Adult Children</i>	.51	.25									
<i>Arranged Marriage</i>	.00	.12	-.04								
<i>High Fertility</i>	.19	.25	.14	.05							
<i>Family Unity/Loyalty</i>	.04	.10	.17	-.14	.13						
<i>Elder Respect</i>	.00	.02	.09	.00	.05	.41					
<i>Nonmarital Childbearing</i>	-.10	-.04	.08	.28	-.07	.00	.06				
<i>Nonmarital Cohabitation</i>	.02	.01	.08	.20	-.08	.08	.17	.70			
<i>Premarital Sex</i>	-.05	-.03	.07	.21	-.17	.01	.16	.57	.65		
<i>Gender Equality</i>	.09	.15	.15	.32	.04	-.06	.01	.39	.24	.28	
<i>Marital Dissolution</i>	.04	.20	.17	.06	.17	.25	.24	.31	.36	.30	.32
<b>China</b>											
<i>Married Children live w/ Parents</i>											
<i>Young Marriage Age</i>	.37										
<i>Elderly Parents live w/ Adult Children</i>	.62	.28									
<i>Arranged Marriage</i>	.36	.58	.21								
<i>High Fertility</i>	.30	.27	.21	.51							
<i>Family Unity/Loyalty</i>	.29	.20	.50	.23	.08						
<i>Elder Respect</i>	.18	-.05	.34	.05	.12	.50					
<i>Nonmarital Childbearing</i>	.22	-.06	.18	.11	.20	.14	.31				
<i>Nonmarital Cohabitation</i>	.22	.02	-.03	.12	.11	.06	.20	.75			
<i>Premarital Sex</i>	.23	.00	.02	.11	.23	.14	.12	.70	.95		
<i>Gender Equality</i>	.00	.21	-.10	.25	.20	-.05	-.12	.28	.28	.22	
<i>Marital Dissolution</i>	.27	.13	.16	.25	.20	.12	.15	.40	.40	.37	.27
<b>Egypt</b>											
<i>Married Children live w/ Parents</i>											
<i>Young Marriage Age</i>	.52										
<i>Elderly Parents live w/ Adult Children</i>	.57	.59									
<i>Arranged Marriage</i>	.57	.43	.64								
<i>High Fertility</i>	.51	.50	.52	.55							
<i>Family Unity/Loyalty</i>	.58	.33	.66	.56	.26						
<i>Elder Respect</i>	.34	.14	.28	.48	.19	.46					
<i>Nonmarital Childbearing</i>	.32	.35	.58	.47	.45	.47	.51				
<i>Nonmarital Cohabitation</i>	.27	.37	.49	.42	.43	.42	.54	.91			
<i>Premarital Sex</i>	.28	.30	.47	.39	.44	.33	.44	.85	.89		
<i>Gender Equality</i>	.27	.31	.33	.44	.45	.03	.20	.41	.46	.39	
<i>Marital Dissolution</i>	.02	.07	.12	.12	.05	-.05	.16	.28	.24	.24	.25

