Independent Research & Further Reading

Guest: Dr Darby Saxbe

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Contents

Paternal Brain Changes: Grey Matter Volume Loss and the Mentalising Network

> *"So we found that in fathers, and this is similar to what's been observed in mothers, the brain is actually losing gray matter volume, so it is shrinking… the parts of the brain that are shrinking the most are in what we call the mentalising network, and that's a part of the brain that helps us understand other people's feelings and intentions"*

The transition to fatherhood triggers measurable structural and functional neuroplasticity in the adult male brain. Dr Saxbe's lab (Saxbe & Martínez-García, 2024) followed 38 first-time fathers in California who were cohabiting with pregnant partners expecting a singleton infant. Fathers completed a structural MRI during mid-to-late pregnancy and a second MRI about 6 to 12 months postpartum, with questionnaires collected prenatally and again at 3, 6, and 12 months after birth.

The study reported that **first-time fathers showed small but significant cortical grey matter volume reductions** from pregnancy to postpartum. Specifically, total cortical volume fell by about 0.9%, with a significant prenatal-to-postpartum reduction. Reductions appeared across frontal, parietal, temporal, and right cingulate regions; the left cingulate was borderline, and subcortical change was not significant. Larger reductions were associated with stronger prenatal bonding, planning more time off work, stronger postpartum bonding, lower parenting stress, and more time with the infant. Larger reductions also predicted more postpartum sleep problems and higher anxiety, depression, and psychological distress even after adjusting for prenatal levels. The authors interpret the pattern as both adaptation and vulnerability: the same cortical remodelling that tracks bonding and caregiving also appears to mark greater risk for later sleep disruption and psychological distress.

Other studies include Martínez-García et al. (2022), where the authors asked whether becoming a father changes brain anatomy when the changes are examined across two international longitudinal samples. It followed 20 expectant fathers before and after the birth of their first child, included a Spanish control group of 17 childless men, and tested cortical volume, thickness, area, and subcortical volumes. The main finding was overlapping cortical volume reductions in first-time fathers across the default mode and visual networks in both samples, with preserved subcortical structures. The paper interprets this as evidence that the transition to fatherhood is a meaningful window of experience-induced structural neuroplasticity in males.

Kim et al. (2014) focused on the early postpartum period, scanning fathers twice between 2–4 weeks and 12–16 weeks after birth using longitudinal voxel-based morphometry. Its hypotheses were directional: increases in motivation and decision-making regions such as the striatum and prefrontal cortex and decreases in the insula. The results were mixed. Fathers showed grey matter increases in regions tied to parental motivation, including the hypothalamus, amygdala, striatum, subgenual anterior cingulate, and lateral prefrontal cortex. They also showed grey matter decreases in the orbitofrontal cortex, posterior cingulate cortex, and insula, a pattern the authors noted differed from mothers in their prior postpartum study.

Paternina-Die et al. (2020) used a surface-based approach, which let the authors separate cortical volume into thickness and area and use more stringent permutation-based statistics. It specifically tested whether first-time fathers show changes in cortical volume, thickness, and area, and whether those changes relate to infant age or fathers' neural responses to their own infant. The clearest anatomical result was a significant reduction in precuneus cortical volume and thickness in first-time fathers. Larger reductions and thinning were associated with stronger brain responses to pictures of the fathers' own baby, making this the first study to link preconception-to-postpartum structural change in fathers with infant-cue neural responses.

Taken together, these studies suggest that first-time fathers show real but modest brain remodelling, with the strongest repeated signal being cortical reductions, especially around default mode regions, alongside some early postpartum increases in motivation-related regions.

References 1-4.

Postpartum Testosterone Decline in Hands-On Fathers

> *"Typically men, when they're hands-on as fathers, show about a 25% drop in testosterone, and some of the best studies of this have been done longitudinally in the Philippines."*

This closely tracks the landmark longitudinal Cebu Longitudinal Health and Nutrition Survey cohort study in the Philippines (Gettler et al., 2011), which followed 624 men from 2005 to 2009. Men who transitioned from single non-fathers to partnered fathers over that period showed a **median 26% decline in waking testosterone and a 34% decline in evening testosterone**, significantly

greater than the decline in men who remained single and childless. Fathers reporting three or more hours of daily childcare had lower testosterone at follow-up than less-involved fathers. Because testosterone was measured before as well as after the transition to fatherhood, the study could rule out reverse causation (i.e., that low-testosterone men simply become fathers more often), establishing that hands-on fatherhood itself drives the decline, a pattern consistent with hormonal trade-offs seen in other biparental-care species. A follow-up study (Gettler et al., 2015) showed that men who increased weekly childcare involvement experienced corresponding testosterone declines.

However, several other longitudinal studies found **no significant testosterone decline across the transition to fatherhood**:

- A 2025 longitudinal study (Rilling et al., 2025) of 51 first-time fathers found no overall main effect of fatherhood status on testosterone levels across four time points.
- A study (Cardenas et al., 2023) of 78 couples found no significant prenatal-to-postpartum testosterone difference, with 55% of fathers actually showing an increase.
- An earlier study (Perini et al., 2012) of 37 fathers found lower testosterone than controls post-birth but did not report a within-subject decline.

Studies that did find prenatal declines report that testosterone may rebound within months postpartum, potentially explaining null findings when postpartum sampling occurs later.

References 5-17.

Paternal Testosterone, Relationship Satisfaction, and Postpartum Depression

> *"My lab did a study where we found that men who had relatively higher testosterone after their baby's birth had partners who were more dissatisfied in the relationship and reported more intimate partner aggression… when testosterone is really low after a birth, men have higher postpartum depression symptoms."*

This matches Saxbe's published research (Saxbe et al., 2017), which found that **higher paternal testosterone in the postpartum period was associated with a lower risk of depressive symptoms in fathers** but with greater risk for mothers and children, i.e., the same hormonal profile

that seems protective for dads is linked to worse outcomes for their partners and kids, consistent with the relationship-dissatisfaction and aggression findings described here.

Donovan and Corpuz (2025) tested the dual-hormone hypothesis on 220 first-time fathers at 3 months postpartum, predicting that high testosterone combined with low cortisol would yield the lowest relationship satisfaction. The results ran opposite to predictions: fathers with high testosterone and low cortisol reported the highest relationship satisfaction, a small but counter-predicted effect. Because these findings are correlational, the literature treats testosterone as one contributing factor among several (sleep, stress, relationship quality) of family wellbeing. The paper emphasises its small effect size and the need for replication with less homogenous samples.

