SY-05 Toward design principles for living together

An exhaustive synthesis of human biology, behavioural psychology, and sociology reveals a complex architecture governing how men and women interact, cooperate, and conflict. Developing design principles for human coexistence requires a rigorous empirical foundation that spans evolutionary imperatives, physiological realities, and cultural scaffolding. This report isolates the structural realities of sex and gender differences by stratifying the evidence across three distinct layers: physiology (the measurable biological substrate), behaviour (statistical distributions and overlapping traits), and culture (variable socio-ecological expressions).
The objective of this comprehensive analysis is not to prescribe fixed social roles, but to distil robust, replicable data into testable hypotheses for optimising human coexistence across multiple scales—from the intimate dyad to the global community.

The Distinction Between Population Averages and Individual Expression

Before examining the empirical data, it is imperative to establish the statistical reality of sex differences. In the behavioural and psychological sciences, male and female traits are consistently distributed along overlapping bell curves. The vast majority of individuals fall near the mean of their respective groups, leading to a substantial common area between the sexes. Consequently, what is true of a population on average cannot predict the traits of an individual. For instance, if a psychological trait shows a standardized mean difference (Cohen's *d*) of 0.20, the distributions overlap by approximately 85% of their joint area[1]. Therefore, encountering an individual from the higher-scoring group does not guarantee they will possess more of the trait than an individual from the lower-scoring group. However, at the extreme tails of the distribution, small differences in the mean can result in massive disparities in representation. If men have a slightly higher mean and greater variance in a specific trait, the individuals at the absolute highest percentiles of that trait will be overwhelmingly male, despite the average man and average woman being highly similar. All subsequent analyses in this report treat sex differences as probabilistic, overlapping distributions, entirely distinct from deterministic individual typologies.

Layer 1: Physiology (The Measurable Substrate)

The physiological layer encompasses sexually dimorphic traits shaped by deep evolutionary history, natural selection, and sexual selection. These traits are highly conserved across human populations and are objectively measurable through anatomy and neurobiology.

Somatic Dimorphism: Muscle, Fat, and Stature

Human sexual dimorphism is moderate compared to other primates regarding height and weight, but extreme regarding body composition. Stature differs by roughly 7% and body mass by 16% between men and women globally[4]. However, these gross measurements obscure profound, highly replicated differences in fat-free muscle mass and strength.

According to Lassek and Gaulin (2009, *Evolution and Human Behavior*), men possess approximately 65% more total muscle mass, 72% more upper-arm muscle volume, and 50% more lower-body muscle mass than women across diverse nutritional environments[4]. This physiological divergence translates to a 90% difference in upper-body strength and a 65% difference in lower-body strength[6]. The effect size is massive: sex alone accounts for roughly 70% of the variance in human strength[6]. From an evolutionary perspective, these extreme differences are best explained by intra-sexual competition—specifically male-male contest competition for mating access throughout ancestral human history, where upper-body strength was critical for unarmed combat[4].

Conversely, human females possess roughly 1.6 times more body fat than males, uniquely distributed in the gluteofemoral region (hips and thighs)[4]. Lassek and Gaulin argue that this dimorphism is the result of natural selection on women to store neurodevelopmental resources. Specifically, gluteofemoral fat is a privileged store of long-chain polyunsaturated fatty acids (such as DHA), which are metabolically required to sustain the expensive growth of unusually large-brained human infants during gestation and lactation[4].

Trait	Average Male vs. Female Difference	Evolutionary Driver
Stature	~7% greater in males	Diminished male-male contest / Bipedal pelvic constraints for females[4]
Body Mass	~16% greater in males	Caloric partitioning and muscle density[4]
Total Muscle Mass	~65% greater in males	Intra-sexual selection (male-male competition)[4]
Upper-Body Strength	~90% greater in males	Selection for unarmed ancestral combat and resource defence[6]
Body Fat Percentage	~1.6 times greater in females	Natural selection for maternal neurodevelopmental investment capacity[4]

The Brain: The Mosaic Hypothesis vs. Multivariate Predictive Accuracy

One of the most fiercely contested physiological domains is the existence of the "male" versus "female" brain. The controversy centers heavily on methodology and the interpretation of overlapping neural distributions.

In a highly publicized study, Joel et al. (2015, *Proceedings of the National Academy of Sciences* [*PNAS*]) analysed magnetic resonance imaging (MRI) scans of over 1,400 human brains. They assessed internal consistency, classifying regions as strictly "male-end" or "female-end." They found that only 1.2% to 6% of brains were internally consistent (possessing all male-typical or all female-typical features). Between 23% and 53% of brains showed "substantial variability"—a mosaic of both male and female traits. Based on this, Joel et al. concluded that human brains cannot be categorized into distinct male or female classes, severely undermining the biological basis for binary psychological sex differences[9].

