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Anna Rozman  
anya.m.rozman@gmail.com

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Life History Theory and School-Age Pregnancy: Review and Application

Anna Rozman

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**Abstract**

The United States currently holds one of the highest teenage pregnancy rates in the developed world, but many Americans, including policy makers, view adolescent childbearing as a societal problem that stems from negligence, promiscuity, and poor decision making. This project seeks to frame the institution of school-age motherhood through the lens of Life History Theory, which posits that early reproduction is an adaptation in the face of harsh conditions and high extrinsic mortality rates. This assertion is supported by evidence that adolescent childbearing has been the norm for most of human history, and continues to be practiced in natural fertility populations even today. Special focus is given to urban communities of color in the United States, where early reproduction can hold advantages for both mother and child, especially when their decision is supported by the larger community. Historically, however, policies to curb teenage childbearing have failed to take into account the socioeconomic context of early reproduction. I conclude by discussing whether or not programs aimed at lowering adolescent pregnancy rates address factors that make childbearing an adaptive decision for some teens.

## Introduction

The tired, the poor, the huddled masses, were never much welcome in the United States. With each new wave of immigrants over the decades and centuries has come a matching wave of xenophobia, feeding a sense that whoever this new group coming into the country is, their numbers pose a threat to the very infrastructure of nation. Inevitably, this fear takes on a racial tone, and as the ethnic group's population grows, so does the racist sentiment that the reproduction of these women—particularly those of color—is out of control, and therefore in need of being curbed (Roberts, 1997; Gutierrez, 2008; Nelson, 2003). Yet at the same time, it can no longer be ignored that the United States has one of the highest teen pregnancy rates in the developed world, and that within-race rates of teen pregnancy are highest among minority groups (Singh et al., 2001; Geronimus, 2004).

The only way to reconcile these facts is to ask why it is the case that minorities begin reproduction earlier and continue at greater rates. Surprisingly, this is not a question often addressed in policies meant to deter early reproduction. Often cited explanations of adolescent childbearing, in particular among minorities, include a lack of self-restraint, a lack of common sense, or even the desire to exploit the welfare system, all of which are largely unfounded and furthermore rest upon the assumption that minority women are immoral, uneducated, and use their children as a means to an end for themselves (Roberts, 1997, p. 8-19). Historically, responses to the problem of growing minority and adolescent birth rates have ranged from welfare reforms meant to deter early or single motherhood, to practices in some public hospitals of sterilizing women based on age-parity formulas (Geronimus, 1997; Gutierrez, 2008, p. 37). However, if one were to look at early reproduction of disadvantaged minorities through the lens

of Life History Theory, as a response to the pressures of poverty rather than as a consequence of any personal moral failings, the pattern makes more sense. Moreover, it opens the way to more concrete solutions toward curbing adolescent pregnancy rates. If early reproduction is a consequence of and adaptation to economic hardship and lack of opportunity, the key to decreasing teen childbearing rates lies in a massive overhaul of the way in which America views and deals with poverty. In other words, in order to understand why adolescent childbearing is so prevalent among the poor and disadvantaged, we need to look at what economic factors lead to early childbearing in the first place.

### **Life History Theory**

As with most scientific theories seeking to explain the natural world, Life History Theory is derived from the principles of natural selection. In essence, three conditions must be met for natural selection to take place. First, there must be phenotypic variation within a population. Whereas a genotype is limited to the genetic information passed from parent to offspring, the phenotype is the expression of that genetic information as influenced by environmental factors, and includes not only morphology, but also the physiology and behavior of an organism. The genotype itself is therefore not subject to selective pressures directly, but instead only as a consequence of selective pressures acting on the ensuing phenotype.

The second condition of natural selection is that this phenotypic variation must be transmissible to offspring. In some cases this may indeed be through genetic transmission, but because behaviors are also included in our definition of the phenotype, cultural behaviors that are learned over the course of an individual's lifetime from his or her community also fulfill this criterion.

Finally, the third condition of natural selection is that phenotypic variation must produce variance in fitness within the population. In other words, some phenotypes will produce more offspring than others. The more offspring that are produced, the better that phenotype can be said to be adapted—or “fit”—to its current environment. More offspring from one phenotype will result in a greater incidence of that phenotype in future populations. (Smith & Winterhalder, 1992).

At first, it seems apparent given these conditions that the answer to being the most “fit” organism is simple: for a phenotype to be the most successful, it must simply have more offspring than every other phenotype. By this logic, all organisms should therefore be optimized to produce the greatest number of offspring possible; however, this is not what is observed in the natural world. For example, consider a classic study by David Lack (1947) with various bird species. Lack found that average clutch sizes among different species are always significantly smaller than the maximum observed in the species. When the brood sizes were experimentally manipulated to increase the number of eggs to the maximum observed naturally-occurring clutch sizes, survivorship was not significantly impacted, meaning that parent birds were capable of having more offspring, but for some reason fewer offspring were being favored. Lack proposed that the reason for this seeming anomaly lay in the decreasing survivorship of parents with increasing brood size. He therefore proposed that clutch size was not merely a factor of how many eggs a female could lay, but how many they could take care of while incurring the least cost to themselves. Over time, natural selection would favor the optimal tradeoff, and indeed all species produced what Lack calculated to be the optimal brood size for their habitats. This tendency of organisms to exhibit optimum levels of lifetime reproduction rather than maximum levels of immediate reproduction has since been termed the Lack Effect.

Interbirth intervals in humans follow similar patterns and constraints. The !Kung of Sub-Saharan Africa have one of the longest interbirth intervals for natural fertility populations in the world at nearly four years between births, whereas most other hunter-gatherer women typically give birth once every three years (Blurton Jones, 1986). Obviously, a longer interbirth interval results in fewer offspring, and as an adaptive strategy should be vulnerable to competition from a more parous population, yet surprisingly, this is not the case for the !Kung, who have managed to survive and thrive even while bearing fewer children. One explanation that has been put forth comes from the observation that women need to carry their young children while foraging, so it is therefore more advantageous to space births out such that one child may be old enough to be left at camp before the next is born. The mother's increased efficiency from the reduced backload would therefore explain the lower mortality that results from lower interbirth intervals (Blurton Jones, 1986). If the !Kung were to try to decrease their interbirth intervals, their foraging efforts would become less efficient, and their infant mortality would rise, thus canceling out the benefits of having more children in the first place.