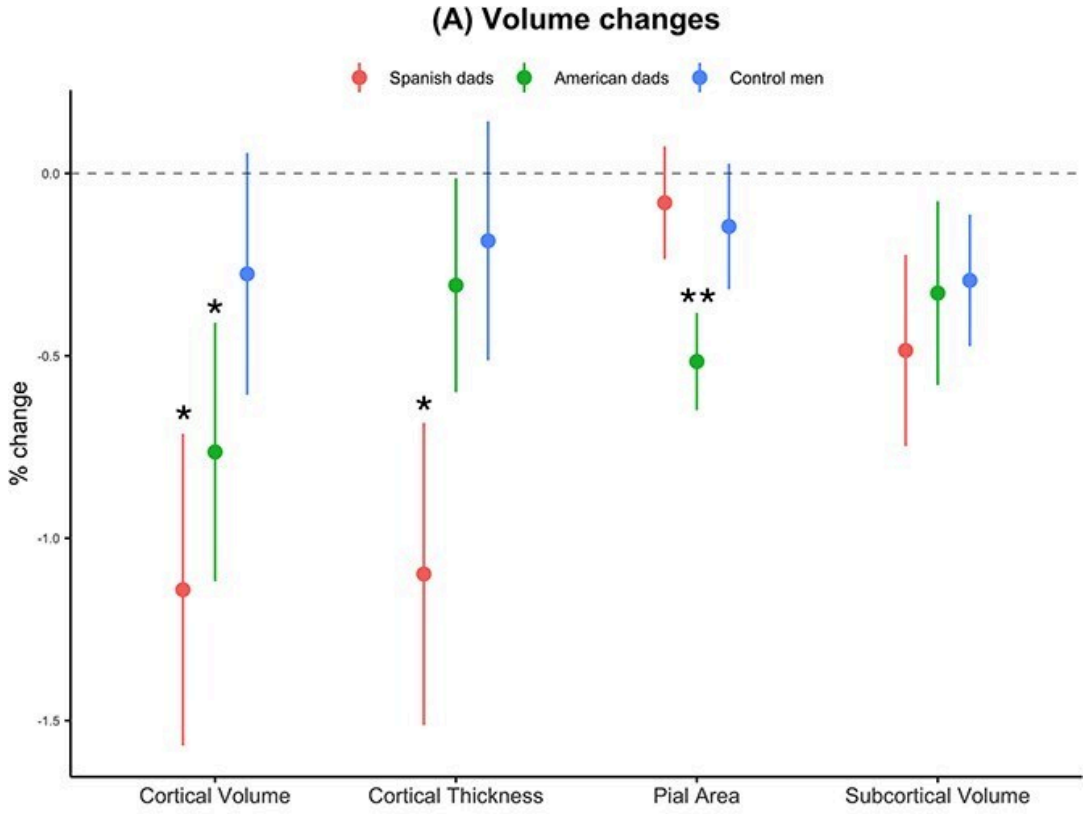
References 18, 19.

Magnitude of Brain Volume Loss: Mothers Versus Fathers

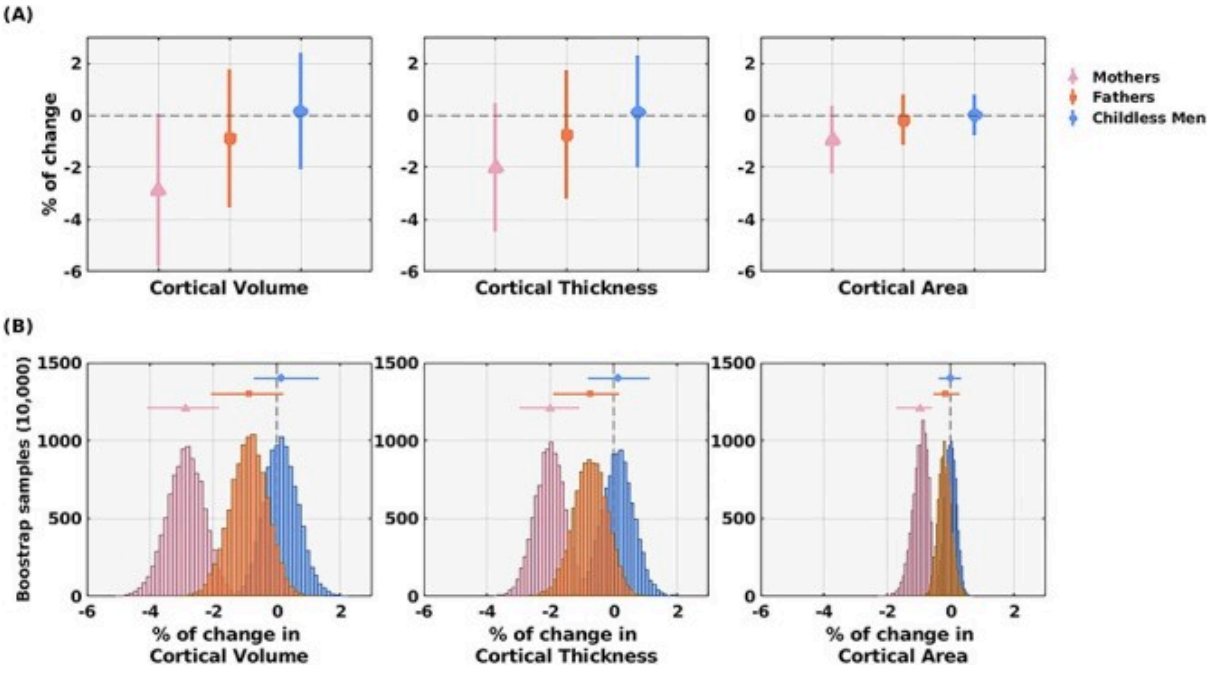
> *"Moms are losing about 2.5% of their brain volume from before pregnancy to after birth… Dads, in our studies, we found they lose about 1% of their brain volume."*

Both mothers and fathers undergo structural brain changes across the transition to parenthood, but the magnitude, timing, and mechanisms differ substantially between sexes. In mothers, pregnancy itself drives pronounced grey matter volume reductions that begin during gestation and are already present before childbirth. In fathers, who do not experience pregnancy directly, cortical volume reductions are detectable but smaller and less uniform.

Fathers' reductions are less pronounced than those in mothers: while first-time mothers display a 2.6% reduction in total cortical volume, Spanish and Californian fathers display only 1.14% and 0.76% reductions, respectively (Martínez-García et al., 2023). Unlike mothers, fathers do not show significant subcortical volume changes (Saxbe et al., 2024). One early study (Paternina-Die et al., 2020) found no significant pre-to-postpartum changes in fathers, though reanalysis with surface-based methods revealed precuneus reductions that the original voxel-based approach had missed.



"One-sample t-tests analyses of the percentage of change (y-axis) between prenatal and postnatal MRI scans" from Martínez-García et al. (2023)



"Global cortical percentages of change in first-time mothers (N = 25), first-time fathers (N = 20), and childless men (N = 17)" from Paternina-Die et al. (2020).

A longitudinal study (Daneshnia et al., 2026) scanning fathers at 3-week intervals over 24 weeks postpartum found that grey matter volume reductions were most pronounced within the first 12 weeks, affecting bilateral frontal, temporal, parietal, and occipital cortices, with more circumscribed frontal and cerebellar decreases at 24 weeks. From 12 weeks onwards, local grey matter volume increases appeared in frontal and cerebellar regions. This pattern contrasts with the maternal postpartum trajectory, which shows far greater and mostly increasing volume changes as the brain regenerates from pregnancy-induced loss.

References 20-24.

Parenthood and Brain Age in Later Life (UK Biobank)

> *"The UK Biobank… they find that both men and women who report having had more kids have markers of a younger-looking brain age… it seems like the greatest benefit is at two or three kids."*

Ning et al. (2020) matches a 2020 UK Biobank study (Ning et al., 2020). The study analysed 303,196 adults of European ancestry without brain or nervous-system illness for cognition and an MRI subset of 13,584 for brain age. Participants were grouped by number of offspring as 0, 1, 2, 3, or 4+ children, because the authors expected the association might be non-linear and the highest-parity group was sparse. The cognitive outcomes were response time and a visual-memory test based on the number of mistakes, and the MRI outcome was relative brain age derived from structural morphometry using a LASSO-based prediction pipeline. Regression models adjusted for age, education, BMI, income, smoking, alcohol use, sleep, living arrangement, diabetes, and hypertension, with sex-stratified analyses and sex-interaction tests.

They found modest links between parenthood and younger-looking brain markers in later life. In both women and men, having offspring was associated with faster response time and fewer mistakes on a visual-memory task after adjustment for demographic, lifestyle, and health covariates. The pattern was non-linear, with the largest cognitive differences generally seen between childless participants and those with two or three children, while differences among parents were small.

