PS-07 Attachment, love and long-term bonding

The mechanisms that unite human beings in dyads, sustain their bonds over decades, and organize their familial and social structures are among the most intensely researched domains in the behavioral, biological, and psychological sciences. Understanding how men and women can best live together—whether in couples, families, small groups, organizations, or societies—requires deconstructing these bonds across three distinct but deeply interacting layers of reality. The first layer is physiological, consisting of the measurable neurochemical pathways, hormonal fluctuations, and neural activations that represent the shared biological hardware of the species. The second layer is behavioral, comprising the statistical distributions of attachment styles, mate preferences, and conflict responses that exhibit measurable variations, overlapping trait distributions between the sexes, and distinct lifespan trajectories. The third layer is cultural, encompassing the variable socio-historical expectations, marital paradigms, and ecological pressures that govern how physiological and behavioral tendencies are expressed and evaluated.

By synthesizing peer-reviewed primary literature, systematic reviews, and meta-analyses, this report establishes a rigorous empirical foundation regarding the science of romantic love, attachment, and the durability of long-term bonds.

Layer 1: The Physiology of Love and Bonding

The physiological layer of human bonding represents an ancient mammalian architecture that has been uniquely co-opted to support human pair-bonding. It is physically measurable and largely universal across the human species.

The Three Phases of Love and Their Neurochemistry

The foundational framework for the biology of mating and reproduction was proposed by Helen Fisher (1998, 2005), who delineated three distinct, interacting neural systems that govern human romance: lust (the sex drive), attraction (romantic love or limerence), and attachment (companionate bonding). Each phase is mediated by distinct neurochemical and neural pathways, reflecting specific evolutionary imperatives.

The sex drive, or lust, is primarily mediated by androgens (such as testosterone) and estrogens, motivating individuals to seek sexual union broadly. In contrast, the attraction phase—termed "limerence" in the psychological literature to describe the obsessive, intensely focused, and euphoric state of early love—is driven heavily by the dopaminergic reward system. In a landmark functional magnetic resonance imaging (fMRI) study published in *The Journal of Comparative Neurology*, Fisher et al. (2005) observed 17 individuals who reported being intensely "in love." When viewing photographs of their beloved, participants exhibited pronounced activation in the right ventral tegmental area (VTA) and the right caudate nucleus[1]. The VTA is a central node in the mammalian reward and motivation system, heavily populated with dopamine-producing neurons. These findings suggest that early-stage romantic love is not merely an emotion, but a powerful, goal-directed motivational state or drive designed to

focus mating energy on a specific partner, thereby conserving time and metabolic resources[2]. This VTA activation in the context of early-stage romantic love has been robustly replicated; a highly controlled fMRI study by Ueda and Abe (2021) utilizing 51 male participants in relationships of less than six months successfully replicated this profound VTA and dopaminergic activation[4].

Simultaneously, the limerence phase is characterized by a temporary, severe alteration in the serotonergic system, which correlates with the intrusive, obsessive thoughts characteristic of new lovers. A highly cited study by Marazziti et al. (1999) published in *Psychological Medicine* compared the platelet serotonin transporter (SERT) density of 20 individuals who had recently fallen in love (reporting obsessive thoughts about their partner for approximately 65% of their waking hours) against 20 individuals with Obsessive-Compulsive Disorder (OCD) and 20 healthy controls. The researchers found that the in-love group exhibited significantly lower SERT density, rendering their serotonergic profiles statistically indistinguishable from the OCD patients[5]. Importantly, this physiological state is demonstrably transient; follow-up testing a year later revealed that the serotonin transporter densities of the in-love participants had returned to baseline, mirroring the natural decline of limerence and obsessive ideation over time[5].

The Role of Oxytocin and Vasopressin in Human Bonding

As the dopaminergic intensity of limerence subsides, the physiological architecture of the relationship shifts toward the attachment system, which is heavily mediated by the neuropeptides oxytocin (OT) and arginine vasopressin (AVP)[7]. Evolutionarily, romantic attachment in humans is believed to have co-opted the ancient mammalian neural circuitry originally designed for mother-infant bonding, given that mother-infant physiology preceded pair-bonding in mammalian evolutionary history[9].

Feldman (2012), in *Hormones and Behavior*, extensively documented the role of OT and AVP in generating "bio-behavioral synchrony"—the process by which attachment partners dynamically coordinate their physiological and behavioral responses during social contact[8]. Through micro-coded observations of parent-infant and romantic partner interactions, it has been established that plasma OT levels are strongly associated with affectionate contact, mutual positive affect, and gaze synchrony, whereas AVP is more heavily implicated in stimulatory contact, physical play, and joint attention (often observed more robustly in paternal and male-partner interactions)[7]. Genetic variations also play a role; Walum et al. (2008) in *PNAS* reported that the RS3 polymorphism of the AVPR1A gene in men was associated with pair-bonding behavior and marital stability[12]. However, the broader replication of these specific genetic findings has been mixed, with researchers like Zietsch et al. (2015) noting difficulties in replicating the exact behavioral phenotypes across diverse cohorts[12].