Leading critics, however, challenged this conclusion by demonstrating that univariate analyses obscure aggregate multivariate realities. Chekroud et al. (2016, *PNAS*) responded using a machine-learning approach (support-vector machines) on 1,566 MRI scans. By treating the brain as a multivariate system rather than isolated regions, Chekroud et al. successfully predicted the biological sex of the individuals with 93% accuracy (95% CI: 89.5–94.9%, $P < 10–16$)[12]. Similarly, Del Giudice et al. (2016, *PNAS*) demonstrated that multivariate overlap between male and female brains is moderate (averaging 42%), and Joel et al.'s strict criteria for "internal consistency" were mathematically guaranteed to fail even in highly dimorphic populations (such as simulated monkey species where sex differences are visually obvious)[10]. The consensus indicates that while the brain is a mosaic at the level of individual regions, the overall *pattern* of the mosaic is highly sexually dimorphic and reliably maps to biological sex.

Life History: The Grandmother Hypothesis

Human physiology is unique among primates due to the prolonged post-menopausal lifespan of females. Hawkes et al. (1998, *PNAS*) established the "Grandmother Hypothesis," leveraging demographic data from historic populations (N=51,012) to explain this anomaly[16].

When ancestral females lost fertility, they redirected caloric production to provisioning their grandchildren. This intergenerational subsidy allowed their daughters to wean infants earlier and overlap dependents, dramatically increasing the family's overall reproductive success[17]. Over evolutionary time, this inclusive fitness benefit drove selection for extended female longevity. Combined with Charnov's dimensionless assembly rules for mammalian life histories, this hypothesis accounts for the entire human life-history trajectory: late maturity, early weaning despite slow development, high fertility, and the encephalization (brain growth) characteristic of the human species[17]. The physiological reality of menopause is thus not an evolutionary decay, but a highly selected adaptation for cooperative kinship.

Layer 2: Behaviour (Statistical, Overlapping Distributions)

Behavioural traits are influenced by physiological constraints but are expressed variably across environments. The debate here centers on the magnitude and significance of sex differences in cognition, personality, risk-taking, and mating strategies.

The Gender Similarities Hypothesis vs. Multivariate Divergence

The prevailing psychological paradigm of the early 2000s was the "Gender Similarities Hypothesis," pioneered by Hyde (2005, *American Psychologist*). Based on a review of 46

meta-analyses, Hyde argued that males and females are overwhelmingly similar, with 78% of effect sizes being small or trivial ($d < 0.35$)[2]. This was replicated by a massive meta-synthesis by Zell et al. (2015, *American Psychologist*), which aggregated 106 meta-analyses comprising over 12 million participants. Zell et al. found an average absolute difference of $d = 0.21$, with 85.5% of effects categorized as small or negligible[1]. The largest univariate differences found were in masculine versus feminine trait dimensions ($d = 0.73$), mental rotation ($d = 0.57$), preference for physical attributes in mates ($d = 0.53$), and physical aggression ($d = 0.45$)[21].

Critics of this approach argue that averaging hundreds of disparate, sometimes unrelated variables artificially flattens real, systemic differences. The strongest counter-evidence comes from Del Giudice, Booth, and Irwing (2012, *PLOS ONE*). Using the 16PF personality questionnaire on a representative U.S. standardization sample (N=10,261), they measured sex differences using a multivariate effect size metric known as Mahalanobis *D*. While individual personality traits showed small differences (e.g., $d = 0.2$ to 0.5), aggregating these correlated traits revealed a global Mahalanobis D of 2.71[22]. An effect size of $D = 2.71$ indicates that the multivariate personality profiles of men and women overlap by only 10%[23]. This finding successfully replicated in subsequent large-scale analyses; for instance, Kaiser et al. (2019, *Journal of Personality*) closely replicated the methodology on 21,567 U.S. participants and found a global sex difference of $D = 2.06$ (an overlap of roughly 30%)[22].

Risk Taking and Greater Male Variability

Behavioural variance itself is sexually dimorphic. The "Greater Male Variability" (GMV) hypothesis asserts that males generally exhibit a wider statistical distribution in traits than females, a pattern observed since Darwin[27]. Lehre et al. (2009) demonstrated GMV in physiological parameters, noting that out of 31 blood parameters, males showed greater variability in 13, and greater standard deviations in physical traits and standardized test scores[27]. Extensive analyses by Falk et al. (2018) in a global sample of 80,000 individuals across 76 countries confirmed significant GMV in economic preferences. Men are statistically more likely to possess extreme risk, time, and social preferences, whereas women cluster more tightly around moderate preferences[31].

Regarding mean differences in risk-taking, a seminal meta-analysis of 150 studies by Byrnes, Miller, and Schafer (1999, *Psychological Bulletin*) confirmed that males take significantly more risks in 14 out of 16 categories[32]. The differences are largest in intellectual risk-taking and physical skills, and narrower in domains like smoking or sexual risk[32]. This disparity maps onto evolutionary models where risk-taking was an adaptive necessity for males to secure mates in highly competitive ancestral environments[32].