In the MRI subsample of 13,584 participants, number of offspring was also associated with relative brain age, an imaging-derived estimate of how old the brain appears relative to peers. Participants with two or three children had younger estimated brain age than childless participants in both sexes, by about 0.5 to 0.7 years in women and 0.6 to 0.7 years in men, with no significant sex interaction for this brain-age result.

The authors argue that these associations are more consistent with lifestyle and social factors that accompany parenthood than with pregnancy biology alone, because similar patterns appeared in men as well as women. They suggest possible pathways such as healthier behaviour, greater social engagement, and support from adult children, but they also emphasise that the study is observational, so it cannot establish causation and could reflect residual confounding or reverse selection.

References 25-27.

Oxytocin, Neuroinflammation, and Alzheimer's Pathology in Animal Models

> *Steven Bartlett: "Research shows that oxytocin actively down regulates harmful pro-inflammatory cytokines in the brain… studies on aging mice demonstrated that long-term oxytocin treatment can… enhance the brain's plasticity… in animal models of Alzheimer's, oxytocin has been shown to reduce the toxicity of amyloid beta plaques."*

These claims are drawn from preclinical research, though the evidence tier is worth flagging: every specific finding cited here comes from animal or cell-culture models, not human clinical trials.

- In cultured mouse microglial cells, oxytocin suppresses pro-inflammatory cytokines, including IL-6 and TNF-α.
- Long-term oxytocin treatment appears to enhance brain plasticity in ageing mice, with the strongest direct evidence showing that 13 weeks of oxytocin in 12-month-old mice improved spatial memory, increased hippocampal doublecortin-positive cells, and upregulated GluR1 and NMDAR2B, consistent with enhanced neurogenesis and synaptic plasticity. Supporting ageing-related work

found that aged mice have lower oxytocin levels and epigenetic and mitochondrial changes, while 10 days of nasal oxytocin restored plasma oxytocin, reduced inflammation, and recovered TET2, 5hmC, and COX IV in hypothalamus and hippocampus. Additional studies show oxytocin-driven plasticity can persist across social, stress, autism, and drug-exposure models, but it is not uniformly beneficial across all contexts because effects vary by developmental timing, brain circuit, age, and sex, including a juvenile male rat study in which an oxytocin agonist impaired CA1 LTP.

- In transgenic APP/PS1 mouse models of Alzheimer's disease, intranasal or intracerebroventricular oxytocin has reduced microglial activation, shifted amyloid-beta deposition toward a less-toxic pattern. These are promising early-stage mechanistic findings supporting oxytocin as a candidate neuroprotective agent, but they have **not yet been established in human Alzheimer's trials**, so the practical implication for human brain ageing and dementia risk remains speculative at this stage.

References 28-41.

Paternal Touch and Oxytocin

> *"My lab found actually that when dads engage in more physical touch, there's a type of touch that's called proprioceptive touch… When dads did more of that, they subsequently had higher oxytocin levels."*

This matches Saxbe's published research (Morris et al., 2021). They examined whether specific forms of fathers' physical touch during interaction with their 6-month-old infants predicted fathers' later oxytocin levels, using an observational lab study with parallel oxytocin assay methods. The study included **45 fathers** and their six-month-old infants in a laboratory free-play interaction. Fathers' touch behaviours were micro-coded at 0.1-second intervals, allowing the authors to distinguish forms of touch during the interaction. Paternal oxytocin was measured in blood plasma, and samples were assayed both with and without an extraction step so the two measurement approaches could be compared directly.

Playful proprioceptive touch showed the clearest association: **fathers who used more of this touch had higher oxytocin** on both extracted and unextracted assays. Gentle affectionate touch and functional proprioceptive touch predicted higher oxytocin only in the unextracted assay, not in the extracted assay. Fathers who engaged in **no physical touch had lower oxytocin** on both assay types. The two assay methods were moderately correlated, but they did not yield identical patterns of association across touch types. The authors concluded that **father-infant physical touch, particularly playful proprioceptive touch, is associated with higher paternal oxytocin levels**. They also argued that the findings replicate earlier work based on unextracted oxytocin measures while showing that some, but not all, associations remain when using the more rigorous extracted method.

The design tested whether fathers' observed touch during a lab interaction predicted subsequent oxytocin levels, not whether changing touch would cause oxytocin to rise. The study cannot conclude that physical touch increases oxytocin in fathers, because the reported result is an association rather than an experimental effect. It also **cannot conclude the reverse is false: fathers with naturally higher oxytocin might simply be more likely to engage in playful or affectionate touch**.

This builds on earlier work from Ruth Feldman's lab showing that paternal oxytocin release tracks specifically with proprioceptive/stimulatory touch, while maternal oxytocin tracks more with affectionate touch (stroking, cuddling), a sex-differentiated pattern replicated across several labs.

References 42-44.

Global Fertility Decline and Population Projections to 2100

> *"A landmark 2024 study published in The Lancet projects that by the year 2100, 97% of all countries and territories will have fertility rates too low to sustain their populations. The global fertility rate has plummeted from an average of five children per woman in 1950 to just 2.2 today. And according to the CDC and Pew Research data, the US total fertility rate just hit an all-time recorded low of 1.6… CDC data shows total US birth rates dropped yet again by 1% in 2025, falling to roughly 3.6 million babies… by 2100, one in every two children born on the planet will be born in sub-Saharan Africa."*

This segment accurately summarises the 2024 Lancet/IHME Global Burden of Disease study on global fertility (Bhattacharjee et al., 2024). The study projects that 198 of 204 countries and territories (97%) will have fertility rates below replacement level by 2100, up from roughly half in 2021. The 2024 Lancet analysis estimated that the global total fertility rate fell from 4.84 in 1950 to 2.23 in 2021.

On the US figures: CDC final data put the 2024 total fertility rate at 1.599, and provisional 2025 data show a further decline to roughly 1.57, both consistent with the “1.6” cited (reflecting the figure available at the time of recording). CDC also confirmed a 1% decline in total US births from 2024 to 2025, to a provisional 3,606,400. matching the “roughly 3.6 million” figure.

References 45-49.

Paternal Postpartum Depression Prevalence

> *“There's some evidence that dads' prevalence rate for depression, so in new dads, it's about twice that of the general population.”*

A meta-analysis (Paulson & Bazemore, 2010) investigated 43 studies and estimated that approximately **10.4% of fathers experience paternal depression across studies conducted from pregnancy through one year postpartum**. This is **roughly double the 4.8% twelve-month prevalence of depression among similar-aged men in the general US population**. However, most studies contributing to the paternal estimate identified depression using self-report symptom questionnaires and cutoff scores, whereas the 4.8% general-population estimate concerned major depressive disorder assessed using diagnostic interviews. Later, other meta-analyses have found somewhat lower overall estimates (around 8%), reflecting differences in the studies and measurement tools included.

References 50-53.

Cortisol Synchrony and Marital Satisfaction in Couples

> *"I found that when couples had really strongly linked levels of cortisol, they reported lower marital satisfaction… you don't actually wanna be contagious to other people's stress."*

This is from Saxbe's research (Saxbe & Repetti, 2010), which found that spouses' cortisol levels were positively linked day to day and that couples whose cortisol and negative mood were more tightly linked reported worse relationship satisfaction. This counterintuitive finding, that physiological "synchrony" between partners can signal strain rather than closeness, has been replicated across several other labs, with stronger cortisol linkage associated with lower relationship satisfaction both in daily life and during laboratory conflict discussions.

Some other research finds the opposite pattern specifically around the prenatal-to-postpartum transition, where certain kinds of hormonal synchrony (e.g., in testosterone) have instead been linked to better postpartum relationship quality, so the meaning of synchrony appears to depend on the hormone and the life stage in question.

References 54-57.

