



Review

Married Too Young? The Behavioral Ecology of ‘Child Marriage’

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Abstract: For girls and women, marriage under 18 years is commonplace in many low-income nations today and was culturally widespread historically. Global health campaigns refer to marriage below this threshold as ‘child marriage’ and increasingly aim for its universal eradication, citing its apparent negative wellbeing consequences. Here, we outline and evaluate four alternative hypotheses for the persistence of early marriage, despite its associations with poor wellbeing, arising from the theoretical framework of human behavioral ecology. First, early marriage may be adaptive (e.g., it maximizes reproductive success), even if detrimental to wellbeing, when life expectancy is short. Second, parent-offspring conflict may explain early marriage, with parents profiting economically at the expense of their daughter’s best interests. Third, early marriage may be explained by intergenerational conflict, whereby girls marry young to emancipate themselves from continued labor within natal households. Finally, both daughters and parents from relatively disadvantaged backgrounds favor early marriage as a ‘best of a bad job strategy’ when it represents the best option given a lack of feasible alternatives. The explanatory power of each hypothesis is context-dependent, highlighting the complex drivers of life history transitions and reinforcing the need for context-specific policies addressing the vulnerabilities of adolescence worldwide.

Keywords: child marriage; anthropology; human behavioral ecology; global health; harmful cultural practices; life history theory; cooperation; conflict



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1. Introduction

Marriages taking place in the period between puberty and adulthood, i.e., ‘adolescence’, for girls are currently legal in almost all countries and were historically ubiquitous, including in the global north (Dahl 2010; Arthur et al. 2018). The last few decades have witnessed a dramatic increase in interest in ‘child marriage’ (legally defined as any marriage occurring before 18 years) and its apparent negative wellbeing consequences. Illustrating this trend, worldwide Google searches for child marriage have approximately doubled over the last 10 years (Lawson et al. 2020). This interest from the general public is paralleled by, and partially a product of, an emerging campaign to eradicate child marriage led by international development and global health actors. These efforts are exemplified by organizations like Girls not Brides, a global partnership founded in 2011 of now over 1000 civil society organizations committed to ending child marriage and increasing public awareness of its prevalence and purported harmful consequences (Girls not Brides 2017). Moreover, the United Nation’s (UN) 2015 Sustainable Development Goals, which guide global current health policy, have pledged to abolish child marriage within a generation, with an ambitious 15-year target (UN General Assembly 2015).

The current global campaign to end child marriage has its origin in a century of both legal and attitudinal shifts towards the concept of childhood in the global north (Dahl 2010; Lancy 2015) in which children have become increasingly viewed as vulnerable, in need of protection, and unprepared for ‘adult’ responsibility. The transition to this view of

childhood culminated in legally defining childhood as ending at 18 years and attributing rights and protections to this demographic (UN General Assembly 1989), a legal framework now widely adopted (e.g., OAU 1990). Efforts to end marriages prior to this threshold are reinforced through studies that demonstrate statistical, although not necessarily causal, associations between marrying before age 18 years and outcomes for girls, including low educational attainment (Field and Ambrus 2008; Hodgkinson 2016), poor reproductive and maternal health (Irani and Roudsari 2019; Nour 2006), and even reduced country-level economic productivity (Wodon et al. 2017). Campaigns to end child marriage define it as a ‘harmful cultural practice’ akin to female genital cutting/mutilation or female infanticide (Longman and Bradley 2015) and posit that eradicating marriages before age 18 years will tangibly improve girls’ lives and health (Girls not Brides 2014). Yet, despite growing investments in eliminating these marriages, marriage before age 18 years remains common with approximately 20% of women married before this threshold worldwide (UNICEF 2020). This proportion is highest in low-income countries, especially within sub-Saharan Africa and South Asia where in some countries over half of young women married as minors (Table 1; UNICEF 2020).

Table 1. Prevalence of female marriage under the ages of 15 and 18 years in the 10 countries with the highest rates of marriage among minors and total fertility rate (TFR). Data source: (UNICEF 2020).

Country	% Married by 15 Years	% Married by 18 Years	TFR
Niger	28	76	6.91
Central African Republic	26	61	4.72
Chad	24	61	5.75
Mali	16	54	5.88
Mozambique	17	53	4.85
Burkina Faso	10	52	5.19
South Sudan	9	52	4.70
Bangladesh	16	51	2.04
Guinea	17	47	4.70
Nigeria	16	43	5.38

In this paper, we outline and evaluate alternative hypotheses explaining the persistence of early marriage using the theoretical framework of human behavioral ecology (HBE) (Nettle et al. 2013; Smith and Winterhalder 2006). Note, while we purposely engage here with the global health literature on child marriage, we opt for the term ‘early marriage’ throughout because our hypotheses address relative marital timing generally, rather than any specific age threshold. HBE takes an optimality approach to understanding behavioral variation, grounded in the logic of evolution by natural selection. Inclusive fitness, i.e., the long-term production of genetic descendants, rather than health, status, or happiness, is positioned as the ultimate utility function guiding behavior. When strategies to maximize wellbeing and fitness are not aligned, natural selection is predicted to favor behaviors that optimize fitness. This perspective offers novel opportunities to consider the potential rationality of early marriages and draws attention to the conflicts of interest between genders or family members that may ultimately drive inequalities and restrict women’s autonomy (Lawson and Gibson n.d.). As a branch of anthropology, HBE is committed to field-based and ethnographically grounded studies, and a dedicated exploration of context-dependent costs and benefits of alternative behavioral ‘strategies’ across and within socioecological settings.

