

The Population Sciences Are in The Dark Ages

Imagine the field of astrophysics if nobody agreed on the definition for “mass” and if the formula for gravity was unknown. The field would literally be in the dark ages. That is the situation with the population sciences today. They are in the dark ages.

The definition of “overpopulation” and “carrying capacity” are actually defined reasonably well, but they are not understood and thus if you ask 10 different population experts whether humans are overpopulated or not, you’ll get 10 different answers. Worse is that the formula $(x-2)/x$ is virtually unknown. It tells us the child mortality rate when we average x babies. For example, if we average 3, then 1/3rd of the children must die.

There is a fundamental concept that seems to be entirely overlooked too. I explained the concept to Martin Kolk at the Population Association of America convention many years ago in San Francisco. He was presenting a paper that showed there was a correlation between how many children one has and how many their parents had. I pointed out to him that if there is a correlation, it shows that the demographic transition provides no reason to believe that fertility rates will stay low. After that convention, he produced a paper that explains this but nobody seems to have noticed.

Dead Children

Not only have I failed to find any reference to the formula $(x-2)/x$ in any population related discussion, text, article, or video, I find no mention anywhere that averaging too many babies, or a too high fertility rate, can *possibly* cause child mortality. I am not talking about a dirt poor family getting pregnant when they are barely able to feed their children. That pregnancy can be lethal to specific individuals. I am talking about the big picture. If we average too many babies worldwide for too long, dead children must be the consequence. There will be no specific pregnancy or birth that causes any specific deaths. The births everywhere attempt population growth that cannot be accommodated, thus ensuring that some are so poor they cannot keep their children alive.

The thing that blows my mind is the fact that generally everyone knows that averaging too many babies will be lethal. If you were going on a multi-generational journey on some small space ship that can keep say one thousand people alive at one time, you would not allow the passengers to have as many babies as they pleased, right? If the passengers average more than 2, it will be lethal. Enlarging that spaceship and calling it “Earth” somehow causes that knowledge to vanish.

We are killing children today because we average too many babies worldwide. That is an indisputable fact that is virtually unknown. I have struggled in vain to get others to comprehend this on forums like Quora, or MAHB. If I get any response, they are invariably lousy. For example, in response to that statement, I have gotten “we are not overpopulated because the child mortality rate has been dropping”, as if a trend proves something. Unfortunately it seems that trends and correlations are the only thing that matters to population experts.

I speculate that the formula $(x-2)/x$ is rejected with minimal thought because we've never measured child mortality at anything close to that rate. In other words the data does not back up the theory. Well, sure, if we mindlessly apply the formula, we get bogus conclusions. With that poor reasoning the formula for gravity is wrong because we are not hurtling towards the Sun. There are 3 factors that when they are changing allow more children to live: 1) if the average age of the parents is increasing, or 2) the adult life expectancy is falling, or 3) the supply of sustenance is increasing, then fewer than that formula dictates must die. Note that those factors must be **changing** in order for the formula to fail and those three factors are bounded. They cannot change for long on this finite planet. For the past several hundred years we have managed countless technological advances that have increased the supply of sustenance. Everything from the form of governments, to fertilizers, to computers and thousands of other things have exploded the subsistence availability. While the subsistence production is expanding, the rate that children must die is lower than the formula dictates. In other words, of course the child mortality rate does not exactly equal $(x-2)/x$ for the past few hundred years.

Another guess as to why population scientists don't ever seem to mention that averaging too many babies is killing is because they assume it isn't. First, let's recognize that assuming something is bad science. Second, I'm not sure how this leads a scientist to conclude that we don't need to mention or think about that possibility, so this guess does not explain much. My suspicion is that experts expect the world to be obviously over crowded with most people struggling to find food. In other words, they have some subjective quality of life in mind such that if we are above it, we are not overpopulated. Unfortunately the quality of life is totally irrelevant. If we average too many babies, dead children is the only thing that nature requires.

However, let's examine if it is possible that we are **not** causing child mortality today by averaging too many babies. Notice what I am doing here. I am shifting the burden of proof to the other position. The notion that I must prove that we are causing child mortality is bogus. We are dealing with a force that is attempting exponential growth in a finite space. It makes no sense to demand proof that this growth is not being limited by the finite space. Of course it is, unless you can prove otherwise. In order to prove that, you have to show that humans have not existed for long enough, or there is some sort of fertility rate regulator that ensures we do not average too many. In addition to showing one of those two, we must explain why we have, and generally always have had, groups of people suffering starvation related child mortality. First let's get time out of the way. Unless you are going to argue that a man and a woman were beamed onto the planet a few thousand years ago, we can dispense with the notion that humans have not existed for long enough on Earth. Population experts routinely trot out the fact that for the bulk of human

history the population did not grow exponentially. Invariably, the expert will follow that with the banal statement that births matched deaths, and totally overlook the burning question. How was it possible for these two to match? How was it possible for births to arrive in response to deaths, so that deaths did not happen in response to births? Go ahead and describe a plausible fertility rate mechanism that will throttle fertility **before** the child mortality starts happening.