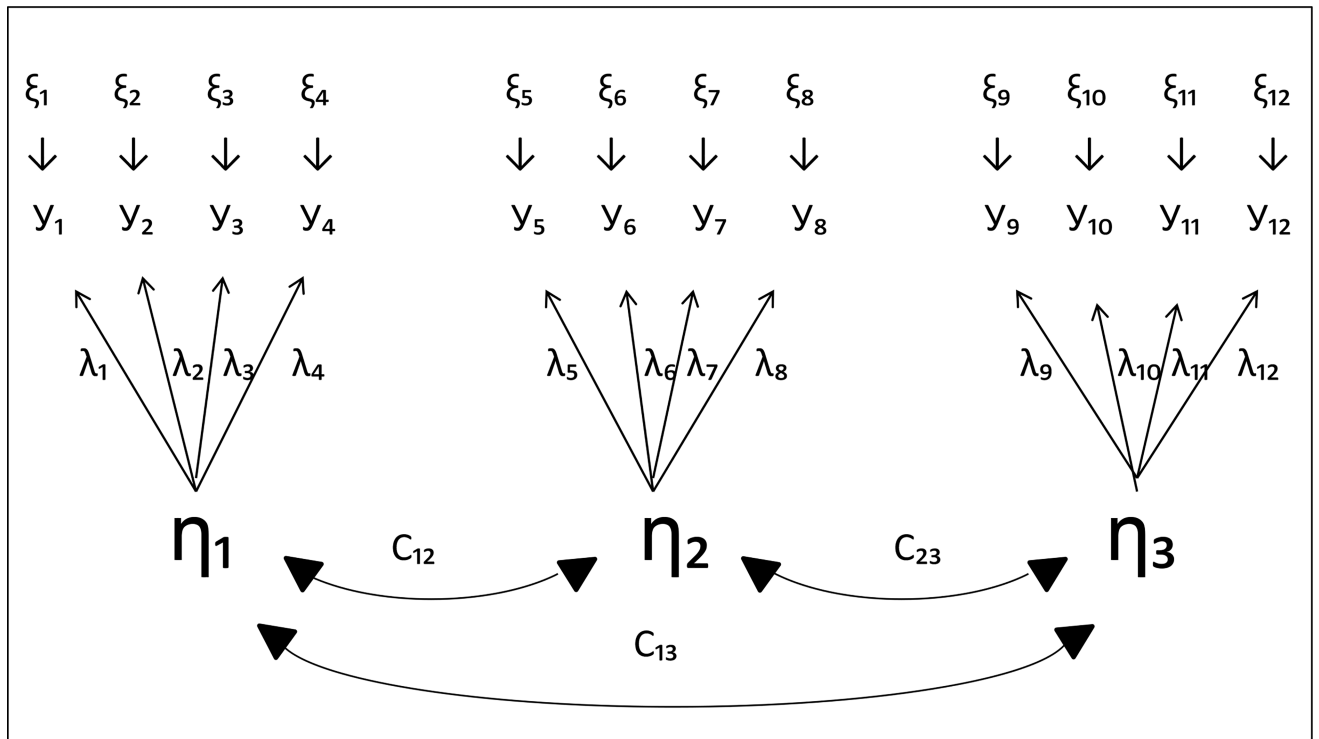
## Appendix B

Exploratory Factor Analysis. Loadings and Goodness of Fit for Three-Factor Model.  
Standardized Coefficients.