Despite a large literature on marriage systems, HBE has rarely addressed the topic of ‘child marriage’ directly. This is understandable. The threshold of 18 years presents a largely arbitrary legal distinction between ostensive childhood innocence and adult responsibility. Not only does this arbitrary threshold not engage with cultural flexibility in the timing of onset of social and physiological features associated with adulthood (Dixon-Mueller 2008; Lancy 2015; Hart 2006), but it also ignores variation in conceptualizations of childhood

itself that do not always assume innocence and need for protection (Lancy 2015). Moreover, unlike polygynous versus monogamous marriage (Fortunato 2015), marriages under 18 years are rarely qualitatively distinct from marriages over 18 years in terms of associated customs or social expectations. Indeed, in settings where early marriage is normative, girls who do not marry before reaching 18 years typically do so shortly after and may otherwise have largely similar experiences of married life. In other words, ‘child marriage’ as a dedicated study subject makes little conceptual sense outside of the global health framework, which itself is grounded in concepts of childhood’s boundaries and characteristics specific to histories of the global north. Nevertheless, child marriage lends itself to the HBE approach due to potential fitness implications through associations with fertility and/or lifetime reproductive success (Onagoruwa and Wodon 2018). Further, HBE scholars have addressed questions related to early marriage surrounding the timing of life history transitions such as age at menarche or first reproduction (Nettle 2011), sexual conflicts of interest relating to marriage (Borgerhoff Mulder and Rauch 2009) and reproduction (Moya et al. 2016), and conflict between family members (Apostolou 2015; Moya and Sear 2014; Mace 2013). There has also been relevant work examining the intersection of global/public health and HBE perspectives on teenage pregnancy and motherhood (Kramer 2008; Kramer and Lancaster 2010; Johns et al. 2011). We build on these contributions here by extending the HBE perspective to early marriage, while emphasizing that the timing of marriage does not always align with other life history transitions—timing of puberty, sexual activity, or reproduction.

Along with academic insight, HBE has the potential to strengthen global health responses to the vulnerabilities of adolescence by identifying key socioecological features driving variations in behavior and wellbeing. To this end, we consider four main explanations for early marriage grounded in HBE, drawing out predictions about which socioecological conditions may make each explanation most relevant. We consider the possibilities that early marriage is the result of (1) adaptation to low life expectancy, despite reducing wellbeing; (2) parents winning a parent–offspring conflict in which parents benefit from girls early marriages at cost to their daughter; (3) daughters winning an intergenerational conflict in which daughters benefit from earlier marriages than their caregivers prefer; or (4) a ‘best of a bad job’ strategy whereby early marriage presents the best available option for daughters and parents alike in the face of a highly constrained environment. These explanations are not necessarily in conflict with common explanations for child marriage arising from global health. In fact, they are often complementary. Rather, HBE provides a unifying theoretical framework that attempts to disentangle the drivers of variation in human behavior by making testable predictions about socioecological characteristics influencing the optimality of alternative behaviors. This framework can help push forward research related to wellbeing, and in some cases be used to derive novel policy recommendations, including the design of interventions and impact evaluations (Gibson and Lawson 2015; Schaffnit et al. 2020).

2. Early Marriage Is a Response to Low Life Expectancy

Perhaps the simplest evolutionary explanation for why child marriage was universally common historically, and is still common in some contexts, is that marrying at young ages can be adaptive when mortality and/or morbidity rates are high. A basic tenet of life history theory is that harsh environments will favor accelerated transitions to reproductive maturity to ensure successful reproduction before death or physical deterioration (Charnov 1991; Stearns 1992; though extremely harsh environments may necessitate delays if early reproduction itself dramatically threatens survival). The underlying logic of this argument is that where life expectancy is low, early reproduction is a means of ensuring that a person will pass on genes to future generations (Kramer 2008; Nettle 2011). In cultural contexts where childbearing mostly takes place within marriages (as opposed to preceding or outside of marriage), it follows that girls and women may optimize their potential for successful reproduction through earlier ages at marriage. This motivation to reproduce,

and thus marry early, may also be reinforced by benefits of capitalizing on essential allomaternal help from parents while they are still alive and healthy (Geronimus 2003). Critically, this model could explain why marriages at young ages happen even if girls' wellbeing is compromised. That is, cultural traditions and individual preferences for early marriage (and thus reproduction) have been favored by natural selection, despite trade-offs with wellbeing, to avoid missing the opportunity for successful reproduction altogether.

