

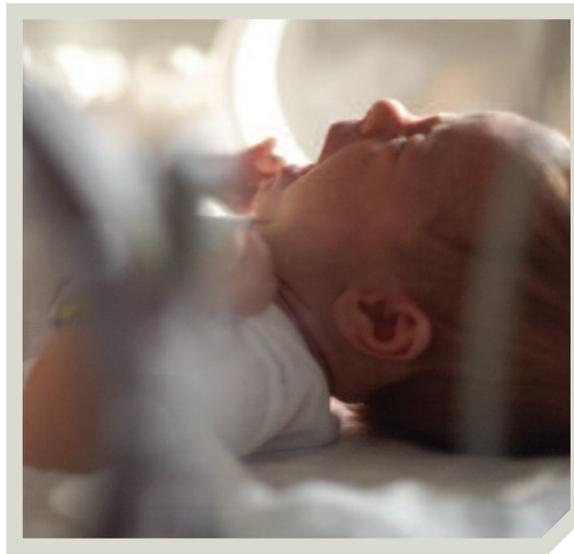
Why demography needs psychologists

Gillian Pepper, Lisa McAllister and Rebecca Sear look for psychological answers to questions about fertility and population dynamics

Skimming through recent news articles, it is easy to see that the social, political and economic consequences of population change are a concern. 'World population will soar by 2bn more than forecast' reported *The Times* in 2014: tinyurl.com/naf8o98. This was in response to a paper in *Science* claiming an 80 per cent probability that the world population, now at 7.2 billion, will increase to between 9.6 and 12.3 billion by the year 2100 (Gerland et al., 2014). Other media coverage emphasised the implications of such population growth: 'The world's population is now odds-on to swell ever-higher for the rest of the century, posing grave challenges for food supplies, healthcare and social cohesion' reported *The Guardian* (tinyurl.com/mg99v4v). Readers of *The Psychologist* have voiced similar concerns: 'At a time when we are hoping to reduce the human impact on world resources and limit carbon emissions, whilst still lifting the poorest out of poverty and malnourishment, [population growth] is perhaps the most important problem we face today' (Haran, 2014).

The fastest population growth is occurring in sub-Saharan Africa. There, the number of children that an average woman bears during her reproductive years (the fertility rate), is still very high, reaching a peak in Niger at 7.6 children per woman (2013 data: Population

Reference Bureau). Fertility rates in the rest of the world are closer to the global average of 2.5 children per woman. This still implies population growth, as a fertility rate above 2.1 children per woman will result in a growing population. However, population growth trajectories vary quite dramatically around the world. Fertility rates in the UK, for example, are now only 1.85 children per woman (Office for National Statistics, 2014). This is below the level required for population growth, or even population replacement, and may ultimately result in population decline



Population growth and ageing pose challenges at the societal level

(without immigration). Such low fertility also means that the UK, along with many other rich economies, faces the challenge of population ageing.

Population ageing is an increase in the proportion of the population over 65 years relative to the number of people of working age. Given the aforementioned concerns about population growth, low growth, or even population decline, may seem like a good thing. However, population ageing is associated with its own set of economic and social challenges. In the UK today there are in the order of 28 people over 65 years for every 100 people of working age (15 to 64 years), but this is estimated to increase to around 42 per 100 by 2050 (United Nations, 2013). Concerns over how a working population will support large numbers of elderly people have triggered much public debate in the UK. For example, The Big Ageing Population Debate, an ongoing feature by *The Guardian*, asks questions like 'What should the Government do for older people?' and 'Ageing well: whose responsibility is it?' However, this is typical

of the public debate on the issue, which focuses on how to manage an ageing population with little discussion about *why* our ageing population has come about.

So, should we be concerned about population growth, or population ageing? The truth is that they are two sides of the same coin and we must hope that a balance can be reached. While population growth and ageing pose challenges at the societal level, we have not reached a balance at the individual level either: many people are not having their preferred number of children. For example, in Uganda in 2011 average desired family size was 4.8 but the fertility rate was 6.2 (Muhoza et al., 2014): unwanted fertility. Meanwhile, in the UK in 2011 approximately 30 per cent of people aged 40 to 54 years had fewer children than they wanted (Testa, 2012):

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underachieved fertility.