Imagine a simple situation where there are 2 tribes in an environment. Both tribes are averaging more than 2. The stronger tribe is able to avoid child mortality caused by averaging more than 2 by expanding their territory at the expense of the weaker tribe. The other tribe is suffering all of the child mortality to ensure that the total numbers do not exceed what the environment can keep alive. This magical fertility rate regulator must throttle back the fertility of the stronger tribe in response to the suffering of the weaker tribe and must do so prior to the weak tribe suffering starvation related child mortality. Good luck proposing how this fertility rate regulator might function. More importantly whatever evidence you think shows this magical fertility rate regulator in action is destroyed by the existence of groups of people suffering starvation related child mortality. Dead children is the one and only thing that nature can do to stop the attempt at infinite population.

Just to be clear, there is plenty of behaviors that reduce fertility from what it otherwise would have been. For instance, the institution of marriage and the social stigma of births out of wedlock, ensures a lower fertility rate than otherwise. Similarly, the existence of cheap effective birth control ensures a lower fertility rate than otherwise. However, we must not confuse these “lower” fertility rates with a mechanism that ensures we do not average so many babies that we cause child mortality.

Some have argued that we have the resources to feed them, but politics, or bad distribution, prevented those from getting the resources. This argument is just plain stupid. The argument states that other people did not allow, or provide, sustenance to the ones that died. This argument is attempting to blame the bad behavior of other people, to prove that there are not too many other people. Clearly that is ridiculous.

The authors of this argument are really trying to say that the food existed to keep those people alive and therefore the deaths were not caused by resource limitations. Unfortunately this totally fails to take into account time. The authors are saying that the required amount of subsistence, nutrition, clean water, shelter, and distance from waste, existed last year to keep alive all the children that died last year. If only we had distributed it properly, they would not have died. This is true, but next year is going to occur. If the children do not die, there will be exponentially more humans to feed the following year. I hate to point out the obvious, but a year followed by another year, has been going on for a few years now. Of course there is excess subsistence that will keep alive a finite number of people over some specific time span if only it is not wasted. That will always be true. We will never have zero waste, or zero unused capacity.

Essentially the author of this line of argument is believing that when the population gets too high, it will be obvious. The author is assuming we will all sacrifice to keep others from starving and therefore everyone will be scratching around for something to eat. That threshold of misery is totally invented in the author's mind. The starvation related child mortality that is happening right now proves that the threshold is not as high as the author would like to believe.

Notice that I state that a group of people suffering starvation related child mortality proves are averaging too many. An individual certainly might starve to death even if there is plenty of subsistence, but a group of humans cannot be beat to the subsistence that grows on this planet by anything but other groups of humans.

The fact that we are killing children today by averaging too many babies must be known throughout the world. It also provides a term to the population sciences that is entirely missing.

Definitions

Scientific terms are essential for understanding. In an appendix of Joel Cohen's book "How Many People Can Earth Support", he lists over 30 different interpretations of the term "overpopulation". The book is a good representation of the current state of thinking in the population sciences. It shows us that this field is in a dreadfully poor state. Scientists must define terms that are useful and efficient and get agreement on them. The ambiguity regarding the term "overpopulation" is a colossal failure. Ironically, the term "overpopulation" is defined reasonably well.

"Overpopulation" is defined as exceeding the carrying capacity, and the "carrying capacity" is the maximum that can be sustained indefinitely. Indefinitely is the key word. It means no specific time frame. This means that the carrying capacity is the maximum that can be sustained using only renewable means, and that tells us how the maximum can be exceeded. If we consume resources faster than they renew, we are overpopulated. Obviously humans are enormously overpopulated. We depend upon burning fossil fuels and many other one way acts of destruction to keep our numbers alive. We have only theories as to how to fertilize, harvest, store, package, deliver the necessary quantity of subsistence, and eliminate the waste, using only renewable means. Our economies and infrastructure are totally dependent on fossil fuels. Overpopulation is a potentially dangerous situation to be in. The resources that are being consumed faster than they renew will run out, and then the population will be killed down to what the remaining resources can keep alive.