Controversy: The Limits of Exogenous Oxytocin

The widespread popularization of oxytocin as the "cuddle hormone" has led to a major controversy regarding the efficacy of exogenous (intranasal) OT to treat social deficits or artificially enhance bonding. A comprehensive multilevel meta-analysis by Keech, Crowe, and Hocking (2018) in *Psychoneuroendocrinology* evaluated 12 randomized controlled trials (RCTs)

involving 498 participants utilizing intranasal oxytocin for autism spectrum disorders[14]. The overall analysis revealed inconsistent and often non-significant effects on social impairments, only finding beneficial effect sizes at very high daily doses (48 IU/day)[14].

Leading critics of the "oxytocin panacea" narrative argue that exogenous application cannot reliably mimic the complex temporal release of endogenous neuropeptides during actual social synchrony. This skepticism is supported by heavily powered fMRI RCTs. Straccia et al. (2022) tested the effects of intranasal OT and AVP on mentalizing (understanding others' mental states) in a large sample and returned definitively null results, demonstrating no effect on reaction time, accuracy, or functional connectivity within the mentalizing network[15]. The scientific consensus suggests that while endogenous OT and AVP are critical biomarkers of bond formation, their exogenous application does not reliably alter complex social cognition in the absence of authentic, synchronous interpersonal interaction.

Neural Correlates of Bond Durability

A prevalent assumption in relationship science has been that the neurological intensity of romantic love inevitably decays, giving way entirely to companionate love—a state defined by emotional intimacy and commitment but lacking physiological passion. However, neuroimaging data challenges this binary trajectory. Acevedo, Aron, and Fisher (2012) in *Social Cognitive and Affective Neuroscience* utilized fMRI to study 17 individuals in long-term marriages (averaging 21 years) who self-reported still being intensely in love with their spouses[17].

The researchers found that these individuals exhibited sustained activation in the dopamine-rich VTA and dorsal striatum when viewing their partners, effectively mimicking the neural profile of early-stage lovers[17]. Crucially, however, the long-term lovers also showed pronounced activation in the global pallidus and regions associated with maternal attachment and endogenous opioid systems—regions that mediate calm security and pain suppression, which are largely absent in the frantic phase of early-stage limerence[17]. This physiological data indicates that intense, dopamine-driven reward responses can be sustained long-term, provided they are integrated with the calming, opioid-mediated neurochemistry of deep companionate attachment.

Neurochemical Phase	**Primary Hormones/Transmitters**	**Key Neural Regions Implicated**	**Psychological Manifestation**
Lust / Sex Drive	Androgens (Testosterone), Estrogens	Hypothalamus, Amygdala	Seeking of sexual union, generalized physical arousal.
Attraction / Limerence	Dopamine (elevated), Serotonin (depleted)	Ventral Tegmental Area (VTA), Caudate Nucleus	Obsessive thinking, euphoria, focused attention on one mate.

Attachment / Bonding	Oxytocin, Vasopressin, Endogenous Opioids	Global Pallidus, Ventral Striatum	Bio-behavioral synchrony, calm security, companionate love.

Layer 2: The Behavior and Statistics of Attachment

The behavioral layer translates physiological drives into observable psychological traits, interpersonal strategies, and conflict responses. Unlike the universal presence of dopamine or oxytocin, behavioral traits are distributed statistically across populations, resulting in overlapping bell curves between sexes and age cohorts.

Adult Attachment Styles and Lifespan Development

Adult romantic attachment is predominantly conceptualized along two orthogonal dimensions: attachment anxiety and attachment avoidance, routinely measured by gold-standard self-report instruments like the Experiences in Close Relationships-Revised (ECR-R), validated by Fraley, Waller, and Brennan (2000) in the *Journal of Personality and Social Psychology* (JPSP)[18]. As synthesized by Mikulincer and Shaver (2016) in *Attachment in Adulthood*, individuals low in both anxiety and avoidance possess a "secure" attachment style, characterized by comfort with intimacy and an internal working model that views the self as worthy and others as reliable[20].

Individuals high in attachment anxiety hyperactivate their attachment system in response to threat; they fear abandonment, exhibit hypervigilance regarding partner availability, and seek excessive reassurance[21]. Conversely, individuals high in attachment avoidance deactivate their attachment system; they suppress emotional needs, maintain psychological distance, and prioritize compulsive self-reliance to preemptively defend against rejection[21].

