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The Greater Female Vulnerability Hypothesis:

Women's traits are designed to elicit care

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Short Abstract

Because mothers were more critical to offspring survival than fathers, women faced pressures to ensure their survival. If social partners could provide food and aid, ancestral women faced selective pressures to recruit support by communicating need. Compared to men, women 1.) are more concerned about social acceptance, 2.) perceive themselves as more vulnerable, 3.) more readily communicate suffering, 4.) more effectively elicit sympathy, 5.) and more often suffer from psychopathologies communicating desperation. Female psychopathology has worsened despite increased resources and opportunities, suggesting it does not entirely reflect absolute deprivation, but rather, is a competitive adaptation activated by heightened social competition.

Long Abstract

Because mothers and grandmothers more strongly promote children's survival than fathers or grandfathers, women faced amplified pressure to ensure their safety and survival across human history. Yet, ancestral women faced constraints (e.g., pregnancy) on their ability to provision themselves and offspring. Social partners were sources of aid, food, and protection. Women who successfully appealed to such partners could have promoted their own and children's survival. The Greater Female Vulnerability Hypothesis contends that women faced stronger social selective pressures than men to display vulnerability to elicit sympathy and support. Modern men and women exhibit preferences for morphological and behavioral vulnerability in women, suggesting these women would have better attracted mates and allies. To appeal to such preferences and recruit support, women faced social pressures to demonstrate vulnerability and communicate need. Congruent with such selective forces, compared to men, women 1.) are more concerned with their social acceptance, 2.) perceive themselves as more physically and

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emotionally vulnerable, 3.) more readily communicate suffering to others and pursue care, 4.) more effectively elicit sympathy, and 5.) more often suffer from psychopathologies communicating desperation (e.g., depression, self-harm). That girls/women are increasingly suffering from these need-communicating pathologies despite secular increases in resources and opportunities suggests these tendencies do not solely reflect societal treatment. Rather, these tendencies might be competitive adaptations increasingly activated by intensified social competition. Altogether, evidence supports women faced stronger social selection to experience and communicate vulnerability, and are more successful at recruiting sympathy and investment, in line with the Greater Female Vulnerability Hypothesis.

Keywords: anxiety, depression, psychopathology, self-harm, sexual selection, social selection, social support, sympathy, vulnerability, women

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Although numerous theoretical frameworks have been forwarded to explain the comprehensive suite of men's traits (Geary, 2021; Puts, 2010; van Vugt, 2009), many fewer provide a unified framework for understanding those of women. Yet, sex differences result not only from pressures operating on men, but also from those acting upon women. Indeed, ancestral women faced their own set of reproductive (Campbell, 1999), mating (Buss, 1989), and social challenges (Reynolds, 2022). To address this lacuna, Benenson and colleagues (2022) argued that many of women's traits were selected to insulate women against various physical and social threats. Because women's survival was more critical to that of children's than was men's, women evolved a suite of physiological, psychological, and behavioral traits to protect themselves from harm and promote their survival. Although this framework has undoubtedly advanced the scientific understanding of women's broad phenotypes, it cannot make sense of female tendencies to harm their well-being and safety. For example, compared to their male counterparts, girls and women more often self-harm, attempt suicide, maintain unhealthily low body weights, and in rare cases, feign their own illnesses. Such tendencies appear, at face value, antithetical to a female self-protective strategy.

To make sense of these inclinations, along with broader patterns of female morphology, behaviors, and psychopathology, the current article proposes the Greater Female Vulnerability Hypothesis. According to this hypothesis, relative to our male ancestors, female ancestors faced stronger incentives to signal need, appeal to others' sympathies, and recruit support due to their significance for offspring survival and reproductive constraints on securing food. Ancestral women who elicited resources, aid, and protection from social partners would have been more

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likely to promote their own and children's survival. If those who demonstrated need tended to evoke sympathy and support, social selection might have favored female tendencies to perceive themselves as vulnerable and communicate those vulnerabilities to others.

The paper begins by considering ancestral women's critical role in reproduction and the importance of their survival, as well as and the obstacles they faced, and thus, the necessity of recruiting support. Then, it evaluates whether men's mating preferences and women's same-sex preferences incentivized female displays of vulnerability, revealing which women might have more effectively won the favor of potential mates and allies. Third, it examines the relative support for five predictions stemming from the Greater Female Vulnerability Hypothesis: relative to men, women should: 1.) be more concerned about their social approval, 2.) perceive themselves as more vulnerable, 3.) be more likely to communicate suffering to social partners, 4.) be more effective in eliciting support, and 5.) exhibit psychopathology centered around communicating need. Last, it considers whether secular increases in the relative female prevalence of these psychopathologies suggest intensified social competition activates sex-specific competitive adaptations. That female mental anguish is most exacerbated in contexts with greater resources and opportunities for women suggests these pathologies result less from absolute deprivation and instead, social competition.

1. Female Vulnerability

Due to their critical roles in reproduction, our female ancestors faced amplified pressures to insulate themselves against harm throughout human history. As Anne Campbell (1999) argued, mothers contribute more strongly to the survivorship of children than do fathers. That is, children experience heightened mortality risk when their mothers are absent compared to when their fathers are absent (Sear & Mace, 2008). For example, Tsimane infants faced 169 times greater

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risk of death when their mother died, but only 3 times greater risk when their fathers did (Winking et al., 2011). Even following their post-reproductive years, maternal grandmothers enhance grandchildren's nutrition and survival (Chapman et al., 2021; Hawkes et al., 1997; Sear et al., 2000). Thus, women's survival was more closely intertwined with children's and grandchildren's survival than men's.

Threats jeopardizing women's survival therefore similarly compromised offspring survival. Benenson and colleagues (2022) contended that because women contribute so invaluably to reproduction, they evolved a wide array of psychological, physiological, and behavioral adaptations to protect themselves from harm. For example, relative to men, women exhibit stronger immune (Yang & Kozloski, 2011) and emotional responses to threats (e.g., fear, Archer, 2019; disgust, Al-Shawaf et al., 2018). Thus, women's consequential reproductive roles favored a suite of protective traits, which likely contributes to their longer average lifespans than men's (Benenson et al., 2022; Hamilton, 1966; Zarulli et al., 2021).

Beyond possessing physical, emotional, and behavioral responses that shelter themselves against threats, girls and women should also possess adaptations that evoke protection and aid from social partners. Social partners were potential sources of food, resources, care, support, and defense. All else equal, women who more effectively capitalized on the affordances of social partners would have been more likely to survive and promote their children's survival compared to women who did not take advantage of interpersonal opportunities for assistance (Geary, 2021). Women who braved life's exigencies on their own or who appealed unsuccessfully to social partners would have been disadvantaged relative to the women who successfully compelled allies to invest. That is, one strategy by which women could have promoted their survival is through appealing to the sympathies of social partners.

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Across human history, social partners might have provided aid to the ill and wounded as well as defense against conspecific violence. Archaeological evidence reveals that early humans provided extensive aid to social partners as far back as 1.5-1.7 million years ago (Lordkipanidze et al., 2005; Walker et al., 1982). Compassion and generosity might have been favored by sexual selection if they revealed fitness (Miller, 2001). In subsistence societies, women suffer from warfare (6%), but not to the same extent as men (28%; Wrangham et al., 2006). Among Hiwi hunter-gatherers, both young adult women and men die by violence, suggesting interpersonal aggression threatens women and men alike (Hill et al., 2007). In these communities, disputes over women and sexual jealousy are common predictors of homicide, suggesting young women's reproductive capacity made them vulnerable to male aggression. Indeed, men's sexual coercion posed a recurring threat to women's reproductive autonomy and ability to attract investing mates across history (Buss, 2021; Thornhill & Palmer, 2000). These patterns suggest that women across cultures and history have been vulnerable to male physical and sexual violence.