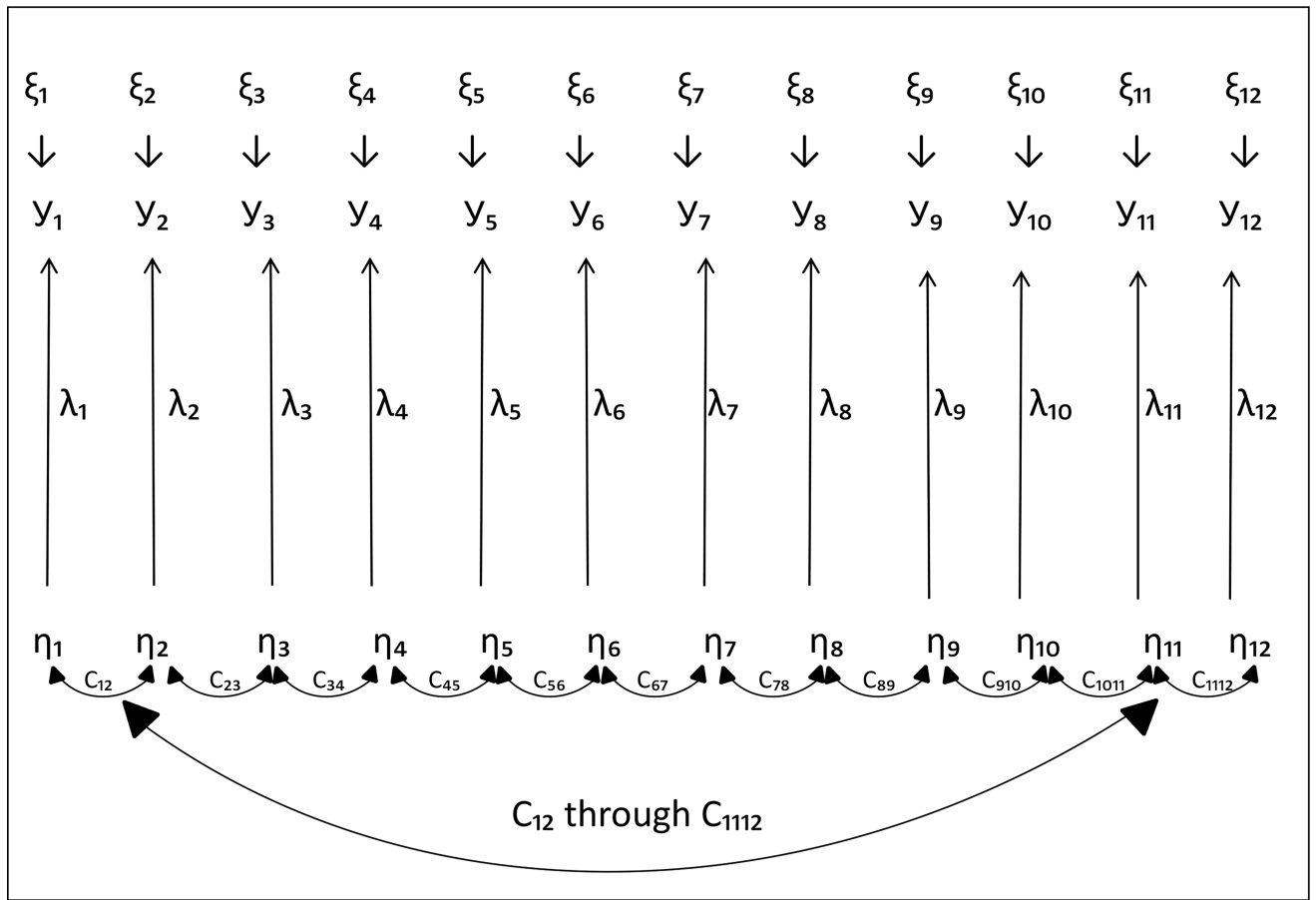
	Argentina			China			Egypt		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
<b>Loadings (<math>\lambda</math>)</b>									
<i>Married children live w/ Parents</i>	.804	-.088	-.005	.470	.452	.043	.718	.021	-.077
<i>Young Marriage Age</i>	.540	-.012	.068	.715	.000	-.152	.766	.046	.205
<i>Elderly Parents live w/ Adult Children</i>	.555	.026	.167	.317	.729	-.150	.632	.277	-.088
<i>Arranged Marriage</i>	.113	.374	-.193	.806	-.042	-.009	.676	.197	.004
<i>High Fertility</i>	.293	-.124	.134	.491	.031	.108	.826	-.011	.386
<i>Family Unity/Loyalty</i>	.003	-.176	.780	.041	.658	.000	.005	.679	-.970
<i>Elder Respect</i>	-.044	.023	.539	-.179	.628	.157	-.014	.601	-.223
<i>Nonmarital Childbearing</i>	-.010	.822	.006	-.004	.188	.731	.042	.921	-.004
<i>Nonmarital Cohabitation</i>	.000	.793	.162	-.003	-.024	1.01	-.023	.974	.046
<i>Premarital Sex</i>	-.036	.715	.090	.024	.003	.938	.003	.879	.099
<i>Gender Equality</i>	.259	.463	-.081	.313	-.276	.292	.598	.062	.526
<i>Marital Dissolution</i>	.178	.337	.341	.242	.080	.382	.062	.206	.222
<b>Goodness of Fit</b>									
X <sup>2</sup>		81.11			60.27			56.08	
DF		33			33			33	
P-value		.000			.003			.007	
RMSEA		.038			.036			.022	
Eigenvalue		1.51			1.71			1.22	



**Figure 1.**  
One Factor Model of Latent and Observed Variables



**Figure 2.**  
Three Factor Model of Latent and Observed Variables



**Figure 3.**  
 Twelve Factor Model of Latent and Observed Variables



**Table 1**

Measures for Respondent's Perception of Where Certain Family Attributes are More Common. Variable Names, Question Wording, Coding, and Percent Choosing the Developmental Idealism Answer, by Research Site.