'Dad Bod': Weight Gain in Expectant Fathers Across Species

> *"It's been found across both animal and human studies that males tend to gain weight when they become fathers… there was a study that looked at tamarin monkeys that were expecting offspring… the expectant dads actually gained more weight, even though they were eating the same diet."*

Ziegler et al. (2006) tracked weight in 14 male common marmosets and 11 male cotton-top tamarins, highly paternal primate species, across their partners' pregnancies, compared with males whose partners were not pregnant. Diet quantity and quality were held constant for all animals. However, **they did not measure how much each animal actually ate**; indeed, the monkeys were

routinely offered more food than they would normally consume. The authors explicitly say they therefore could not determine whether the weight gain resulted from increased food intake or from metabolic changes. Expectant males in both species gained significantly more weight than controls (some gained up to around 20% of body weight, specifically for the marmosets, whereas tamarins showed 1–8% increases), a pattern the researchers interpret as males "stocking up" energy reserves ahead of the metabolic demands of intensive infant-carrying. This is described as an animal analogue of the human "couvade" phenomenon (sympathetic pregnancy symptoms in expectant fathers). Separate human cohort research tracking over 10,000 men longitudinally has similarly found that new fathers gain measurably more weight on average than men who do not become fathers.

References 58-59.

Female Preference for the 'Dad Bod' Body Type

> *"Women actually like a dad bod. So studies of single women have found that… the dad bod is the most popular."*

Much of the data on "women prefering the dad bod" comes from commercial or marketing-commissioned polling, not from peer-reviewed research. The statistic most likely behind the claim comes from a 2021 Dating.com survey of 2,000 single users. Nearly 75% said they preferred a "dad bod", compared with 15% preferring a highly toned "Barbie or Ken-like" physique. However, this was a commercial dating-site survey, not a peer-reviewed scientific study, and Dating.com did not publish a demographic breakdown showing that those respondents were specifically women. The survey included singles of different genders and sexualities. There is separate survey evidence specifically involving women. Planet Fitness reported in its 2021 commissioned survey that 70% of women said they were attracted to men with dad bods, and 59% said they would prefer a man with a dad bod to someone "really muscular". But again, this was a commercial opinion survey, and it was not restricted to single women.

The peer-reviewed literature is more mixed. Some academic studies using controlled figure ratings have found that men with lower waist-to-chest ratios (a "dad bod"-consistent physique) receive lower physical attractiveness ratings but higher ratings on traits like affection, nurturance, and perceived fitness as a father, suggesting a "good dad, not necessarily most physically attractive"

signal. Other controlled studies using digitally manipulated male figures have instead found that women consistently rate leaner, more muscular, higher shoulder-to-hip-ratio bodies as more attractive.

Overall, the evidence is closer to “a dad bod signals good caregiving traits to women” than “a dad bod is women's most preferred physique", and the stronger, more absolute version of the claim rests mainly on non-academic survey data.

References 60-68.

US Paid Family Leave: Policy and Public Support

> *Steven Bartlett: “The baseline federal protection is… the Family and Medical Leave Act. It guarantees up to 12 weeks of unpaid leave. Your employer must also maintain your group health insurance during this time.”*
>
> *Darby Saxbe: “It's one of the best polling issues. It's bipartisan… I think it's something like 80% of Americans are in favor of it.”*

The FMLA description is accurate: the US Family and Medical Leave Act (1993) guarantees eligible employees up to 12 weeks of unpaid, job-protected leave for the birth or care of a new child (among other qualifying reasons), during which the employer must continue the employee's group health insurance on the same terms as if they were working. It does not require paid leave, and eligibility rules (based on employer size and hours/tenure worked) exclude many workers, including many gig, part-time, and small-business employees. On public support: national polling has repeatedly found strong, bipartisan majorities in favour of paid family leave. A 2024 BPC Action/Pivotal Ventures/Morning Consult poll found 82% of voters supported a federal paid family and medical leave programme (90% of Democrats, 76% of Republicans), and a 2025 Echelon Insights survey found 83% support for Congress acting on paid family leave, both consistent with the “something like 80%” figure cited in the conversation.

References 69-70.

Longevity and Relationship Quality: The Harvard Study of Adult Development

> *Steven Bartlett: "I sat with Robert Waldinger, who's done that long Harvard study on human happiness, and the conclusion is that one of the single biggest predictors of longevity is whether you have strong relationships."*

This reflects the central finding of the Harvard Study of Adult Development, one of the longest-running longitudinal studies of adult life, which has followed participants (and later their spouses and children) since 1938 and remains ongoing. Its director, Dr Robert Waldinger, has repeatedly summarised the study's headline finding as: when researchers looked back at what best predicted physical health and happiness at age 80, it was not mid-life cholesterol levels but satisfaction with close relationships at age 50. As with any single long-running observational study, the original sample has well-documented limitations (initially all male, White American men, later expanded to spouses and descendants), and the "relationships beat cholesterol" comparison is a synthesis by the study's leadership rather than a single controlled effect size, but the underlying conclusion, that relationship quality predicts later-life health and wellbeing at least as well as many biomedical markers, is well supported and widely replicated in the broader social-connection literature.

References 71-77.

Testosterone Synchrony Between Expectant Parents

> *"Our lab found that actually expectant dads and expectant moms had correlated levels of testosterone during pregnancy… Mom was influencing Dad's testosterone levels, and the more strong that relationship was, the more Dad showed a drop in testosterone after birth."*

Dr Saxbe's lab has reported that expectant mothers' and fathers' testosterone levels track together across pregnancy and that stronger prenatal testosterone synchrony predicts a larger

postpartum testosterone decline in fathers, as well as greater paternal relationship investment after birth. This is a relatively young area of psychoneuroendocrinology, generally based on the modest sample sizes, so the precise mechanism (proximity, shared stress, behavioural or other cues) remains an open question.

References 78-79.

Testosterone, Sperm Count, and Immune Function

> *"High levels of testosterone actually decrease our sperm count, and they are, um, bad for our immune system."*

Across the literature, the clearest finding is that exogenous testosterone or anabolic-androgenic steroid use reduces sperm production, whereas normal intratesticular testosterone is required for spermatogenesis. High testosterone inside the testis supports Sertoli-cell signalling, maintenance of the seminiferous epithelium, and suppression of germ-cell apoptosis, but testosterone given from outside the body suppresses GnRH, LH, and FSH, lowers intratesticular testosterone, and thereby impairs sperm production. Clinical and review evidence links testosterone abuse to testicular atrophy, reduced sperm concentration and quality, azoospermia, and longer recovery after higher-dose or longer-duration exposure, with recovery sometimes incomplete even after cessation.

On immunity, the evidence supports immunomodulation more than a simple claim that testosterone is uniformly bad for the immune system. Reviews and meta-analysis report that experimental testosterone manipulation tends to suppress immune function, and several mechanistic papers describe downregulation of inflammatory responses, reduced lymphocyte proliferation, reduced antibody production, lower proinflammatory cytokines, and effects on innate and adaptive immune cells. Testosterone also appears to promote regulatory T cells and suppress Th1- and Th17-type inflammation, which can be protective in autoimmune settings instead of harmful.

Human evidence is more mixed than animal and experimental evidence. A meta-analysis found no significant overall correlation between circulating testosterone and immune function in

correlational studies, and a study in 97 healthy men found free testosterone positively correlated with influenza vaccine response while total testosterone showed no clear immunomodulatory association. Ecological context also seems to matter, because some human findings vary by nutritional or environmental setting, and an animal field experiment found that immune activation reduced testosterone, while experimentally raising testosterone did not reduce measured immunocompetence. That is consistent with newer reviews arguing that sex steroid effects depend on hormone concentration, receptor distribution, tissue type, age, disease state, and immune outcome being measured.