If male aggression posed a threat to women's safety and reproductive choice across human history (Smuts, 1992), such risks might have favored female mate preferences for partners able to defend them and their children against other men's violence (Mesnick, 1997). Indeed, single women are more often victimized by sexual aggression than married women (Wilson & Mesnick, 1997), supporting that male partners provide defense. Men's ability and willingness to protect is a critical component of their social status across cultures (Buss et al., 2020), revealing worldwide expectations of male defense. Modern women prefer mates and male friends capable of providing defense (Barlev et al., 2025; Bleske-Rechek & Buss, 2001; Lewis et al., 2011), raising the possibility that the threat of violence shaped both female platonic and romantic alliances with men.

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Women might have also recruited support for shielding against same-sex aggression. Girls' and women's intrasexual aggression tends to rely on indirect and social tactics, whereby perpetrators attempt to damage victims' social standing while maintaining plausible deniability (Archer, 2004; Benenson, 2014; Crick & Grotpeter, 1995). Such covert approaches conceal perpetration, thereby reducing risk of physical harm, reputational damage, or retaliation, congruent with a female self-protective strategy (Campbell, 1999). These tactics should also be preferred by girls and women because they disrupt victims' access to social support, which, according to the Greater Female Vulnerability Hypothesis, was critical to survival. If so, it follows that gossip especially harmful to girls and women should portray them as undeserving of aid (e.g., misusing or rejecting assistance; Prediction 1, Table 6). Modern evidence suggests women with known allies nearby are less likely to be targeted by negative gossip (Hess & Hagen, 2021), suggesting friends deter others' indirect aggression. Indeed, women's friendship norms suggest they expect such defense: compared to men, women are less tolerant of same-sex friends' disclosing their secrets, making negative remarks about them, or failing to defend them in public (Felmlee et al., 2012; Felmlee& Muraco, 2009; Reynolds & Palmer-Hague, 2022). These modern demands suggest women throughout history might have dodged the reputational blows of same-sex peers by armoring themselves with loyal allies.

Beyond aid or defense or, ancestral women might have also relied upon social partners for food provisioning. In natural fertility populations, women produce about 5-6 children on average across their lifetimes (Bentley et al., 1993; Hill & Hurtado, 1996). In these settings, pregnant women who overwork risk miscarriage (Gurven et al., 2007), suggesting constraints on foraging capacities. Yet, women's caloric requirements increase over the course of pregnancy (Most et al., 2019), indicating foraging becomes riskier during reproductive stages when

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additional nutrients are consequential. Moreover, mobility is constrained during later stages of pregnancy (Van de Pol et al., 2006), further impairing foraging, suggesting pregnancy was a precarious time for securing critical calories.

The arrival of newborns and nursing demands further constrain mothers' ability to forage and provide for their weened children (Dyble et al., 2016; Hawkes et al., 1997; Hurtado et al., 1992). Small children cannot survive for much longer than a week without food due to diminished fat reserves and increased metabolic rates (Hill & Hurtado, 2009). Thus, sustained provisioning was critical to children's survival. Relative to juveniles of other species, human children develop slowly and are quite dependent, not producing more calories than they consume until at least their teenage years (Gurven & Walker, 2006; Kramer, 2005). Because children consume more calories than they produce, couples in non-industrialized contexts often cannot produce sufficient calories to provide for multiple dependents and therefore, must rely on others' assistance (Hill & Hurtado, 2009). These patterns suggest ancestral women faced heightened nutritional demands for both themselves and dependent offspring during their reproductive years.

Access to men (including mates) likely offered opportunities for women to secure critical calories. Although women occasionally hunt, men are the primary hunters across hunter-gathering societies[1], and often contribute the preponderance of calories to subsistence (Dyble et al., 2016; Ember, 1978; Gurven & Hill, 2009; Venkataraman et al., 2024). In foraging contexts, men provide about 65% of the calories and 85% of the protein (Kaplan et al., 2000). Because hunting can produce more calories than gathering, single men's efforts often subsidize families' diets (Gurven & Hill, 2009; Hill & Hurtado, 2009). These patterns suggest women and their families would have faced greater chances at survival if men were willing to share their hunting returns.

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Although hunting can produce more calories than gathering, it is incompatible with caring for young children, which likely contributes to the sexual division of labor (Brown, 1970; Gurven & Hill, 2009). Indeed, in traditional societies, women conduct most of their daily activities while caring for children (Hurtado et al., 1985). Childcare, along with camp work and tool manufacturing, constrict the time women can spend foraging (Hurtado et al., 1985), and curtail women's ability to produce enough calories even for themselves (Kaplan et al., 2000). These patterns suggest even the most driven and hardworking women may have struggled to provision themselves and children, but especially when pregnant, breastfeeding, or caregiving. Such reproductive constraints on foraging would have necessitated reliance on social support and consequently, favored traits/tendencies that elicited aid.

One primary source of these necessary calories were women's romantic partners. Across foraging societies, fathers contribute substantially to children's diets, as hunters' families often receive disproportionate shares of kills (Gurven, 2004; Wiessner, 2002; Wood & Marlowe, 2013). This paternal provisioning likely contributes to children's greater survival when parents remain married compared to when they separate (Hill & Kaplan, 1988; Pennington & Harpending, 1988). Such benefits are not unique to non-industrialized contexts; across societies, children are less likely to perish when their fathers remain married to their mothers (Geary, 2000).

However, even investing fathers could struggle to provision children if those fathers became sick or injured. Across non-industrialized groups, men's health constrains their hunting capacities during 20% of days, with bouts of infirmity lasting a month on average (Bailey, 1991; Hill & Hurtado, 2009). To buffer against starvation during these setbacks, hunters preemptively provide excess meat to others, so favors could be returned if later unsuccessful, injured, or ill

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(Sugiyama & Chacon, 2000). Hunters who share meat more generously tend to receive more meat and aid when incapacitated (Gurven et al., 2000). Across cultures, families who share meat tend to be those who receive it in return, supporting that generosity can reduce risk (Allen-Arave et al., 2008; Patton, 2005; Ziker & Schnegg, 2005). Thus, one way by which women could buffer against their families' starvation or undernourishment is by pairing with hunters sufficiently successful and generous to share excess meat with others as insurance against potential setbacks.

Evidence suggests women married to successful hunters experience numerous fitness-related benefits. For example, such women do not have to spend as much time foraging to support their families (Hurtado et al., 1992). Indeed, skilled hunters can provide 3-4 times the food for their families than less skilled hunters (Wood & Marlowe, 2013). Perhaps due to their husbands' sharing of excess meat, wives of more (versus less) skilled hunters tend to have more cooperative partners and less often change residencies (Wiessner, 2002). These women also tend to have more children (Marlowe, 2001), who are more likely to survive (Gurven & von Rueden, 2006; Hill & Hurtado, 1996). Thus, women who secured the sustained investment from skilled partners attained higher reproductive success than those whose partners abandoned them or were less skilled. Such disparate outcomes likely to contribute to why women the world over express a preference for mates with resources (Buss, 1989; Walter et al., 2020). Modern women also tend to prefer male friends with greater resource access (Lewis et al., 2011), raising the possibility that platonic alliances with men served as additional buffers against starvation. Among subsistence cultures, skilled hunters marry earlier to younger, more attractive wives, supporting that they are preferentially selected as mates (Gurven & von Rueden, 2006).