What these two examples demonstrate is that there are always a number of trade-offs at work. Whether they are a conscious decision on the part of the organism or a strategy wrought by hundreds of thousands of years of selective pressures is irrelevant, because the end result will be the same cluster of slight variation around some optimum.

Generally speaking, the two most important trade-offs in terms of reproduction are the decisions between quality and quantity of offspring, and between current and future reproduction (Hill, 2005). Most organisms do not consciously make the decision between quantity and quality for themselves. Instead, we find that it is millennia of selective pressures that shape whether a species produces large litters of low cost offspring, or one or a few offspring at a time that

requires a great deal of investment on the part of its parents. For our purposes, the question of current versus future reproduction is a much more interesting one, specifically because it involves a decision on the part of the individual actor. For simplicity, most models assume a rational actor that makes the optimal decision based on all the information available to them. This rational individual has to realize that it has a finite amount of energy that it can expend, and once used, the energy cannot be put to other uses. This is known as the Principle of Allocation (Hill, 2005). Energetic invests of organisms can be divided into two main categories: somatic effort and reproductive effort. Somatic effort is the energy expended to upkeep the body, and especially to grow, while reproductive effort can be broken down further into mating effort (energy needed to produce sex cells and reproduce) and parenting effort (energy invested into offspring). Therefore, the age of first reproduction balances the need to invest in one's own growth versus the need to invest in one's reproduction (Chisholm, 1993).

Each energy investment (i.e., whether investing in one's own growth or reproduction) has its advantages and disadvantages. In the animal kingdom, investing in one's growth may mean that an animal attains a larger body size before reproduction, allowing them to acquire better mates, a larger territory, or more resources. For humans, self-investment may mean delaying reproduction to further one's education in order to secure a higher income in the future. Especially in the post-industrial age, the gap between when one can physically begin to reproduce and when one actually does reproduce has increased substantially (Hill, 2005, p. 79). Conversely, earlier reproduction would mean getting one's genes into the gene pool earlier. Because population growth is exponential, organisms that reproduce early will—given equal survivorship of young in comparison to members of the same population that delay reproduction—dominate the gene pool. Furthermore, the longer an organism delays

reproduction, the greater the odds of it dying before it can get the chance to reproduce at all. Therefore, in any environment, the imminent threat of extrinsic mortality puts pressure on an organism to reproduce while it can. (Chisholm, 1993).

In anthropological studies of pre-industrial, natural fertility populations, extrinsic mortality is closely tied with age of first reproduction. One study using United Nations data on the fertility of 163 countries compared current adolescent fertility rate with infant mortality risk both around time that the adolescent parents were born and the current adult mortality risk. What they found was that high infant mortality lead to surviving infants reproducing earlier as adolescents and adults, whereas in countries where mortality risk had been low at the time of birth and had since risen, age of first reproduction remained later, as in countries where current mortality risk remained low. In other words, early risk indicated increased fertility, but present risk did not cause populations to increase fertility if early risk was not already present. The causal mechanisms behind this relationship were outside the scope of the study, but it remains established regardless that early mortality risk has a significant impact on later fertility (Placek & Quinlan, 2012).

A natural experiment of this phenomenon can be observed with historical fertility and infant mortality rate data of the relatively closed-off Caribbean community of Domenica over the course of the twentieth century. As Quinlan (2010) charts, infant fertility rates were low in the 1920s, but began to rise around 1929 until finally spiking as high as 72% in the 1950s and decreasing thereafter. While the initial rise can be attributed to deteriorating economic conditions and a bad flu year, the high infant mortality rate throughout the forties and fifties is known to have been the result of massive food shortages on the island due to World War II and related reconstruction. As is to be predicted by Life History Theory, fertility increased as women who

lost their children sought to have more. Curiously, the trend continued even after the infant mortality rate returned to endemic levels. Quinlan (2010) theorized that as parental effort shifted from low-fertility, high-investment childrearing to a high-fertility, low-investment strategy in the face of a harsh environment, the lower attachment experienced by offspring lead to a hormonal shift that lead to earlier reproduction in the new generation.

More significantly, the study theorized that the psychological measure of an individual's locus of control may play a reproduction regulating effect. The locus of control refers to a person's perception of how much control they can exert over the events in their lives (Quinlan, 2010). When extrinsic mortality is high—specifically defined as the mortality caused by means that affect the entire population regardless of age or health status—locus of control would appear quite low, because death comes frequently regardless of one's choices.

For the Pumé foragers of Venezuela, extrinsic mortality is unusually high compared to the rest of the world, and the age at which girls begin to bear children is unusually low. Because of their isolation from the developed world, the Pumé have no access to modern healthcare or immunizations, and their annual dry season leads to extreme food stress during half the year (Kramer et al., 2009; Kramer, 2008). Normally, these would not seem like conditions under which early reproduction would be advantageous. Rather, it would make more sense to delay reproduction, and instead focus somatic efforts on growing, provisioning, and building a strong immunity. Adolescent reproduction would mean having to provide for offspring as well as oneself at a time when one is still developing one's own adult body.

The Pumé circumvent this dilemma by pooling their energy resources. Young girls receive the majority of their calories from the provisioning of older adults in their camp, which are usually comprised of related individuals. After passing their childbearing years, women then

take on the task of provisioning not only themselves but the younger generation. These pooled energy budgets allow Pumé girls to mature and give birth as early as age fifteen. By comparison, other South American hunter-gatherers do not begin reproduction until they are somewhere between seventeen and nineteen, although the Pumé still fall well within the average in terms of their typical age at menarche (Kramer et al., 2009). The Pumé's next door neighbors for instance, the Hiwi, live in a very similar environment but have adapted to be horticulturalists. Higher food stability, as well as closer contact with trade markets and healthcare, coincide with a drastically later age of first reproduction, falling between the ages of eighteen and twenty-two (Kramer & Lancaster, 2010). Could these trends be connected?