References 80-88.

Body-Size Dimorphism and Mating Systems

> *Darby Saxbe: "The best way to describe humans is we're sort of monogamous with benefits… like gorillas, male gorillas are way bigger than female gorillas… fully monogamous animals are exactly the same size, like prairie voles… So we're sort of somewhere in between."*

Across mammals, sexual size dimorphism (SSD) usually means males are larger than females, and mating system means the recurring pattern of who mates with whom, such as monogamy, polygyny, polyandry, or multimale–multifemale systems. Broad comparative studies do find that male-biased SSD is more common in polygynous species, where one male mates with multiple females, while monogamous species tend to be less dimorphic. That association is not fully reliable, because "mating system" is only a rough proxy for sexual selection, meaning differential reproductive success driven by competition over mates. Several papers show that the observed mating system does not always predict actual variance in male reproductive success or genetic paternity, and some newer phylogenetic analyses find that spatial competition, ecology, or body-size evolution can explain SSD as well as or better than polygyny alone.

In humans, the relatively modest male-female size difference does support the view that humans did not evolve under the extreme reproductive skew seen in gorillas or other strongly polygynous mammals. Reviews of human anatomy place humans within the range expected for pair-bonded or mildly polygynous primates, and human testes and sperm traits also fit monogamous or polygynous primates better than multimale-multifemale systems with intense sperm competition.

Human evidence points to predominant pair-bonding, not obligate monogamy. Pair-bonding means a relatively stable social association between a male and a female, but it is not identical to strict genetic monogamy. Pair-bonding can occur in formally monogamous systems and also within societies where some polygyny or polyandry occurs, so “pair-bonded” humans need not be exclusively monogamous in every case. Cross-culturally, polygyny is permitted, but monogamy is usually the dominant marriage form within a given society, extra-pair paternity is relatively low, and the pair-bond appears to be a human universal, often expressed as social or serial monogamy with facultative polygyny.

Human dimorphism alone cannot prove a single ancestral mating system, because human SSD may also reflect intergroup violence, resource competition, female choice, or derived changes unique to Homo instead of a simple inheritance from ape ancestors. Some fossil-proxy work even suggests that certain earlier humans or Neanderthals may have had somewhat more polygynous tendencies than most recent human populations, which fits a facultative rather than fixed system.

So, sexual size dimorphism is associated with mating systems across mammals and primates, but not reliably enough to use as a one-to-one diagnostic. For humans specifically, modest dimorphism supports a species history centred on pair-bonding with facultative polygyny.

References 89-100.

The ‘Who Does What’ Gap: Prenatal Predictions Versus Postpartum Caregiving

> *“Every single couple expected dad would do more before birth than dad was actually doing after birth… they under-delivered on average… both moms and dads thought that dad would be doing more.”*

Saxbe’s prospective ‘Who Does What’ study of 93 first-time heterosexual couples found that couples predicted a more egalitarian division of infant care during pregnancy than they achieved by about six months postpartum. In that same study, fathers both expected and reported a more equal division than mothers did, indicating gendered perception gaps as well as gendered behaviour.

Other longitudinal first-time-parent studies report the same mismatch. Belgian and German first-time fathers had more egalitarian prenatal expectations and desires than what they experienced after birth, with lower paternal childcare involvement than expected. An earlier study following couples from pregnancy to 1 and 4 months postpartum found that mothers reported fathers doing less childcare than mothers expected, while fathers reported mothers doing more than fathers expected.

References 101-104.

‘We-ness’ Language and Postpartum Relationship Happiness

> *“The more we-ness the dads were showing, the more happy they were in their relationship after birth… it was actually the dads that did more who's told us they were happier.”*

"We-ness" language, the use of first-person plural pronouns ("we," "us," "our") over singular pronouns when describing relationship events, serves as a linguistic marker of cognitive interdependence and predicts relationship satisfaction across diverse couple populations. A meta-analysis of 30 studies confirmed a positive association between we-talk and both relationship and personal functioning, with partner effects tending to be stronger than actor effects.

In the specific context of early parenthood, evidence is more nuanced: we-talk appears protective against declines in marital satisfaction over time, but its associations differ by gender and by whether the "we" references the partner or the infant. For example, in the postpartum context specifically, when couple relationship quality was good, mothers' elevated partner-inclusive talk was paradoxically associated with reduced caregiving sensitivity, suggesting that focus on the partner may compete with infant engagement.

A longitudinal study of 77 couples with preschool-aged children found that low actor we-talk at baseline predicted declines in marital satisfaction over 12 months, whereas high actor we-talk buffered against such declines. The meta-analysis by Karan and colleagues further established that we-talk is most strongly associated with relationship functioning (compared to mental health or health behaviours) and that a partner's we-talk is a better predictor of one's own relationship outcomes than one's own we-talk.

References 105-109.

References

1. Martínez-García, M., Paternina-Die, M., Cardenas, S. I., Vilarroya, Ó., Desco, M., Carmona, S., & Saxbe, D. (2022). First-time fathers show longitudinal gray matter cortical volume reductions: evidence from two international samples.. Cerebral cortex.

2. Kim, P., Rigo, P., Mayes, L., Feldman, R., Leckman, J., & Swain, J. (2014). Neural Plasticity in Fathers of Human Infants. Social neuroscience, 9, 522 - 535.

3. Saxbe, D., & Martínez-García, M. (2024). Cortical volume reductions in men transitioning to first-time fatherhood reflect both parenting engagement and mental health risk.. Cerebral cortex, 34 4.

4. Paternina-Die, M., Martínez-García, M., Pretus, C., Hoekzema, E., Barba-Müller, E., De Blas, D. M., Pozzobon, C., Ballesteros, A., Vilarroya, Ó., Desco, M., & Carmona, S. (2020). The Paternal Transition Entails Neuroanatomic Adaptations that are Associated with the Father's Brain Response to his Infant Cues. Cerebral Cortex Communications, 1.

5. Gettler, L. T., McDade, T. W., Feranil, A. B., & Kuzawa, C. W. (2011). Longitudinal evidence that fatherhood decreases testosterone in human males. PNAS, 108(39), 16194-16199.

6. Gettler, L. T., McKenna, J. J., McDade, T. W., Agustin, S. S., & Kuzawa, C. W. (2012). Does cosleeping contribute to lower testosterone levels in fathers? Evidence from the Philippines. PLOS ONE, 7(9), e41559.

7. Gettler, L. T., McDade, T. W., Agustin, S. S., Feranil, A. B., & Kuzawa, C. W. (2013). Do testosterone declines during the transition to marriage and fatherhood relate to men's sexual behavior? Evidence from the Philippines. Hormones and Behavior.

8. Kuzawa, C. W., Gettler, L. T., Muller, M. N., McDade, T. W., & Feranil, A. B. (2009). Fatherhood, pairbonding and testosterone in the Philippines. Hormones and Behavior, 56, 429-435.

9. Rilling, J. K., Lee, M., Zhou, C., Jung, E., Arrant, E. J., Davenport-Nicholson, A., Zhang, X., & Ethun, K. (2025). Hormonal Changes in First-Time Human Fathers in Relation to Paternal Investment. Hormones and behavior, 171, 105740 - 105740.

10. Cardenas, S. I., Tse, W., León, G. A., Kim, A. J., Tureson, K., Lai, M., & Saxbe, D. (2023). Prenatal testosterone synchrony in first-time parents predicts fathers' postpartum relationship quality. Hormones and behavior, 156, 105440 - 105440.

11. Perini, T., Ditzen, B., Fischbacher, S., & Ehlert, U. (2012). Testosterone and relationship quality across the transition to fatherhood.. Biological psychology, 90 3, 186-91 .