Women's caloric dependence on men should have favored female traits and behaviors that increased men's inclination to select them as mates, remain partnered, and provide sustained

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investment. However, even when partnered, couples struggle to provision for numerous dependents. Thus, attracting a mate who was both a skilled hunter and inclined towards sharing might have ensured greater social support during times of need. Among the women unlucky in securing mates who were committed, skilled, or avoided life's perils, their ability to provision themselves and their children would have been, to some degree, dependent upon others' generosity. Indeed, non-industrialized groups share food based upon need (Allen-Arave et al., 2008). All else held equal, the women who were more sympathetic or pitiable should have been more successful in garnering such support compared to those who appeared capable, were bothersome, or rejected aid. Thus, whether in the context of attracting and retaining investing partners or when unpartnered, our female ancestors likely buttressed their and their children's chances of survival if they could effectively evoke social support.

Male Preferences for Physical Vulnerability

Because women's and children's caloric needs could be supplemented through men's meat provisioning, women who appealed successfully to men's preferences might have been better able to provide for their families. That is, men's preferences may have shaped the selective pressures acting upon women's traits.

Because gestation occurs within women's bodies, ancestral men's reproductive success was most strongly constrained by access to fecund women, or those who could become pregnant (Symons, 1979). Women's age is one of the strongest predictors of their fecundity, as their likelihood of conceiving declines linearly with age, beginning in the 20s (Eijkemans et al., 2014; Geruso et al., 2023). Thus, ancestral men who selected mates with higher reproductive capacities would have been more likely to produce offspring than those who selected mates of advanced ages. The point at which women achieve maximum reproductive capacity, or when they are most

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likely to produce future children, is when they have reached sexual maturity but have not yet had borne any children (i.e., are nulliparous, Symons, 1979). This reproductive peak is estimated to occur around age 15 (Bowles & Posel, 2005). Men who selected partners near this age would have been most likely to capitalize on their female partners' entire reproductive careers, with greater probabilities they fathered all their partners' offspring. Indeed, across cultures, modern men express stronger preferences than do women for mates who are young (Buss, 1989; Hitsch et al., 2010; Kurzban & Weeden, 2005; Walter et al., 2020).

Although reproductive capacity is not directly discernible, age-linked physical cues could provide some information about women's positions in their reproductive careers. All else held constant, the men who preferred partners displaying features associated with youth, such as wrinkle-free supple skin, large eyes, or lustrous hair would have been more likely to select mates with high reproductive capacity, thereby enhancing their reproductive success. Thus, modern men are likely to be the descendants, on average, of men possessing preferences for female features denoting youth. The reproductive relevance of female partners' ages likely contributes to why globally men place such emphasis on potential mates' physical appearances (Buss, 1989; Lippa, 2007; Walter et al., 2020): traits deemed attractive are those conveying cues of youth and reproductive capacity.

Such male preferences would have favored women with physical features conveying high reproductive potential, irrespective of their true ages. That is, women who possessed youthful traits despite their advancing age should have been preferred as mates over women whose features accurately revealed their age or suggested an older age. In support of such selective forces, neotenous features, including large wide-set eyes, high foreheads, narrow chins, and smaller noses predict female facial attractiveness, even after accounting for women's ages

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(Cunningham et al., 1995; Jones et al., 1995). These patterns suggest individuals across cultures prefer female faces retaining juvenile features, regardless of women's true ages, revealing social selective forces for female cues of youth.

If individuals possess perceptual biases to respond to cues of neoteny with care (Burnstein et al., 1994), then pressures on women to appear youthful might have also produced physical features that evoke sympathy. Indeed, female faces are perceived as naiver than men's (Keating et al., 2003). Exaggerating these neotenous features increases people's motivation to not only care for babies (Glocker et al., 2009) but also to help women (Keating et al., 2003). Such patterns suggest the female facial traits perceived as attractive also elicit support. If women with neotenous faces were especially effective in recruiting aid broadly, this social selection could have further favored the juvenility of women's appearances (West-Eberhard, 1979; 1983). In other words, sexual selection for youth might have allowed women to better appeal to third parties' sympathies, which could elaborate female neoteny.

Similar pressures might have also shaped women's bodies, such that they tend to cohere with male preferences and effectively recruit social support. Cross-cultural investigations reveal men generally prefer relatively slender female figures (Swami et al., 2010), with BMIs around 19-22 kg/m^2 (Swami & Tovée, 2005; Swami et al., 2006; 2007). BMI is reliably associated with age and parity, suggesting lower weights are cues of youth and nulliparity (Lassek & Gaulin, 2019). Consequently, BMI accounts for roughly 70-85% of variance in female body attractiveness judgments (Swami & Tovée, 2005; 2007; Swami et al., 2006; Wang et al., 2015). If across human history, men preferred relatively thin women as mates, such social forces might have contributed to modern women's body composition. To be sure, however, mating pressures might have also shifted the nature of women's fat deposits such that they are disproportionately

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stored away from the abdomen and instead in areas signaling fecundity, such as breasts and buttocks (Jasieńska et al., 2004; Lassek & Gaulin, 2008; Singh & Young, 1995). Gluteal femoral fat stores harbor DHA, which is critical for developing fetal brains (Lassek & Gaulin, 2019). Yet, even with these fat stores, the preferred female BMI across cultures is thinner than that most strongly associated with survival (Wang et al., 2015), suggesting women faced social and sexual pressures to possess leaner bodies than advantageous for withstanding famines. Molecular genetics suggests directional selection on women's body fat, BMI, waist size, and waist-to-hip ratio was less positive than that operating on men's traits (Sanjak et al., 2018).

If ancestral women faced pressures to possess thinner bodies (aside from gluteofemoral fat stores), then to counteract the potential survival risks, women might have needed to recruit additional support. Indeed, women who consume more dietary DHA tend to store less fat (Zhang et al., 2017). Similar patterns are found across mammals such that in species where females receive more alloparental care, females store less fat (Heldstab et al., 2017). These patterns raise the possibility women could only afford to remain thin if they received sufficient nutrients and aid. In modern contexts, people report greater sympathy for and willingness to help thinner than heavier women (Randall et al., 2017; Sikorski et al., 2015; Swami et al., 2008a). Thus, female thinness appears to be preferred by mates, rewarded by social partners, and sustainable to the degree someone is sufficiently nourished. These patterns suggest that relative to their heavier counterparts, thinner women might have more often elicited male attraction and aid. Future research might better address this possibility by examining whether across cultures, people feel greater sympathy, pity, and motivation to aid thinner versus heavier women and whether responses differ from those to men of varying thinness (see Table 6 predictions).

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Men's preferences for female height tend to be more relative than their preferences for female weight, such that men generally prefer partners shorter than themselves (Fink et al., 2007; Pawlowski, 2003; Salska et al., 2008; Swami et al., 2008b). Female height is genetically correlated with age at first birth, such that shorter women tend to reproduce earlier (Barban et al., 2016). The relative nature of men's preferences might also be due in part to social perceptions that taller women are more dominant than their male partners (Boyson et al., 1999). However, even absent visual cues, men tend to prefer the voices of smaller than larger women (Collins & Missing, 2003). Regardless of the proximate mechanism, such a preference for sexual dimorphism might have contributed to the large observed sex difference in stature across cultures, with women substantially shorter than men (d = 1.63; Lippa, 2009). Indeed, across countries, taller women are less likely to get married, marry at older ages, and have fewer children (Murasko, 2020; 2022). Genetic evidence among contemporary populations supports directional selection for shorter female heights (Sanjak et al., 2018). Although most evolutionary accounts attribute this sexual dimorphism to pressures on men to be formidable (e.g., Hill et al., 2017), patterns of mate preferences raise the possibility that social pressures might have also constrained female body size.