Sexual Strategies Theory

Mating behaviour relies on distinct, evolved psychological mechanisms. Buss and Schmitt (1993, *Psychological Review*; revised 2019) outlined Sexual Strategies Theory (SST) based on asymmetrical obligatory parental investment[36]. Because women incur the heavy metabolic costs of gestation and lactation, their long-term and short-term strategies generally prioritize mate quality, resource acquisition, and commitment[37]. Men, whose obligatory investment can be minimal, evolved strategies that heavily value youth and fertility cues, alongside a stronger

psychological drive for partner variety in short-term contexts[37].
While both sexes pursue both short-term and long-term strategies depending on ecological contexts (e.g., operational sex ratios, pathogen prevalence), the adaptive problems they are solving differ fundamentally. For example, men face the adaptive problem of identifying fertile mates and ensuring paternity certainty, whereas women face the adaptive problem of securing sustained paternal investment and immediate resource extraction[36]. This divergence is empirically robust across cultures, explaining why men consistently desire more sexual partners over a given time interval and consent to intercourse much earlier in a relationship than women do[40].

Layer 3: Culture (Variable Contexts)

The cultural layer investigates how socio-economic conditions, state-level laws, and local institutions modulate, suppress, or exaggerate baseline physiological and behavioural differences.

The Gender Equality Paradox vs. Social Role Theory

A central controversy in sociology and psychology is the origin of sex differences in occupational choice, personality, and economic preferences. Eagly and Wood (1999, 2012, *American Psychologist*) championed "Social Role Theory." They posited that psychological sex differences are not inherent evolutionary adaptations, but rather are accommodations to the sexual division of labour and gender hierarchies imposed by patriarchal societies[42]. According to this theory, as a society becomes more economically developed and implements gender-egalitarian policies, sex differences in behaviour, preferences, and personality should converge and eventually disappear[45].
However, massive global datasets have repeatedly falsified this specific prediction, giving rise to the "Gender Equality Paradox." Falk and Hermle (2018, *Science*) collected data from 80,000 individuals across 76 countries, measuring six fundamental preferences (risk-taking, patience, altruism, trust, positive reciprocity, and negative reciprocity). They found that as economic development (GDP) and gender equality indices increase, the sex differences in these preferences *widen*, rather than narrow[45]. Similarly, Stoet and Geary (2018, *Psychological Science*) analyzed data from over 300,000 students across 73 countries in the Programme for International Student Assessment (PISA). They discovered that the gender gap in Science, Technology, Engineering, and Mathematics (STEM) graduation is largest in the most gender-equal countries (such as Scandinavia) and smallest in highly patriarchal countries[49].
The leading explanation for this paradox relies on an evolutionary resource hypothesis: in impoverished or highly constrained societies, both men and women must prioritize sheer economic survival, forcing their choices to converge on lucrative or stable fields. In wealthy, egalitarian societies, individuals are freed from subsistence pressures and societal constraints, allowing intrinsic, biologically influenced preferences and varying cognitive strengths to fully manifest[45].

Macro-Politics: The Security of Women and State Stability

At the highest cultural scale, the physical security of women acts as a fundamental structural load-bearing pillar for civilization. Hudson, Caprioli, Bowen, and McDermott (2012, *Sex and*

World Peace; updated in 2020 as *The First Political Order*) compiled the WomanStats Database—a repository of over 130,000 data points across 175 countries—to measure macro-level state stability[53].

The empirical literature provides striking clarity: the single best predictor of a nation's peacefulness—superior to its level of democracy, its wealth (GDP), or its ethno-religious identity—is its level of physical violence against women[54]. Societies with high disparities in family law, male-biased sex ratios, and unpunished gender violence are statistically vastly more likely to engage in intra-state and inter-state conflict, suffer high corruption, and initiate the use of force[57]. Polygamy, in particular, is highly associated with state instability, as it creates a surplus of unmarried, disenfranchised young men, driving up crime and conflict[57]. Furthermore, Caprioli (2000, *American Political Science Review*) demonstrated that women's substantive involvement in high-level comprehensive peace negotiations is significantly correlated with the inclusion of lasting peace provisions, but only when women hold actual positions of power, rather than mere observational roles[60].

Unpaid Labour and Economic Design

Even in egalitarian contexts, cultural structures heavily dictate behavioural outcomes regarding the division of labour. Bick and Fuchs-Schundeln (2017, *American Economic Review*) demonstrated that joint taxation models for married couples heavily disincentivize secondary earners (predominantly women) from engaging in the formal labour market[61]. Concurrently, global time-use surveys reveal that even in dual-earner households, women spend from 20% to 1000% more time than men on unpaid domestic work and caregiving[62]. While advanced economies have seen reductions in this gap, the persistence of unpaid labour disparities underscores how deeply cultural and tax structures interact with evolutionary tendencies to reproduce traditional gender dynamics, even against stated egalitarian goals[62].

Toward Testable Design Principles for Living Together

The translation of biological, psychological, and sociological data into architectural "design principles" requires strict avoidance of the *naturalistic fallacy*—the philosophical error of assuming that what is biologically natural is inherently morally good. Principles must be framed as testable hypotheses that leverage human nature for mutual flourishing while mitigating its destructive variances.

