

Emily: I'm Emily Kumler and this is Empowered Health. This week on Empowered Health we're going to look at the essential role that women play post-menopause in society. We've spent the last few weeks talking about all the [different<sup>1</sup> stages of<sup>2</sup> menopause<sup>3</sup>](#) and some really hard aspects like insomnia and skin rashes, hot flashes, and then even more serious stuff like your increased risk for heart disease and the deterioration of your bones and brain health. Through all of that, I feel like it's really important to understand those things because they may feel scary and overwhelming, but having a handle on what's normal and what's not and what the treatment options are, which we've explored in the previous episodes, I feel demystifies it a little bit and at least gives us an awareness of what's happening and why so that we can sort of better live our lives. This week we're going to sort of take a look at what happens to the sort of society when women age and that there's this sort of old idea that women's purpose is really to make babies right and that reproduction is your primary contribution to society. This week we're going to sort of flip that on its head and say like, actually, no, not really. Post-menopausal women serve an incredibly important purpose in our society. Anybody who is looking around their community and seeing who's organizing events that have to do with politics or the school committee or whatever are often older women. They're not necessarily younger women who are busy raising their kids there. Women who know the community really well know the country really well, know the organization really well and know the needs of the people and are able to sort of serve that need well. It turns out that is not just important but scientifically based in hunter-gatherer populations which culminates in this hypothesis called [the grandmother hypothesis<sup>4</sup>](#). We're going to look really closely at that this week with the anthropologist famous for finding all of the data which you sort of found serendipitously, I guess you could say she wasn't really looking for it. A lot of people would say this is like one of the biggest breakthroughs in evolutionary biology in the last 50 years. Perhaps even more. The grandmother hypothesis is one of these ideas that sort of turns some of the ways that we think about women and their importance in our society on its head, and it's really fundamental for all of us to hold onto this for a little bit, I don't know about you, but at least a couple of times from a couple of different people I've gotten in debates about what is the sort of biological evolutionary purpose of women versus men. Oftentimes people really strongly believe that women's purpose is to have babies. You pass on your genetic

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<sup>1</sup> <https://empoweredhealthshow.com/ep-22-whats-happening-to-my-body-the-run-up-to-menopause/>

<sup>2</sup>

<https://empoweredhealthshow.com/ep-23-why-were-so-confused-about-perimenopause-and-hormone-the-rapy/>

<sup>3</sup>

<https://empoweredhealthshow.com/ep-24-mood-and-memory-changes-during-menopause-with-dr-jan-shifren-and-dr-nancy-woods/>

<sup>4</sup> <https://www.pnas.org/content/95/3/1336>

makeup, hopefully you've passed on the best genes possible and you've made it with the right person and your kids, grandkids, and so on and so forth. We'll be stronger and healthier than the prior generations. Right? I get that, but there was always something that really bothered me about it because I didn't think that was right. And we've certainly heard in the last few weeks that most women live a third of their life post-menopause. So if you're living in a third of your life post-menopause, but you've sort of served your evolutionary purpose, that doesn't, that doesn't really seem right to me. I would think that we would probably be dying, right? Not living longer. This grandmother hypothesis answers that question with a lot of really hard data and shows us very specifically that grandmother's serve and essential role.

Kristen Hawkes: My name is [Kristen Hawkes](https://anthro.utah.edu/faculty/khawkes/)<sup>5</sup>. I'm a distinguished professor of anthropology at the University of Utah and I'm a behavioral ecologist especially interested in what happened in human evolution and of course there's a long story about how I came to do what I do, but I think the reason we're talking is that more and more based on both data that my colleagues and I have collected and data other people have collected and trying to pull together all these different kind of silos of information more and more it seems like really the best hypothesis we have to explain a lot of things about this animal ourselves, I'm getting myself in the chest is the grandmother hypothesis which comes in a lot of varieties, but our particular version of it is about what happened to distinguish our genus and our, our lineage from the other grade apes. So our closest living relatives are the other great apes and closest of all genus pan. That's [chimpanzees and bonobos and they're closer to us](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3498939/)<sup>6</sup> than they are to gorillas and yet think about the differences and there are some really striking differences between us and them and among them is our much greater longevity and this many features of it. But the one that the title of the grandmother hypothesis comes from is this increased longevity and this life history stage post-fertility in women. This is a problem with me. I tend to just rant on and on so maybe you might want to interrupt me there, but it's so easy for people to misunderstand some things about demography because it's certainly true that life expectancy until really the beginning of the 19th century life expectancy for populations all over the world [was a little under 50](http://www.osfi-bsif.gc.ca/eng/docs/deip_gallop.pdf)<sup>7</sup> and for the hunting and gathering populations, that's especially where I pay a lot of attention and have collected data life expectancy as and less than 40 but the reason that that number is what it is is because it's an average of all the lifespans and there are a lot of tiny short ones because there's a lot of infant end juvenile mortality. And so it really brings the average down. It doesn't mean there aren't any old people, and in fact in human populations everywhere, the

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<sup>5</sup> <https://anthro.utah.edu/faculty/khawkes/>

<sup>6</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3498939/>

<sup>7</sup> [http://www.osfi-bsif.gc.ca/eng/docs/deip\\_gallop.pdf](http://www.osfi-bsif.gc.ca/eng/docs/deip_gallop.pdf)

fraction of female years lived, that's post fertile is substantial. About a third of the women in hunting and gathering populations are, if we just talk about the adults, about [a third of them are past childbearing ages](#)<sup>8</sup>. So in a lot of ways that poses amazing, interesting evolutionary questions. What the heck is that about? The tendency is to think it can't have anything to do with our evolutionary history because those are women who aren't having babies, but it turns out that that's likely what explains a whole bunch of other things, including our very short birth intervals. So shall I just keep ranting on and on about this?