Although much less work has investigated preferences for women's muscularity, tentative evidence suggests men tend to dislike muscular women (Salusso-Deonier et al., 1993) and prefer frailer women (Yanover & Thompson, 2010). Muscularity is energetically costly (Lassek & Gaulin, 2009), and thus, it might not have been favored in women if their activities less often required strength. However, women with elevated testosterone levels tend to be more muscular and suffer reduced fertility (Bushell & Crespi, 2024). Thus, men might tend to disfavor heightened muscularity if it corresponds to hormonal profiles less conducive to reproduction.

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Women less strongly desire to be muscular than do men (d = .91, McCreary & Saucier, 2009), and occasionally desire no muscularity (23%, Steinfeldt et al., 2011) or to be less muscular than they are (Grossbard et al., 2011). Compared to men, women possess about 40% less muscle mass on average (Lassek & Gaulin, 2009). Although this disparity has been largely attributed to selection pressures operating on men (Lassek & Gaulin, 2022), it is also possible that sexual and social pressures have reduced women's muscularity. Lower levels of muscularity tend to increase perceptions of vulnerability and evoke pity and protective inclinations (Dijker, 2001). Conversely, increased muscularity is associated with perceptions of criminality (Shaw & Wafler, 2016). Thus, women who were less muscular might have been more effective in recruiting social aid, widening sex differences in body composition. Future research might assess this possibility by examining sexual and social preferences for women's muscularity, as well as genetic evidence for directional selection.

Evidence supports that sexual and social preferences have constrained women's foot size. Across cultures, people evaluate smaller female feet as more attractive than larger feet (Fessler et al., 2005b; 2012; Voracek et al., 2007). Female foot size might be treated as a cue of youth and reproductive potential, as foot size increases with age and parity (Fessler et al., 2012; Voracek et al., 2007). Because pregnancy raises women's center of gravity and increases the costs of falls, natural selection should have favored larger female feet for stability (Fessler et al., 2005a). That women exhibit smaller proportionate foot size than men across cultures (Fessler et al., 2005a; Voracek et al., 2007) supports that social and sexual preferences have shifted female morphology away from the optimal, increasing female vulnerability.

Taken together, these patterns raise the possibility that men's mating preferences have shaped women's faces, weights, heights, muscularity, and feet to make them more neotenous and

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diminutive. If these features also make women appear more vulnerable, sexual pressures might have allowed women to more effectively recruit sympathy and aid, further favoring juvenility and gracility. If such selection pressures could alter female physical features, then it is possible women's psychologies and behavioral inclinations have also been shaped to recruit male investment by advertising vulnerability.

2. Male Preferences for Behavioral Vulnerability

Although greater physical vulnerability might have aided women's chances at attracting mates, behavioral cues of vulnerability might have amplified women's likelihood of retaining mates. Women's dominance not only harms their likability (Williams & Tiedens, 2016), but also their romantic appeal (Brown & Lewis, 2004; Lukaszewski & Roney, 2010). One potential explanation for this detrimental effect of dominance on romantic desirability is that potential partners use female dominance as a cue of proclivities towards committing sexual infidelity (Brown & Lewis, 2004). Across human history, ancestral men lacked paternity certainty, such that they never had perfect confidence they were the genetic fathers of children. Men therefore risked investing care, resources, and protection into children who were not their biological descendants—cuckoldry— and consequently, male psychology has been shaped to minimize these potential costs (Daly et al., 1982). Indeed, some evidence tentatively supports that men use cues of women's agency, such as educational attainment, as proxies for their probable infidelity (Greitemeyer, 2007).

There is a kernel of truth in the assumption that women's dominance corresponds to their propensity towards infidelity. Wives who were more (versus less) extraverted were more likely to commit infidelity (Altgelt et al., 2018). Because dominance is a facet of extraversion (DeYoung et al., 2007), this suggests dominant wives were more inclined towards infidelity. To be sure,

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women's extraversion correlates with physical attractiveness (Lukaszewski & Roney, 2011), so it is also possible extraverted women are more often approached. However, a cross-cultural analysis of 46 nations further supported associations between women's extraversion and short-term mating orientations (Schmitt & Shackelford, 2008).Thus, men might tend to evaluate dominant women as less appealing long-term romantic partners if dominance is treated as a proxy for proclivity towards infidelity.

Alternatively, heightened female dominance might correlate with hormonal profiles less conducive to fertility. For example, women with elevated testosterone (due to PCOS) tend to be more dominant and suffer from impaired fertility (Bushell & Crespi, 2024). Similarly, women exposed to abnormally high androgen levels in utero tend to be more aggressive, less tender-minded, less interested in children (Matthews et al., 2009), more likely to pursue masculine occupations (Strandqvist et al., 2025), and experience reduced fertility (Casteràs et al., 2009) compared to unaffected women. Thus, men might perceive heightened female dominance as less attractive if it corresponds to hormonal levels detrimental to fertility or to less nurturing tendencies during childrearing. Female dominance might also be associated with status pursuits that delay childbearing (Low et al., 2002). If women experience stronger tradeoffs between pursuit of cultural resources and reproductive success than men (Geary, 2021), traits associated with status pursuit (e.g., dominance) could be disfavored.

If men faced incentives to avoid dominance in their female mates, then women who demonstrate power, status, or agency might experience diminished relationship outcomes. Women face a greater probability of divorce following promotion to powerful positions, such as mayor, parliament member, or CEO, compared to men promoted to identical leadership roles (Folke & Rickne, 2020). When wives earn more than their husbands, couples experience greater

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dissatisfaction, conflict, and divorce (Bertrand et al., 2015; Jalovaara, 2003; Liu & Vikat, 2007). Similarly, women face heightened risk of abuse from their husbands when they earn relatively higher incomes (Atkinson et al., 2005; Zhang & Breuing, 2023). Taken together, these patterns suggest dominance, power, and success are associated with worse relationship outcomes.

If these detriments persisted across evolutionary history, then ancestral women who were less agentic, status-striving, or competitive might have been better able to attract and retain mates. Indeed, girls and women seem to restrain their competitive behavior when competing against boys or men versus same-sex peers (Balliet et al., 2011; Gneezy & Rustichini, 2004; Niederle & Vesterlund, 2008). Moreover, the difference between men and women in agency widens when assessing couples versus individuals (Hsu et al., 2021). Such a disparity raises the possibility that women diminish their agency when in proximity to their romantic partners or alternatively, that less agentic women are preferentially selected as romantic partners. Altogether, these patterns suggest agentic women risk diminished mating opportunities relative to women who instead display more naïve or submissive qualities.

3. Female Preferences for Behavioral Vulnerability

Although ancestral women likely benefitted from appealing to men's preferences, female peers might have also been critical sources of support, and thus, selection, throughout human history. For example, among extant hunter-gatherers, women give away about 55% of their food to those outside their nuclear families, a similar amount to that shared by men (Gurven, 2006; Gurven et al., 2000; 2001; Kaplan & Hill, 1985). Bayaka women share food with their female friends (Lewis, 2017) and Batek women forage with female allies, who might offer protection or information about opportunities and threats (Kraft et al., 2023). In some non-industrialized groups, women fill important social roles in publicly critiquing norm violators and mediating

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community conflict (Bowser & Patton, 2010; Lewis, 2014; Wiessner, 2005). Thus, it could prove advantageous to befriend women with the influence to sway public opinion in one's favor. Among both Bayaka and Agta mothers, greater access to second or third-degree connections (e.g., friends of friends) corresponded to more surviving children (Page et al., 2017). Likewise, among the Tsimane, women better liked by their female peers had more surviving children (Rucas, 2017). Thus, female allies might have been significant sources of aid and protection in buttressing women and their children from peril.