It is often assumed that, if contraceptives are available, and people want fewer children, then fertility will decline. However, this does not seem to be the case. Across Europe in the 1800s, fertility declined without access to modern contraceptives. In sub-Saharan Africa, fertility remains high despite declines in desired family size and some access to contraceptives (Gerland et al., 2014; Muhoza et al., 2014). The UK has one of the highest rates of teenage pregnancy in the European Union (EU) despite having the fourth highest contraceptive use rate in the world (World Health Organization, 2013). Clearly, contraceptive access alone does not determine fertility. We need a better understanding of why people have the number of children that they do, and why so many births are currently unplanned.

Likewise, there is more to underachieved fertility than meets the eye. We might assume that the more resources you have, the more children you can afford to have. However, the paradox of the fertility decline, which has occurred almost worldwide over the last two centuries, is that fertility has declined as economic standards and living conditions have improved. Within rich economies today, the relationship between wealth and fertility is complex, but a consistent finding is that more highly educated people tend to have fewer children, and larger gaps between intended and achieved fertility, than those with less education (Testa, 2012). Pronatalist government programmes that reduce the cost of having children in Japan, Italy and Singapore are failing to increase fertility, and those in France and Sweden are having only modest effects (Kramer, 2014). While the economic costs (and benefits) of children may be important to some extent in determining fertility, it is clear that other factors also play a substantial role. We need a better understanding of what these factors are; and psychologists may hold the

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'Demography matters. The study of population dynamics is undeniably useful, as population trends have important political and economic implications. They affect policy planning for health, economies, the environment, resources and infrastructures. Yet most demographic research fails to account for the psychology behind reproductive behaviour, which is a key factor underlying population change.

We have come together as a behavioural scientist, an anthropologist and a demographer, who share interests in reproductive decision making. Here we put forward questions that psychologists might help to answer and outline why it is important to answer them. There has been surprisingly little interest so far from psychologists in reproductive decision-making: we hope that will soon change, so that we can gain a better understanding of why people so often fail to meet their reproductive goals.'



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key. Psychologists can help to improve our understanding of the reproductive decision-making process and what factors, including our social and physical environments, influence decisions about whether and when to have a(nother) baby.

We shall illustrate this by addressing an example question: What determines when someone starts reproducing? This is relevant to the issue of fertility because reproductive timing and fertility tend to be negatively correlated (Low et al., 2008): that is, delayed childbearing is characteristic of populations with low fertility. There are various approaches that psychologists might employ to answer the question of what determines reproductive timing. We use an evolutionary framework, derived from life history theory. One prediction of this theory is that life expectancy affects reproductive timing (Chisholm, 1993). Across countries there is a strong positive association between life expectancies at birth and average ages at

first birth (Low et al., 2008). Patterns within countries are similar (Nettle, 2010; Quinlan, 2010). When life expectancy is low, there are clear benefits to reproducing sooner: both the likelihood of having children before death and the time a parent is around to care for children increase. As life expectancy increases, so do the benefits to delaying reproduction: prospective parents can accumulate more resources that can be invested in themselves and later in their children.

The evidence summarised above suggests that life expectancy affects reproductive behaviour. But what cues lead to these reproductive responses? The limited existing evidence suggests that experiences of death and danger may affect people's reproductive timing. One study found a mini baby boom in response to the Oklahoma City bombing of 1995. Rodgers and colleagues (2005) were inspired to look for such an effect after reading a poem by Deborah Garrison in the *New*

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Yorker, which she wrote in response to the 9/11 terrorist attacks in the USA:

Now can I say?
On that blackest day,
When I learned of
The uncountable, the hellbent
obscurity,
I felt, with shame, a seed in me,
Powerful and inarticulate:
I wanted to be pregnant...

The 2004 Indian Ocean tsunami had a similar effect in Indonesia (Nobles et al., 2014). In communities where tsunami-related mortality rates were high, women who did not have children before the tsunami started having them sooner than women in communities with few to no such fatalities.