Emily: Well, yeah, I mean I'm fascinated by all this. I am so excited to talk to you because I feel like I've read some of your research and I was, I said to Jill, we just have to talk to her. And part of what I want to make sure we just dwell on for one more minute is this idea that people really do tie sort of life worth or evolutionary worth to reproduction. And I think what your research has done in provoking my own thought process is to say this isn't just about having a child. It's also about caring for the children, right? Or caring for the generations of people who follow you. And so one of the things that I was struck by when we were working on, we've done three episodes on menopause, is that there were people who I talked to who sort of said, well, is anybody even asking if menopause is a normal phenomenon? Because if the life expectancy of somebody is say a hundred years ago was 45 for a woman, she might not have ever gone through menopause because she didn't live that long. And what you're saying is no, that's not looking at the math correctly. The statistics with child or infant mortality will weigh the average age down.

Kristen Hawkes: It's so important to really kind of fully take that on board because life expectancy when people use it just in this general way, they don't specify. It's usually life expectancy at birth. And that means at birth, the average lifespan that is likely for a newborn female is let's say less than 40 but that means because she has a very high likelihood of dying while she's still an infant or a child. And so those short averages, those short lives go into the average, which is life expectancy at birth if she manages. And there are a lot of places in the world where this is tricky. Even today, if she manages to live to adulthood, then her chances of living past her fertility are way better than not living past her fertility. So this is a distinctive feature of human populations, and it's one of the things that separates us from the other great apes. The chimpanzees, for example, a female [Jane Goodall](#)<sup>9</sup> said, [chimpanzees reach become aged by 33 they age more quickly than we do](#)<sup>10</sup>. And yet the end of fertility is [so similar to ours](#).<sup>11</sup> What's [inaudible] striking about us is that we, if we make it to adulthood, are likely to have decades of years past our

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<sup>8</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5875731/>

<sup>9</sup> <https://www.janegoodall.org/our-story/about-jane/>

<sup>10</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2553520/>

<sup>11</sup> <https://www.ncbi.nlm.nih.gov/pubmed/19213006>

childbearing ages. And so that's poses this, you're implying this interesting evolutionary question isn't, is an evolution all about reproductive. What turns out to have the highest reproductive success and reproduction often gets collapsed into fertility. And actually as you pointed out, it's not only bearing an offspring, but that offspring, if they're going to be genes in future generations, that offspring has to serve [...] to adulthood. And if I just, sorry about this, go on and on about, what's a striking thing about us is our very short intervals. So in most mammals, and this is true of the other great apes, it's true of primates in general. When an infant is weaned, it's weaned because it can now feed itself. And in fact, we [have really good data now on chimpanzees in particular using isotopes](#)<sup>12</sup> to show that an infant, depending on mother's milk, you know, the infant is hanging onto mom, she's foraging and feeding herself in the infant within its first year of life begins to feed on some of the same things she's eating while it's also depending on her milk. And as it moves through infancy, the milk covers a less and less of what it needs and its own foraging covers more and more. And when it's weaned, it is an independent, forager still has really important relationships with mom, but it's feeding itself. [And that's not true in humans](#)<sup>13</sup>. And it's real shift in the evolution of our lineage for depending on the kinds of foods that just weaned kids can't manage on their own. And that's where ancestral grandmothers came in.

Emily:           Okay. So talk to me a little bit more about the grandmother's role and how do we know it's grandmothers and not mothers?

Kristen Hawkes:    So here's a sort of cartoon of– and remember we're talking hypotheses– we don't have a time machine, so we can't go back. Although we model these things to see whether or not what we think might have been going on, whether it would really have the effects we hypothesized and my collaborators who are mathematicians, and I'm not, continue to do that. And what we find is the effects we hypothesize could absolutely have turned what is a great ape life history into a human one. And so let's pick up two important differences. There's the increased longevity and the female survival past the end of fertility and during the childbearing years, much shorter birth intervals. So what was happening is birth intervals were getting shorter. So, mothers, we're actually investing less in offspring. And the way they could get away with that is because the offspring or subsidized by the foraging of females whose on fertility was ending.

Emily:           And so just to clarify though, the intervals means I have one child and then the time in which it takes for me to have the next child. Correct?

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<sup>12</sup> <https://pdfs.semanticscholar.org/c829/bae74f3ba6752181e70dd5bf577333019b2d.pdf>

<sup>13</sup> [https://www.health-e-learning.com/articles/A\\_Natural\\_Age\\_of\\_Weaning.pdf](https://www.health-e-learning.com/articles/A_Natural_Age_of_Weaning.pdf)