Support for this hypothesis is mixed. In general, early marriage remains most common in parts of the world with relatively high mortality and low healthy life expectancy, and in these contexts marriage at younger ages is associated with higher fertility and presumably reproductive success (Onagoruwa and Wodon 2018). That said, the strength of correlations between age at first marriage and first birth or fertility are variable (Harwood-Lejeune 2001). Indeed, in some contemporary contexts early marriage is combined with relatively low fertility. For example, Bangladesh combines one of the highest rates of marriage under 18 years and an early age at first birth (Islam et al. 2017) with a total fertility rate of only around two children per woman (Table 1). Further dedicated analysis of the historical and present-day relationships between age at marriage, reproductive timing, and lifetime reproductive success would therefore be desirable and should be possible with publicly available data. Moreover, even in areas where childbearing takes place exclusively within marriage and early marriage is linked to early reproduction, we might expect early marriage to be fitness maximizing for girls only when it occurs in late adolescence rather than immediately following puberty. Reproduction in early adolescence very soon after menarche is more likely to result in pregnancy complications, putting both the mothers' and their children's lives at risk and thus reducing fitness (Kramer and Lancaster 2010). Indeed, research in semi-urban Tanzania suggests a U-shaped association between age at marriage and fertility, such that those married in late adolescence have higher fertility than those married in early adolescence or early adulthood (Schaffnit et al. 2019a). As such, the hypothesis that early marriage as an adaptation to low life expectancy has clear explanatory potential, but may not extend as far as explaining very early marriages, especially when combined with very early reproduction.

Research on the timing of puberty further illustrates the limits of this hypothesis and introduces new considerations. While poverty tends to be associated with relatively earlier marriage in low-income countries, it also is associated with later menarche, most likely due to associated nutritional deprivation (Kyweluk et al. 2018; Leone and Brown 2020). This suggests that early marriage cannot be viewed as part of a coordinated physical-behavioral maturational shift to expedite reproduction. Further research disentangling the determinants and consequences of the timing of menarche, marriage, and reproduction is required to investigate these questions. If, in some contexts, relatively late menarche is combined with relatively early marriage, then it also seems unlikely that this would be adaptive for the girls/women involved, indicating that alternative factors, such as the conflicting interests of men or family members, must drive at least some very early marriages for girls.

3. Parents Winning a Parent–Offspring Conflict Drives Early Marriage

Our second hypothesis suggests that the timing of marriage may be a source of conflict between parents and daughters, and parents winning such a conflict could lead to early marriage. This idea has roots in Trivers' concept of parent–offspring conflict (Trivers 1974). While close relatedness between parents and daughters means that their interests often align, an individual daughter may benefit from higher parental investment even at disadvantage to her siblings, whereas parents will be motivated to prioritize their family unit. By extension, parents and their children may have conflicting optima over marriage decisions, and when conflicts arise, parents may manipulate or coerce their children in order to win the conflict (see also Agey et al. n.d.). Such a model for understanding timing of marriage aligns with policy discourse on 'child marriage', which emphasizes the role of parents in coercing daughters to marry early despite potential costs

to her fitness and/or wellbeing. Parents are routinely portrayed as viewing daughters as economic burdens or commodities to be strategically married for benefit of the family unit (UNFPA 2012; Ministry of Health 2017; Petroni et al. 2017), as exemplified in Figure 1. Parents are said to benefit from girls' early marriages by reducing their economic burdens, thus freeing investments for other children, and sometimes benefiting from favorable financial transfers at the time of marriage. In contrast, daughters are presumed to benefit from delayed marriage so that they may capitalize on prolonged parental investments, such as investments in continued education.