### **Hardship & Health**

It is not always the case that early reproduction is a decision made in the face of a high probability of death. However, early timing of first reproduction does have positive outcomes for both mother and infant, especially when it comes to African-American women. When compared to white women in the United States, African-American women's health actually starts to decline, or weather, as early as their 20s, in an effect known as the Weathering Hypothesis. As a result, neonatal mortality of black children is actually slightly lower when the mother is a teenager than when she is in her twenties—the opposite of the pattern among white women (Geronimus, 1991; Geronimus, 1987; Rosenzweig & Wolpin, 1995).

The effects become more visible as time goes on. When questioned about the latest one should have a child, black teens from low-income families put the cut-off at age thirty, while their middle-class, white counterparts generally agreed that it was okay to still be having children at age forty. When asked for reasons why, white teens cited a generational disconnect between

an older mother and her children, and did not list health nearly as much as black teens, who were generally pessimistic about survival past age fifty (Geronimus, 1996).

The impressions of black teens are not wrong. Half of men and nearly half of women living in inner-city communities of color could be expected to die or become disabled by age fifty. Nationwide, such proportions are not reached by white populations until their seventies. If the average black Harlem man were to wait until age thirty to father a child, there would be a 30% chance he would not survive to see his child's twentieth birthday, and nationwide, a fifteen-year-old black parent has the same chances of surviving to their child's twentieth birthday as a white parent who begins reproduction at age thirty (Geronimus et al., 1999).

The weathering of black women's health can also be seen clearly in their birth outcomes at different ages. When pairs of African-American sisters were used as controls, teen mothers actually gave birth to heavier babies, and the children of women in their twenties suffered a higher infant mortality rate (Geronimus, 1991; Rosenzweig & Wolpin, 1995). The same pattern was not observed in white women (Geronimus, 1991). In fact, black women have smaller babies than white women even when controlling for socioeconomic status, and even upwardly mobile black women have children with birth weights and mortality rates at comparable levels with white women who remain chronically poor, whereas upward mobility among white women does correlate with improved birth outcomes (Colen et al., 2006). Even among teen births, in which white mothers are less likely to breastfeed and more likely to postpone prenatal care, as well as more likely to have fewer well-child visits after the birth, average birth weights are still higher than those of black births from mothers of any age (Geronimus & Korenman, 1993, p. 217).

However, some studies do reveal adaptations on the part of black kin networks to buffer the effects of declining maternal health over time. The most obvious of these adaptations is that

reproduction begins early, when the mother is still in her teens. Rather than spend her most healthful years in child-rearing, however, the mother turns to her own mother—her child's grandmother—to raise her offspring, while she enters the labor force. Because reproduction begins so early in life, women become grandparents as early as their thirties, and are therefore still healthy enough to take on the responsibility of raising their grandchildren, at comparable ages to when other women in the United States might only just be starting to have children of their own. Therefore, such a contracted life history can only work as an adaptation within a community and kin network that practices it collectively (Geronimus, 1992).

Prenatal care and social support play a much larger role than maternal age itself in infant mortality of infants born to young mothers. For the Pumé foragers discussed above, who have no access to prenatal care, infant mortality is fairly constant from a maternal age of 15 onward. In rare cases when a first-time mother is fourteen, the infant mortality is much higher (Kramer, 2008). In the United States, on the other hand, two thirds of teen births are to women who are either eighteen or nineteen, meaning that biologically speaking, their age is not a barrier to their ability to have healthy children (Geronimus, 1997). The difference must lie elsewhere, in social and economic contexts. Compared to their black counterparts, pregnancy is more likely to come as a surprise to white teens, who are not likely to receive the same support from their families during and after the pregnancy. They are also more likely to exhibit deviant behavior and drug use, leading to a higher infant mortality rate among the offspring of white teen mothers than among offspring of black teen mothers (Geronimus, 1987).

Meanwhile, black women find it more advantageous to have children in their teens, before they are required to enter the workforce (Geronimus, 1987, p. 258). Burton's (1990) field work in a rural black community at Gospel Hill in New York portrayed this choice as an

alternate life course strategy rather than merely a deviation from the Western norm. The strategy was characterized by an accelerated family timetable, in which adolescence was perceived to end sooner than elsewhere in the Western world, sometimes as early as thirteen or fourteen years of age. Additionally, to cope with high male incarceration and death rates in the community, there was a perceived separation of reproduction from marriage, making it the social norm to bear children out of wedlock. Most importantly, the adaptive strategy at Gospel Hill was characterized by intergenerational caregiving and grandparental childrearing. In other words, a woman would have a child in her teens who would be raised by the child's grandmother, who also had children in her teens and would therefore only be about thirty years of age when her grandchild was born. The mother, meanwhile, would focus on maximizing her income and caring for her own grandmother—her child's great grandmother—in her waning years (Burton, 1990). Nor is this the only study to suggest teen childbearing as an adaptive reproductive strategy. Whereas popular notions suggest that teen childbearing leads to poverty and disadvantage, it has been increasingly demonstrated that teen mothers come from poor and disadvantaged families themselves, and studies of sisters have shown that even when controlling for family of origin, teen motherhood has no significant impact on future socioeconomic advancement (Geronimus, 1991; 1992; 1996; 2003; Geronimus & Korenman, 1992).

### **Contraception & Choice**

The issue that has yet to be addressed is just how much control a young woman actually has over her reproductive timing in practice. Birth control is not universally available in the United States, and common wisdom is quick to suggest that early reproduction is the result of contraceptive disuse and misuse rather than conscious intention. Neither, however, is wholly

accurate.