The developmental trajectory of these styles demonstrates both trait-like stability and systematic change over the lifespan. A massive 59-year longitudinal study by Chopik, Edelstein, and Grimm (2019) published in *JPSP*, which analyzed data from 628 individuals, elegantly mapped the lifespan trajectory of attachment[23]. The data revealed that attachment anxiety peaks during late adolescence and young adulthood—a period coinciding with intense social evaluation and initial mate selection—and reliably declines through middle and older adulthood[23]. Attachment avoidance, conversely, shows a more linear decrease across the lifespan[23]. Ultimately, the normative trajectory for human beings is a gradual maturation toward attachment security, facilitated by the accumulation of stable, long-term relationship experiences[25].

Controversy: The Intergenerational Transmission Gap

A foundational tenet of traditional attachment theory is that secure parents raise secure children through continuous environmental modeling. Verhage et al. (2016) published a comprehensive meta-analysis in *Psychological Bulletin* encompassing 95 samples and 4,819 individuals to test this intergenerational transmission[26]. They compared parents' Adult

Attachment Interviews (AAI) to their infants' Strange Situation responses, confirming a transmission effect size of r = .31 for secure-autonomous representations[26]. However, path analyses showed that caregiver sensitivity could not fully explain this transmission, leaving an intriguing "transmission gap"[26].

Behavioral geneticists, such as Fraley and Chopik, are the leading critics of the purely environmental transmission model. They argue that traditional attachment research conflates the *shared environment* (parenting styles) with heritability. A study leveraging the Minnesota Twin Registry (N=1,377 twins) demonstrated that adult attachment styles are approximately 36% heritable[28]. The remaining 64% of the variance is driven almost entirely by the *non-shared* environment (idiosyncratic life events, specific romantic partnerships), while the *shared* environment has a negligible effect on attachment dimensions by the time individuals reach adulthood[28]. The transmission gap is likely explained by the fact that parents transmit genes, not just working models, and individual romantic experiences overwrite childhood templates.

Sex Differences in Mating and Attachment: Averages vs. Individuals

The question of whether men and women differ fundamentally in their relational behaviors is heavily contested, often plagued by a failure to distinguish between population averages and individual predictability.

In a landmark meta-analysis published in *Psychological Bulletin*, Del Giudice (2011) aggregated 113 samples representing 66,132 individuals to examine sex differences in ECR anxiety and avoidance dimensions[30]. The analysis found that, globally, men exhibit higher levels of romantic avoidance and lower levels of romantic anxiety than women[30]. The magnitude of these differences varied significantly by sampling method: community samples showed a moderate effect size (Bivariate D = .28), college samples showed a small effect (D = .12), and web-based samples showed a negligible reversal (D = -.07)[30].

Del Giudice interprets these findings through the lens of evolutionary Life History (LH) theory. Under ecological stress, insecure attachment strategies diverge by sex. Avoidance serves as a male-biased fast life-history strategy to minimize parental investment and pursue short-term mating, while anxiety serves as a female-biased strategy to maximize proximity to kin and secure investment from partners[30]. However, the naturalistic fallacy must be rigorously avoided here. A Cohen's D of 0.28 indicates a distributional overlap of roughly 78% between men and women. This statistical reality means that while the *average* man is slightly more avoidant than the *average* woman, observing a specific individual's sex offers almost zero predictive power regarding their specific attachment style.

Mate Preferences: Stated vs. Revealed

Evolutionary psychology postulates that asymmetrical parental investment has driven divergent mate preferences. Buss (1989) famously documented that across 37 cultures, men prioritize physical attractiveness (a cue for youth and fertility), while women prioritize earning potential and status (cues for resource provisioning)[34]. Penke and Asendorpf (2008) in *JPSP* validated the Revised Sociosexual Orientation Inventory (SOI-R), finding that men, on average, score higher on unrestricted sociosexuality (willingness to engage in uncommitted sex)[36]. However, the behavioral manifestation of these stated preferences is highly

context-dependent. Eastwick and Finkel (2008) conducted speed-dating experiments—recently replicated by Eastwick et al. in 2024 with a sample of 307 participants—comparing *stated* ideal preferences on surveys against *revealed* preferences (who participants actually pursued face-to-face)[34]. While participants replicated the traditional sex differences on questionnaires, the live interactions showed no sex differences whatsoever in the actual prediction of romantic desire based on a partner's attractiveness or earning potential[34]. In real-world contexts, holistic interpersonal chemistry overrides stated evolutionary checklists, and both sexes pursue physically attractive partners at equal rates[34].