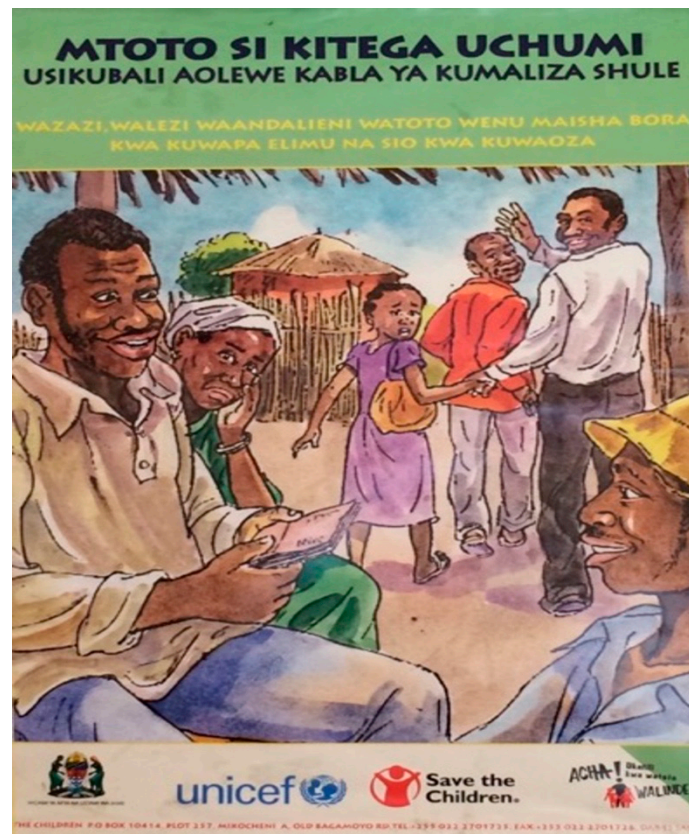


Figure 1. Photo of anti-child marriage poster displayed in a government office in Mwanza, northwest Tanzania. Swahili text reads: “A child is not a commodity. Do not let her marry before she finishes school. Parents and caregivers, give your children a better life by giving them an education and do not let them marry.” Photo by: David Lawson.

There is indirect evidence that parent–offspring conflict, or more specifically parents winning such a conflict, could drive early marriage. Girls from poorer families are more likely to marry at young ages compared to those from wealthier families (Nour 2006; Raj 2010), supporting the idea that marriage can help reduce the financial strain of raising daughters for a family. Furthermore, several studies have noted that financial transfers that accompany marriage in many cultures are more advantageous to brides’ families when brides are young; dowry costs (paid from a bride’s family to the groom’s) are lower (Chowdhury 2010) and bridewealth (paid from a groom’s family to the bride’s family) is higher (Hoogeveen et al. 2011; Schaffnit et al. 2019a) when brides are younger. Finally, child marriage rates have been observed to increase in response to extrinsic economic shocks (e.g., drought) in African regions where bridewealth is commonly practiced, with parents presumably marrying daughters early in order to access capital (Corno and Voena 2016). Global health actors expect a similar pattern may arise in response to the ongoing Covid-19 pandemic (Cousins 2020).

Even with this indirect support for the hypothesis, the idea that parent–offspring conflict drives early marriage has rarely been directly evaluated. Part of the reason for this is that while identifying domains of disagreement between parents and daughters over mating is relatively simple to evaluate via the study of stated preferences (Apostolou 2015; van den Berg et al. 2013), a true parent–offspring conflict in an evolutionary sense requires a broader understanding of the fitness costs and benefits to the loser/winner of the disagreement (Agey et al. n.d.). To our knowledge, there are two studies that consider this hypothesis explicitly. Weissner (2009) records conflict in the Ju/'hoansi foragers of the Kalahari Desert between parents and their children over marriage, including conflict over timing. Ju/'hoansi parents specified that they wanted children to marry early, partly so they would no longer rely on the parents for food. In contrast, Ju/'hoansi girls stated that they wished to delay marriage out of fear of childbirth and a desire to remain carefree. The costs of such conflicts were real: girls protested marriages by hiding in nearby bush to avoid a marriage and guardians of disobedient girls threatened suicide if a marriage was refused. While parents most often won these conflicts, Weissner found that over the past decades children have taken greater control of the marriage process, and as a result of this, marriage has shifted to older ages than in the past. In more recent research, Schaffnit et al. (2019a, 2019b) found that although parents in a semi-urban, primarily Sukuma, area of Tanzania benefited from their daughter's earlier marriages through higher bridewealth transfers, girls/women reported deciding when and who to marry, and estimated wellbeing costs to marrying below the threshold of 18 years were largely equivocal. In fact, there appeared to be fitness benefits for the girl because marriage in mid-late adolescence was related to relatively higher fertility than marriage at older ages. Later qualitative work identified that higher bridewealth payments for younger brides need not necessarily be an indication of their desirability on the marriage market, however. In this cultural context, sexual activity or marriage with schoolgirls is illegal and men face the threat of a 30-year prison sentence for violating this law (Makoye 2016). Community members report that higher bridewealth is sometimes required as a compensation for a man taking the girl out of school and as a measure to prevent the authorities being notified (Schaffnit et al. 2020). These considerations emphasize the importance of understanding the full context within which marriage decisions are made, and the value of mixed-methods research.