Even before the Affordable Care Act, most women sought publicly funded reproductive health services, and those who did generally sought a wider range of services than did women who paid for private care. Poor women and women of color were especially likely to seek public services, but the most important predictive factor in which type of care women sought proved to be the source of their insurance, with women on Medicare and women without insurance more likely to frequent public clinics and forego preventative care entirely (Frost, 2001). Even so, with preventative services now fully covered under the Affordable Care Act, contraceptive methods are still being underused (Finer & Sonfield, 2013). In fact, contraceptive availability does not fully account for the high teen pregnancy rate in the United States when compared to European countries, nor does it explain inter-state variation within the US itself (Kearney & Levine, 2012).

Perhaps it is misuse, then, that accounts for this disparity. Sure enough, coitus-related methods such as the condom, which are more widely used and easily acquired, are more likely to be used incorrectly than longer-term methods such as pills, IUDs, or subdermal implants (Frost & Darroch, 2008). Black women, who according to a Jones et al. (2002) study have the highest abortion rate of any ethnic group in the United States (up to 49 per 1,000), are also the group with the highest failure rates of contraception, especially if they are married or cohabiting (Jones et al., 2002; Ranjit et al., 2001). Still, IUD and subdermal implant use has only increased in the last decade, and the percent of teen contraceptive users that rely on such long-term methods has risen from 0.3% in 2002 to 3.6% in 2008 (Kavanaugh et al., 2011). Meanwhile, teen birth rates, which have actually been decreasing since 1990, continue to remain too high to be explained by contraceptive misuse alone (Kearney & Levine, 2012). Why black women more so than women of other ethnic groups hold the highest rate of contraceptive misuse can also not simply be

explained away by higher rates of misuse, since there should be no reason black women misuse their available methods at rates higher than white or Latina women when all other factors are held constant.

Only when teen pregnancy data controlled for inter-state socioeconomic inequality does the pattern start to make sense (Kearney & Levine, 2012). Frost et al. (2007) looked into a number of risk factors for unplanned pregnancy, and found a number of strong patterns. Women who are ambivalent about becoming pregnant rather than opposed are more likely to find themselves unexpectedly pregnant, as are women who are black, having infrequent sex, not in a relationship, or dissatisfied with their contraceptive methods but perceive themselves as lacking the resources to switch. Women who are unsatisfied with their method are more likely to use it inconsistently, and women who are unconcerned about possibly becoming pregnant are less likely to use long-term, more reliable methods like the pill and instead turn to periodic abstinence or pulling out, as well as inconsistent condom use (Frost & Darroch, 2008). Although knowing about contraceptive methods and their effectiveness has been found to be negatively associated with risk of unintended pregnancy, factors that increase the likelihood of unintended pregnancy also include a fatalistic attitude (“it’ll happen eventually whatever I do”), ambivalence (“I don’t care if I get pregnant”), or a mistrust of the government in the case of women who rely on publicly funded health services (Frost et al., 2012).

Qualitative research using direct interviews with teen mothers-to-be to assess their attitudes and beliefs about their pregnancy has also been conducted. A number of these young women struggled with contradictions to which they themselves may not have realized they gave voice. A common example was the tension between “it happened, I have to just deal with it” and “I wanted it to happen.” Even those young women who sought to become pregnant still held a

pragmatic view of just having to deal with the consequences of their actions. Another area of contradiction involved the father of the child. Some participants seemed to want his support while simultaneously saying they could do without it and raise the child themselves. For those for whom the father's involvement was uncertain, there was significant indecision with regards to whether or not they would be open to it. Finally, the last major contradiction was the divide between "once you're pregnant, you have to think about the future" and "I'm living day-to-day." In terms of Life History Theory, these last sentiments make a lot of sense. These young women have found themselves in situations in which support for themselves and their child is not always certain, with many being rejected or not fully supported by their natal families or partners (Merrick, 2001). In such circumstances where the future is so uncertain, living day to day and reproducing early is the most advantageous course of action. On the other hand, planning ahead for one's child is also a necessary investment. This phenomenon works well as an analog with Quinlan (2010)'s historical study of Dominica's low locus of control and subsequent early reproduction.

Becoming pregnant is more a matter of a woman's circumstances than her lack or misuse of contraceptives. Her lack of financial and sometimes social resources puts her in a position where her present situation holds so much uncertainty that she cannot afford to plan for a future, resulting in fatalistic and ambivalent attitudes toward pregnancy reflecting her current perceived lack of control over her environment. No matter how freely available contraceptive methods may be to a woman in such a position, there is no guarantee that she will use them if she does not see an advantage or benefit in doing so.

## **Economics & Behavior**

If a woman's socioeconomic circumstances determine her reproductive timing, it would stand to reason that we would see correlations between national birth rates and fluctuations in economic and political climates. Sure enough, since at least 1965, infant mortality rates have increased by an average of 3% when a Republican held the presidency than when a Democrat was in office (Rodriguez et al., 2013). Rodriguez et al. (2013) did not offer an explanation for this trend except to suggest that the political system plays a role in generating health inequality in America. It could likely be a factor of economic policies, since the economic boom of the 1990s saw a drop in birth rates and increase in contraceptive use, most significantly among black teens. Conversely, the inverse pattern was seen during times of economic hardship, with a steep increase in teen births. These sorts of fluctuations are most evident in poor, black populations who are tied most closely to the labor market. When the economy does well and jobs are easier to come by, women can delay their fertility to join the labor force, whereas a lack of jobs drives many to the same apathy about the future that results in teen pregnancies (Colen et al., 2006).

Another environmental factor with strong associations with fertility timing is local life expectancy. A study on Chicago neighborhoods found that as homicide rate (and therefore extrinsic mortality) increased, women began reproducing earlier. In this study, the early pregnancy rates were linked with risk taking behaviors rather than apathy, with the suggestion that living in an environment with a low life expectancy lowers the relative cost of risky behaviors, thereby making any possible gains seem more worth the risk. Under such circumstances, crime rates would have also been predicted to increase, as the data confirm. The unfortunate consequence is a vicious cycle of crime rates leading to greater incentive to turn to risky behaviors (Wilson & Daly, 1997).

Another study found that education, rather than life expectancy or even income, was the

strongest explanatory factor in early sexual activity. Internationally, women with a college education are less likely to become sexually active before age 20 than their counterparts with a high school education or less (Singh et al., 2001). Of course, the root cause remains the same. Whether by economic or educational opportunity, women who see their future as something to be invested in will make an effort to delay their reproduction in favor of furthering their education or entering the workforce.