Kristen Hawkes: That's it. Exactly. So average intervals in humans. I mean in societies like ours, I know lots of people who have had, wow, didn't I just have a baby and no, I'm pregnant again, good heavens and wasn't it if I was nursing, wasn't that supposed to not happen? Well in our sort of overfed, under-exercised, et Cetera, et world, our intervals can be so extremely short and nursing is not a prophylactic— watch out for that. In a lot of foraging contexts, and for mammals generally, as long as they are lactating, they're not obsoleting. And therefore that period of what's often called [lactational amenorrhea](#)<sup>14</sup>, the milk production is keeping them from cycling again and so they don't get pregnant. And then it's when that lactational load is coming to an end that their cycling starts and then they can get pregnant again. And in great apes, generally our family of hominids, so that includes the other great apes in the way that taxonomy is written now. So hominids are few. The living hominids are us and the other great apes and that tax on that family is the longest-lived of all the primates. That's the order we belong to, the order of monkeys and apes and the Hominid family is the longest-lived, the latest maturing, has the longest intervals between births of any of the families, but now we are kind of bending the curve in that our longevity is much greater than the other members of the Hominid family. And our intervals are shorter. So again, the cartoon for that, although I could talk about the kinds of foods that the spreading savannas made really inviting for ancestral populations to exploit, but they were the kinds of things that require size and strength to be good at. Like for example, geophytes, it's these underground storage organs like potatoes that are, you have to dig to get them up and then handle them in various ways to eat them. And that requires strength that little kids don't have, well, ancestral populations trying to exploit those resources. Moms would have had to lengthen their intervals because they're kids, it would take them longer to get big enough to be able to feed themselves. But those foods do not have to come from moms. So her milk is really important. But these other foods, as they become part of what that infant needs in our ancestral populations, those foods could be acquired and processed, handled, and a technical jargon by older females whose own fertility was ending. So older females, because of their farming productivity, they allowed their daughters to spend less on each offspring and therefore have shorter intervals, have more of them. And that altered the way selection affected aging rates. And so the slightly longer lived females could subsidize more and therefore their daughters could have more offspring who survived. And those increased longevity genes would increase in subsequent generations. So often when the label reproduction is used, it gets just telescoped as though fertility is the only element in the story. And of course it's not. And so one way to think about this is a kind of division of labor between the ancestral older females who by subsidizing the fertility of the younger females,

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<sup>14</sup> <https://www.ncbi.nlm.nih.gov/pubmed/9678098>

produced more descendants and therefore there got to be more older females because those who are aging slightly more slowly, the left more genes in subsequent generations. And so this life history shift, which has so many other consequences that this is probably not the place to talk about, but I just continue to be gobsmacked. Oh, that too. Whoa. It turns out that it seems like that might be behind so many things that are characteristic of us as animals.

Emily: I want to make sure that we understand this in practice, so the idea would be I'm home with my baby nursing or just being with the baby and my mom is out in the field sort of digging up the potatoes and bringing them back for us to eat.

Kristen Hawkes: Let me use the example that really, so I have to say, we certainly didn't have this hypothesis in mind. I didn't even think, wow. It wasn't even kind of on my radar to think about what old ladies are doing. When we started this longterm field project with, with people who live on wild foods, Hadza foragers in northern Tanzania and my research collaborators, we all had kind of slightly different questions as we went, but we went in as [behavioral ecologists](#)<sup>15</sup> and so we were systematically because people were so wonderful and allowed us to do this, welcomed our presence and we therefore wanted to monitor how people of both sexes and all ages were spending their time and what they got for it. And because we were spending time following all, both sexes and all ages, we began to accumulate this data showing how incredibly productive these old ladies were. And in fact, one of the first papers we wrote was had the title [hardworking Hadza grandmothers](#)<sup>16</sup> because these women who at that time we guessed were in their sixties and since then [Nick Blurton Jones](#)<sup>17</sup>, one of my collaborators, he's been working on the demography for decades and it was just in 2016 that his book, "[Demography and Evolutionary Ecology of Hadza Hunter Gatherers](#)"<sup>18</sup> was published where he has now these longitudinal data to show things about the demography of the population. But he's also then aged people, which is really a tricky thing to do when you can't say, I want to see your driver's license or it. Right. So when people don't even know their own ages, you know, they don't know the year they were born, then figuring all that out turns out to be complicated. But these old ladies and indeed we were right, they were well into their sixties and their productivity was just as great as the women who are still in the childbearing years. And they actually spent more time on these particular resources. These deeply buried [geophytes](#)<sup>19</sup>. It's the underground storage organs of these plants. Now. It's not that the younger women did not continue to forage. So this is not the sort of pattern—

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<sup>15</sup> <https://www.nature.com/subjects/behavioural-ecology#>

<sup>16</sup> [http://content.csbs.utah.edu/~hawkes/Hawkes\\_al89hardworkingHadzaGrams.pdf](http://content.csbs.utah.edu/~hawkes/Hawkes_al89hardworkingHadzaGrams.pdf)

<sup>17</sup> <https://anthro.ucla.edu/faculty/nicholas-blurton-jones>

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<sup>19</sup> <https://www.uaex.edu/yard-garden/resource-library/plant-week/geophytes-4-1-11.aspx>

let's see if I can, you know, we sort of tend to think of mom staying home with the kids and whoever's the provider going off and bringing home the bacon somehow. The pattern is that even little kids do try to go for resources like this. And one of the things that surprised us in this project was which active foragers a little kids tried to be, but they're too beansy, you know, they're just not strong enough to be able to earn rates that are high enough to feed themselves. So it really took a while for us to be able to see in our data that the women who were spending more time foraging and getting a little more, their kids were growing better because we were weighing people periodically until mom had a new baby and then that link went away and the kids, how well they were growing depended on their grandmother's foraging and how, how much time she spent, how productive she was. So we weren't looking for it, it kind of smacked us in the face out of our own data to see this what again, I described a minute ago as kind of a division of labor that the productivity of these older women allows the younger women to move on and have a new baby before the previous one can feed itself.