Scale 1: The Couple (Dyadic Bonding)

Hypothesis: *Stable dyadic pair-bonds require a heavily asymmetric ratio of positive to negative interactions to withstand the destructive entropy of interpersonal conflict.* **Evidence:** Observational coding of couples by Gottman (1994) indicated that partners who maintained long-term stability exhibited roughly five positive interactions (humour, affection, validation) for every one negative interaction during conflict. The presence of the "Four Horsemen" (criticism, contempt, defensiveness, stonewalling) severely degraded relationship stability[64]. Small "bids for connection" (turning towards a partner's attempt at engagement) are highly predictive of long-term bonding[64]. **Counter-evidence/Nuance:** The exact "5:1 ratio" is frequently mischaracterized as an infallible mathematical predictor of divorce. Heyman and Slep (2001)

demonstrated that Gottman's initial 90% prediction accuracy suffered from in-sample overfitting; when applied predictively to new, out-of-sample populations, the positive predictive value dropped to roughly 29%[64]. Therefore, the ratio is a risk factor and a descriptive heuristic, not a deterministic prophecy. **Outcome Measures:** Self-reported marital satisfaction, physiological stress markers (cortisol/heart rate) during conflict, longevity of the relationship[67]. **Known Examples:** Couples therapy frameworks (e.g., the Gottman Method) prioritizing daily, structured "bids for connection" rather than focusing solely on deep conflict resolution[64].

Scale 2: The Family (Kinship and Provisioning)

Hypothesis: *Families function most resiliently when resource provisioning and childcare are socially distributed across non-reproductive group members (intergenerational subsidy).* **Evidence:** The Grandmother Hypothesis (Hawkes et al., 1998) demonstrates that the economic productivity of older, post-menopausal females allows reproductive-age females to wean earlier and secure higher infant survivability[16]. Inclusive fitness is maximized through cooperative breeding structures rather than isolated nuclear dyads. **Counter-evidence:** Modern economic mobility often fractures physical proximity to extended kin. Capitalist structures successfully substitute market-based childcare (daycares, nannies) for kin-based subsidies, which allows for immense economic output but may alter socio-cognitive development and place high psychological strain on isolated nuclear parents. **Outcome Measures:** Infant mortality, maternal cortisol levels, economic stability, offspring educational attainment. **Known Examples:** Historic hunter-gatherer bands with high alloparenting; modern multi-generational immigrant households where grandparents absorb childcare costs to allow dual-income earning.

Scale 3: The Small Group / Team (Task Execution)

Hypothesis: *Task-oriented groups maximize "collective intelligence" not by aggregating individual high IQs, but by equalizing communication variance and maximizing social sensitivity, a dynamic heavily mediated by the inclusion of women.* **Evidence:** Woolley, Chabris, Pentland, Hashmi, and Malone (2010, *Science*) proved the existence of a *c*-factor (collective intelligence) in human groups. *c* was not strongly correlated with the maximum or average individual intelligence of the members. Instead, it strongly correlated with equality of conversational turn-taking and the group's average "Reading the Mind in the Eyes" (RME) score, a measure of Theory of Mind[70]. Because women score significantly higher on the RME test on average, teams with a higher proportion of women demonstrated significantly higher collective intelligence[71]. **Counter-evidence:** While Woolley et al. found a single dominant *c*-factor, a later meta-analysis by Credé and colleagues (2019) suggested that collective intelligence might fracture into multiple domains (e.g., execution vs. idea generation vs. conflict resolution) rather than a single unifying factor, particularly depending on whether the team interacts face-to-face or via online, text-based modalities where visual cues are absent[74]. **Outcome Measures:** Group problem-solving efficacy, task completion speed, innovation metrics. **Known Examples:** Cross-functional corporate agile teams; medical diagnostic panels; intelligence analysis cells where hierarchy is flattened to ensure equal speaking time.

Scale 4: The Organisation (Structural Incentives)

Hypothesis: *Organisations seeking maximal productivity and equitable advancement must decouple reward structures from extreme, unbroken time-commitments, which inherently penalize female obligatory investment and nonmarket time constraints.* **Evidence:** Research in the financial services sector and broader economic models shows that women face tighter nonmarket time constraints (due to the persistent unpaid labour gap) and experience a less favourable realized commission-time trade-off when workload expands[62]. If an organisation bases advancement solely on maximizing working hours without scaling efficiency returns, it artificially selects for male variability and single-mindedness while bleeding female talent. **Counter-evidence:** Some high-intensity industries (e.g., investment banking, emergency medicine) argue that unbroken time commitments are not an arbitrary cultural artifact but a strict operational requirement for continuity of client care or market responsiveness. **Outcome Measures:** Retention rates of women in executive leadership, organizational profitability, employee burnout rates. **Known Examples:** Companies adopting strict outcomes-based evaluations (ROWE - Results Only Work Environment) rather than hours-logged metrics; Scandinavian corporate boards with mandated structural representation.

Scale 5: The City (Local Infrastructure)

Hypothesis: *Urban environments that prioritize spatial integration of commercial, residential, and childcare facilities reduce the friction of the unpaid labour divide, selectively boosting female economic participation.* **Evidence:** The persistence of the unpaid labour gap—where women do 20% to 1000% more unpaid work—is exacerbated by urban sprawl, which forces long commutes that conflict with localized school and care schedules[62]. **Counter-evidence:** High-density, mixed-use urban planning can inadvertently raise the cost of living (gentrification), pushing families into suburbs regardless of the theoretical benefits of proximity. **Outcome Measures:** Female labour force participation rates by zip code, average commute times, localized economic velocity. **Known Examples:** The "15-minute city" urban planning model in Paris; localized cooperative housing models in Vienna.