Large-scale disasters may trigger increased awareness of mortality risk, even in those not directly affected, but personal experiences are also important. One British study found that girls who felt they lived in an unsafe environment had a higher chance of becoming teen mothers than those who felt they lived in a safe environment (Johns, 2010). And North American adults who had suffered more bereavements, a potential cue to personal mortality risk, started having children sooner than people who had suffered few bereavements (Pepper & Nettle, 2013). Even those who did not have children reported wanting to have them sooner if they had suffered more bereavements.

These studies suggest that our environments and experiences signal our life expectancy, thus affecting our reproductive scheduling. However, they are correlational studies and cannot confirm a causal relationship between life expectancy and reproductive timing. Nor can they isolate what specific cues or experiences are most important. We believe that psychological experiments have much to offer in this regard.

Psychological research into the effects of life expectancy on reproductive decision making is scant; however, a handful of experiments offer insights. One found that participants from low-income families who

read a newspaper article reporting increases in random acts of violence, rather than a control article, reported younger ideal ages to start having children (Griskevicius et al., 2011). Using an internet experiment, Mathews and Sear (2008) showed that, after answering a series of priming questions designed to focus attention on mortality, male participants reported wanting more children – an outcome associated with earlier initiation of reproduction. These studies were motivated by predictions derived from life history theory: both studies provide support for the hypothesis that early reproduction will be prioritised in risky, high-mortality environments. However, studies based on terror management theory have uncovered similar results. Terror management theory proposes that people's fear of death causes anxiety when mortality is made salient, leading them to attempt to 'transcend death' through actions such as having children (Fritzsche et al., 2007). Studies based on this theory have found that making mortality salient leads people to want children sooner (Fritzsche et al., 2007; Wisman & Goldenberg, 2005).

The experimental studies above make an important contribution by testing for a causal link between perceived life expectancy and reproductive timing. However, there are many other unanswered questions that psychological experiments could address. For example, what types of mortality matter most? From an evolutionary perspective, we would predict that mortality risks beyond individual control should have the greatest impact on reproductive scheduling (Quinlan, 2010). So, for example, rates of death due to large-scale disasters should have a greater impact on reproductive



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timing than rates of death due to individually controllable causes, such as suicide or drug abuse. Psychologists can help fully explore this question.

It may also be important to know, what is the relative importance of each piece of information people use to judge their mortality risk? While experiences of close bereavements are related to measures of ideal and actual reproductive timing, there appears to be no effect of the sheer number of people participants know who have died (Pepper & Nettle, 2013). Why might this be? Perhaps people we feel close to tend to share more of our own characteristics. They may be similar in age, gender and social class, they might live in the same place, or share our genes. Such similarities could make their deaths, rather than those of our more distant acquaintances, the best available indicators of our own life expectancy. Further psychological studies can help to assess the relative importance of such cues for reproductive preferences.

We have focused on the effects of life expectancy on reproductive decisions, because this is the topic that most experimental psychological research on

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reproductive decision making has focused on. However, we expect other factors to be important. Returning to the issue of whether the economic costs and benefits of children influence fertility: despite the paradox that, at the population level, lower fertility is associated with higher economic development, there is evidence at the individual, within-population level that the rising costs of investing in children may have contributed to decreases in family size (Lawson & Mace, 2011). Such relationships may be driven by perceptions of economic hardship, rather than an absolute

level of poverty that would make successfully raising healthy children difficult. In the UK, for example, even relatively wealthy mothers perceive that greater economic hardship is involved in raising larger families (Lawson & Mace, 2010a). Policy makers clearly believe that costs are a deciding factor in fertility. Pronatalist government programmes in Europe and East Asia focus on reducing the cost of having children, and some offer direct cash transfers, such as the Australian baby bonus. However, as we have already mentioned, these pronatalist programmes are having little to no effect on fertility. The rising economic cost of children, although an important factor, is only a component of what drives fertility down.