Emily: Is there something to be said for the fact that ownership is similar than it is here? So like a grandmother is out and she's bringing food back for her family rather than for the village at large.

Kristen Hawkes: So issues around sharing are so interesting and this is such a big, and I think not so complicated topic, but the kinds of resources that people choose to take when they're foraging for a living are really various, both plants and animals and the extent to which they go around to everybody varies by resource type and the things that men tend to specialize in, like for example, hunting big animals, which is certainly something these amazing hunters do. They go for those big, if you've seen any, any of those wonderful films of animals on the Serengeti go for those big herbivores. When they are successful, that's a huge pile of meat. In fact, again, this is the thing that emerged out of our data, not only what the result of people exploiting those big animals looked like archeologically because one of my collaborators, [Jim O'Connell](#)<sup>20</sup>, an archeologist, was especially interested in that, but how risky it is to spend your time doing that, how often you fail. In fact, [the average Hadza hunter is only successful 3.4% of days](#)<sup>21</sup>, so more than 96% of the days he goes out to get a big animal, he fails. And that means if everybody depended on, if the kids depended on dad bringing home the bacon, that they'd be in deep trouble. But when he is successful, everybody comes. Everybody comes to take advantage and into, as the Hadza say, eat the people's meat. So

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<sup>20</sup> <https://core.tdar.org/document/394847/james-f-oconnell-and-great-basin-archaeology>

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[https://www.researchgate.net/profile/James\\_Oconnell3/publication/266152149\\_More\\_Lessons\\_from\\_the\\_Hadza\\_about\\_Men's\\_Work/links/55df136608aeaa26af108d07/More-Lessons-from-the-Hadza-about-Men-s-Work.pdf](https://www.researchgate.net/profile/James_Oconnell3/publication/266152149_More_Lessons_from_the_Hadza_about_Men's_Work/links/55df136608aeaa26af108d07/More-Lessons-from-the-Hadza-about-Men-s-Work.pdf)

everybody arrives. Where's mine? It goes around not only to all the people that happened right now to be living in the same camp, but if it's a really big animal, people come from neighboring camps to help eat the meat. As they say. The kinds of resources that women tend to specialize in are things that come in much smaller packages are much more predictable. And so a woman going out to collect something, we have never seen a woman fail at that. If you or I, here we were suddenly and we couldn't go to the grocery store or even if you have a garden, didn't even have one of those. And there you were having to feed yourself and your kids, you'd really be in deep trouble. But if you are one of these Hadza women, you spent all your life learning about these plants and when you were a little kid, you were with your mom and you learned where they are and what to do with them. And then as kids grow up, boys began to, and girls began to do different things. But the kinds of resources that women get are smaller packaged, so they don't go around as far. Way less unpredictable, so you don't fail. And so there is the correlation I mentioned a minute ago that there is a relationship between moms timespan foraging and how well her kids are doing. So there really are differences and there are ways in which you can pick out the relationship between a woman's work and how well her kids are doing. As I said, as soon as she's got a new baby that goes away. Not that she doesn't still continue to do some foraging, but now she's got this bundle of joy that's altering her pattern of attention a little bit. And the kids, her slightly older kids, the weaned ones, who can still be a little bitty, you know, we can still be talking about a three year old of course, who's really tiny. Now it turns out that what grandmother acquires is really crucial to how well they do. Is that making sense? I mean, in a way it's so simple and I get carried away with all the connections maybe. And I don't tell it as clearly as I maybe could if you asked me the right questions.

Emily: No, absolutely. And I think it's wonderful to hear you make the connections. One of the questions that I did have was, I think it was, you know, [Wednesday Martin](#)<sup>22</sup>, are you familiar with her?

Kristen Hawkes: I'm not. I'm sorry to say

Emily: She's an anthropologist, but she writes more sort of looking at modern culture and how it has roots or origins based in sort of anthropological traditions. And I heard her speak and I believe this is where the information came from and she had mentioned something about how when women were in these hunter gatherer societies, they were menstruating less because they had lower body fat likely and so the intervals between birth could be potentially, I'm wondering attributed to this idea that like you're not getting a period every month, like you're not actually able to have a baby as regularly as we are

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<sup>22</sup> <http://wednesdaymartin.com/>

today. And so this idea that women were sort of, they would go through a reproductive phase and have lots of kids and then that was sort of all they did. I think her point was more of like women were out doing a lot of the work and that they were physically much stronger than women are today because of that, and because of that lower body fat percentage, potentially they weren't menstruating as much. Is that something that you've heard?

Kristen Hawkes: The story about it that I would emphasize is women don't menstruate nearly as much because they are most of the time either lactating or pregnant. So when you get pregnant, well you can't get pregnant again. You're not going to menstruate for a while. The baby lives you nurse the baby or your cycles stop. And again, I think I said a minute ago, watch out for those in our modern socioecology to think that if you are nursing a baby that you therefore won't be ovulating. That doesn't follow here because we are overfed and underexercised. And so the basic thing about people being stronger and less overfed certainly holds. But the thing that results in women not menstruating nearly as often as we do. So there's a whole story there about continually running these hormonal cycles, which is very unusual in terms of the deeper evolutionary story. When a woman has a baby, she nurses it. And then as I said a minute ago about other mammals, the milk is supplying less and less of what that baby needs. As it gets bigger and bigger in humans, the something else isn't something that the infant is acquiring on its own. It's getting supplementary feeding from somewhere else. But as that continues and then the something else is supplying the nutrition for the kid. So lactation is coming to an end, then ovulation cycles start. I mean there's a whole story on lactational Amenorrhea, why we have it, what its consequences are. But just for the moment, let's stick to the fact that in most socio ecologies where women are, or we don't have the couch potato phenomenon, or here I am sitting at my desk. Not exactly the same, but very similar, looking at a screen, sitting in a chair. The pull on my energy is less than it would be if I were far reaching for a living. But the thing that's really affecting the fact that while in our societies, a woman could have, you know what the 400 ovulations, right? You know, what is the calculation? You could, I mean [we're starting menarche earlier and earlier.](#)<sup>23</sup> but you can only do that as long as you're never pregnant. So you're cycling every single month. But in ancestral populations and in traditional societies and haven't undergone what we call the demographic transition with these controlled family sizes, cycling is just this brief interruption or this brief period between one baby being weaned in before you get pregnant with the next one.