In all likelihood, parents winning a parent–offspring conflict is a good model for understanding high rates of early marriage in some contexts, like in the Ju/'hoansi examples, but not others, such as in the study of northern Tanzania where most girls decide when to marry themselves and where marriages are rarely forced or arranged. At this juncture, it is also instructive to highlight that even where marriages are arranged, they are not best understood as forced, with parents and children sometimes in agreement over the desirability of selected spouses (Shenk 2020; Agey et al. n.d.). The HBE framework facilitates consideration of the specific contexts in which parent–offspring conflict may be most relevant to understanding persistence of early marriages. For example, parent–offspring conflict is probably more relevant in areas where very young marriages (e.g., under 15 years) are common (Table 1) as opposed to marriages in later adolescence. This is because very young girls are less likely to have control over the marriage process and more likely to experience fitness costs to marrying early due to complications or death arising from early reproduction (Kramer and Lancaster 2010). Parent–offspring conflict could also be particularly relevant in places where parents have greater control over their children's marriages generally, such as in parts of Bangladesh where arranged marriage is nearly universal (Shenk et al. 2013), or in other areas where forced marriages are common. When parents have control over the marriage process of their daughters, they are more likely to enforce arrangements advantageous to their family unit as a whole even when there are costs to an individual child. Finally, in areas where divorce is not common or acceptable (e.g., Bangladesh (Shenk et al. 2013)) parent–offspring conflict may be especially relevant because opportunity costs of early marriage are higher for girls when they lose a

disagreement with their parents because they may be stuck in a sub-optimal marriage. In summary, despite this model being a dominant framework in global health approaches to early marriage, a universal application is clearly inappropriate. More dedicated studies of the consequences of early marriage for both girls/women and their parents across cultural contexts are needed.

4. Early Marriage Occurs When Girls Win an Intergenerational Conflict

Early marriage could also arise due to an intergenerational conflict. In some cases effectively parallel to parent–offspring conflict, intergenerational conflict extends to conflict between girls and older co-resident adults— including parents, guardians, or others—and emphasizes the reproductive nature of conflicts arising specifically from having overlapping reproductive life-spans between generations. The intergenerational conflict hypothesis emphasizes contexts in which girls are motivated to invest in their own (future) children rather than investing in those in her natal home, to whom she may be more or less related (e.g., full siblings, half or step siblings, or other children). This hypothesis suggests that coresident adults can benefit from later marriage of girls in order to draw on their continued labor contributions to the household, which can benefit their own pre-existing or future children. Supporting this hypothesis, we know that girls provide important labor to their households in many contexts throughout the world, including directly helping to raise other children (Kramer 2005; Hedges et al. 2018; Bereczkei and Dunbar 2002). In contrast, girls may prefer earlier marriage to emancipate themselves from such responsibilities, gain benefits of marriage, and invest in their direct fitness by beginning their own families (Moya and Sear 2014).

Lower genetic relatedness between caretaker and adolescent, or adolescent and other minors in the household (e.g., step- or half-siblings), may exacerbate intergenerational conflicts with adolescents less motivated to invest in the wellbeing or growth of that family unit than if they were more closely related. Rather, adolescent girls may be motivated to begin their own families, or at least emancipate themselves from the home of their guardians, as has been documented in the United States (Syrett 2016). Consistent with this perspective, girls who live with unrelated guardians (e.g., step-parents or foster parents) as opposed to their biological parents in adolescence have been found to reproduce earlier in several settings (e.g., UK: Nettle et al. 2011; Sheppard and Sear 2012; Malaysia: Sheppard et al. 2014).

Even in households where a girl lives with her biological parents, reproductive conflicts between caregivers and daughters arise (Mace 2013), reinforcing daughters' motivations to marry early due to tangible financial or social benefits, while parents aim to capitalize on longer periods of support/labor from their daughters to benefit their own reproduction. Indeed, girls have been documented to deem early marriage an attractive option in many settings for a variety of reasons: improving their standard of living and gaining self-sufficiency and respect (Stark 2017); improving their status within their community (Tanzania: Schaffnit et al. 2019b); fulfilling cultural expectations (Kenya: Pike et al. 2018; Review: Wodon 2016); avoiding risks of remaining unmarried, such as risky sexual behavior or unwanted attention from men (Pakistan: Nasrullah et al. 2014; Tanzania: Schaffnit et al. 2020); or simply fulfilling a desire to bear children (Kenya: Pike et al. 2018).

Overall, the intergenerational conflict model of early marriage is potentially a powerful explanation for some early marriages. However, similar to the parent–offspring conflict hypothesis, studies specifically aimed at testing this hypothesis and its multiple predictions are needed. It is likely that intergenerational conflicts in which girls fulfil their desire to marry earlier than their caretakers would prefer will be most relevant in settings where fostering is common (and thus girls are likely to live with guardians less related than a biological parent) and where unmarried girls provide important labor to their guardians at home, thus incentivizing guardians to encourage delayed departures. However, none of the studies cited above formally evaluate the proposed benefits to parents of having unmarried adolescent girls at home, as opposed to married. Furthermore, this hypothesis will logically be most relevant in contexts where marriage is associated with tangible

benefits for girls that are disassociated from benefits their parents or guardians may receive from that marriage (e.g., when early marriage does not lead to more profitable or less costly marriage payments).