Controversy: Jealousy and Reactions to Separation

A fierce methodological debate exists regarding romantic jealousy. Buss et al. (1992) published data in *Psychological Science* showing that men exhibit greater psychological and physiological distress (measured via heart rate and skin conductance) in response to imagined sexual infidelity, due to the evolutionary pressure of paternity uncertainty[39]. Women showed greater distress to imagined emotional infidelity, theoretically tied to the fear of resource diversion[40]. Leading critics DeSteno and Salovey (1996) published counter-evidence in *JPSP*, demonstrating that the sex difference in jealousy only appears when participants are constrained by a rigid "forced-choice" questionnaire[42]. When continuous Likert-scale measures are used, the sex differences vanish entirely; both men and women rate sexual infidelity and emotional infidelity as devastatingly distressing, with sexual infidelity often scoring higher for both sexes[42].

Regarding relationship dissolution, evolutionary behavioral scientist Craig Morris et al. (2015) in *Evolutionary Behavioral Sciences* analyzed quantitative sex differences in response to romantic relationship dissolution (RRD)[43]. Morris found that women tend to experience higher initial levels of acute physical and emotional pain immediately following a breakup. However, men consistently take significantly longer to recover emotionally, and a substantial subset of men report that they never fully recover, instead simply adapting to the loss over time. This aligns with attachment theory, noting that men often have smaller emotional support networks outside of their primary romantic partner, exacerbating the trauma of separation.

Construct	Evolutionary Hypothesis	Empirical Reality (Meta-Analytic / Modern View)
Jealousy	Men fear sexual infidelity; Women fear emotional infidelity.	Artifact of forced-choice testing. On continuous scales, both sexes report severe distress to both.
Mate Preferences	Men seek physical beauty; Women seek financial resources.	True in stated questionnaires. False in actual live face-to-face behavior (Speed Dating).

Separation	Women suffer more due to lost resource investment.	Women report higher acute pain; Men take significantly longer to recover and show prolonged impairment.

Layer 3: The Culture and Trajectory of Long-Term Bonds

The cultural layer encompasses the socio-historical paradigms within which physiological drives and behavioral traits are expressed. How a society structures the concept of a long-term bond determines whether those bonds endure or suffocate under the weight of expectations.

The Suffocation of Marriage Model

Historically, the function of long-term bonding has shifted radically. Eli Finkel et al. (2014) outlined this historical trajectory in *Psychological Inquiry* through the "Suffocation of Marriage" model[45]. Finkel maps marital expectations to Maslow's hierarchy of needs.

During the "Institutional Era" (1700s–1850), marriage was a pragmatic economic and survival unit aimed at satisfying physiological and safety needs. During the "Companionate Era" (1850–1965), shifting labor markets allowed marriage to ascend the hierarchy, prioritizing love, belonging, and sexual intimacy. Today, Western cultures inhabit the "Self-Expressive Era" (1965–present), where individuals expect their spouse to facilitate their self-actualization, personal growth, and highest esteem needs[45].

Finkel argues that fulfilling these high-altitude, self-actualization needs requires immense psychological investment, deep interpersonal insight, and vast amounts of time[46]. The modern crisis of pair-bonding—what Finkel terms "suffocation"—occurs because cultural expectations for the relationship are higher than ever, but couples, strained by modern economic and social demands, are actually investing *less* time and energy into their relationships than previous generations[46]. Those couples who can deploy the necessary resources experience unprecedented levels of relationship satisfaction, but those who cannot experience steeper declines in marital quality, leading to higher dissolution rates[46]. To predict bond durability, Joel et al. (2020) in *PNAS* utilized machine learning across 43 datasets, finding that individual traits matter far less than dyadic variables; perceived partner responsiveness and commitment are the absolute strongest predictors of relationship quality and survival[49].

The Durability of Love and Its Health Implications

Despite the pressures of the self-expressive era, empirical evidence refutes the cultural cynicism that romantic love inevitably decays. A meta-analysis by Acevedo and Aron (2009) in the *Review of General Psychology* analyzed 25 studies involving 6,070 individuals[51]. They cleanly distinguished between "romantic love" (intensity, engagement, and sexual interest without obsession) and "passionate/obsessive love" (limerence accompanied by anxiety). The meta-analysis found that romantic love can and does endure in long-term relationships and is

robustly, positively associated with relationship satisfaction and individual well-being in both the short and long term[51].

The durability and quality of these bonds have profound, measurable impacts on human physiology and mortality. Robles et al. (2014) published a massive meta-analysis in *Psychological Bulletin* spanning 50 years of research, 126 studies, and over 72,000 individuals[53]. They found that greater marital quality is associated with significantly better physical health and lower mortality risk, with mean effect sizes ranging from $r = .07$ to .21[53]. While these effect sizes appear small in isolation, Robles notes they are statistically identical in magnitude to the health benefits of highly promoted behaviors like diet and physical exercise[53]. Poor marital quality, conversely, is linked to elevated cardiovascular reactivity, dysregulated hypothalamic-pituitary-adrenal (HPA) axis activity, and impaired immune function[53].