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<sup>23</sup> <https://www.ncbi.nlm.nih.gov/pubmed/12319855>

Emily: So what are the average ages of people getting pregnant and say the Tanzania population that you are with?

Kristen Hawkes: The average age at first birth is a little over 18 and again, that's not because those girls haven't been having sex before that. And that's very close to what people calculate to be the average age at first birth. And not only in most populations where people are foraging for living, but in [traditional populations it's around 18 or 19 is the average age of first birth.](#)<sup>24</sup>

Emily: Why is that? That seems late. If you are getting your period at let's say 13 or 12 or something like that, are they getting their periods at the same ages?

Kristen Hawkes: I think the data show that men are can be a lot earlier in populations like ours. There has been this declining age menarche and there are lots of [different hypotheses](#)<sup>25</sup> about that. I mean one of them is nutrition. There are some things about light and a whole array of things about why it's happening so early. And you know, it does happen every once in a while. These, oh just so sad stories about girls that are just little girls who end up getting pregnant. But that's not the common pattern in traditional societies. And so menarche is later. But it's also the case that typically there is what's called this adolescent subfertility in traditional populations where women may have had their first menstruation but they are not yet ovulating regularly enough to carry a pregnancy. And so again, when I say the average, again this can be confusing, it averages, it doesn't mean that there's never a girl who doesn't have an earlier first birth, but the average is over 18. So 18 and 19 it's the same way with the, the [!Kung foragers in Botswana that Nancy Howell](#)<sup>26</sup> described so well.

Emily: And then about how many births are people having?

Kristen Hawkes: Well that is amazingly variable and so interesting. So if I, if I take the three populations, this tree hunting and gathering populations that I know best because [I've worked a little bit with the three](#)<sup>27</sup>, the spread is wide. So the most is these Ache foragers in the forests of eastern Paraguay where what's called the total fertility rate, and that's the number of births that a woman would have if she lived throughout the childbearing years. And there it's 8.2. Again, that's average. So it doesn't mean that there aren't occasionally 12 right,

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<sup>24</sup> <https://www.cia.gov/library/publications/the-world-factbook/fields/352.html>

<sup>25</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2958977/>

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[https://scholar.google.com/scholar\\_lookup?title=Demography+of+the+Dobe+!Kung&author=N+Howell&publication\\_year=1979&](https://scholar.google.com/scholar_lookup?title=Demography+of+the+Dobe+!Kung&author=N+Howell&publication_year=1979&)

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<https://cpb-us-e1.wpmucdn.com/blogs.uoregon.edu/dist/8/2512/files/2015/10/White-Churchill-comment-2g-gxd7g.pdf>

but the average and on the other hand, these !Kung foragers though in Botswana and Namibia, Nancy Howell's data. Again, these are data she collected in the 1960s and there the number was 4.2 or something like that. So they have much longer intervals and the Hadza I was just talking about our kind of smack dab in the middle 6.2 so it varies and that variation does seem to be associated with some of the energetics that you were instancing. How well fed is everybody, how much fluid is there around that seems to make a difference. So the Hadza population I was talking about, they are kind of typical for actually traditional populations. You know you probably have a number right about in there, a little over six on average as the number of babies that the average woman if she lived throughout her childbearing years would have.

Emily: And then I guess my natural next question is, is there any bearing on the number of children with the woman's longevity in terms of like, I mean obviously maternal mortality is what would be first and forefront, but I also think having 12 kids is a lot on your body. I have two and I feel like it's a lot on my body.

Kristen Hawkes: I mean you are not surprised to hear that it is always true in all human populations where we have any data that mothers have help every. So this is, this is language that comes from [Sarah Hrdy](#)<sup>28</sup> who is a just an amazing scientists who's been [especially interested in maternal tradeoffs](#)<sup>29</sup> and she talks about these important differences between us and most other primates, but certainly the other great apes that those females are quote independent mothers. You know, as I was saying, most mammals when first of all the kid is starting to feed itself a little bit very soon after birth, even though it's still depending on mother's milk. And then finally when it's weened, it's eating whatever she's eating. By elephants for example, by eating the same stuff. It's the same way with chimpanzees. They are the same fruits, the same leaves and pith and so on. But in humans, independent mothering is never what you see. And so when I say that, what happened in our evolution was mothers started investing less in each offspring. That was because mothers had help and what those offspring required to grow up and do well was coming from the foraging of somebody else. And our hypothesis is that right at the heart of the story, we're ancestral grandmothers. And that that is the reason why we have this post fertile life stage. It has the contributions that these older

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<sup>28</sup> <https://anthropology.ucdavis.edu/people/sbhrdy>