5. Early Marriage Is a Best of a Bad Job Strategy

Finally, early marriage may represent a ‘best of a bad job strategy’, that is, it will be common when it is the best locally available option. The notion of making the best of a bad job is a general concept in behavioral ecology that explains how seemingly non-ideal reproductive/mating strategies can persist in a population due to constraints placed upon some individuals that limit their option set of available or feasible behavioral strategies (Partridge 2017). Applied to marital timing, it could explain how marrying early may persist for people experiencing certain constraints, even though early marriage is not the optimal strategy for other girls living in different contexts in terms of their fitness and/or wellbeing. More specifically, this describes a situation where both daughters and parents from relatively disadvantaged backgrounds (e.g., with limited resources to pay for further schooling, living under patriarchal norms that restrict non-marital opportunities for girls and young women), favor expedited marriage as the best available option given their available choice sets. Central to this hypothesis is the point that marrying at young ages is not expected to be the best option for all girls or in all contexts, but rather that early marriage will occur when it is the best option available for certain persons given their reality. This hypothesis predicts that, all things being equal, when comparing girls and women experiencing similar constraints within a population, early marriage will either have no correlation or a positive correlation with fitness and/or wellbeing.

Conceptually, a best of a bad job model is ostensibly a good explanation for the persistence of early marriage in many settings where it remains common. Due to pressure from global health and development actors (Schaffnit et al. 2021), early marriage is increasingly not seen as ideal in populations where it is common. Further, early marriage can be costly to girls physically, as in the case of very early birth, and socially, for example, by limiting access to education (Field and Ambrus 2008). Even so, dangers to female adolescent wellbeing outside of marriage (e.g., via risky sexual behavior, including increased exposure to sexual transmitted infections and an increased likelihood of raising children without an investing fathers) are frequently equivalent or higher to those affecting married adolescents. Furthermore, marriages can bring immediate benefits to adolescent girls unavailable through other means, including increased power in household decision-making, access to money, and improved social status and community respect (Schaffnit et al. 2019b; Stark 2017, 2018). As such, marrying is sometimes seen as the best option and/or a strategic tool with which to address hardships and constraints, making it effectively the optimal choice within the constraints of local context. This logic is reflected in a number of recent qualitative studies that tease apart rationales for early marriage: in Brazil girls often attempt to delay marriage but ‘give in’ when things are going badly within their home (Taylor et al. 2015); in Kenya parents prefer for their daughters to delay marriage in favor of higher education, but when financial constraints make education unobtainable, marriage is seen as the best way to secure their daughter’s economic wellbeing via the formation of advantageous alliances (Archambault 2011); and in Tanzania, girls and their parents weigh marriage against risks of school attendance, including rape and physical abuse, sometimes finding marriage to be the more desirable option (Schaffnit et al. 2020). Further examples of these rationalizations abound (e.g., Boyden et al. 2012; Clark et al. 2009; Knox 2017; Montazeri et al. 2016; and Stark 2017, 2018) and contrast starkly with statistical findings from large-scale studies that demonstrate correlations between early marriage and harmful outcomes at regional or national levels. Indeed, such large-scale correlations may often reflect statistical confounding rather than causal relationships since early marriage is typically most common among relatively less privileged communities and peoples.

The best of a bad job hypothesis emphasizes the need to better identify and understand the structural factors that restrict women’s options and motivate marriage at young ages.

This feature makes this hypothesis potentially widely applicable because all humans are responsive to the structures and cultures they exist within. Structural factors like poverty, lack of employment opportunities, or access to reproductive and sexual health services are applicable in many contexts to varying degrees, though others will be context-dependent such as specific policies, histories, and customs. Social norms regulating women's behavior may be particularly important, redirecting our focus to understanding the determinants of patriarchy as a much broader cultural system that restricts women's agency and opportunities, often independently of the precise age of marriage. Among the Sukuma of Tanzania, for example, traditional songs about marriage both reflect and reinforce norms of women's subordination for all age groups (Masele and Lakshmanan 2021). HBE can provide a framework for analysis here too; scholars working in this tradition have long considered the socioecological and evolutionary roots of patriarchy, often placing emphasis on the role of livelihood shifts, such as the uptake of agriculture and its impacts on gendered divisions of labor and resource control, along with variation in post-marital residence norms that may influence a woman's ability to draw on support from kin when facing a conflict of interest with men and patrilineal relatives (Hrdy 1997; Smuts 1995; Borgerhoff Mulder and Rauch 2009; Lawson et al. 2021). Ultimately, these considerations leave us with a more nuanced perspective on early marriage, highlighting that marrying early can be indicative of and perpetuate patriarchal structures that restrict women's agency and yet, given that a woman lives within this system, participating in an early marriage may present the best available option.