If same-sex peers provided fitness benefits, ancestral women who better appealed to their preferences or avoided their scorn should have left more surviving children on average. Modern women would tend to be descendants of female ancestors who won the favor of other women. A wide array of evidence supports that modern women dislike and avoid cruel or competitive same-sex peers . Moreso than men, women prioritize empathic understanding (Hall, 2011; Williams et al., 2022) and kindness (Vigil, 2007) in friends. Compared to men, women are more willing to end friendships over various transgressions, including cruel comments, teasing, betrayed confidences, failing to stand up for them, and physical harm (Felmlee & Muraco, 2009; Reynolds & Palmer-Hague, 2022; Vigil, 2007). Similar patterns are found among the Tsimane, whereby women known for lying and gossip are disliked by same-sex peers (Rucas et al., 2006). Women tend to dislike competitive women as friends (Duarte et al., 2025a), and competition more strongly harms female than male friendships (Hibbard & Buhrmester, 2010; Schneider et al., 2005). Perhaps because women are aware of these social costs, women show greater disapproval and distress about competition in their same-sex relationships than do men (Lee et al., 2016; McGuire & Leaper, 2016).

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Because cruelty and competitiveness are forms of agency, these patterns suggest women who instead expressed passivity or vulnerability might better avoid female rejection. Indeed, compared to men, women hold higher expectations for their friends' intimacy, empathy, emotional support, and self-disclosure (Hall, 2011; Williams et al., 2022). Such preferences suggest women who openly express vulnerabilities and respond compassionately to those of their friends should tend to be rewarded with same-sex allyship. Women prefer female gossipers delivering reputation-harming information under the guise of their own victimhood (Reynolds & Palmer-Hague, 2022). That is, compared to speakers gossiping about third person victimization ("Amanda knew Tina was going through a hard time, but never checked on her") women more strongly preferred female gossipers delivering statements as their own victimization ("Amanda knew I was going through a hard time, but never checked on me"). These patterns suggest that when women engage in intrasexual competition, those who do so under the guise of personal victimhood are advantaged. Similarly, female gossipers are better liked when they phrase their defamatory statements with concern ("I am worried about her") rather than maliciously or neutrally (Reynolds et al., 2025). Such patterns suggest innocence and vulnerability are socially advantageous when women engage in the competitive acts of same-sex reputation manipulation. Thus, women who more readily portray their innocence or suffering might be especially successful in recruiting female peer support.

Reynolds (2022) contended that ancestral women likely avoided cruel and competitive same-sex peers in favor of kind and vulnerable ones due to the social arrangements across human history. If many social groups practiced patrilocality (Burton et al., 1996; Lippold et al., 2014; Szécsényi-Nagy et al., 2015; Wilkins, 2006), whereby women resided with their husbands' families upon marriage, many ancestral women could not have relied on shared genetic

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relatedness to support their same-sex bonds. Because cooperation between non-relatives tends to be less stable than among relatives, women had to assess carefully which peers were likely to be trustworthy and committed. Women needed to actively cultivate and maintain their relationships with nearby women, such as through reciprocal altruism (Geary, 2002) or mutualism. All else held equal, potential allies who were kind would have offered more generous exchanges and forgiveness of defections. Ancestral women might have also prioritized cues of interpersonal loyalty to ascertain which potential allies would remain steadfast exchange partners in the face of more profitable options, as well as which might defend their reputations against defamation. That is, absent the stability of kinship bonds, women should have scrutinized potential allies for cues of altruism and loyalty. Thus, female ancestors who preferred kind and devoted same-sex peers likely enjoyed more favorable and sustained cooperative partnerships.

Relative to modern men, women express stronger preferences for kind and loyal same-sex friends (Reynolds & Palmer-Hague, 2022). Disclosures of vulnerability might serve as one cue of loyalty when they reveal reputation-harming information, thereby raising the cost of the discloser's abandonment (Hess, 2006). That is, women might prefer when same-sex peers disclose vulnerable personal information because these disclosures serve as collateral, such that the listener now has "dirt" on the discloser if she were to abandon the friendship. If women had to discern trustworthy peers in patrilocal contexts, hard-to-fake signals of loyalty should have been prioritized. Compared to men, women attribute more disloyalty to friends who are unwilling to disclose personal information (Felmlee et al., 2012; Shackelford & Buss, 1996). These patterns suggest that by disclosing vulnerabilities, women might have better communicated loyalty to same-sex peers, thereby securing allies.

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Not only do women tend to dislike and penalize competitiveness and cruelty, traits that would likely lead to unfavorable exchanges, women also seem averse to status inequities among their same-sex relationships (Duarte et al., 2025b). Partner asymmetry tends to undermine reciprocal cooperation (Colnaghi et al., 2025). Thus, if ancestral women relied on reciprocal exchanges, they would be more successful at sustaining cooperation with same-sex peers who had symmetrical levels of status and resources because this parity would favor goal alignment. Compared to boys and men, girls and women tend to show stronger preferences for egalitarian distributions of resources (Andreoni & Vesterlund, 2001; Benenson et al., 2019; Berdahl & Anderson, 2005; Carlsson et al., 2005; Kamas & Preston, 2015; Saad & Gill, 2001). In modern workforces, when women hold divergent levels of power, they tend to show reduced cooperation (Benenson et al., 2014) and dissatisfaction with higher-ranking women (Artz & Taengnoi, 2016). Some evidence suggests women strategically leverage equality norms to bring down high performing same-sex peers (Benenson & Markovits, 2023a). That is, women more often prefer equal payoff schemes when competing against higher, but not lower, performing women. Thus, it is possible that some of these egalitarian preferences function to hinder the success of threatening same-sex rivals. Indeed, compared to their male counterparts, girls and women tend to feel more bothered by same-sex peers' surpassing them across various domains (Benenson & Benarroch, 1998; Benenson & Markovits, 2023b). Thus, advertising one's low rank, limited resources, or poor competitive abilities might have enhanced women's success in recruiting and maintaining same-sex friendships.

Altogether, this body of evidence suggests women likely encountered social pressures from same-sex peers to emit cues of vulnerability and kindness over competitiveness or cruelty.

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If women tend to penalize or dislike same-sex peers who attain higher status and resources, then those who advertise need or low rank might better win the favor and support of same-sex peers. That is, communicating vulnerability might be a successful female intrasexual strategy.

4. Overview of Predictions

Taken together, the patterns above suggest women faced sexual and social incentives to downplay their dominance, competitiveness, and malice in favor of vulnerability. If such social pressures were sustained throughout human history, it should follow that women's phenotypes were selected to advertise vulnerability. That is, if women conveying innocence, concern, and need were more successful in evoking pity, allyship, and male investment than women displaying assertiveness, confidence, or success, then signaling vulnerability might be a socially selected competitive female strategy.