The costs of children, and perceptions of these costs, may also be influenced by the availability of support for parents in raising children. Throughout most of human history, children have been raised in cooperative childrearing systems, with mothers receiving much help from other family members in caring for, and provisioning, children (Hrdy, 2009). The nuclear family system of most high-income environments means that parents are expected to raise children with very little help from others, and much of the responsibility for hands-on childcare is borne by the mother alone. Such family systems may considerably increase the costs, and perceived costs, of raising children for parents. Combined with increasing economic prosperity and decreasing mortality rates, the dispersal of family units that occurred as countries industrialised may help to explain the transition to low fertility in Europe. Indeed, cross-cultural correlational evidence suggests that fertility may be higher in the presence of helpful family networks, and even in high-income, low-fertility environments, the provision of

childcare and financial support from grandparents has been correlated with higher fertility among parents (Sear & Coall, 2011). However, perceptions of support may be as important, if not more so, than practical or material support. Studies indicate that greater emotional closeness with kin may be linked both to the timing of fertility (Mathews & Sear, 2013), and to fertility intentions (Tanskanen & Rotkirch, 2014). Psychologists can help to test these under-examined ideas further – perhaps using experimental priming methods like those we described for the case of mortality risk.

There are also elements of population structure that may affect reproductive strategies. For example, the operational sex ratio (OSR), the ratio of males to females of reproductive age, may be important. When males of reproductive age are scarce, men have more mating opportunities and fewer incentives for long-term

commitment.

Meanwhile, when females of reproductive age are scarce, men should be more willing to make commitments and to invest resources in children. This idea was

supported by a study based on English census data. It found that across relatively deprived areas, which tend to have earlier average ages at first birth, young women had higher birth rates in areas where males were scarce than in areas where males were plentiful (Chipman & Morrison, 2013). This suggests that women shift towards even earlier births when men are unlikely to make long-term commitments, and there is little point waiting for a mate who will invest heavily in his children. Again, this is an idea that could be tested further, by experimentally manipulating perceptions of male and female scarcity.

We have discussed the idea that structural and social factors, such as life expectancy, economic prosperity and family support influence reproductive behaviour. But how does this understanding change things? What are the implications for policy? Let us take the example of teenage pregnancy. As mentioned, the UK has one of the highest rates of teenage pregnancy in the EU at 19.7 births per 1000 women aged 15 to 19, compared with an average of 12.6 per 1000 across the EU (Office for National Statistics, 2014). British public health policies aim to reduce teen pregnancy on the assumption that it will improve health and life outcomes. However, as we explained above, earlier reproduction can be a rational, though not necessarily consciously reasoned, response to

circumstances associated with poverty – such as a relatively short life expectancy (Johns et al., 2011). This implies that the traditional approach of providing sex education and free contraceptives, though laudable and relatively easy to execute, may have limited effects. By contrast, tackling poverty and low life expectancy, though markedly more difficult to achieve, should reduce teen pregnancy as well as being beneficial in and of itself. As Arline Geronimus (1996) so eloquently put it, ‘...focusing on teen pregnancy prevention as the solution to persistent poverty may be the modern-day equivalent to suggesting that those without bread can eat cake. Instead or in addition, policy approaches that would offer poor women and men real reasons to expect to live predictable, long lives deserve a prominent position on the policy agenda.’

UK policies on teenage pregnancy are just one example of fertility-focused policy making that can be improved by a better understanding of reproductive psychology. The Singaporean government reportedly spends £810 million per year on policies to encourage its citizens to have more children. Initiatives aimed at boosting fertility are said to have included speed dating nights, perfumes containing pheromones, and a viral video of a rap encouraging citizens to ‘do their national duty’ and make babies. Despite all this, the total fertility rate of Singapore remains the lowest in the world at 0.80 children per woman (Population Reference Bureau).

It is also important to understand the impacts of population policies on psychology. For example, one study found that China’s one-child policy has produced a cohort of individuals who are less trusting, more risk-averse, less competitive, more pessimistic, and less conscientious than those born before the introduction of the one-child policy (Cameron et al., 2013). Another study, from the UK, has shown that having older siblings is associated with having relatively good mental health (Lawson & Mace, 2010b). Such findings highlight the potential dangers of instigating population policies that are not informed by a proper understanding of their likely psychological effects.

Whether or not we agree with specific policies for encouraging, or curtailing, population growth, this is clearly a hot topic. And, with organisations such as the UK Behavioural Insights Team now dedicated to applying behavioural sciences insights to policy, it is clear that psychology is having an increasing impact. Population policies need input from psychologists and we invite you to step up to the challenge.

“Population policies need input from psychologists”