6. Conclusions

In evaluating these four HBE-grounded hypotheses for the persistence of early marriage, we have identified that explanations are context-dependent (Table 2). For example, parental coercion is most likely to drive earlier marriage in contexts where dowry or bridewealth transfers provide incentives for parents to encourage early marriages for daughters and where norms of very young marriages (e.g., under 15 years) or traditions of arranged marriage increase the scope for coercion of daughters. Alternatively, intergenerational conflicts will be particularly relevant where non-nuclear family structures are common, wherein adolescent girls share less genetic relatedness with household heads and members and where unmarried adolescent girls and young women provide substantial labor to their natal household. These considerations emphasize the value in focusing on the role of socioecological context rather than presenting early or child marriage as a uniform behavior with monolithic determinants and consequences.

Understandings of early marriage that emerge from the HBE framework can help inform current global health efforts to improve girls' lives throughout the world in several ways. Most importantly, explicit consideration of the potential costs *and* benefits of early marriage encourages us to treat the topic more empathetically. Global health discourse often presents child marriage and other so-called 'harmful cultural practices' (e.g., polygyny, female genital cutting/mutilation, etc.; Longman and Bradley 2015) through an exotifying and moralizing lens, frequently presenting traditions of early marriage as wholly irrational or even 'primitive' by only considering apparent harmful consequences and assuming those that marry early must, almost by definition, be either ignorant of the costs or actively coerced. Consequently, dominant global health narratives, and their presentation to the general public (Lawson et al. 2020; Figure 1), risk propagating stereotypes that the poor wellbeing of girls and young women in low-income countries is caused their own moral failings or ignorance (e.g., selfish parents forcing daughters into marriage for their own financial gain; under-informed girls choosing to marry early). Such stereotypes can detract from the more deeply rooted causes of early marriage, including systems of poverty that themselves are often perpetuated by the policies of countries who fund and set global health agendas. Recognizing the potential rationality of decisions to marry early is critical in treating communities at the receiving end of international development campaigns with dignity. This does not imply that child marriage is not a cause for concern or that decisions

to marry early need to be viewed as ‘good decisions’ but correctly identifies that such decisions can be rational choices within specific circumstances, often motivated by desires to mitigate alternative risks.

Table 2. Summary of hypotheses explaining early marriage, their logic, and the specific socioecological contexts within which each hypothesis is expected to be most relevant.

Hypothesis	Logic	Relevant Socioecological Contexts
Early marriage is a response to low life expectancy	Marrying early in areas with low life expectancy or high morbidity increases chances of successful reproduction before death or loss of key alloparental support	<ul style="list-style-type: none"> • Low life expectancy • Premarital childbearing is rare, and childbearing typically occurs soon after marriage. • Grandparents play important role in childrearing
Parents winning a parent–offspring conflict drives early marriage	Parents prefer daughters to marry earlier than is optimal for them and parents coerce daughters to marry early	<ul style="list-style-type: none"> • Parents control marriage process • Financial transfers occur at marriage (i.e., dowry, bridewealth) • Divorce is unacceptable (especially combined with parental control over marriage) • Female youth is prized on the marriage market
Early marriage occurs when girls win an intergenerational conflict	Co-resident adults/caretakers wish to exploit girls’ labor to improve their fitness while girls prefer to invest in their own families	<ul style="list-style-type: none"> • Multigenerational households are common and multiple women of reproductive age coreside • Unmarried adolescent girls play important roles in domestic labor • Girls commonly live with non-biological parents/caretakers • Marriage has direct benefits to girls unavailable through other means
Early marriage is a best of a bad job strategy	Given certain constraints, early marriage is the best option available for ensuring girls wellbeing and/or fitness	<ul style="list-style-type: none"> • Women are unable to support themselves outside of marriage (e.g., cannot own land or be employed) • Sex without marriage is risky (e.g., unwanted pregnancy, STI exposure) • Marriage has direct benefits to girls unavailable through other means

While the HBE perspective does not shy away from considering of the role of family conflict in driving early marriage under certain circumstances, engaging with the potential rationality of early marriage for girls offers important insights for policy-makers. For example, programs to end early marriage often include efforts to empower girls to exercise agency to delay marriage. Such efforts may fail when the assumption that girls are forced into adolescent marriages by others is not met or if risks associated with alternatives to marriage (e.g., education) are not fully engaged with. In such cases, efforts to empower girls to exercise greater agency may hasten rather than delay marriage. This raises the dilemma in which young people’s agency is accepted by external actors only when they make the ‘right’ choice according to development agendas (Schaffnit et al. 2020). Critically, (re)conceptualizing early marriage as a product of specific sets of constraints strongly suggests that a robust strategy to address the vulnerabilities of female adolescence will require broader engagement with structural and culturally-specific factors that limit options. Such