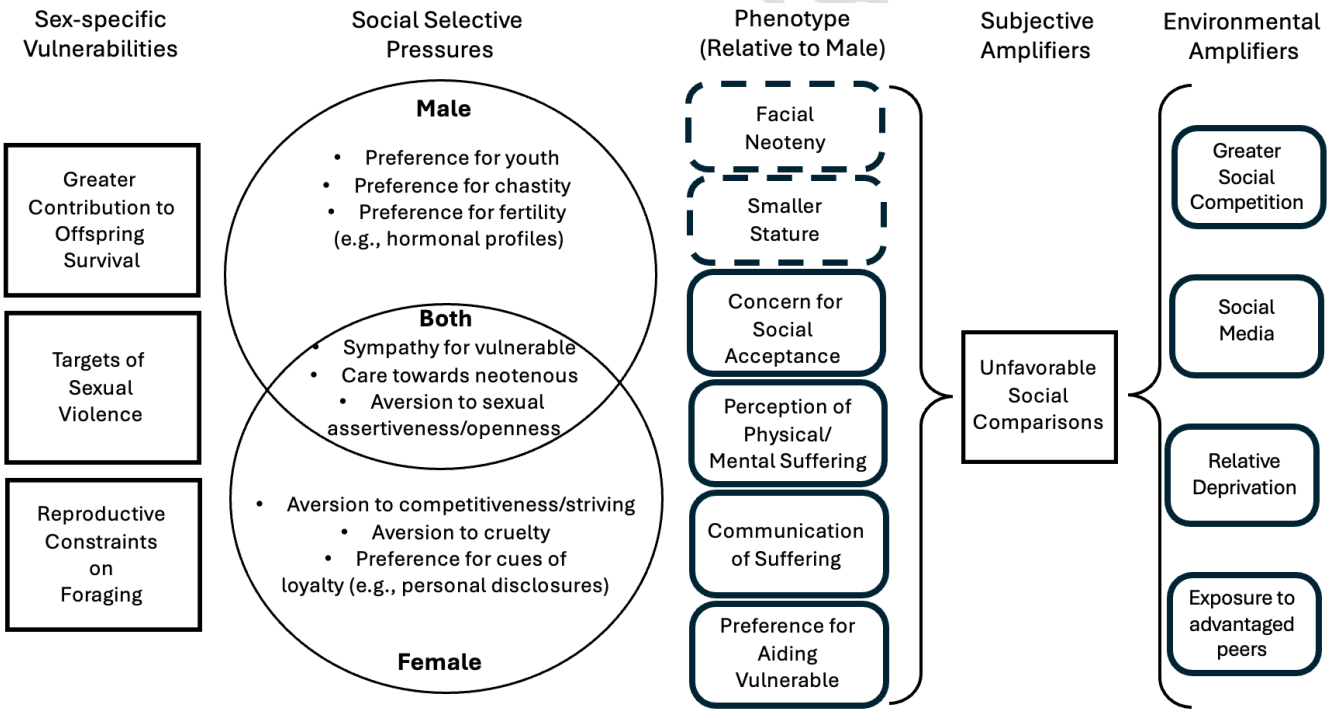
To date, many sex differences, such as men's greater strength, risk-taking, or aggressiveness have been attributed to the selective pressures operating on men, such as coalitionary conflict (e.g., Hill et al., 2017; Lassek & Gaulin, 2022). However, it is quite possible that social and mating pressures have operated simultaneously on women to augment and display their physical and psychological vulnerability. Due to their greater contribution to offspring survival, women faced heightened selection pressures to promote their survival. Yet, they also faced constraints on their ability to provision and protect themselves, as well as their highly dependent children. Benenson and colleagues (2022) contended women possess numerous traits to protect themselves from harm, such as greater fearfulness, immune reactivity, pain sensitivity, and nighttime wakefulness than men. Yet, if social partners, including mates, were critical sources of aid and resources that could also buttress women against harm, then women might possess a suite of traits to elicit care. If men favored cues of youth, fertility, and chastity, women

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might possess neotenous physical features and inclinations away from dominance to recruit and retain male investment. If female peers favored demonstrations of vulnerability over agency, women might have won the support of same-sex allies by communicating fragility. Because cues of vulnerability tend to elicit pity and aid, social selection may have further favored female perceptions of their own suffering and communication of desperation to social partners (West-Eberhard, 1979; 1983). See Figure 1 for an overview of hypothesized selective forces, resultant female phenotypic traits, and potential subjective amplifiers.

Figure 1

Hypothesized Selection Pressures, Resultant Phenotype, and Proposed Amplifiers



Note. Dashed ovals represent physical traits whereas remaining solid ovals represent psychological/behavioral inclinations.

The remainder of this paper examines the relative support for the Greater Female Vulnerability Hypothesis—that women have been selected to advertise need and vulnerability to

recruit social support. Specifically, it examines five predictions. 1.) If women faced stronger selective pressures to elicit social support, they should be especially concerned about their relative social acceptance compared to men. 2.) If advertising vulnerability over agency was an effective mechanism of recruiting support, women should perceive themselves as less agentic and competitive, as well as more physically and emotionally vulnerable than men. 3.) If social partners buttressed women against harm, then women should be more willing to disclose their suffering to social partners, take advantage of social safety nets, and promote redistributive societal policies to benefit those in need. 4.) If women faced pressures to advertise vulnerability, then selection should have shaped women to be more effective than men in recruiting pity and aid. 5.) If women experienced selection towards greater vulnerability, then the tail end of the female distribution should exhibit pathologically heightened social sensitivity, dependence, and signaling of need. That is, mental illnesses that more often afflict women should communicate desperation to social partners.

Last, the paper examines whether secular decrements in women's wellbeing reflect heightened social competition. If signaling need is a competitive female adaptation, then women should increasingly experience and demonstrate vulnerability as the social world becomes more competitive. That is, cues of heightened social competition might activate women's competitive mechanisms, which according to the Greater Female Vulnerability Hypothesis, include demonstrations of desperation. Thus, modern women might experience amplified suffering, despite greater access to resources and power, if the social world becomes increasingly competitive. To contextualize the degree of support for each prediction, Tables 1-5 provide effect and sample sizes (when available or calculable[2]) for referenced studies.

5. Prediction 1: Monitoring Acceptance

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If female ancestors could promote their survival by evoking social support, then they should be especially attuned to their level of social acceptance and inclusion. That is, relative to men, women might show greater attunement to cues indicating their social approval. Indeed, meta-synthesis reveals that relative to men, women show stronger interest in people and attachment to peers (Zell et al., 2015). Across 57 countries, women score higher in theory of mind (Greenberg et al., 2023) and the affective (but less so cognitive) component of empathy (Angh & Goh, 2010; Toccaceli et al., 2018). This greater understanding of others' emotions might be especially valuable for detecting cues of disapproval or potential rejection. Moreover, empathy is even more heritable among women relative to men (Toccaceli et al., 2018), justifying that selection could influence this trait. Women also show stronger implicit motivations for affiliation (Drescher & Schultheiss, 2016) and perceive affiliative touch as more rewarding (Russo et al., 2020), suggesting stronger drives for proximity to social partners. Girls and women also smile more (LaFrance et al., 2003), and use more affiliative and less assertive language (Leaper & Ayres, 2007), revealing tendencies towards reducing tension and risk of disapproval (Benenson et al., 2022).

Indeed, girls and women experience greater distress about the degree to which they are socially accepted. For example, compared to men, women experience higher rejection sensitivity (Giovazolias & Paschalidi, 2022; Maiolatesi et al., 2022) and interpersonal sensitivity (Lambert & Hopwood, 2016;Nyström et al., 2018). Similar patterns are found among adolescents: compared to boys, girls experience heightened rejection sensitivity (Zimmer-Gembeck, 2015), friendship stress (Rudolph, 2002), and excessive reassurance seeking (Nesi, & Prinstein, 2015). Experimental manipulations uncover similar divergences: in response to social exclusion, women

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show faster heart rates (Benenson et al., 2013) and increased cortisol (Stroud et al., 2002) relative to men.