The most logical course of action for programs seeking to curb teen childbearing, therefore, would appear to be policies that seek to provide young women and their partners with opportunities and hope for their future. Historically, however, the United States has instead opted for policies that punish young parents, especially young single mothers, with welfare cuts for their choices—which only exacerbates the problem—and increased funding to abstinence-only education (Singh et al., 2001). Additionally, despite numerous legislation intended to curb teen pregnancy, no policy makers argue that it is an attainable goal, much less one that will improve poverty to a significant degree. Arguments that teenage parents perpetuate higher rates of child abuse, or that children of teenage parents have higher incarceration rates are not supported by any data. The opposition to teenage childbearing seems to stem more from moral grounds than anything, despite 40% of teenage mothers being wed, and the remaining unwed teenagers accounting for only one-third of unwed mothers in the United States (Geronimus, 1997).

The flawed logic behind these policies takes the childbearing itself as the root cause of the poverty in which these people find themselves, rather than seeing their financial circumstances as the cause of their early fertility. While there do exist significant associations between teenage childbearing and low income—as well as associations between teenage childbearing and neighborhood disadvantages, poverty, low education, underemployment, and

inequality—the Geronimus & Korenman (1992) study comparing sisters with differing ages at first reproduction clearly showed that the effects of these environmental disadvantages are not lessened for the sister that delayed reproduction (Penman-Aguilar et al., 2013). In other words, it cannot be that early age of reproduction leads to poverty, since there was no discernable economic advantage to delaying reproduction when controlling for family of origin background (Geronimus & Korenman, 1992). Furthermore, a study from the same year found that adolescent childbirth cost black women on average two years less education than if they had delayed reproduction but with no significant negative impacts on their subsequent wage (McCarte, 1992). Since their income would not have shown significant improvement with later age of first reproduction, their early childbirth cannot be taken as the cause of their poverty. Instead, Life History Theory would suggest that it is their poverty that drives adolescent reproduction, and it is therefore poverty and systematic inequality that should be the target of interventions seeking to keep young people in schools.

### **Evaluation of Programs**

There are countless programs across the United States intended to minimize the rates at which teenagers become pregnant, usually in combination with decreasing the spread of contract HIV and other STIs, and decreasing reckless or criminal behavior in general. Although an early age of first pregnancy is likely an adaptation to harsh conditions, it comes with its costs, including personal and federal financial costs associated with pregnancy and childcare, the educational attainments for the parents but especially the mother, and intimate partner strains (Killebrew et al., 2014). Therefore, some benefits may be derived from reducing school-age pregnancy rates, and of course, their surrounding variables. For our purposes, the goal is not so

much to find the program most effective at decreasing rate of school-age pregnancy, but to demonstrate how the environmental factors discussed above covary with attempts to improve them.

The following five interventions were chosen on the basis that they encompass a range of different approaches in school and school-related settings. To analyze their intended goals and how well those goals were met, a public health ethics framework outlined in detail in Kass (2001) will be employed. The framework asks six key questions, of which we will use five. First and foremost, what are the public health goals of the program? Are there any known or potential burdens associated with the program? For our interests, these include risks to privacy and confidentiality, as well as risks to justice if some groups are more affected than others. Was the program implemented fairly across the intended population, and if not, is the unequal distribution supported by the data? Are the benefits and burdens of the program fairly balanced? Most importantly, how effective was the program at achieving its stated goals? (Kass, 2001).

### *Teen Outreach*

Teen Outreach was a program aimed at high school students across the United. Between 1991 and 1995, Allen et al. (1997) ran a randomized control trial of the intervention at twenty-five locations in the United States. The stated goal was to lower teen pregnancy rates, school dropoutism, and school suspension rates over the course of an academic year. The program itself consisted of engaging students in structured community outreach volunteer work, paired with weekly or twice-weekly classroom discussion of future career options and life decision-making. Very little of this discussion was directly centered around the stated goals themselves, although family planning was discussed. Rather, the program sought to foster a sense of agency and inner

worth in the participants, as well as build connections between peer and adult facilitators.

Intervention and control groups were assigned randomly across SES, race, and sex. The entire sample (N=695), including both groups, was approximately 2/3 African-American and 85% female. Both groups were issued self-report questionnaires regarding their previous history of school suspensions and past pregnancies (females) or pregnancies caused (males). Program outcomes showed no interaction effects with household composition, parental education levels, minority status, grade, or history of prior problems. There was, however, a significant effect showing that more volunteer hours made students less likely to fail out of the program (Allen et al., 1997).

Potential burdens of the program include its costs, which for a full academic year of a class of 18-25 students would amount to approximately \$100 of direct cost per student, thereby making the program unsuitable for very low income communities. Privacy and confidentiality were a concern when it came to the questionnaires, on which it was key that students were ensured that their responses remained confidential to avoid falsified responses to the fullest extent possible. At many potential locations for the study, the concept of running a control classroom was seen as ethically objectionable. Because students could not be forced into the program, participation was determined on a volunteer basis, thus possibly missing at-risk individuals. Overall, however, the burdens and benefits were balanced to the fullest extent of the experiments' ability (Allen et al. 1997).

From a Life History standpoint, the program design looks highly feasible. Already, it combines the problems of teenage pregnancy and school dropoutism. As has been demonstrated, ambivalence toward safe sex and continued education are both attitudes that stem from a perceived lack of control over one's circumstances and future, and low expectations of outcomes

regardless of efforts made to the contrary. The program remedies these thought patterns by engaging students with the community and teaching them key skills for their social development, as well as discussing paths for their future they may not have been aware of or may not have thought within their grasp.

Allen et al.'s (2007) study found that the risk of school suspension rates of the groups enrolled in the Teen Outreach program was only 42% of the risk of the control group. Risk of teen pregnancy was 41% as large in the treatment group as among the controls, and risk of course failure was 39% as large among treatment participants as in the control groups. These effects remained significant even when controlled for demographic information and entry level reports of prior problem behaviors. By all counts, the program was found to be highly successful in achieving its stated goals (Allen et al., 2007).