Therapeutic Optimism: Intervening on Insecure Bonds

Given the severe health and societal costs of bond dissolution, significant psychological research has focused on altering insecure behavioral patterns. The data indicates that attachment strategies are highly plastic.

At the clinical level, Emotionally Focused Couples Therapy (EFT), developed by Sue Johnson and Leslie Greenberg, directly targets the attachment bond. EFT assumes that relationship distress is driven by absorbing states of negative affect and rigid pursue-withdraw interaction cycles stemming from unmet attachment needs[55]. A comprehensive 2022/2024 meta-analysis by Spengler et al. analyzed 20 studies (N=332 couples) and demonstrated that EFT yields a remarkably large pre-to-post-treatment effect size ($d = .93$)[57]. At the conclusion of EFT, approximately 70% of couples are classified as entirely symptom-free of relationship distress, and these gains hold robustly at long-term follow-ups[57].

At the experimental level, Gillath et al. (2006, 2015) in *Social Cognitive and Affective Neuroscience* demonstrated that exposing individuals to "attachment security priming" (e.g., subliminal exposure to supportive words or images of caring figures) can temporarily alter neurobiology[60]. In fMRI studies, participants subjected to security priming exhibited significantly attenuated amygdala activation when confronted with social or linguistic threats, compared to controls[60]. This proves that the brain's threat-detection circuitry can be actively down-regulated by the perceived presence of a secure attachment figure, further reinforcing the concept that human beings coregulate their nervous systems through secure social bonds.

Synthesis

Summary of Robust Findings

1. Romantic love transitions through distinct physiological phases: lust (androgen-driven), limerence (dopaminergic VTA activation), and attachment (oxytocin/vasopressin).
2. Limerence is transient, marked by serotonin depletion, but intense romantic love can endure for decades without obsessive anxiety.
3. High relationship quality provides mortality reductions and physical health benefits statistically equivalent to diet and exercise (r = .07 to .21).
4. Adult attachment naturally matures across the lifespan, with anxiety peaking in early

adulthood and avoidance declining linearly into old age.
5. Men exhibit slightly higher attachment avoidance and lower anxiety than women on average (D = .28), but individual variability overwhelms demographic averages.
6. Adult attachment styles are moderately heritable (~36%), with the non-shared environment driving the majority of individual differences.
7. Machine learning models confirm that perceived partner responsiveness is a vastly stronger predictor of relationship survival than individual personality traits.
8. Men and women show divergent ideal mate preferences on surveys, but these sex differences vanish entirely in live, face-to-face interaction.
9. Women report higher acute pain following romantic separation, while men exhibit significantly longer, and sometimes permanent, recovery trajectories.
10. Emotionally Focused Couples Therapy effectively restructures insecure attachment patterns, demonstrating massive clinical effect sizes (d = .93).

Contested or Open Questions

- **The Jealousy Debate:** Are sex differences in jealousy (sexual vs. emotional) a hardwired evolutionary reality, or merely an artifact of forced-choice psychological testing methods?
- **Oxytocin's Limits:** Can the complexities of human bio-behavioral synchrony ever be reliably manipulated through exogenous pharmacological interventions (e.g., intranasal OT), or is the neural circuitry too heavily dependent on actual social context?
- **Stated vs. Revealed Preferences:** Why do human beings exhibit profound cognitive dissonance between the traits they consciously claim to want in a partner on surveys versus the traits possessed by the people they actually pursue and marry?
- **The Transmission Gap:** If maternal sensitivity only accounts for a fraction of the intergenerational transmission of attachment, what precise environmental or epigenetic mechanisms constitute the missing variance?

Most Important Sources to Read in Full

1. **Mikulincer, M., & Shaver, P. R. (2016).** *Attachment in Adulthood: Structure, Dynamics, and Change*. Guilford Press.
2. **Del Giudice, M. (2011).** Sex differences in romantic attachment: A meta-analysis. *Psychological Bulletin*.
3. **Finkel, E. J., et al. (2014).** The suffocation of marriage: Climbing Mount Maslow without enough oxygen. *Psychological Inquiry*.
4. **Acevedo, B. P., & Aron, A. (2009).** Does a long-term relationship kill romantic love? *Review of General Psychology*.
5. **Eastwick, P. W., & Finkel, E. J. (2008).** Sex differences in mate preferences revisited. *Journal of Personality and Social Psychology*.
6. **Robles, T. F., et al. (2014).** Marital quality and health: A meta-analytic review. *Psychological Bulletin*.
7. **Feldman, R. (2012).** Oxytocin and social affiliation in humans. *Hormones and Behavior*.
8. **Fisher, H., et al. (2005).** Romantic love: An fMRI study of a neural mechanism for mate choice. *Journal of Comparative Neurology*.