Variable	Question wording and Coding In general, is [this] more common in countries that are <b>not developed</b> or more common in countries that are <b>developed</b> ?	% Choosing Developmental Answer		
		Argentina N=1003	China N=633	Egypt N=1500
<i>Married Children live w/Parents</i>	Married children living with their parents or in-laws ( <b>Not Developed</b> )	80	65	97
<i>Young Marriage Age</i>	Females marrying before the age of eighteen ( <b>Not Developed</b> )	79	84	95
<i>Elderly Parents live w/Adult Children</i>	Elderly parents living with their adult children ( <b>Not Developed</b> )	67	60	92
<i>Arranged Marriage</i>	Arranged marriages ( <b>Not Developed</b> )	68	92	94
<i>High Fertility</i>	Couples having many children ( <b>Not Developed</b> )	88	89	94
<i>Family Unity/Loyalty</i>	Family unity and loyalty ( <b>Not Developed</b> )	35	27	88
<i>Elder respect</i>	Respect for elders ( <b>Not Developed</b> )	27	36	78
<i>Nonmarital Childbearing</i>	Babies born to unmarried mothers ( <b>Developed</b> )	23	78	85
<i>Nonmarital Cohabitation</i>	Opposite sex couples living together without being married ( <b>Developed</b> )	32	85	88
<i>Premarital Sex</i>	Premarital sex ( <b>Developed</b> )	23	86	86
<i>Gender Equality</i>	Equality between women and men ( <b>Developed</b> )	70	87	86
<i>Marital Dissolution</i>	Marriages breaking up ( <b>Developed</b> )	42	82	41

Note: Responses to these questions were coded dichotomously so that those indicating agreement with developmental models (bolded responses shown in parenthesis) were coded "1" and those indicating disagreement with developmental models were coded "0." A third option "about the same" was not read aloud but was accepted if the respondent volunteered that answer. Answers of "about the same" were coded "0" for our analyses since they expressed views inconsistent with developmental idealism.

**Table 2**

Confirmatory Factor Analysis Results. Loadings, Factor correlations and Goodness of Fit for Selected Three-Factor and Four-Factor Models. Standardized Coefficients.

Loadings (λ)	Model 1				Model 2			
	Argentina	China	Egypt	Egypt	Argentina	China	China	Egypt
<b>Factor 1: Collective Family Behaviors</b>								
<i>Married Children live w/Parents</i>	.783	.779	.690	.731	.775	.688		
<i>Young Marriage Age</i>	.526	.496	.614	.561	.504	.614		
<i>Elderly Parents live w/Adult Children</i>	.626	.738	.863	.628	.732	.861		
<i>Arranged Marriage</i>	.074	.610	.797	.089	.622	.798		
<i>High Fertility</i>	.281	.462	.676	.318	.467	.678		
<b>Factor 2: Family Cohesiveness</b>								
<i>Family Unity/Loyalty</i>	.534	.855	.714	.580	.853	.719		
<i>Elder Respect</i>	.764	.590	.647	.704	.591	.642		
<b>Factor 3: Individualistic Family Behaviors</b>								
<i>Nonmarital Childbearing</i>	.787	.762	.944	.796	.767	.946		
<i>Nonmarital Cohabitation</i>	.856	.993	.969	.871	.995	.970		
<i>Premarital Sex</i>	.725	.954	.899	.734	.954	.900		
<i>Gender Equality</i>	.414	.300	.499	---	---	---		
<i>Marital Dissolution</i>	.473	.486	.258	---	---	---		
<b>Factor 4: Gender Relations</b>								
<i>Gender Equality</i>	---	---	---	.641	.712	.342		
<i>Marital Dissolution</i>	---	---	---	.498	.382	.736		
<b>Factor Correlations</b>								
Factor 1 with Factor 2	.160	.529	.853	.176	.528	.852		
Factor 1 with Factor 3	.102	.247	.635	.015	.202	.608		
Factor 1 with Factor 4	---	---	---	.385	.405	.616		
Factor 2 with Factor 3	.221	.228	.705	.165	.234	.731		
Factor 2 with Factor 4	---	---	---	.366	.141	.273		
Factor 3 with Factor 4	---	---	---	.669	.633	.640		

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	<u>Model 1</u>			<u>Model 2</u>		
	Argentina	China	Egypt	Argentina	China	Egypt
<b>Goodness of Fit</b>						
X <sup>2</sup>	253.7	150.1	205.7	207.4	137.2	170.1
DF	51	51	51	48	48	48
P-value	0.00	0.00	0.00	0.00	0.00	0.00
CFI	.85	.98	.98	.88	.98	.98
RMSEA	.06	.06	.04	.06	.05	.04
<b>Cronbach's Alpha</b>						
Factor 1	.54	.75	.85	.54	.75	.85
Factor 2	.58	.67	.63	.58	.67	.63
Factor 3	.78	.81	.83	.84	.92	.96
Factor 4	---	---	---	.48	.43	.40