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[https://s3.amazonaws.com/academia.edu.documents/30935493/PLS\\_2001-9-entire.pdf?response-content-disposition=inline%3B%20filename%3DThe\\_Homeopathy\\_of\\_Kin\\_Selection\\_An\\_Evalu.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190910%2Fus-east-1%2Fs3%2Faws4\\_request&X-Amz-Date=20190910T230810Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=bfab4e6ec5d1e17eb4cf1aef0edf121255ac5dab031ea5a72fddfe70b879650d#page=139](https://s3.amazonaws.com/academia.edu.documents/30935493/PLS_2001-9-entire.pdf?response-content-disposition=inline%3B%20filename%3DThe_Homeopathy_of_Kin_Selection_An_Evalu.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190910%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190910T230810Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=bfab4e6ec5d1e17eb4cf1aef0edf121255ac5dab031ea5a72fddfe70b879650d#page=139)

females were making to the number of descendants that they left increased because they were subsidizing their daughter's fertility, she had more surviving offspring, they had more grandchildren, et cetera. And so selection was altering the life history pattern to increase longevity and at the same time, so my mathematical collaborator, [Peter Kim](#)<sup>30</sup>, when just this paper that we've been working on for a while, but it was just [published this year](#)<sup>31</sup>, a modeling paper, because again, we can't go back and look, but his agent based model for considering if we start out with a great ape life history that these grandmothering subsidies not only increased longevity as they allow shorter intervals, but they also hold, keep the end of fertility from increasing to older ages. So this is a question that a lot of people have asked. Well, once we got that longevity, why does fertility stop when it does? Why did quote menopause evolve? And from the perspective of the picture I'm trying to paint here, it didn't. That the end of fertility is essentially the same in us as it is in genus Pan as it is in the other great apes, the end of fertility is the same. What is really different is that the rest of our Soma ages more slowly and we therefore survive the end of our fertility where they usually die during their childbearing years. I instance that observation of Jane Goodall's long ago saying that the chimpanzee, she was watching at Gombe on watching very closely seem to become aged, seem to become old by 33.

Emily: So there's [an article that you wrote that was in Nature](#)<sup>32</sup> where you are looking at the sort of Finnish and the Canadian populations and this sort of effect with family size and longevity. Can you talk a little bit about how that showed you this impact with sort of the influence of having grandmothers around to take care of grandchildren?

Kristen Hawkes: Right. Well, this was a comment, this was a comment, it wasn't our own research, but it was a comment on research done by people looking at historical data sets where you can go back and have a record in which you know about the births and deaths of individuals longitudinally over several generations. And what [they had done](#)<sup>33</sup> was gone back where they could not only see the births in whether or not the kids survived, but they also had data to know whether or not grandmother was still alive at the time. Now we're talking about an agricultural population. So this is a historical population, not, they were absolutely not far. [...] were talking about farmers, but remember farming is so recent in our history. There wasn't any of that until the last 10,000 years. And it changes a lot of things. But a lot of things about our demography persist once we come to be human, whether we're talking about living by foraging or by something else. And because they had data that showed

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<sup>30</sup> [https://www.researchgate.net/scientific-contributions/38986107\\_Peter\\_S\\_Kim](https://www.researchgate.net/scientific-contributions/38986107_Peter_S_Kim)

<sup>31</sup> <https://link.springer.com/article/10.1007%2Fs11538-017-0323-0>

<sup>32</sup> <https://www.nature.com/articles/428128a>

<sup>33</sup> <https://www.nature.com/articles/nature02367>

whether or not grandmothers were still alive, they could show that the, having grandmother around increased the, no, I'm not going to remember without going back to look at the paper, but something that covered the reproductive success of their kids. So this was a case, a historical case of farmers in which something that's part of the story I'm telling using the Hadza as an instance that moms can move on, have that next baby without risking the survival of the previous one by her attention now being drawn to the newborn because grandmother is there to subsidize the kid that is weaned. And that's something that the group looking at these Finnish data found in their longitudinal data sets. So my comment was on that as I recall in that comment, I was taking advantage of modeling. We rely on that often. We need both things. We need data, but often we need models to help us think through whether or not stuff we think might happen actually, whether those pieces go together that way and we can be misled. Models can mislead it. So hard to do all this stuff.

Emily: Well, no, but what I think is interesting about that in particular is that it sounds like these are in some ways very different if we're thinking about this in terms of evolution. These are very different periods of time. Even though theoretically the group that you're studying is of the same, there is farming happening in the world at the same time, but suspend that sort of disbelief for a minute because I think like what this says to me is that like this link is present in these different cultures because it's serving the same purpose.

Kristen Hawkes: Oh, absolutely. Thank you for making that point. I think it's so important, but the question has been motivating us is how did we get this life history? How come again, because so many, and you continue to find this in the literature, the notion is that after women are no longer fertile, well what the heck is that about? That can't be as just leftover because now somehow we're keeping everybody alive when they would have died, and this is a whole novel thing we didn't use to have any old people. Well that's incorrect. That is incorrect. And this, there's a whole array of kinds of data that speak to the key role that older females are having on how the life history evolves is the heart of the grandmother hypothesis. It has consequences for so many other things. But one of its big consequences is that we got all of these post-fertile women around and that's because evolution in our lineage favored that. And it favored that because of the contribution they were making to the ancestry of future generations. And that's us

Emily: And I feel like that's just, it bears repeating because I think so many people—

Kristen Hawkes: I couldn't agree more.

Emily: —don't value older women, right?