12. Mascaro, J. S., Hackett, P. D., & Rilling, J. (2014). Differential neural responses to child and sexual stimuli in human fathers and non-fathers and their hormonal correlates. Psychoneuroendocrinology, 46, 153 - 163.

13. Storey, A., Walsh, C., Quinton, R. L., & Wynne-Edwards, K. (2000). Hormonal correlates of paternal responsiveness in new and expectant fathers.. Evolution and human behavior : official journal of the Human Behavior and Evolution Society, 21 2, 79-95 .

14. Berg, S. J., & Wynne-Edwards, K. (2001). Changes in testosterone, cortisol, and estradiol levels in men becoming fathers.. Mayo Clinic proceedings, 76 6, 582-92 .

15. Grebe, N. M., Sarafin, R., Strenth, C. R., & Zilioli, S. (2019). Pair-bonding, fatherhood, and the role of testosterone: A meta-analytic review. Neuroscience and Biobehavioral Reviews, 98, 221–233.

16. Meijer, W. M., Van IJzendoorn, M. H., & Kranenburg, M. J. (2019). Challenging the challenge hypothesis on testosterone in fathers: Limited meta-analytic support.. Psychoneuroendocrinology, 110, 104435 .

17. Corpuz, R., & Bugental, D. (2020). Life history and individual differences in male testosterone: Mixed evidence for early environmental calibration of testosterone response to first-time fatherhood. Hormones and behavior, 120, 104684.

18. Saxbe, D. E., Dunkel Schetter, C., Simon, C. D., Adam, E. K., & Shalowitz, M. U. (2017). High paternal testosterone may protect against postpartum depressive symptoms in fathers, but confer risk to mothers and children. Hormones and Behavior, 95, 103-112.

19. Donovan, R. L., & Corpuz, R. (2025). The dual-hormone hypothesis and first-time fathers' relationship satisfaction at 3 months postpartum. Frontiers in Psychology.

20. Martínez-García, M., Paternina-Die, M., Cardenas, S. I., Vilarroya, Ó., Desco, M., Carmona, S., & Saxbe, D. (2023). First-time fathers show longitudinal gray matter cortical volume reductions: evidence from two international samples.. Cerebral cortex.

21. Kim, P., et al. (2014). Neural plasticity in fathers of human infants. Social Neuroscience, 9(5), 522-535.

22. Hoekzema, E., et al. (2017). Pregnancy leads to long-lasting changes in human brain structure. Nature Neuroscience, 20, 287-296.

23. Paternina-Die, M., Martínez-García, M., De Blas, D. M., Noguero, I., Servin-Barthet, C., Pretus, C., Soler, A., López-Montoya, G., Desco, M., & Carmona, S. (2024). Women's neuroplasticity during gestation, childbirth and postpartum. Nature Neuroscience, 27, 319 - 327.

24. Daneshnia, N., Losse, E., Kurz, A., Chechko, N., & Nehls, S. (2026). The paternal brain: longitudinal insights into structural and functional plasticity and attachment over 24 weeks postpartum. Translational Psychiatry, 16.

25. Ning, K., Zhao, L., Franklin, M., Matloff, W., Batta, I., Arzouni, N., Sun, F., & Toga, A. (2020). Parity is associated with cognitive function and brain age in both females and males. Scientific Reports, 10.

26. Orchard, E. R., Chopra, S., Ooi, L. Q. R., Chen, P., An, L., Jamadar, S. D., Yeo, B. T. T., Rutherford, H. J. V., & Holmes, A. J. (2025). Protective role of parenthood on age-related brain function in mid- to late-life. Proceedings of the National Academy of Sciences of the United States of America, 122(9), e2411245122.

27. De Lange, A. D., Leonardsen, E., Barth, C., Schindler, L., Crestol, A., Holm, M., Subramaniapillai, S., Hill, D., Alnæs, D., & Westlye, L. (2024). Parental status and markers of brain and cellular age: A 3D convolutional network and classification study.. Psychoneuroendocrinology, 165, 107040 .

28. Selles, M., Fortuna, J. T. S., De Faria, Y. P. R., Siqueira, L. D., Lima-Filho, R., Longo, B., Froemke, R., Chao, M., & Ferreira, S. T. (2023). Oxytocin attenuates microglial activation and restores social and non-social memory in APP/PS1 Alzheimer model mice. iScience, 26.

29. Selles, M., Fortuna, J. T. S., De Faria, Y. P. R., Longo, B., Froemke, R., Chao, M., & Ferreira, S. T. (2022). Oxytocin attenuates microglial activation and restores social and non-social memory in the APP/PS1 mouse model of Alzheimer's disease. bioRxiv.

30. Inoue, T., Yamakage, H., Tanaka, M., Kusakabe, T., Shimatsu, A., & Satoh-Asahara, N. (2019). Oxytocin suppresses inflammatory responses induced by lipopolysaccharide through inhibition of the eIF-2α-ATF4 pathway in mouse microglia. Cells, 8(6), 527.

31. Ye, C., et al. (2022). Oxytocin nanogels inhibit innate inflammatory response for early intervention in Alzheimer's disease. ACS Applied Materials & Interfaces, 14, 21822-21835.

32. Yuan, L., Liu, S., Bai, X., Gao, Y., Liu, G., Wang, X., Liu, D., Li, T., Hao, A., & Wang, Z. (2016). Oxytocin inhibits lipopolysaccharide-induced inflammation in microglial cells and attenuates microglial activation in lipopolysaccharide-treated mice. Journal of Neuroinflammation, 13.

33. Hwang, W., Jang, Y., Hong, J., Kang, S., Hur, J., & Lee, H. J. (2026). Oxytocin Modulates Microglial IL-17-Linked Inflammatory Pathways Through the IL-6/COX-2. Life, 16.

34. Koulousakis, P., Willems, E., Schepers, M., Rombaut, B., Prickaerts, J., Vanmierlo, T., & Van Den Hove, D. V. D. (2023). Exogenous Oxytocin Administration Restores Memory in Female APP/PS1 Mice. Journal of Alzheimer's Disease, 96, 1207 - 1219.

35. Michaelian, J., McCade, D., Hoyos, C., Brodaty, H., Harrison, F., Henry, J., Guastella, A., & Naismith, S. (2023). Pilot Randomized, Double-Blind, Placebo-Controlled Crossover Trial Evaluating the Feasibility of an Intranasal Oxytocin in Improving Social Cognition in Individuals Living with Alzheimer's Disease. Journal of Alzheimer's Disease Reports, 7, 715 - 729.

36. Michaelian, J., McCade, D., Hoyos, C., Brodaty, H., Harrison, F., Henry, J., Guastella, A., & Naismith, S. (2022). Pilot Randomised, Double-Blind, Placebo-Controlled Crossover Trial Evaluating the Feasibility of an Intranasal Oxytocin in Improving Social Cognition in Individuals Living with Alzheimer's Disease. Alzheimer's & Dementia, 18.

37. Shin, M., Yin, Z., Yoon, K.-N., Quan, Q.-L., Lee, D. H., & Chung, J. H. (2025). Oxytocin enhances neurogenesis and synaptic plasticity to attenuate age-related cognitive decline in aged mice. IBRO Neuroscience Reports, 19, 774 - 780.

38. Khazen, T., Narattil, N. R., Ferreira, G., & Maroun, M. (2022). Hippocampal oxytocin is involved in spatial memory and synaptic plasticity deficits following acute high-fat diet intake in juvenile rats.. Cerebral cortex.