Scale 6: The State (Macro-Governance)

Hypothesis: *The structural stability, democratic integrity, and peacefulness of a macro-society depend fundamentally on the physical security of women and the strict legal mitigation of male-dominated dominance hierarchies.* **Evidence:** Hudson et al. (2012) empirically established via the WomanStats Database that the largest gender gaps in human rights, unbalanced sex ratios, and tolerance of domestic violence are the strongest predictors of state-level violence, corruption, and propensity to initiate war[54]. The legality of polygamy correlates heavily with state instability by mathematically creating a surplus of unmarried, disenfranchised young men, driving up crime and conflict[53]. **Counter-evidence:** Traditional international relations theory asserts that economic development (GDP) and democratization are the primary drivers of peace, treating women's rights as a downstream luxury of wealth rather than an upstream causal driver. However, Hudson's multivariate models demonstrate that gender security precedes and predicts democratic stability[54]. **Outcome Measures:** Rates of internal and external conflict, government corruption indices, maternal mortality, national GDP trajectory. **Known Examples:** The contrast in state stability between highly egalitarian Nordic states versus nations with systemic violence against women, highly disparate family law, and high

polygyny rates.

Scale 7: The World (International Relations)

Hypothesis: *Global conflict resolution and treaty adherence are highly contingent on the substantive integration of women into primary geopolitical power structures, leveraging differences in risk-taking and social preferences.* **Evidence:** Societies with low levels of violence against women are more likely to comply with international treaty obligations and refrain from using force to resolve external tensions[55]. Caprioli (2000) demonstrated that women's substantive involvement in comprehensive peace negotiations correlates with the inclusion of lasting peace provisions, but only when women hold actual positions of power (Track 1 negotiators), rather than mere observational roles[60]. Additionally, the global variance in male risk-taking (Byrnes et al., 1999) suggests that overwhelmingly male-dominated state apparatuses are statistically more likely to engage in high-risk brinkmanship[32].
Counter-evidence: Including women in peace negotiations does not guarantee success if the underlying structural causes of the war (resource scarcity, ethnic division) remain unresolved. Furthermore, women in extreme positions of geopolitical power may conform to aggressive norms to survive in masculinized institutions, muting the expected biological or social preference differences. **Outcome Measures:** Longevity of peace treaties, international treaty compliance rates, frequency of interstate conflict. **Known Examples:** The 2003 Accra Peace talks regarding Liberia, where women exerted immense influence over the settlement outcomes[60].

Summary of Robust Findings

#	Core Finding
1	Men and women differ vastly in upper-body physical strength and muscle mass due to evolutionary intra-sexual contest competition.
2	At a univariate behavioural level, the sexes are vastly more similar than different, exhibiting highly overlapping statistical distributions.
3	At a multivariate level, aggregating multiple traits results in extremely large, predictable differences between male and female profiles in personality and brain architecture.

4	Males exhibit greater statistical variability (wider distributions) in physical, cognitive, and preference-based traits.
5	The Gender Equality Paradox dictates that in wealthy, egalitarian societies, psychological and preference differences between men and women widen, rather than converge.
6	Human life history and brain development are heavily predicated on cooperative breeding and intergenerational kin subsidies, particularly post-menopausal grandmothers.
7	Mating strategies differ significantly by sex due to asymmetric obligatory parental investment, dictating distinct short-term and long-term evolutionary priorities.
8	Group cognitive performance (collective intelligence) is optimized by social sensitivity and equal turn-taking, mediated positively by female representation.
9	Systemic physical security and legal equality for women are the absolute strongest empirical predictors of macro-state peacefulness and low corruption.
10	The 5:1 positive-to-negative interaction ratio is a strong descriptive marker of marital stability, functioning as a vital risk factor rather than a deterministic prophecy.

Contested or Open Questions

Domain	Key Open Question
The Equality Paradox	Does the widening of gender differences in wealthy nations strictly reflect innate biological preferences manifesting under freedom, or does it reflect a post-materialist restructuring of distinct cultural gender roles?
The Brain Mosaic	At what specific level of regional neurological analysis does the brain shift from being an internally variable "mosaic" to a highly predictable dimorphic network?
Collective Intelligence	Does the female-mediated *c*-factor operate with equal efficacy in purely remote, text-based online work environments where visual cues of social sensitivity (Theory of Mind) are restricted?
Variability Mechanisms	What are the exact genetic (e.g., X-chromosome hemizygosity) and environmental mechanisms that cause males to exhibit wider variance across almost all physical and psychological domains?
Mating Strategies	How do modern artificial contraception and digital dating markets disrupt the ancient evolutionary algorithms of Sexual Strategies Theory?