a strategy for improving girls wellbeing may not actually center on ending early marriage itself. For example, the criminalization of marriage under 18 years without accompanying adjustments to the wider constraints that motivate early marriage in the first place may not meaningfully improve women's lives, and may actually be harmful by limiting their ability to make strategic choices (Schaffnit et al. 2020). In fact, history demonstrates that ages at marriage increase as socioecological contexts change without external pressure of criminalization because that is largely what has happened in the global north. Indeed, 'child marriage' is still legal in most of North America and Europe (Arthur et al. 2018) and yet is very uncommon in these areas. This is likely due to many factors that together incentivize delayed marriage, including mandatory schooling laws complimented by high-quality education, fulfillable employment aspirations for girls, greater social recognition of women's roles beyond marriage and childrearing, and increased access to economic security nets for families. As we have argued elsewhere, "supporting adolescent girls to live the lives they desire may mean acknowledging and respecting the full range of their agency while simultaneously working to dismantle unduly limiting structures which shape all decision-making" (Schaffnit et al. 2020, p. 11).

Another major contribution of HBE to global health approaches to child marriage is a reiteration that context matters and one-size-fits-all explanations for any behavior are rarely appropriate (Gibson and Lawson 2015). HBE identifies multiple specific potential rationalities behind decisions to marry early or to favor early marriage for one's daughter (Table 2). In contrast, current global health discourse primarily focuses on the parent-offspring conflict hypothesis, albeit often implicitly (Figure 1). This narrow lens can only limit the effectiveness of current policy. We therefore advocate for greater consideration of the contextual factors that may lead to differing explanations and to variable potential solutions to tackle early marriage specifically and the wider vulnerabilities of female adolescence more generally. Policy-makers must consider what drives early marriage in each context and be open to the possibility that the drivers and wellbeing consequences of early marriage may vary not just between populations but within them depending on the age of the girl/woman involved, her family background, her economic situation, and the options available to her. HBE provides a broad, anthropologically-informed perspective to identify socioecological factors (e.g., demographic parameters, economic conditions, educational opportunities, and specific patriarchal traditions) that may incentivize early marriage and thus reliably predict such patterns. This contribution is highly complementary to frameworks in development economics but goes further by clarifying that the ultimate utility function guiding behavioral variation is inclusive fitness, leading to novel insights, including the possibility that early marriage may persist in the absence of wellbeing benefits to any party involved, provided it is fitness-maximizing (or was in prior environments) (Gibson and Lawson 2015).

Just as HBE contributes to our understanding of early/child marriage, we also note that a more dedicated study of marital timing, drawing on findings from across the social sciences, would benefit HBE more broadly. Specifically, considering the context-dependent drivers of early marriage highlights shortcomings of common notions of fast/slow life history continuums that are popular in the evolutionary behavioral sciences. This approach is characterized by assumptions about coordinated physical-behavioral strategies to time reproduction (Sear 2020, e.g., a 'fast life history strategy' may combine early puberty, marriage, and first birth in harsh environments, while a 'slow life history strategy' would combine delayed puberty, marriage, and first birth in more steady environments). However, while timing of marriage is often correlated with other life history transitions central to determining reproductive timing (e.g., puberty, first sex), marriage differs because it also reflects mate choice strategies sensitive to cultural institutions and norms regulating family alliance formation and transfers of wealth (Shenk et al. 2016; Fortunato 2015). The costs and benefits of marriage timing may therefore vary independently from physiological transitions to adulthood via puberty or decisions about when to start reproduction. For example, as we highlight above, at a global level early marriages are most common in

areas where puberty is late. In these settings, social or financial benefits of marriage likely incentivize early marriage, while relative nutritional deprivation leads to later menarche. In contrast, in well-nourished populations puberty seems to be occurring at earlier and earlier ages than in the past (Herman-Giddens 2006) while entry to adulthood and perceived readiness to marry is being delayed, presumably due to a number of novel features of the environment that alter benefits of delayed marriages, costs of early marriages, and the dynamics of conflicts over ideal timing between girls and their extended networks. Remarkably, in light of these shifts, public health professionals in the global north now recommend that we extend conceptualizations of adolescence, and its implied vulnerability, into the third decade of life (Sawyer et al. 2018).

In summary, addressing early marriage remains central to current global health agendas, with large amounts of money and brainpower going towards its eradication. The HBE approach to understanding early marriage underscores the importance of context-dependency in both drivers of early marriage but also the likely effectiveness of policy responses. With improving girls' lives at the base of the global campaign to end child marriage, HBE can help identify and predict the constraining structures that lead to harmful early marriages. Critically, it also cautions against portraying early marriage as the lynchpin that, once dislodged, will dismantle the constricting structures within which it is common. Instead, it offers to situate our understanding of marital timing within a broader body of theory addressing not just marriage and reproduction but patriarchal norms and cultural institutions (Hrdy 1997; Borgerhoff Mulder and Rauch 2009; Smuts 1995; and Lawson et al. 2021) that pattern human behavior and wellbeing worldwide.

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