Kristen Hawkes: I hear it all the time. Well we also, I mean there are all kinds of things to say about aspects of our current socioecology that are so, so unusual in a lot of ways. Even traditional societies that are not like our western industrialized societies. Attitudes toward old people are really different in the kind of socioecology that we live in. We have things like changing technology all the time and ways in which we privilege youth. And that's a whole topic that we could talk about and we privilege aspects of so many things that make it seem like old people are kind of beside the point. And why don't they just get out of the way and then trying to understand that. We also—

Emily: And yet I would say there's even a sex difference there, right?

Kristen Hawkes: Huge.

Emily: Because it's like the wise old man.

Kristen Hawkes: Absolutely. So yeah, and let me tie in another thing. So one of the things that goes with is life history shift when longevity is increasing. And this is, so the models that we've been using are two-sex models where, I mean, although often when you build a model, you want to ignore that, depending on the question you're asking. But we do have two sexes and it takes one sperm and one egg to make every new individual and that has enormous consequences. And so these are two sex models. And what happens in mammals, generally female reproductive physiology has these characteristics, which you might already have talked about in previous podcasts, but in female mammals, all of the [...] you're ever gonna have, all the eggs you're ever going to have. You build that stock very early in life. And in us, in humans, [it's about the fifth month of fetal life that we have the finite stock](#)<sup>34</sup> and we actually start losing them even before birth and then continue to lose them well before we start menstruating and lose them even while we're pregnant. So they are going away through a triage all the time. In male mammals, sperm production continues, [new sperm are being produced all the time](#)<sup>35</sup>. And so when longevity increases, there are now a lot more post-fertile females, but there also are a lot more older males. And so what happens on the male side is male male competition for paternity gets tough in a way that has consequences across all kinds of animals. When the sex ratio in the fertile ages is male biased, the strategy that begins to pay off is to meet guard because the competition's really tough. And the fact that we've got all these old guys trying to take control and hold down the young guys because competition is so tight. In fact, oh, see, I could just go off on these things about male strategies and how they shift in chimpanzees, for example. Young males who are really low, they are not really serious about getting anywhere high in the

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<sup>34</sup> <https://www.sciencedirect.com/topics/medicine-and-dentistry/oocyte-development>

<sup>35</sup> <https://www.healthline.com/health/mens-health/how-long-does-it-take-for-sperm-to-regenerate>

male hierarchy. Yet those males don't ignore the young, just now ovulating females and the older males ignore them. The data show that [adult male chimpanzees prefer to mate with older females](#)<sup>36</sup> and lots of good reasons for that. The older females tend to be more successful as moms, but because they are not being drawn to the young females, the young males are actually getting paternities early, and so if you compare male age specific fertility in humans to male age specific fertility in chimpanzees, what you see is all of this early fertility in male chimpanzees but not in humans. And in fact, in some populations where the males really are exercising serious control, the young men may not be able to get a mate until they're into their thirties

Emily: What are the consequences of–

Kristen Hawkes: It's male-male competition really taking a turn that has huge consequences for the political lives that we can't help but live.

Emily: Meaning what?

Kristen Hawkes: Meaning that male alliances, alliances males form with each other, control over things that are associated with status and with hierarchy are so important that they run the politics of communities. And so anthropologists talk about the role of male alliances in structuring community affairs across traditional societies. And I would say look, look around right here that there is this clear obvious male bias in participation in political activity, in things associated with enhancing status and status increases and hard to talk about all these pieces. And I worry about talking about them without talking about all the connecting ones. So we're used to this thing about living in these isolated nuclear families. People move around all the time, so you tend not to live near your kin and work is someplace else, someplace that's really hostile to kids. And so the tradeoffs that women face are so different than is the case in traditional societies. And if I think about, again with hunter gatherers, the kids are right there and kids are interacting with other kids all the time. Multiple ages are all together. That tends to be not the case in our society. And because we have this very low fertility, people don't grow up with babies. They may have a sibling, but the sibling was very close in age to them, so they're not used to being around babies. And then here we are in these isolated pair bonds and oh, there's a baby, I'm good heavens, what do I do? I don't know how to, and then we turn to and rely on, let me, let me find somebody who will tell me, what should I do with this baby? Because it's a novel experience and notions about what to do really get to be, ooh, worrying concerns, sources of anxiety for people who think, ooh, I have to make sure that I teach my child that how, what do I do, do I need to play Mozart to it, that it will grow up and go to Harvard and you know, et Cetera. These are worries that we have that go with our

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<sup>36</sup> <https://www.sciencedirect.com/science/article/pii/S0960982206022676>

socioecology that are novel because of the features of our socioecology that are novel. It's still the same human-

Emily: I mean I think the other aspect of this, there was actually just an [article in the local paper](#)<sup>37</sup> here about how more grandparents are taking care of children because of all of the drug abuse kind, I think it was like opioids, meth, all of these different things. And I was sort of surprised by that for a number of reasons and so I went and looked up the data because that's what I like to do. [U S census does not agree with that](#)<sup>38</sup> and they have a very clear question about grandparents being a primary caretaker of grandchildren on there and it declined from last year. So the newspaper article got it, I think, incorrect. But it is an interesting trend.

Kristen Hawkes: This is the problem.

Emily: Yeah.

Kristen Hawkes: Problem you face as a journalist because you want of course to get it right, but also to make it clear and the difficulty. And then of course it seems like why can't those scientists just be clearer? And of course we have different jobs.