Most Important Sources to Read in Full

Author(s) & Year	Journal / Publisher	Significance of the Work
Falk, A., & Hermle, J.	*Science*	The definitive global dataset (80,000 individuals,

(2018)		76 countries) demonstrating the Gender Equality Paradox regarding economic preferences.[45]
Hudson, V. M., et al. (2012)	*Columbia University Press*	*Sex and World Peace* utilizes the massive WomanStats database to prove that state security is fundamentally predicated on the physical security of women.[53]
Woolley, A. W., et al. (2010)	*Science*	Proved the existence of collective intelligence (*c*-factor) in groups, driven by social sensitivity and female representation.[70]
Del Giudice, M., et al. (2012)	*PLOS ONE*	Revolutionized the measurement of sex differences in personality by utilizing Mahalanobis *D* to reveal massive multivariate divergence.[23]
Hawkes, K., et al. (1998)	*Proceedings of the National Academy of Sciences*	Formulated the Grandmother Hypothesis, explaining human encephalization, longevity, and cooperative breeding.[16]
Chekroud, A. M., et al. (2016)	*Proceedings of the National Academy of Sciences*	Utilized machine learning to demonstrate that whole-brain multivariate patterns can predict biological sex with 93% accuracy.[12]
Buss, D. M., & Schmitt, D. P. (1993)	*Psychological Review*	The foundational text for Sexual Strategies Theory, outlining the evolutionary

		logic of human mating.[36]
Zell, E., Krizan, Z., & Teeter, S. R. (2015)	*American Psychologist*	A massive meta-synthesis of 12 million participants defining the scope of univariate gender similarities.[1]
Byrnes, J. P., et al. (1999)	*Psychological Bulletin*	The preeminent meta-analysis proving structural gender differences in risk-taking behaviour across 150 studies.[32]
Lassek, W. D., & Gaulin, S. J. (2009)	*Evolution and Human Behavior*	Essential reading on somatic dimorphism, explaining the massive strength disparities between the sexes.[4]

Implications for living together

To live well together at any scale, societal systems must be engineered around the empirical realities of human nature, explicitly rejecting utopian blank-slate theories without falling victim to the naturalistic fallacy. Acknowledging that males possess vastly greater physical strength, higher variance in risk-taking, and distinct mating strategies does not morally excuse aggression or systemic inequality; rather, it dictates that successful societies must build robust legal and cultural constraints to channel these realities productively.

The macro-level data clearly demonstrates that patriarchal dominance hierarchies—characterized by highly disparate family law, unpunished violence against women, and polygamous structures—are inherently unstable, violent, and economically corrupt. True design principles require leveraging the complementary multivariate differences between the sexes. Organisations, families, and governments that integrate female social sensitivity, prioritize female physical security, and structurally accommodate the biological realities of reproduction achieve superior collective intelligence, lower corruption, and vastly higher stability. Ultimately, human flourishing is not achieved by enforcing artificially identical roles, but by legally guaranteeing equal opportunity while maintaining cultural spaces that accommodate the distinct, evolved life histories and statistical distributions of both men and women.

Works cited

1. Evaluating Gender Similarities and Differences Using Metasynthesis, https://www.researchgate.net/publication/271722875_Evaluating_Gender_Similarit

ies_and_Differences_Using_Metasynthesis
2. 3.5 Skills in Action: Evaluating Research on Sex/Gender Differences, https://nerd.wwnorton.com/ebooks/epub/psychwomen2/EPUB/content/3.5-chapter03.xhtml
3. The Distance Between Mars and Venus: Measuring Global Sex, https://pmc.ncbi.nlm.nih.gov/articles/PMC3251566/
4. Substantial but Misunderstood Human Sexual Dimorphism Results, https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.859931/full
5. Substantial but Misunderstood Human Sexual Dimorphism Results, https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.859931/pdf
6. Why do men tend to be larger, taller, and stronger than women?, https://www.reddit.com/r/AskAnthropology/comments/hj3uuz/why_do_men_tend_to_be_larger_taller_and_stronger/
7. The importance of physical strength to human males, https://research-repository.griffith.edu.au/server/api/core/bitstreams/6794e87b-ab7a-58d0-818a-b7b6263a2fd6/content
8. A meta-analysis of the association between male dimorphism ... - eLife, https://elifesciences.org/articles/65031
9. After the trans brain: a critique of the neurobiological accounts of, https://pmc.ncbi.nlm.nih.gov/articles/PMC10837215/
10. Joel et al.'s method systematically fails to detect large, consistent sex, https://marcodg.net/wp-content/uploads/2016/03/delgiudice_etal_2016_letter_joel-etal_pnas.pdf
11. Sex beyond the genitalia: The human brain mosaic - PNAS, https://www.pnas.org/doi/10.1073/pnas.1509654112
12. Patterns in the human brain mosaic discriminate males from females, https://www.pnas.org/doi/10.1073/pnas.1523888113
13. Morphometrical brain markers of sex difference - bioRxiv, https://www.biorxiv.org/content/10.1101/2020.08.01.232165v1.full.pdf
14. Patterns in the human brain mosaic discriminate males from females, https://pmc.ncbi.nlm.nih.gov/articles/PMC4833246/
15. Joel et al.'s method systematically fails to detect large, consistent sex, https://www.pnas.org/doi/10.1073/pnas.1525534113
16. Evaluating Grandmother Effects - PMC - NIH, https://pmc.ncbi.nlm.nih.gov/articles/PMC2745839/
17. Grandmothering, menopause, and the evolution of human life histories, https://www.researchgate.net/publication/13783044_Grandmothering_Menopause_and_the_Evolution_of_Human_Life_Histories
18. Cognitive consequences of our grandmothering life history, https://royalsocietypublishing.org/rstb/article/375/1803/20190501/31283/Cognitive-consequences-of-our-grandmothering-life
19. Gender Similarities Hypothesis (Hyde, 2005) - Largest meta ... - Reddit, https://www.reddit.com/r/MensLib/comments/5edl7g/gender_similarities_hypothe