#### *Spruce Adolescent Health Promotion Project*

While not part of an ongoing program, Jemmott et al.'s (1998) randomized control trial consisted of testing the effectiveness of an abstinence-based intervention against a safer sex HIV risk-reduction intervention among African American middle school students from three schools in Philadelphia, PA. The interventions occurred for only a total of eight hours over two consecutive Saturdays, and included over 600 participants, with sex ratios approximate equal. Self-report questionnaires were administered to gauge students' willingness to use condoms, attitudes toward sex, instances of unprotected sex, and confidence in various methods of preventing pregnancy and the spread of HIV and other STDs immediately prior and following treatment, as well as at 3-, 6-, and 12-month follow-ups. The safer sex group was taught that condoms could prevent pregnancy and STDs, including HIV, that sex could be a positive

experience, and how to negotiate condom use with their partners, as well as the proper use itself. The abstinence group was taught about the dangers of HIV, that abstinence was the only assured method of preventing pregnancy and sexual transmission of HIV as well as other STDs, and the skills necessary to resist temptation for intercourse. A control group was also run, teaching health topics related to the dangers of cardiovascular disease and certain cancers which could be prevented with proper diet and cessation of smoking (Jemmott et al., 1998).

Potential burdens to privacy were minimized by tracking questionnaires with assigned ID numbers rather than names. A case may be made for unfair implementation of interventions only to African American adolescents, but because the programs were designed with cultural tailoring in mind, expanding admission to other students may not have been appropriate for their needs. In addition, the problem of HIV among African American adolescents is staggeringly higher than among other ethnic groups, so early intervention was thought to be key (Jemmott et al., 1998).

In terms of Life History Theory, none of the treatment groups really get to the heart of addressing why these adolescents may go on to have children in their later teens. There was no focus on creating a brighter future outside the cautions against contracting HIV. The abstinence intervention seemed more like a scare tactic. In the face of other extrinsic risks, the proposed danger could lead to students having *more* unprotected sex later in life as a means of thrills or rebellion. While it would have left them with some greater sense of control with regard to how to abstain and therefore avoid HIV, the students who cannot overcome their later sexual urges may end up feeling even less control over their lives than before. Sensing too much external danger and no hope of controlling it, investments in early reproduction are sure to follow. The safer sex intervention, on the other hand, gave the students the power to make choices and compare alternatives when it came to how to protect themselves. This helped them increase the amount of

control they felt they had, and was not dependent on suppressing their sexual urges.

At the end of the study, it was found that both interventions showed some degree of effectiveness in reducing the number of days students engaged in unprotected intercourse. The greatest difference proved to be in how long each was effective, with the abstinence intervention group eventually increasing their instances of unprotected sex. The safer sex group, meanwhile, both increased their condom use and decreased instances of unprotected sex, with a difference evident even after 12 months. In addition, it was shown that the safer sex group, which was exposed to frank discussion of condom use and sexuality, did not have more sex than the control group, which did not discuss topics of sexuality and protection. The safer sex group did, however, have less unprotected sex, demonstrating that talking to adolescents about sexuality does not necessarily increase sexual activity itself (Jemmott et al., 1998).

### *Safer Choices*

Another program aimed at high school students, Coyle et al.'s (1999) analysis examines the effects of the first year of a two-year intervention program instituted in ten schools in Texas and California, as compared to ten schools running the standard knowledge-based HIV curriculum. The program, much like the standard curriculum, was designed to educate students on STD, HIV, and pregnancy risk, took the extra effort to specifically target home and school environments to create a holistic culture in which students felt better able to openly discuss issues of safe sex with their parents, peers, and partners (Coyle et al., 1999).

To achieve this, a five-pronged approach was implemented. A council was put together of students, teachers, parents, administrators, and representatives from the surrounding community to plan and organize program events. Ten times in an academic year, class time was

devoted to peer-facilitated activities. Each school also formed a Safer Choices club, which with the help of a teacher coordinator planned events and activities intended to change the normative culture of the school. The club also ran a resource center, and published student stories related to experiences with HIV and STDs in a monthly calendar. In addition to the council, classroom, and club within the school, the intervention involved parents and the community as well. Parents were sent a thrice-yearly newsletter with information about HIV transmission and how to talk to their children about contraception and sexual health. Some homework assignments included asking parents about these topics. Community involvement came in the form of students researching resources offered to them outside the school, and the school bringing in HIV positive guest speakers and other experts capable of speaking on sexual health topics (Coyle et al., 1999).

The study included a total of 3,677 high school students, with representative race and sex ratios, coming overall to 53% female and the majority of participants either white or Hispanic. Baseline self-report data were collected in the fall of 1993, looking into attitudes on condom use and HIV and STD risk, as well as behavioral questions such as protection used at last intercourse, rate of unprotected intercourse, and number of partners. Follow-up data were collected again in the spring of 1994 (Coyle et al., 1999).

Once again, the greatest burden seems to be a risk to privacy when it came to data collection. Obviously, individual students would also not have been able to opt out of the program without transferring schools entirely. Because schools in the study could only be selected based on the school district's ability and willingness to implement the Safer Choices program, fair implementation may have been an issue with regard to poorer districts being unable to participate. However, financial disparities aside, the study sorted its treatment and control schools randomly, thereby implementing the intervention as fairly as possible.

From a Life History theory perspective, Safer Choices, if interventions are implemented effectively, should be moderately successful. Changing the culture of a school and community is certainly an important step in normalizing safe sex practices. The importance of students knowing where to access contraception with ease cannot be underestimated. Other than scaring students with the risks of HIV, however, Safer Choices as described in Coyle et al. (1999) does not adequately stress why unprotected sex is not a risk worth taking in the long term. The answer may seem obvious, but as we have seen, adolescents in bad circumstances view the possibility of pregnancy with ambivalence. Furthering their education is not seen as an investment that will benefit them, so dropping out to have a child is just another path that life blows them down. Safer Choices does not address, much less attempt to break this cycle. Their work is certainly important, but in communities where teen pregnancy is rampant, it may not have the same effects as it would in schools where students are already more motivated to succeed from the onset.