Although sex differences in attachment styles are modest, with women scoring slightly higher in attachment anxiety (Del Giudice, 2011; Gray & Dunlop, 2019), facet-level analyses suggest women are especially prone to preoccupation—worry about abandonment and neediness—upset over partners' disinterest (Del Giudice, 2016). Compared to boys and men, girls and women also experience more shame and guilt (Else-Quest, et al., 2012), suggesting stronger motivation to repair transgressions and avoid social devaluation (Sznycer et al., 2018). Altogether, these patterns suggest women are more strongly motivated to maintain proximity to social partners and are more concerned over social partners' responses to them, which should aid in the recruitment of pity and assistance.

Table 1

Support for Prediction 1: Monitoring Social Acceptance

Trait/tendency	**Effect Size**	**Sample Size**	**Population**	**Citation**
Interest in people	d = .49		Meta-synthesis	Zell et al., 2015
Attachment to peers	d = .51		Meta-synthesis	Zell et al., 2015
Theory of mind	d = .17	N = 305,726	57 countries	Greenberg et al., 2023
Greater emotional than cognitive empathy	d_{emot} = .84 d_{cog} = .49	N = 396	Adolescents in Singapore	Ang & Goh, 2010
	d_{emot} = .75 d_{cog} = .26	N = 1,687	Italian twins	Toccaceli et al., 2018
Implicit affiliation motivations	d = .45	N = 5,962	Meta-analysis	Drescher & Schultheiss, 2016
Perceive affiliative touch as more rewarding	d = .25	N = 362	Meta-analysis	Russo et al., 2020
Smile more	d = .41	N = 109,654	Meta-analysis (k = 162)	LaFrance et al., 2003
More affiliative and less assertive language	d_{affil} = .12 d_{asser} = -.09	N_{affil} = *2,781* N_{asser} = *2,541*	Meta-analysis (k_{affil} = 54) (k_{asser} = 50)	Leaper & Ayres, 2007
Rejection sensitivity	d = .17	N = 679	University students	Giovazolias & Paschalidi, 2022
	d = .23	N = 1,679	Swedish young adults	Maiolatesi et al., 2022
	d = .21	N = 711	Early adolescents (grades 5-7)	Zimmer-Gembeck, 2015

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Interpersonal sensitivity	d = .47	N = 235	Undergraduates	Lambert & Hopwood, 2016
	d = .46	N = 252	Undergraduates	Nyström et al., 2018
Friendship stress	d = .32	N = 460	Early adolescents (grades 5-8)	Rudolph, 2002
Reassurance-seeking	d = .38	N = 619	Adolescents	Nesi, & Prinstein, 2015
Increased heart rate in response to social exclusion	d = .66	N = 40	Undergraduates	Benenson et al., 2013
Increased cortisol following social exclusion		N = 58	Adults	Stroud et al., 2002
Attachment anxiety	d = .04	N = 65,047	Meta-analysis	Del Giudice, 2011
	d = .19	N = 1,271	American adults	Gray & Dunlop, 2019
Preoccupation about abandonment	d_1 = .13 d_2 = .37	N_1 = 8,829 N_2 = 619	Sample 1: US undergraduates Sample 2: Italian undergraduates	Del Giudice, 2016
Shame	d = .29	N = 236,304	Meta-analysis (k = 382)	Else-Quest et al., 2012
Guilt	d = .27	N = 236,304	Meta-analysis (k = 382)	Else-Quest et al., 2012

Note. Positive effect sizes represent greater levels among girls/women relative to boys/men. Effect sizes are not provided if the relevant information needed to calculate them was not reported in the texts.

6. Prediction 2: Perceptions of Vulnerability

Although sensitivity to social feedback might allow women to monitor how their behavior influences social partners' responses, women might more effectively evoke care if they also view themselves as vulnerable and suffering. That is, women's self-concepts might translate into behaviors that prompt social partners to help. Pity and sympathy are strong predictors of helping and protection motivations (Dijker, 2001). Traits that tend to evoke pity or sympathy include vulnerability, need, younger and older ages (relative to adulthood), poor health, warmth, crying, sadness, and fear (Burnstein et al., 1994; Cuddy et al., 2007; Dijker, 2001; Lishner et al., 2011; Marsh & Ambady, 2007; Zickfeld et al., 2021). Traits that tend to diminish pity are muscularity and competence (Cuddy et al., 2007; Dijker, 2001). This latter pattern might be explained in part by moral typecasting, whereby when individuals detect harm, they instinctively

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cast the involved targets into the roles of harm-inflicting agent (or perpetrator) and pain-experiencing patient (or victim; Gray & Wegner, 2009). These roles are inversely related, such that as a target is perceived as more agentic, they are less likely to be perceived as a suffering patient, and vice versa (Gray & Wegner, 2011). Thus, to evoke pity and sympathy, individuals must not only express vulnerability and suffering, but they must also avoid expressions of agency, because such expressions increase perceived capacity and blame. Indeed, experimental manipulations increasing women's agency diminish perceptions of their pain sensitivity (Blake et al., 2016), supporting that agency undermines perceptions of victimhood.

If women have faced stronger selection pressures than men to elicit sympathy, they should not only view themselves as more vulnerable, but also less agentic. Around the world, women have lower self-esteem than men, suggesting they feel less confident in their capacities and worth (Bleidorn et al., 2016). That self-esteem is heritable supports that it can be altered by selective pressures (Neiss et al., 2005). Relative to men, women perceive themselves as less agentic, independent, and self-confident (Abele, 2003; Hentschel et al., 2019; Hsu et al., 2021). When aggregate levels of traits are considered, women diverge even further from men, such that they evaluate themselves as less agentic, but more communal (D = .67; Eagly & Revelle, 2022). These self-perceptions suggest women view themselves as relatively less capable than men, perceptions that likely influence others' sympathy and aid provisioning. Around the globe, women score higher than men in neuroticism (Schmitt et al., 2008), which is heritable (Hettema et al., 2006), and represents a greater tendency to experience negative emotions. When this larger personality trait is deconstructed into narrower facets, women show even larger deviations from men in vulnerability, anxiety (Kajonius & Johnson, 2018), and apprehension (Del Giudice et al.,

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2012). That is, compared to men, women less often perceive themselves as adequate, secure, or able to cope in the face of stressors (Costa & McCrae, 1995).

Sex differences in motivations further suggest women less strongly desire positions of influence—agentic roles where aid would be less warranted. Compared to men, women less strongly value power and achievement (Leijen et al., 2022; Schwartz & Rubel-Lifschitz, 2009) and less strongly desire to possess power and influence (Schuh et al., 2014). If demonstrations of agency harm the likelihood individuals are perceived as patients (or victims; Gray & Wegner, 2009; 2011), such aversion to agentic and powerful roles might augment the likelihood women are perceived as victims and effectively elicit sympathy. It is possible that following demonstrations of agency (e.g., accomplishments), women are more likely than men to minimize their agentic effort, express gratitude, or credit support networks to preclude perceptions that future assistance is not necessary (see Predictions Table 6). To be sure, diminished motivations for power might also reflect a self-protective strategy if across human history, power struggles entailed violence (Keeley, 1996). Power motivations might have been less strongly favored among women due to these risks, and further disfavored by the moral correlates of power/agency: diminished sympathy and augmented blame. That is, social selection may have elaborated female tendencies towards risk aversion.

In the domain of sexuality, fantasies paint a similar picture. Although men are more likely to experience nearly every paraphilic sexual interest, one of the only exceptions whereby women show stronger paraphilic desires (Joyal & Carpentier, 2017; Levaque et al., 2022) or no sex difference emerges (Bártová et al., 2021) is for masochism—sexual gratification from suffering, being dominated, or being humiliated. Although men more often act on their paraphilic sexual interests than women, one noteworthy exception is masochism, whereby women with an interest

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in suffering, being dominated, or being humiliated were more likely to act upon their interests than men with identical interests (Joyal & Carpentier, 2022). Thus, women occasionally exhibit sexual desires and behaviors that cohere with a submissive, vulnerable role.