sis_hyde_2005_largest/
20. The gender similarities hypothesis - PubMed, https://pubmed.ncbi.nlm.nih.gov/16173891/
21. Gender - Open Publishing - Princeton University, https://openpublishing.princeton.edu/read/gender
22. Global sex differences in personality: Replication with an open, https://www.researchgate.net/publication/334279951_Global_sex_differences_in_personality_Replication_with_an_open_online_dataset
23. The Distance Between Mars and Venus: Measuring Global Sex, https://ideas.repec.org/a/plo/pone00/0029265.html
24. Measuring Global Sex Differences in Personality | PLOS One, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0029265
25. measuring global sex differences in personality - PubMed, https://pubmed.ncbi.nlm.nih.gov/22238596/
26. Heterogeneity Coefficients for Mahalanobis' D as a Multivariate, https://marcodg.net/wp-content/uploads/2018/04/delgiudice_2017_heterogeneity_d_mbr.pdf
27. Recurring Errors in Studies of Gender Differences in Variability - MDPI, https://www.mdpi.com/2571-905X/6/2/33
28. Variability hypothesis - Wikipedia, https://en.wikipedia.org/wiki/Variability_hypothesis
29. does variation in morphological and physiological traits differ, https://royalsocietypublishing.org/rsos/article/10/9/230713/92239/Variability-in-variability-does-variation-in
30. Do Men Vary More than Women in Personality? A Study in 51 Cultures, https://pmc.ncbi.nlm.nih.gov/articles/PMC3612964/
31. Converging evidence for greater male variability in time, risk ... - PNAS, https://www.pnas.org/doi/10.1073/pnas.2026112118
32. Gender Differences in Risk Taking: A Meta-Analysis - ResearchGate, https://www.researchgate.net/profile/James-Byrnes-2/publication/271767506_Gender_differences_in_risk_taking_A_meta-analysis/links/56e9904208ae95bddc29f1a6/Gender-differences-in-risk-taking-A-meta-analysis.pdf
33. Gender differences in risk taking: A meta-analysis - ResearchGate, https://www.researchgate.net/publication/271767506_Gender_differences_in_risk_taking_A_meta-analysis
34. Gender differences in risk taking: A meta-analysis. | Semantic Scholar, https://www.semanticscholar.org/paper/Gender-differences-in-risk-taking%3A-A-meta-analysis.-Byrnes-Miller/c9c58db867808363db7dfb29f4a8d575cfa41af7
35. Sex differences in the use of social information emerge under ... - PMC, https://pmc.ncbi.nlm.nih.gov/articles/PMC5756449/
36. Sexual Strategies Theory: An Evolutionary Perspective on Human, https://labs.la.utexas.edu/buss/files/2015/09/SexualStrategiesTheory.pdf
37. Sexual strategies theory - Wikipedia, https://en.wikipedia.org/wiki/Sexual_strategies_theory
38. Sexual strategies theory: an evolutionary perspective on human,

https://pubmed.ncbi.nlm.nih.gov/8483982/
39. (PDF) Sexual Strategies Theory - ResearchGate, https://www.researchgate.net/publication/312133506_Sexual_Strategies_Theory
40. Sexual Strategies Theory: An Evolutionary Perspective on Human, https://www.researchgate.net/publication/14715297_Sexual_Strategies_Theory_An_Evolutionary_Perspective_on_Human_Mating
41. Sexual strategies theory: An evolutionary perspective on human, https://www.academia.edu/325340/Sexual_strategies_theory_An_evolutionary_perspective_on_human_mating
42. Social Role Theory of Sex Differences | Request PDF - ResearchGate, https://www.researchgate.net/publication/316364132_Social_Role_Theory_of_Sex_Differences
43. Social Role Theory of Sex Differences and Similarities - USC Dornsife, https://dornsife.usc.edu/wendy-wood/wp-content/uploads/sites/183/2023/10/Eagly.Wood_.Diekman.2000_Social_role_theory_of_sex_differences_and_similarities.pdf
44. The Origins of Sex Differences in Human Behavior, https://labs.psych.ucsb.edu/roney/james/other%20pdf%20readings/Eagly_Wood_1999.pdf
45. Relationship of Gender Differences in Preferences to Economic, https://ftp.iza.org/dp12059.pdf
46. Sex, Sex Differences, and Social Behavior - ResearchGate, https://www.researchgate.net/profile/Virginia_Valian/publication/12498619_Sex_sex_differences_and_social_behavior/links/5b1473d10f7e9b498108e489/Sex-sex-differences-and-social-behavior.pdf
47. Relationship of gender differences in preferences to economic, https://www.researchgate.net/publication/328370172_Relationship_of_gender_differences_in_preferences_to_economic_development_and_gender_equality
48. What Gives? Trust, Risk, Altruism, and Reciprocity Across 76 Countries, https://repository.usfca.edu/cgi/viewcontent.cgi?article=2706&context=thes
49. Unlocking mathematical potential through school-based language, https://www.cambridge.org/core/journals/bilingualism-language-and-cognition/article/unlocking-mathematical-potential-through-schoolbased-language-learning-insights-from-pisa-2018/5A0FF18524D854577F4487BC0D36C9AC
50. The Gender-Equality Paradox in Intraindividual Academic Strengths, https://repository.essex.ac.uk/39115/1/balducci-et-al-2024-the-gender-equality-paradox-in-intraindividual-academic-strengths-a-cross-temporal-analysis.pdf
51. The Heterogeneity and Conditional Effects of Achievement Drivers, https://www.mdpi.com/2076-328X/16/10/1737
52. A Systematic Review and New Analyses of the Gender-Equality, https://pmc.ncbi.nlm.nih.gov/articles/PMC12065958/
53. Sex and World Peace - Google Books, https://books.google.com/books/about/Sex_and_World_Peace.html?id=VtucEAAAQBAJ
54. What sex means for world peace - openDemocracy,