Emily: Right? Well, no and I also think that there was a framing in that story that was striking because even though the data was incorrect, like you know, and that's just comparing the last three years. I think over time that's probably true. Like maybe over the last 10 or 12 years it's increased slightly. But I think very important. Two things. One, that's being set up as though it's a failure. So it's essentially saying when the parents are drug addicts, the grandparents have to step up because otherwise the kids have nobody. It's like a last resort option. Whereas I think in a lot of either in immigrant communities or in communities where people have retirement plans that are based around wanting to take care of their grandchildren, this is not the case. I have a group of girlfriends who most of their childcare is provided for by their parents. So like one of my good friends, she goes into work in and three days a week her mother in law comes and stays at their house because she lives about an hour away and takes care of the kids. And the other days of the week, her mom does who actually lives right down the road. But this is their, she would joke, there's pluses and minuses, right, to having that much involvement from your in-law and your mom, but it's free childcare and it's with people that she trusts and that she knows are going to love the children the way she does and the kids get this incredible relationship. I have another really good friend who went

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<https://www.bostonglobe.com/metro/2019/08/12/growing-old-and-back-bouncy-house-more-grandparents-are-raising-grandkids/zlNaJP9pJ0LR5z19aZt6SP/story.html>

<sup>38</sup> <https://www.census.gov/content/dam/Census/library/working-papers/2019/demo/sehsd-wp2019-04.pdf>

through a divorce and moved back in with her family and that was supposed to be temporary and it ended up being so terrific for everybody that they've stayed. You know, I think it's so interesting because we have the stigma and yet there's this incredible craving that you've mentioned for people to be less isolated, for people to have guidance on how to take care of kids. Right. And I mean grandparents that might have been a long time ago since they took care of a kid. And I think even my parents and my in-laws who are wonderful with my kids, like they're exhausted by the end of whatever the visit is. And so I think there's a difference in that kind of stuff, which is part of the reason I was curious about like the average age of birth, because I wonder whether the grandmothers were also younger than our grandmothers are today, which probably has a bearing or like weather if you're in this and you're never out of it. Like I always joke about like the baby cloud and like once you come out of the baby fog, it's really hard to go back in, right? So if somebody doesn't have a kid for like 10 years, it's like they have to relearn everything kind of all over again. But if you're kind of in it, I mean, this is how I feel about breastfeeding. I feel like you should definitely correct this, but there are some women who can't breastfeed and then there's other women who produce tons of milk and you kind of wonder like if we were all sitting under a tree in a village, maybe the ones who are really produce a lot of milk would be the kind of like the [wet nurse](#)<sup>39</sup> for the community. Right. And the ones who couldn't, we'd be out gathering instead of putting it all on one individual as we do now, which is just setting you up for failure. Like there's no way somebody can be the gatherer or the provider, the hunter, the nurse or the baby maker. Like it's a lot.

Kristen Hawkes: Right? It takes a village though. You've probably heard that phrase, but you capture everything so beautifully. I mean, this separation that is part of our contemporary socioecology put so much weight on a few relationships and that has not been true in traditional societies is certainly is not true in places where people still Farge for a living. So that kids, there are other little kids that they're always interacting with. Babies began to have relationships with all kinds of people. It's not just mom, there are all these other, and now because of these isolated nuclear families, we put so much weight on that one pair relationship that is boy, it's just can't take it. It has to be everything and it can't. And that things so difficult where there are lots of other relationships then the weight on any particular one is way less.

Emily: Well I would love to have you back on. I wish I could come and like take a class from you. This is just so interesting. So thank you very much for being so generous with your time

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<sup>39</sup> <https://www.merriam-webster.com/dictionary/wet-nurse>

Kristen Hawkes: Thank you for making these issues around menopause because people don't talk about it and yet and so I really do have to go. But I think it's a thing that women don't talk about enough and this tendency to get caught. So women, and we are lots of reasons why you want to delay having children until you feel like you're sort of figured out how you're going to operate as an adult. So women can tend to think, well, if I'm healthy, when I'm ready, I'll just have a kid. And yet in human populations, and it's true in ours, it's true in the hunter gatherer ones, what you see is the chances of having a kid, a next kid start to decline way earlier than we think. And it's not a matter of whether you're healthy or not, whether you will go through menopause. I mean, if you die, you won't, so there's one way to avoid it. But that is going to happen. And recognizing that that's at the heart of our life history, that is part of our fundamental biology. So we should be recognizing how important it is and what is associated with yes, more of that. More of that. Emily, carry on.

Emily: I feel like this is a really great episode because so much of what we've talked about with menopause does feel sort of scary and overwhelming or you know, just really uncomfortable and something that no one's really looking forward to. But this stage of life after menopause where you are providing an essential role to society that isn't about having kids. That to me is really interesting and worth exploring both whether you want to academically or whether you're just sort of curious about like, well, you know, so many women have their kids go off to college and they feel really depressed and sort of alone and that often coincides with menopause. And I think if we think about this as like the next chapter, then it sort of becomes this idea of transformation, right? We have these different periods of our life where we're transforming. For me, that is much more optimistic than the way it's usually framed. And if you think that the society that you're living in, the community that you're living in, the family that you have, even though we have very different structures of family today than we did back when we were all hunter gatherers, that to me means like, hey, this is a real chance for you to not just reinvent yourself. Maybe you don't want to reinvent yourself. But it's a chance for you to look at life in a new way. You have a new purpose. So for all those people who are about to go through menopause or thinking about menopause, or helping a parent or a sibling through menopause or women who have gone through it, we need you. We need your help. We all need to sort of still be very active and lively in our society. And you have a role to play.