I suspect there are 2 reasons that scientists do not comprehend the real meaning of "overpopulation". First, someone once pointed out that the Sun will burn out eventually thus it is not a renewable resource, and therefore we are always overpopulated. This is true, but the Sun will burn out so slowly that we don't need to be concerned about it. We must average less than two so that the population decreases to nothing when the Sun prevents life on Earth in order to

ensure that we do not cram babies into the finite environment causing child mortality. The time scale for the Sun to burn out is so huge compared to our ability to reduce our numbers that the Sun does not matter. A ridiculous example will show what I mean. If we knew the sun was going to blink out in 120 years and therefore life would be impossible after that, we can average zero right now and our numbers will decrease from old age death to zero before the Sun fails to keep us alive.

The second reason I suspect that the meaning of “overpopulation” is butchered, is because there is no term for the maximum that can be kept alive at one time using renewable and non-renewable means. The failure to understand what overpopulation really means stems from absence of this other term. Let’s call this new term “the population limit”. This maximum cannot be exceeded. The penalty for attempting to exceed it is dead children. When a population is at the limit, births are arriving so fast that they are causing child mortality. I suspect we do not know this concept because experts assume that we will find some sort of miserable living conditions and also a population that is not growing when the numbers are at the limit. They use the term “overpopulation” for this scenario and clearly we are not at that situation, thus we are not overpopulated according to that bogus interpretation. Just to be clear, the consequences of averaging too many babies for too long does not have to result in miserable living conditions and that limit can be rising at the same time that the population is at it.

The bottom line is that “overpopulation” is already defined and the correct interpretation of that definition is very useful. We are blatantly overpopulated right now. The last time humans managed to keep their numbers alive using only renewable means, our numbers were below 1 billion. In addition, we are at the limit right now and generally always have been at the limit. We are averaging too many babies worldwide, causing child mortality to happen as a consequence.

These two facts must be known throughout the world. There is no excuse for the confusion within the population sciences. It is a huge failure that must be corrected.

Bad Math, Bad Science, Bad Logic

In addition to lousy definitions and a failure to comprehend the consequences of averaging too many babies, population scientists seem to be overlooking a fundamental concept. Martin Kolk was presenting his findings regarding the relationship between how many babies one has to how many siblings they have at the Population Association of America convention in San Francisco many years ago. He showed that if you came from large family, you were more likely to have a large family. I pointed out to him how this trashes the demographic transition theory. A few years later, I ran into him again at the Washington D.C. convention and asked him if he had done anything on that topic or knew anyone that understood the concept. He referred me to Oskar Burger. I found one paper of particular interest, “What if fertility decline is not permanent? The need for an evolutionarily informed approach to understanding low fertility” (<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2015.0157#d3e552>),. This paper referred

to “Kolk M, Cownden D, Enquist M. 2014 Correlations in fertility across generations: can low fertility persist? *Proc. R. Soc. B* **281**, 20132561. ([doi:10.1098/rspb.2013.2561](https://doi.org/10.1098/rspb.2013.2561)) [Link](#), [Google Scholar](#)”. Both of these papers are correct. Both of these papers make it clear that there is absolutely no excuse for the optimism that that our population experts are providing. For example, Hans Rosling, now deceased, in his entertaining videos (<https://www.youtube.com/watch?v=FAcK2knC08E&t=3s>) shows a collection of his favorite trends to provide the audience with a “DON’T PANIC” message. However, what struck me about these two papers was the methods and tone that was taken, not to mention the total lack of impact that they have had.

Burger’s paper is basically challenging the assumption that “low fertility” will persist. There’s no excuse for these assumptions in the first place. Nobody should have to write a paper that is obsequious in nature to challenge an assumption. Assumptions are not scientific. They are at least an oversight, and at worst a conclusion based entirely on emotions. We are taught in high school to list the assumptions when we report on our findings. It is unbelievable that Burger has to list 5 solid reasons why the fertility rate will not stay “low” in order to challenge the mindless assumption that it will. The burden of proof is exactly opposite. Anyone that wants to believe that there is some sort of magical fertility rate regulator that will ensure humans will continue with “low” fertility forever has to prove this regulator exists, and trends and correlations prove absolutely nothing. The demographic transition evidence is nothing but trends and correlations.

I had a negative reaction to Kolk’s paper for a different reason. Again, there is nothing dramatically wrong with it. He uses models, or simulations, to prove a fundamental concept. It’s like he’s simulating that when you add a bunch of positive numbers you get bigger positive numbers. Simulations or models are not needed. Comprehension is required. We need to comprehend basic math before we make a model. We need to comprehend what must happen if parents are able to influence how many babies their children have, before we do any empirical study regarding fertility.

The first few sentences in Kolk’s paper shows the confusion.

“Correlations in family size across generations could have a major influence on human population size in the future.”