Unfortunately for our purposes, Coyle et al. (1999) did not examine the long-term effects of the program. In the short term, the program was relatively successful. In both conditions, HIV and STD knowledge increased, but under the Safer Choices program, the increase was demonstrated to be more profound. There were also significant increases in condom use attitudes in the intervention condition, although attitudes toward sex in general were not affected. Self-efficacy with regards to condom use greatly increased and barriers to condom use decreased. Behavioral differences, however, were not statistically significant. There was a decrease in reported unprotected sex, but not a large one. The same can be said for an increase in reported condom and other contraceptive use at last intercourse, and a decrease in sexual partners within the last three months who engaged in unprotected intercourse (Coyle et al., 1999). This may be indicative of the change in student attitudes not translating into action, or merely the sample size

of sexually active students being smaller than the sum of all study participants, thus making a statistically significant difference more difficult to achieve.

### *Children's Aid Society-Carrera Program*

Like Safer Choices, the CAS-Carrera program is a pre-existing program from which sample data were taken at a number of locations during a fixed time period, rather than run exclusively as a separate experimental trial. Phillibier et al. (2002) collected data from a group of students enrolled at three locations in New York City over the course of three years, from 1997 to 2000, as well as a group undergoing a control program. Participants were ages 13-15, low-income, high-risk youth from the inner city. Almost all were black or Hispanic, and more than half came from a single-parent household. The goal of the CAS-Carrera program was to reduce teen pregnancy rates by increasing contraceptive use and access to good healthcare in this population.

To guide their goals, they adopted the philosophy that improving the lives of these adolescents was “a marathon, not a sprint” (Phillibier et al. 2002, p. 250). A parallel family system encouraged program staff to treat participants as if they were their own children, and contact between staff and students was to be continuous and long-term. Seven key program components work together to foster a community and support network that views its participants as pure potential. Five of these components consist of after-school activity sessions, which include a Job Club that helps students find and pursue both employment and future careers, academic help with homework, standardized test preparation, and college admissions, weekly sessions of comprehensive sex and family life education, and art and individual sports activities to boost confidence and teach impulse control. The last two components are services offered to

students in both mental health and medical care. The program meets every day after school during the academic year for about three hours, and regularly over the summer for maintenance of education and cultural trips. The control, in contrast, also included homework help and recreation activities, but did not run over the summer (Phillibier et al. 2002).

The most obvious burden that the program imposed on participants is its time commitment. As might be expected, there were times when students had to miss a session, and dropout rates in both the CAS-Carrera and the control were over 20%. The monetary cost to schools and community centers that run the program is also high, estimated to be about \$4,000 per student per year (Phillibier et al., 2002). For low-income, high-risk communities in which a program like this would be most effective, the cost may be too high to be feasible. Although the study did not look into it as a variable, the amount of emotional investment required by program employees may lead to burnout. Employee turnover rates were not examined. If the program can be proven to be effective, time, monetary, and emotional costs can be justified. Race demographic distribution of program participants was roughly proportional to the race demographics from communities from which they were drawn, so implementation can be considered fair (Phillibier et al., 2002).

Based on its approach, Life History Theory predicts that the CAS-Carrera program would prove highly successful. Its focus on building relationships, connections, and help with increasing self-efficacy, drive, and hope for the future, covers all the psychological bases of delaying reproduction. Its inclusion of mental and physical health services would also help toward this regard, as would the comprehensive sex education. Health services in particular may help to delay the early weathering effects on health seen among African-American women, thus reducing the costs of delaying reproduction. The length of the program, which extends all the

way through high school, would additionally be incredibly powerful in carrying on the effects of all these interventions. Given that a student attends, odds are that their reproduction will be delayed compared to a control student.

In practice, results were very promising in some respects, and in need of revision in others. Both genders were twice as likely to receive adequate primary healthcare under the CAS-Carrera program. Female participants were only half as likely to experience a pregnancy, and only a third as likely to give birth as they would under the control condition. They were also over twice as likely to use a condom *and* hormonal birth control method at last coitus, as opposed to only condoms (Phillibier et al. 2002).

Similar patterns were not observed in male participants. Phillibier et al. (2002) suggested this trend may be caused by cultural expectations from non-program peers in the boys' own age group, and might be alleviated by starting the intervention at a younger age. Life History Theory does not directly account for cultural peer pressures from same-sex friends, although it does recognize that social environments impact the cost and benefits of behaviors. Because most research on early pregnancy also tends to focus on young girls rather than the fathers of their children, there may also be some aspect to early pregnancy that has yet to be addressed.

Perhaps most telling, however, is how much participants enjoyed the program. Dropouts from the CAS-Carrera program were still high, with only 484 of the original 600 participants remaining at the end of the three year period, for a retention rate of 79%. Compared to the control program, with a retention rate of only 36%, the data seem to show that students liked the CAS-Carrera program enough to stay (Phillibier et al., 2002). That the program is both beneficial and enjoyable to its target demographic is a major key to its success.

*Seattle Social Development Project (SSDP)*

Unlike many interventions which tracked students only for the duration of the program, the Seattle Social Development Project (SSDP) followed control and intervention cohorts from when the program began in 1981 for a group of first graders, through its cessation in 1987 when these same students were in sixth grade, and onward, at ages 21, 24, and 27. The program itself was not as focused on sex education as some others. In fact, direct discussion of sex and safe sex practices was not a part of the intervention. Instead, the program sought to strengthen children's bonds with their family and school by promoting active involvement and social competencies, with the hopes of decreasing risk behavior later in life, both in terms of risky sexual activity and crime rates. Teachers in the intervention condition were given special training to teach their students interpersonal problem solving and refusal skills. Their parents were also invited to a series of sessions teaching them how to best bond with their child and establish a supportive environment at home and promoted academics and a drug free lifestyle. Control teachers were given no special training, and continued to teach their classes as usual (Lonczak et al., 2002).