9. **Chopik, W. J., et al. (2019).** Longitudinal changes in attachment orientation over a 59-year period. *Journal of Personality and Social Psychology*.
10. **Spengler, P. M., et al. (2022).** A comprehensive meta-analysis on the efficacy of emotionally focused couple therapy. *Journal of Consulting and Clinical Psychology*.

Implications for living together

When deriving implications for couples, families, and organizations, one must strictly avoid the naturalistic fallacy—the erroneous assumption that because a behavior is evolutionarily "natural," it is therefore optimal or fixed. Evolutionary pressures shaped male populations to lean slightly toward avoidant, short-term mating strategies under ecological stress, and shaped human brains to experience a severe, transient, dopamine-fueled obsession during early courtship. However, the data proves that humans are not slaves to these baseline impulses. The human attachment system is highly plastic, heavily influenced by the non-shared environment, and capable of profound, conscious reorganization through therapy and secure experiences.
For couples and families, the data implies that chasing the euphoric obsession of early-stage limerence as a metric for relationship health is biologically futile; the serotonergic system inevitably normalizes. However, settling for a passionless companionate existence is equally unnecessary. Intense romantic love can be sustained neurologically for decades, provided couples actively engage the brain's reward centers alongside the oxytocin-driven attachment system through shared emotional validation and responsiveness.
Furthermore, the "Suffocation Model" offers a stark operational warning for families and societies: modern partners are asking each other to fulfill the highest possible psychological needs (self-actualization) while frequently starving the relationship of the time and energy required to do so. Ultimately, the evidence demonstrates that securing a high-quality bond is not merely a lifestyle preference; it is a fundamental biological imperative that regulates amygdala threat responses, buffers the immune system, and extends human lifespan with an efficacy rivaling modern medicine. Building communities, organizational structures, and social policies that afford individuals the time, economic stability, and therapeutic support to maintain these bonds is therefore a prerequisite for a healthy society.

Works cited

1. Romantic love: An fMRI study of a neural mechanism for mate choice, https://www.researchgate.net/publication/7511905_Romantic_love_An_fMRI_study_of_a_neural_mechanism_for_mate_choice
2. Romantic Love: An fMRI Study of a Neural Mechanism for Mate Choice, https://www.helenfisher.com/downloads/articles/13JourCompNeur.pdf
3. Biology of romantic love - Wikipedia, https://en.wikipedia.org/wiki/Biology_of_romantic_love
4. dissociable roles of the nucleus accumbens and anterior insula, https://www.biorxiv.org/content/10.64898/2026.02.16.706085v1.full-text
5. (PDF) Blood Levels of Serotonin Are Differentially Affected by, https://www.researchgate.net/publication/254734807_Blood_Levels_of_Serotonin_Are_Differentially_Affected_by_Romantic_Love_in_Men_and_Women