39. El-Ganainy, S., Soliman, O., Ghazy, A. A., Allam, M., Elbahnasi, A. I., Mansour, A. M. A., & Gowayed, M. A. (2022). Intranasal Oxytocin Attenuates Cognitive Impairment, β-Amyloid Burden and Tau Deposition in Female Rats with Alzheimer's Disease: Interplay of ERK1/2/GSK3β/Caspase-3. Neurochemical Research, 47, 2345 - 2356.

40. Maejima, Y., Yokota, S., Yamachi, M., Hidema, S., Ono, T., Taira, S., Nishimori, K., De Wet, H., & Shimomura, K. (2025). Oxytocin Enhances Demethylation Through TET Enzyme Expression in Neurons of Aged Mice: Oxytocin as a Potential Antiaging Peptide. Aging Cell, 24.

41. Joushi, S., Esmaeilpour, K., Masoumi-Ardakani, Y., Esmaeili-Mahani, S., & Sheibani, V. (2020). Intranasal oxytocin administration facilitates the induction of long-term potentiation and promotes cognitive performance of maternally separated rats.. Psychoneuroendocrinology, 123, 105044 .

42. Morris, A. R., Turner, A., Gilbertson, C. H., Corner, G., Mendez, A. J., & Saxbe, D. E. (2021). Physical touch during father-infant interactions is associated with paternal oxytocin levels. Infant Behavior and Development, 64, 101613.

43. Feldman, R., Gordon, I., & Zagoory-Sharon, O. (2010). Maternal and paternal plasma, salivary, and urinary oxytocin and parent-infant synchrony: considering stress and affiliation components of human bonding. Developmental Science, 14(4), 752-761.

44. Feldman, R., Gordon, I., Schneiderman, I., Weisman, O., & Zagoory-Sharon, O. (2010). Natural variations in maternal and paternal care are associated with systematic changes in oxytocin following parent-infant contact. Psychoneuroendocrinology, 35(8), 1133–1141.

45. Bhattacharjee, N. V., et al. (2024). Global fertility in 204 countries and territories, 1950-2021, with forecasts to 2100: a comprehensive demographic analysis for the Global Burden of Disease Study 2021. The Lancet.

46. Institute for Health Metrics and Evaluation (IHME). (2024). Dramatic declines in global fertility rates set to transform global population patterns by 2100 [press release].

47. National Center for Health Statistics (CDC). (2025). Births in the United States, 2024 [final data].

48. National Center for Health Statistics (CDC). (2026). Births: Provisional Data for 2025.

49. Hamilton, B. E., Osterman, M. J. K., & Gregory, E. C. W. (2026). Births: Provisional data for 2025. Vital Statistics Rapid Release.

50. Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. JAMA, 303(19), 1961-1969.

51. Cameron, E. E., Sedov, I. D., & Tomfohr-Madsen, L. M. (2016). Prevalence of paternal depression in pregnancy and the postpartum: an updated meta-analysis. Journal of Affective Disorders, 206, 189-203.

52. Rao, W., Zhu, X.-M., Zong, Q.-Q., Zhang, Q., Hall, B. J., Ungvari, G., & Xiang, Y. (2019). Prevalence of prenatal and postpartum depression in fathers: A comprehensive meta-analysis of observational surveys.. Journal of affective disorders.

53. Reay, M., Mayers, A., Knowles-Bevis, R., & Knight, M. T. D. (2023). Understanding the Barriers Fathers Face to Seeking Help for Paternal Perinatal Depression: Comparing Fathers to Men Outside the Perinatal Period. International journal of environmental research and public health, 21(1), 16.

54. Saxbe, D. E., & Repetti, R. L. (2010). For better or worse? Coregulation of couples' cortisol levels and mood states. Journal of Personality and Social Psychology, 98(1), 92-103.

55. Liu, S., Rovine, M. J., Klein, L. C., & Almeida, D. M. (2013). Synchrony of diurnal cortisol pattern in couples. Journal of Family Psychology, 27(4), 579-588.

56. Timmons, A. C., Margolin, G., & Saxbe, D. E. (2015). Physiological linkage in couples and its implications for individual and interpersonal functioning: a literature review. Journal of Family Psychology, 29(5), 720-731.

57. Laws, H. B., Sayer, A., Pietromonaco, P., & Powers, S. I. (2015). Longitudinal Changes in Spouses' HPA Responses: Convergence in Cortisol Patterns During the Early Years of Marriage. Health psychology : official journal of the Division of Health Psychology, American Psychological Association, 34, 1076 - 1089.

58. Ziegler, T. E., Prudom, S. L., Schultz-Darken, N. J., Kurian, A. V., & Snowdon, C. T. (2006). Pregnancy weight gain: marmoset and tamarin dads show it too. Biology letters, 2(2), 181–183.

59. Garfield, C. F., Duncan, G., Gutina, A., Rutsohn, J., McDade, T. W., Adam, E. K., Coley, R. L., & Chase-Lansdale, P. L. (2016). Longitudinal Study of Body Mass Index in Young Males and the Transition to Fatherhood. American journal of men's health, 10(6), NP158–NP167.

60. Planet Fitness. (2019). National survey on attitudes toward the 'dad bod.'

61. Dating.com. (2021). Survey on body-type preferences among singles.

62. Garza, R., Pazhoohi, F., & Byrd-Craven, J. (2021). Women's Preferences for Strong Men Under Perceived Harsh Versus Safe Ecological Conditions. Evolutionary Psychology, 19.

63. Oswald, F., Champion, A. R., & Pedersen, C. L. (2020). The Influence of Body Shape on Impressions of Sexual Traits. The Journal of Sex Research, 59, 330 - 343.

64. Reeve, S. D., Kelly, K. M., & Welling, L. L. M. (2016). Transitory Environmental Threat Alters Sexually Dimorphic Mate Preferences and Sexual Strategy. Evolutionary Psychological Science, 2, 101-113.

65. Sidari, M. J., Lee, A. J., Murphy, S. C., Sherlock, J. M., Dixson, B., & Zietsch, B. P. (2020). Preferences for Sexually Dimorphic Body Characteristics Revealed in a Large Sample of Speed Daters. Social Psychological and Personality Science, 12, 225 - 236.

66. Tovée, M., Maisey, D., Vale, E., & Cornelissen, P. (1999). Characteristics of male attractiveness for women.. Lancet, 353 9163, 1500 .

67. Sacco, D., Holifield, K., Drea, K., Brown, M., & Macchione, A. L. (2020). Dad and Mom Bods? Inferences of Parenting Ability from Bodily Cues. Evolutionary Psychological Science, 1-8.

68. Brierley, M.-E. E., Brooks, K., Mond, J., Stevenson, R., & Stephen, I. (2016). The Body and the Beautiful: Health, Attractiveness and Body Composition in Men's and Women's Bodies. PLoS ONE, 11.

69. US Department of Labor. Family and Medical Leave Act (FMLA) overview.

70. Bipartisan Policy Center Action / Pivotal Ventures / Morning Consult. (2024). National poll on federal paid family and medical leave; Echelon Insights. (2025). Survey on paid family leave.

71. Harvard Study of Adult Development

72. Waldinger, R., & Schulz, M. (2023). The Good Life: Lessons from the World's Longest Scientific Study of Happiness. Simon & Schuster.

73. Brill, P. (2014). Triumphs of Experience: The Men of the Harvard Grant Study. Activities, Adaptation & Aging, 38, 331 - 332.

74. Vaillant, G. (2012). Triumphs of Experience: The Men of the Harvard Grant Study.

75. Atherton, O. E., Graham, E., Dorame, A. N., Horgan, D., Luo, J., Nevarez, M. D., Ferrie, J., Spiro, A., Schulz, M., Waldinger, R., Mroczek, D., & Lee, L. (2023). Is There Intergenerational Continuity in Early Life Experiences? Findings from the Harvard Study of Adult Development. Journal of family psychology : JFP : journal of the Division of Family Psychology of the American Psychological Association (Division 43), 37, 1123 - 1136.