https://www.opendemocracy.net/en/what-sex-means-for-world-peace/
55. Sex and World Peace | Request PDF - ResearchGate, https://www.researchgate.net/publication/301894717_Sex_and_World_Peace
56. The First Political Order: How Sex Shapes Governance and National, https://www.cambridge.org/core/journals/ethics-and-international-affairs/article/first-political-order-how-sex-shapes-governance-and-national-security-worldwide-valerie-m-hudson-donna-lee-bowen-and-perpetua-lynne-nielsen-new-york-columbia-university-press-2020-616-pp-cloth-40-paperback-28-ebook-2799/5EB6F6E732AB0205B85527AA3B08E58E
57. Sex and World Peace Quotes by Valerie M. Hudson - Goodreads, https://www.goodreads.com/work/quotes/17384033-sex-and-world-peace
58. Sex and World Peace PDF - Bookey, https://cdn.bookey.app/files/pdf/book/en/sex-and-world-peace.pdf
59. Sex and World Peace - Semantic Scholar, https://pdfs.semanticscholar.org/990d/2da20c3036e4e7c6024cdb61274b597a8097.pdf
60. Power Over Presence: Women's Representation in Comprehensive, https://www.cambridge.org/core/journals/american-political-science-review/article/power-over-presence-womens-representation-in-comprehensive-peace-negotiations-and-gender-provision-outcomes/BF6C310AB2A66AE34A8B0BCD75B75116
61. Wages, Work Hours, and Work Effort: How Tax Rates Affect, https://dukespace.lib.duke.edu/server/api/core/bitstreams/29dca367-4aac-4368-8138-0238c337a510/content
62. Reducing and Redistributing Unpaid Work: Stronger Policies to, https://www.imf.org/-/media/files/publications/wp/2019/wpiea2019225-print-pdf.pdf
63. Reducing and Redistributing Unpaid Work: Stronger Policies to, https://www.elibrary.imf.org/view/journals/001/2019/225/article-A001-en.xml
64. The Science of Marriage: Gottman's Research and Your Texts, https://www.mosaicchats.com/blog/gottman-marriage-research
65. Science of Happy Relationships: Research Guide 2026 - PartnerMood, https://partnermood.app/guides/science-of-happy-relationships/
66. Relationship Statistics, Checked - NUMERA, https://mynumera.is/learn/relationship-statistics-checked
67. Observational Analyses of Couple Interactions in Relationship ... - Unil, https://api.unil.ch/iris/server/api/core/bitstreams/0b5aa42c-15e2-4ba9-8c10-fb0c99e48685/content
68. Communication, the Heart of a Relationship - PMC - NIH, https://pmc.ncbi.nlm.nih.gov/articles/PMC8710473/
69. Does Marriage and Relationship Education Improve Couples, https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=2318&context=etd&httpsredir=1&referer=
70. (PDF) Collective Intelligence and Group Performance - ResearchGate, https://www.researchgate.net/publication/286512331_Collective_Intelligence_and

_Group_Performance
71. Reading the Mind in the Eyes or Reading between the Lines, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0115212
72. Quantifying collective intelligence in human groups - PNAS, https://www.pnas.org/doi/10.1073/pnas.2005737118
73. Collective Intelligence in Human Groups, https://sonic.northwestern.edu/wp-content/uploads/2013/09/04.-Anita-Collective-Intelligence-NSF-Network-Science-October-2013.pdf
74. A Meta-Analysis - Collective Intelligence Conference, https://ci.acm.org/2019/assets/proceedings/CI_2019_paper_36.pdf
75. Gender Differences in Risk Taking: A Meta-Analysis - ResearchGate, https://www.researchgate.net/publication/232541633_Gender_Differences_in_Risk_Taking_A_Meta-Analysis
76. Global Gender Differences Can Be Operationalized and Tested, https://www.researchgate.net/publication/282650852_Global_Gender_Differences_Can_Be_Operationalized_and_Tested