Sorry, but correlations have no effect on anything. They are observations. We use correlations to find mechanisms. If something seems tied to something else, maybe there is a mechanism that ensures this tie. In this situation there is a mechanism that is as real as the computer I am using, and a hell of a lot simpler. If it is possible for parents to influence how many grandchildren they have, then the behaviors that cause more than 2 to become adults will dominate in the future relative to the ones that cause fewer than 2. The ones that cause fewer than 2 will shrink to insignificance. That mechanism is going to have influence regardless of whether we find correlations or not.

Another flaw with that sentence is that he states that this could affect the population size. This mechanism ensures we average too many babies. It ensures we are relentlessly attempting to grow the population at an exponential rate. But, we are in a finite space, so this may or may not affect the population size.

Kolk's second sentence shows the upside down priorities.

"Empirical studies have shown that the associations between the fertility of parents and the fertility of children are substantial and growing over time."

That's exactly what one knows will happen, if one understands the concept. Nobody has ever proven that parents cannot affect how many grandchildren they have. Nobody in their right mind will suggest that it is impossible for parents to influence their children with respect to how many children they have. At most, these empirical studies will show the rate that the behaviors that have no effect are disappearing relative to the behaviors that average more than 2. These empirical studies have no business supplying proof of the fundamental concept. Maybe an analogy will help. It's like he wrote "Empirical studies have shown that if a triangle has a 90 degree angle the sum of the square of the two sides will equal the square of the opposite side". Um, no, we have a proof of Pythagoras' theorem that tells us when the measurements are faulty. Measurements cannot prove or disprove that theory.

The bad logic is the failure to recognize the fundamental fact that if parents can affect how many grandchildren they end up with, then the fertility rate cannot stay low. All the inheritable behaviors that result in 2 or fewer offspring adults, will disappear relative to the inheritable behaviors that result in 2 or more offspring adults. The bad science is where population experts assume that the "low" fertility rate found in developed countries is caused by the various factors that are correlated with the "low" fertility, and therefore assume that the "low" fertility will continue. The bad math is where scientists sample, average, extrapolate, then project fertility rates into the future. I'll provide an extreme example to show the bad math.

Imagine if there is a group of people in Japan right now that have a belief that is successfully passed on to the next generation to an average of more than 2 and everyone else on the planet has zero babies from now on. For the next 80 or so years, population experts, using sampling, averaging, and extrapolation will state that humans will be extinct in about the year 2120. They will be 100% dead wrong. That group's descendants will drive the population right back up to the limit where their excessive birth rate is killing their children, just like we are doing today.

I can imagine experts crying foul with this extreme example. Before you go bitching that it is ridiculous, recognize that it is ridiculous in the favor of demographic transition believers. I granted a demographic transition believer everything they could possibly want. Not only is there low fertility in all the developed countries, there is zero fertility everywhere, except this group of believers. Notice too, I did not heap blame on underdeveloped African countries. I can imagine experts arguing that this belief won't continue for long. No belief stays unchanging over larger

and larger numbers of people. Well, this one does. I defined the belief to have just one attribute. It is passed on to the next generation to an average of more than 2. That's it. It can be the belief that we like lots of children. It can be that God wants us to have lots of children. It can be the birth control is bad. It can morph over generations from one to many different attributes. It can be anything you please, as long as it is passed on to an average of more than 2.

Population experts that use the techniques of sampling, averaging, and extrapolating birth rates and projecting them into the future, have to prove that parents cannot affect how many offspring their children have, otherwise their findings are just plain silly. They have to prove this belief cannot exist. Good luck with that. The belief "I have the right to have as many babies as I please" has successfully been passed to an average of more than 2 forever.

Conclusion

The failure to recognize the consequence of averaging too many babies for too long, the poor definitions, and the failure to comprehend the consequences if parents can influence how many babies their children have, conspire to make a horrible mess of the population sciences.

At a parent teacher conference for my son, I leafed through his AP Environmental Science book. I found an explanation of the I=PAT formula, but no mention of anything like $(x-2)/x$. This is absolutely horrible. The I=PAT formula is utterly useless. It speaks to nobody. There is nobody on the planet that will alter their behavior in any meaningful way after having comprehended the meaning of the formula. Nobody is going to avoid inventing new technology. Nobody is going to strive for poverty, and of course many will conclude that a larger "I" is a good thing.

I need help. The fact that we are killing children today by averaging too many babies worldwide, that we are massively overpopulated, and the fact that if your descendants average more than 2, they will cause child mortality must be known by everyone. Population scientists need to know these facts, and then insist that they be taught throughout the world. I need some experts to comprehend what I am saying, and help explain this to some renowned population experts so that we can get the ball rolling towards ending this ignorance.