76. Achenbaum, W. (2014). George E. Vaillant. Triumphs of Experience: The Men of the Harvard Grant Study. Cambridge, MA: Belknap Press of Harvard University Press, 2012. 457 pp. $27.95 (cloth). ISBN 978-0-674-05982-5.. Journal of The History of The Behavioral Sciences, 50, 104-105.

77. Weitzel, W. D. (1978). Adaptation to Life. JAMA, 239, 1552-1553.

78. Saxbe, D. E., Edelstein, R. S., Lyden, H. M., Wardecker, B. M., Chopik, W. J., & Moors, A. C. (2017). Fathers' decline in testosterone and synchrony with partner testosterone during pregnancy predicts greater postpartum relationship investment. Hormones and Behavior, 90, 39–47.

79. Cárdenas, S. I., Tse, W., León, G., Kim, A., Tureson, K., Lai, M., & Saxbe, D. E. (2023). Prenatal testosterone synchrony in first-time parents predicts fathers' postpartum relationship quality. Hormones and behavior, 156, 105440.

80. Dohle, G., Smit, M., & Weber, R. F. A. (2003). Androgens and male fertility. World Journal of Urology, 21, 341-345.

81. Kumar, N., Kakoti, S., & Chung, E. (2025). Pandemic of testosterone abuse: Considerations for male fertility. Arab Journal of Urology: An International Journal, 23, 183 - 189.

82. Ye, L., Huang, W., Liu, S., Cai, S., Hong, L., Xiao, W., Thiele, K., Zeng, Y., Song, M.-R., & Diao, L. (2021). Impacts of Immunometabolism on Male Reproduction. Frontiers in Immunology, 12.

83. Recabarren, S., Rojas-García, P., Recabarren, M., Alfaro, V., Smith, R., Padmanabhan, V., & Sir-Petermann, T. (2008). Prenatal testosterone excess reduces sperm count and motility.. Endocrinology, 149 12, 6444-8 .

84. Foo, Y., Nakagawa, S., Rhodes, G., & Simmons, L. (2017). The effects of sex hormones on immune function: a meta-analysis. Biological Reviews, 92.

85. Trigunaite, A., Dimo, J., & Jorgensen, T. (2015). Suppressive effects of androgens on the immune system.. Cellular immunology, 294 2, 87-94 .

86. Nowak, J., Pawłowski, B., Borkowska, B., Augustyniak, D., & Drulis-Kawa, Z. (2018). No evidence for the immunocompetence handicap hypothesis in male humans. Scientific Reports, 8.

87. Fijak, M., Schneider, E., Klug, J., Bhushan, S., Hackstein, H., Schuler, G., Wygrecka, M., Gromoll, J., & Meinhardt, A. (2011). Testosterone Replacement Effectively Inhibits the Development of Experimental Autoimmune Orchitis in Rats: Evidence for a Direct Role of Testosterone on Regulatory T Cell Expansion. The Journal of Immunology, 186, 5162 - 5172.

88. O'Brien, K. A., Waterman, J. M., Waterman, J. M., Waterman, J. M., Anderson, W. G., & Bennett, N. (2018). Trade-offs between immunity and testosterone in male African ground squirrels. Journal of Experimental Biology, 221.

89. Jones, M. E., & Sheard, C. (2023). The macroevolutionary dynamics of mammalian sexual size dimorphism. Proceedings of the Royal Society B: Biological Sciences, 290.

90. Lindenfors, P., Gittleman, J. L., & Jones, K. E. (2007). Sexual size dimorphism in mammals. 16-26.

91. Weckerly, F. (1998). Sexual-Size Dimorphism: Influence of Mass and Mating Systems in the Most Dimorphic Mammals. Journal of Mammalogy, 79, 33-52.

92. Leutenegger, W. (1978). Scaling of sexual dimorphism in body size and breeding system in primates. Nature, 272, 610-611.

93. Lindenfors, P., & Tullberg, B. (1998). Phylogenetic analyses of primate size evolution: the consequences of sexual selection. Biological Journal of The Linnean Society, 64, 413-447.

94. Bueno, G. L., Tecot, S. R., & Lewis, R. J. (2026). Beyond Body Mass, Beyond Adulthood: The Ontogeny of Sexual Size Monomorphism. American Journal of Biological Anthropology, 190.

95. Cassini, M. (2020). Sexual size dimorphism and sexual selection in primates. Mammal Review, 50, 231-239.

96. Cassini, M. (2023). Role of sexual and natural selection in the evolution of sexual size dimorphism in primates. Journal of Zoology.

97. Schacht, R., & Kramer, K. (2019). Are We Monogamous? A Review of the Evolution of Pair-Bonding in Humans and Its Contemporary Variation Cross-Culturally. Frontiers in Ecology and Evolution.

98. Fletcher, G., Simpson, J., Campbell, L., & Overall, N. (2015). Pair-Bonding, Romantic Love, and Evolution. Perspectives on Psychological Science, 10, 20 - 36.

99. Plavcan, J. (2012). Sexual Size Dimorphism, Canine Dimorphism, and Male-Male Competition in Primates. Human Nature, 23, 45-67.

100. Nelson, E., Rolian, C., Cashmore, L., & Shultz, S. (2011). Digit ratios predict polygyny in early apes, Ardipithecus, Neanderthals and early modern humans but not in Australopithecus. Proceedings of the Royal Society B: Biological Sciences, 278, 1556 - 1563.

101. Aviv, E. C., Vavala, G., Pilgrim, M., Waizman, Y. H., & Saxbe, D. (2025). Prenatal Expectations and Postpartum Reality: How Gender Egalitarianism in Infant Care Division Shapes Parenting Stress and Relationship Functioning. Sex Roles, 91.

102. Scheifele, C., Steffens, M. C., Gehringer, E., & Van Laar, C. (2025). Dashed Expectations and Unmet Desires of Belgian and German First-Time Fathers Regarding Their Engagement in Breadwinning and Childcare. Sex Roles, 91.

103. Biehle, S. N., & Mickelson, K. (2012). First-time parents' expectations about the division of childcare and play.. Journal of family psychology : JFP : journal of the Division of Family Psychology of the American Psychological Association, 26 1, 36-45 .

104. Schmidt, B., Schoppe-Sullivan, S., Frizzo, G. B., & Piccinini, C. (2019). A Qualitative Multiple Case Study of the Division of Labor across the Transition to Parenthood in South-Brazilian Families. Sex Roles, 1-18.

105. Ouellet-Courtois, C., Gravel, C., & Gouin, J. (2022). A longitudinal study of “we-talk” as a predictor of marital satisfaction. Personal Relationships.

106. Karan, A., Rosenthal, R., & Robbins, M. (2018). Meta-analytic evidence that we-talk predicts relationship and personal functioning in romantic couples. Journal of Social and Personal Relationships, 36, 2624 - 2651.

107. Burcu, S., ¨Uçok, ¨., S., & Aydoğan, D. (2025). We Are Together, but How Much Are We Truly ‘We’?: A Dyadic Approach With Turkish Emerging Adults. Emerging Adulthood, 13, 1445 - 1460.

108. Foley, S., Álvarez, C., Mccarthy, J., & Hughes, C. (2020). Two's Company, Three's a Crowd? Maternal and Paternal Talk About Their Infant Differs in Associations With Wellbeing, Couple Relationship Quality, and Caregiving Sensitivity. Frontiers in Psychiatry, 11.

109. Alea, N., Singer, J., & Labunko, B. (2015). “We-ness” in Relationship-Defining Memories and Marital Satisfaction. 163-177.