6. the impact of initiating versus terminating romantic relationships on, https://www.cambridge.org/core/services/aop-cambridge-core/content/view/EB1C633B032B407DF8F706B7D5C7301A/S1092852925000033a.pdf/love_is_expensive_the_impact_of_initiating_versus_terminating_romantic_relationships_on_the_onset_of_obsessivecompulsive_disorder.pdf
7. Oxytocin and vasopressin support distinct configurations of social, https://ruthfeldmanlab.com/wp-content/uploads/2019/06/AVPOT-and-social-synchrony.BR2013.pdf
8. Oxytocin and social affiliation in humans : Hormones and Behavior, https://www.ovid.com/journals/horabe/fulltext/10.1016/j.yhbeh.2012.01.008~oxytocin-and-social-affiliation-in-humans
9. Romantic love evolved by co-opting mother-infant bonding - Frontiers, https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1176067/full
10. Oxytocin and social affiliation in humans | Request PDF, https://www.researchgate.net/publication/221785511_Oxytocin_and_social_affiliation_in_humans
11. (PDF) Synchrony and Specificity in the Maternal and the Paternal, https://www.researchgate.net/publication/230575695_Synchrony_and_Specificity_in_the_Maternal_and_the_Paternal_Brain_Relations_to_Oxytocin_and_Vasopressin
12. The AVPR1A Gene and its Single Nucleotide Polymorphism ... - PMC, https://pmc.ncbi.nlm.nih.gov/articles/PMC6367122/
13. Genetic Influences on Adolescent Sexual Behavior - PMC - NIH, https://pmc.ncbi.nlm.nih.gov/articles/PMC3893311/
14. Intranasal Oxytocin in the Treatment of Autism Spectrum Disorders, https://www.researchgate.net/publication/348179306_Intranasal_Oxytocin_in_the_Treatment_of_Autism_Spectrum_Disorders_A_Multilevel_Meta-Analysis
15. Null results of oxytocin and vasopressin administration on ... - UCLA, https://sites.lifesci.ucla.edu/psych-sanlab/wp-content/uploads/sites/31/2022/07/Straccia-null_results_of_oxytocin_and_vasopressin_administration_on_mentalizing_in_a_large_fmri_sample_evidence_from_a_randomized_controlled_trial.pdf
16. Null results of oxytocin and vasopressin administration on, https://www.cambridge.org/core/journals/psychological-medicine/article/null-results-of-oxytocin-and-vasopressin-administration-on-mentalizing-in-a-large-fmri-sample-evidence-from-a-randomized-controlled-trial/A826FDB3906546AD8943652215447638
17. Neural correlates of long-term intense romantic love - PMC, https://pmc.ncbi.nlm.nih.gov/articles/PMC3277362/
18. Experiences in Close Relationships Revised, ECR-R - Psytests.org, https://psytests.org/ipl/ecrren.html
19. An item response theory analysis of self-report measures of adult, https://pubmed.ncbi.nlm.nih.gov/10707340/
20. Attachment in Adulthood: Structure, Dynamics, and Change, https://books.google.com/books/about/Attachment_in_Adulthood.html?id=PMkG

DAAAQBAJ
21. Attachment in Adulthood: Second Edition - Guilford Press, https://www.guilford.com/books/Attachment-in-Adulthood/Mikulincer-Shaver/9781462533817/contents
22. (PDF) Attachment anxiety predicts worse mental health outcomes, https://www.researchgate.net/publication/354497979_Attachment_anxiety_predicts_worse_mental_health_outcomes_during_COVID-19_Evidence_from_two_studies
23. Longitudinal Changes in Attachment Orientation Over a 59-Year, https://www.researchgate.net/publication/318891455_Longitudinal_Changes_in_Attachment_Orientation_Over_a_59-Year_Period
24. First study to investigate how attachment style changes through, https://www.bps.org.uk/research-digest/first-study-investigate-how-attachment-style-changes-through-multiple-decades-life
25. Attachment security and how to get it - Close Relationships Lab, https://chopiklab.com/wp-content/uploads/2025/08/chopikweidmannohattachmentsecurity.pdf
26. Narrowing the Transmission Gap : Psychological Bulletin - Ovid, https://www.ovid.com/journals/plbul/fulltext/10.1037/bul0000038~narrowing-the-transmission-gap-a-synthesis-of-three-decades
27. Narrowing the Transmission Gap: A Synthesis of Three Decades of, https://www.researchgate.net/publication/286975192_Narrowing_the_Transmission_Gap_A_Synthesis_of_Three_Decades_of_Research_on_Intergenerational_Transmission_of_Attachment
28. Genetic and Environmental Contributions to Adult Attachment Styles, https://pmc.ncbi.nlm.nih.gov/articles/PMC11925692/
29. Rethinking the Transmission Gap : Psychological Bulletin - Ovid, https://www.ovid.com/journals/plbul/fulltext/10.1037/bul0000066~rethinking-the-transmission-gap-what-behavioral-genetics-and
30. Sex Differences in Romantic Attachment: A Meta-Analysis, https://marcodg.net/wp-content/uploads/2014/04/delgiudice_2011_romantic-attachment_meta-analysis-pspb.pdf
31. Sex differences in romantic attachment: a meta-analysis - PubMed, https://pubmed.ncbi.nlm.nih.gov/21239594/
32. Sex Differences in Romantic Attachment: A Meta-Analysis, https://www.researchgate.net/publication/49759935_Sex_Differences_in_Romantic_Attachment_A_Meta-Analysis
33. Sex differences in attachment styles - IRIS-AperTO, https://iris.unito.it/retrieve/e27ce435-5d00-2581-e053-d805fe0acbaa/DelGiudice_2019_sex_differences_attachment_pre.pdf
34. Do People Know What They Initially Desire in a Romantic Partner?, https://faculty.wcas.northwestern.edu/eli-finkel/documents/EastwickFinkel2008_JPSP.pdf
35. (PDF) Mate Preferences and Their Behavioral Manifestations, https://www.researchgate.net/publication/327759539_Mate_Preferences_and_The