The target population were public elementary school students in high-crime neighborhoods in Seattle, Washington. Of the 808 enrolled in either the control or intervention program, half could be contacted for the study conducted at age 21, and nearly six hundred responded to a different study at ages 24 and again at 27. Representative of the region, the student body was in about equal proportions male and female, with race demographics breaking down to be approximately half white, a quarter black, and other races, mostly Asian-American, making up the remaining quarter (Lonczak et al., 2002; Hawkins et al., 2008).

Potential burdens of the program included costs to the school districts themselves, both in resources and time training teachers and parents. For the students, the costs of the program are

not so great. No sensitive topics were discussed, and the skills learned and connections formed are invaluable ones for the extra classroom time it would have taken to instill them. Taking follow-up surveys well into adulthood may have proved to be an annoyance, but since those were given voluntarily, their imposition must not have been too great. Aside from risks to privacy, in that researchers were able to contact participants even decades later, the program participants were likely to have benefited more than they relinquished as cost. Fairness, again, was a matter of local demographics rather than targeting of specific social groups.

In terms of Life History Theory, SSDP presents an interesting approach. Sex education is eliminated from the equation entirely, leaving only a strengthening of the perceived control students had over their environment and social relationships. Should the effect be great enough to buffer the lack of control presented by the high-crime environment (and presumably the resulting high external mortality rate and lowered life expectancy), the approach would predict a lowered frequency of risky sexual and other behaviors, and a later age of reproduction, even without direct coverage of a comprehensive sex education as part of the intervention condition alone. Whether the students in this study received sex education, and how much it covered, was not discussed. However, it would be safe to assume that what sex education they did receive was taught indiscriminately to intervention and control students.

Eleven years after the end of the program, significant behavioral differences were in fact visible in the now twenty-one year old cohort of students. Age of sexual debut did vary with sex, race, and poverty status, with males, African-Americans, and poorer individuals more likely to begin having sexual intercourse at earlier ages. This effect was seen in both intervention and control cohorts, as well as in other studies discussed above. Remarkably, on average the intervention group did see later ages of sexual debut; on average, students in the intervention

condition began having sex at 16.3 years, compared to the 15.8 years of the control students. By age 21, 56% of control females had experienced a pregnancy, and 40% given birth, whereas only 38% of intervention females had reported becoming pregnant and 23% given birth. As with the CAS-Carrera program, the same effects were not observed in males when it came to rates of fathering children (Lonczak et al., 2002).

No significant intervention effects were found on frequency of condom use in the last year either, except among single black participants, 50% of whom reported always using a condom in the last year if they underwent the intervention, compared to 12% among those who had not. For single non-black participants, the difference across intervention and control groups was only 9%. Similarly, significant STD rate reductions in the intervention group were also only observed among black students (Lonczak et al., 2002). Why the proposed buffering effect of increased perceived control should affect black students more than any other race is hard to pin down, but it would not be unreasonable to presume that systemic racism contributed to black students having a decreased sense of control to begin with compared to their non-black counterparts.

In a later reassessment of the same students, a number of significant positive effects were noted in the intervention group. By age twenty-seven, intervention participants had better educational and economic attainment, showed fewer mental health disorder symptoms, reported more community service, and reported fewer STDs, particularly among black participants. Males in particular from the intervention group were more likely to pursue greater education and benefit from a higher income than males in the control condition (Hawkins et al., 2008). Overall, it can be concluded that improving parenting practices, social competence, and classroom management as early as elementary school has positive effects on adult functioning, including

but not limited to age of first reproduction.

## **Conclusion**

By examining these programs, it becomes clear that effective approaches all share the common theme of creating a community in which strengthened social bonds help children and adolescents to have a stronger sense of themselves. By being enmeshed in a community that values delaying reproduction, social costs begin to outweigh the potential gains of risky behavior.

However, it is also important to remember that early pregnancy, like many human behaviors, is an adaptation. For some, payoffs of early reproduction are simply more beneficial than delaying reproduction. For young women who grew up in communities where their mothers all had children in their late teens and were subsequently raised by their grandmothers, this type of family structure constitutes the norm, and asking them to change to meet some larger moral standard is almost nonsensical. Often times, this sort of reproductive model is a response to rapidly declining health in a woman's late twenties and the need to work while she is able. Telling this woman that she needs to wait until her health is suffering to juggle both a small child and a holding down a job, and that all these problems might somehow be solved by delaying having this child, is equivalent to telling her that if she has no bread, she should consider cake (Geronimus, 1996). Historically, the greatest objections to teenage pregnancy have been moral ones; no argument can be made that simply forcing women to delay reproduction would solve any societal issues without also addressing the various disadvantages in which the adaptation exists. No links which can withstand scrutiny have been found that link early reproduction to

economic outcomes, child maltreatment, or incarceration rates of the children of teenage parents (Geronimus 1997).

Does all this mean that efforts to reduce teen pregnancy rates are meaningless? No. In all the approaches we examined, interventions targeted more than just pregnancy. Reducing risky behavior across the board is a noble goal. What needs to be addressed is not the behavior of school-age pregnancy itself, but the conditions that cause it *and* other risky behavior. Policies that punish young women for childbirth at young ages or outside of wedlock do nothing to alleviate the causal mechanisms that drive the behavior in the first place. Comprehensive sex education and the availability of contraception are important resources, but whether or not individuals take advantage of them is all a matter of their personal views of whether or not delaying reproduction is an important investment to make. If a young woman grows up in poverty and sees the adults around her rarely graduate from high school, her actions upon finding herself pregnant at a young age are likely to be more ambivalent than a young woman who has grown up with the expectation of attending college and launching a career.

Therefore, we as a society need to stop viewing teenage pregnancy as a reflection of the poor decision making and carelessness of young women, and instead see it as a systemic consequence of other societal factors that can also lead to worse outcomes. Rather than cutting welfare, policy makers who wish to eliminate school-age pregnancy must look instead to strengthening young peoples' faith in their own future and self-efficacy to increase their lot in life.

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