ir_Behavioral_Manifestations
36. revised Sociosexual Orientation Inventory (SOI-R), https://db.arabpsychology.com/scales/revised-sociosexual-orientation-inventory-soi-r/
37. Relationship Between Sociosexuality and Condom Use Frequency, https://pmc.ncbi.nlm.nih.gov/articles/PMC10103056/
38. (PDF) Do Men and Women Exhibit Different Preferences for Mates, https://www.researchgate.net/publication/283875457_Do_Men_and_Women_Exhibit_Different_Preferences_for_Mates_A_Replication_of_Eastwick_and_Finkel_2008
39. Sex Differences in Jealousy Responses | PDF | Infidelity - Scribd, https://www.scribd.com/document/959379457/Review-Artikel-5-Jealousy-Affective-Scr
40. (PDF) Sex Differences in Jealousy - ResearchGate, https://www.researchgate.net/publication/345985731_Sex_Differences_in_Jealousy
41. Sexual Jealousy, https://hrcak.srce.hr/file/159877
42. Sex differences in jealousy: Evolutionary mechanism or artifact of, https://www.researchgate.net/publication/11048737_Sex_differences_in_jealousy_Evolutionary_mechanism_or_artifact_of_measurement
43. Romantic relationship dissolutions are significantly associated with, https://pmc.ncbi.nlm.nih.gov/articles/PMC10395251/
44. Quantitative Sex Differences in Response to the... - Ovid, https://www.ovid.com/journals/evobs/fulltext/10.1037/ebs0000054~quantitative-sex-differences-in-response-to-the-dissolution
45. (PDF) Expectations in Film Relationships: The Suffocation Model in, https://www.researchgate.net/publication/377357012_Expectations_in_Film_Relationships_The_Suffocation_Model_in_Expectations_in_Film_Relationships
46. (PDF) The Suffocation of Marriage: Climbing Mount Maslow Without, https://www.researchgate.net/publication/271753668_The_Suffocation_of_Marriage_Climbing_Mount_Maslow_Without_Enough_Oxygen
47. Expectations in Film Relationships: The Suffocation Model in Motion, https://scholar.utc.edu/cgi/viewcontent.cgi?article=1613&context=mps
48. The Suffocation of Marriage - Northwestern University, https://faculty.wcas.northwestern.edu/eli-finkel/documents/InPress_FinkelHuiCarswellLarson_PsychInquiry.pdf
49. Couple Relationship Education, Random Forest, Predictors of, https://auetd.auburn.edu/bitstream/handle/10415/9814/Menglin%20Wei%20Dissertation.pdf?sequence=2&isAllowed=y
50. Machine learning uncovers the most robust self-report predictors of, https://www.researchgate.net/publication/343693260_Machine_learning_uncovers_the_most_robust_self-report_predictors_of_relationship_quality_across_43_longitudinal_couples_studies
51. Does a Long-Term Relationship Kill Romantic Love? - ResearchGate, https://www.researchgate.net/publication/228632966_Does_a_Long-Term_Relatio

nship_Kill_Romantic_Love
52. Contrary to widely held beliefs, romance can last in long-term, https://www.sciencedaily.com/releases/2009/03/090317153039.htm
53. Marital quality and health: A meta-analytic review - PMC, https://pmc.ncbi.nlm.nih.gov/articles/PMC3872512/
54. A Social Psychological Perspective on the Links between Close, https://pmc.ncbi.nlm.nih.gov/articles/PMC5373007/
55. (PDF) Emotion-focused couples therapy - ResearchGate, https://www.researchgate.net/publication/317443564_Emotion-focused_couples_therapy
56. EFT: Status and Challenges in Couples Therapy | PDF - Scribd, https://www.scribd.com/document/73341420/Emotionally-Focused-Couples-Therapy-Status-and-Challenges
57. A Comprehensive Meta-Analysis on the Efficacy of... : Couple ... - Ovid, https://www.ovid.com/journals/cfprp/fulltext/10.1037/cfp0000233~a-comprehensive-meta-analysis-on-the-efficacy-of-emotionally
58. A Comprehensive Meta-Analysis on the Efficacy of Emotionally, https://www.researchgate.net/publication/363783246_A_comprehensive_meta-analysis_on_the_efficacy_of_emotionally_focused_couple_therapy
59. 2024 - Spengler Et Al - A Comprehensive Meta-Analysis On ... - Scribd, https://www.scribd.com/document/830990483/2024-Spengler-et-al-A-comprehensive-meta-analysis-on-the-efficacy-of-emotionally-focused-couple-therapy
60. Attachment-security priming attenuates amygdala activation to social, https://pmc.ncbi.nlm.nih.gov/articles/PMC4448028/
61. Attachment-security priming attenuates amygdala activation to social, https://academic.oup.com/scan/article-pdf/10/6/832/27101106/nsu127.pdf