Beyond minimizing agency, women perceive themselves as experiencing greater physical and mental suffering compared to men. Across 59 countries, women reported being in worse physical health than men, even after accounting for societal factors such as gender inequality and individual factors such as smoking (Boerma et al., 2016). Women also report diminished health-related quality of life (Fryback et al., 2007). Similar patterns were found among the Canadian National Population Health Survey, whereby women reported lower health and higher distress than men, even after accounting for differences in structural and individual determinants, such as economic status, traumatic life events, or alcohol consumption (Denton et al., 2004). Thus, women's lower perceived health could not be accounted for by differential exposure to risk factors, suggesting instead sex differences in vulnerability. Because women are less likely to die of nearly every disease and tend to live longer than men (Benenson et al., 2022), female perceptions of worse health run counter to mortality patterns. Although sensitivity to internal states could be favored as self-protective strategies insofar as they prompted treatment seeking (Benenson et al., 2022), perceptions of suffering might have also been favored by social selection by prompting behaviors that elicit care. If social partners tended to prioritize aid to sick over healthy individuals (Burnstein et al., 1994), then perceiving oneself as infirm might increase the probability of receiving resources and support.

In addition to reporting worse physical health, women also report worse mental health (Anguzu et al., 2021). Across 30 countries, relative to men, women report being more depressed, sad, and enjoying life less (Blanchflower & Bryson, 2024). Similar global patterns are found

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among adolescents, whereby compared to boys, girls feel more sad, scared, miserable and dissatisfied with life (Guo et al., 2024). Altogether, these data suggest girls and women not only report being of poorer physical health than their male counterparts, but also poorer mental health.

Evidence also suggests women's perceptual symptoms might be especially prone to amplifying their experience of suffering relative to men. Women are more likely to exhibit nocebo effects, whereby they experience intensified pain or physical symptoms when a treatment is believed to be harmful (Enck & Klosterhalfen, 2019; Vambheim & Flaten, 2017). However, men are more likely to demonstrate placebo effects, whereby they experience increased improvements when a treatment is believed to be helpful. Such patterns reveal the sexes do not merely differ in overall suggestibility; instead, women's physiologies exacerbate suffering rather than promote improvement. However, it is worth noting that even if this suffering is produced by expectations, it could still be real. The more individuals earnestly believe convictions, the more compelling these convictions are to third parties (Von Hippel & Trivers, 2011). Thus, natural selection can favor true experiences of suffering if those more often compelled aid than consciously fraudulent claims.

Altogether, these patterns reveal that compared to men, women more often perceive themselves as less capable, more vulnerable, more physically ill, and more agonized emotionally. Sex differences in motivations suggest women less strongly desire positions of agency, which would be unlikely to convey need or evoke support. Such self-perceptions of vulnerability and diminished motivations for influence should facilitate third-party observers' categorization of women into patient or victim roles rather than agentic or perpetrator roles. That is, to the degree that these self-perceptions motivate statements or actions conveying suffering, women's self-assessments, emotions, and motivations might facilitate social partners' investment.

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Table 2

Support for Prediction 2: Perceptions of Vulnerability

Trait/Tendency	Effect Size	Sample Size	Population	Citation
Lower self-esteem	d = .25	N = 985,937	Internet sample across 48 nations	Bleidorn et al., 2016
Perceive themselves as less agentic	d = .27	N = 1,930	University graduates	Abele, 2003
	d = .19	N = 628	US adults	Hentschel et al., 2019
Have less agentic traits	d = .4	N = 254,731	Meta-analysis (k = 928)	Hsu et al., 2021
Agency versus communion	D = .67		Re-analysis of Lippa's (2001) meta-analysis (k = 5)	Eagly & Revelle, 2022
Higher neuroticism	d = .4	N = 17,637	55 nations	Schmitt et al., 2008
Higher vulnerability (personality facet)	d = .54	N = 320,128	US adults (online)	Kajonius & Johnson, 2018
Higher anxiety (personality facet)	d = .56	N = 320,128	US adults (online)	Kajonius & Johnson, 2018
Higher apprehension (personality facit)	d = .59	N = 10,261	1993 US standardized sample	Del Giudice et al., 2012
Lower valuation of power/achievement		N = 1,599	Dutch adults	Leijen et al., 2022
	d_{power} = .12 d_{achiev} = .11	N = 42,355	25 European countries	Schwartz & Rubel-Lifschitz, 2009
Lower desire for power/ influence	ds = .34 - .60	N= 1,544	German students, employees	Schuh et al., 2014
Interest in masochism	d = .10	N = 1,040	Canadians	Joyal & Carpentier, 2017
	d = .43	N = 1,132	Canadians	Levaque et al., 2022
	d = -.04	N = 10,044	Czechs	Bártová et al., 2021
Engage in masochism	d = .12	N = 1,040	Canadians	Joyal & Carpentier, 2022
Lower perceived physical health	OR = 1.24 (d ~ .12)	N = 258,684	World Health Survey (59 countries)	Boerma et al., 2016
		N = 18,000	Canadians	Denton et al., 2004
Lower health-related quality of life		N = 3,844	US Adults	Fryback et al., 2007
Lower mental health		N = 227,663	US Adults	Anguzu et al., 2021
More depressed, sad, and enjoy life less			167 countries	Blanchflower & Bryson, 2024
More sad, scared, miserable, and dissatisfied with life	d_{sad} = .39 d_{scared} = .35 $d_{miserable}$ = .19 d_{dissat} = .20	N = 941,475	Adolescents across 78 countries	Guo et al., 2024
Stronger nocebo effects				Enck & Klosterhalfen, 2019

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7. Prediction 3: Communication of Suffering

Although perceiving oneself as vulnerable and suffering should invoke the tender responses of others, these perceptions should be more compelling if women behave in accordance with those perceptions. That is, to evoke care, women must effectively communicate or signal their suffering to others.

A wide body of evidence supports that girls and women readily communicate their problems to friends. In adolescence, girls more often discuss their problems with friends than do boys (Borowski & Rose, 2022). Compared to men, women more often disclose how their friends treated them poorly (Reynolds & Palmer-Hague, 2022). Compared to male friendships, female friendships are more often characterized by co-rumination—problem-focused discussions involving extensive rehashing of difficulties and negative emotions (Ames-Sikora et al., 2017; Bastin et al., 2015; Rose et al., 2014; Spendelow et al., 2017), which increase stress (Byrd-Craven et al., 2008; Tudder et al., 2023) and are associated with depression (Calmes & Roberts, 2008; Stone et al., 2011). Thus, girls and women are not only more inclined to disclose their problems to friends, but excessively rehashing such issues further exacerbates suffering.

Compared to men, women report crying more frequently, intensely, and for longer durations (Byslma et al., 2008; Lombardo et al., 2001). Across countries, women more often reported crying in response to recent emotional experiences (Fischer et al., 2004). Similar patterns are found among children and adolescents, with girls reporting crying more frequently and easily than boys (Jellesma & Vingerhoets, 2012; Van Tilburg et al., 2002). Compared to their male counterparts, girls and women also report being more likely to cry in response to anger

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(Santiago-Menendez & Campbell, 2013) and interpersonal conflict (Byslma et al., 2008). Although crying in response to sadness is consistent with communicating suffering, crying while angry might reduce tension and the likelihood of retaliation during conflict (Sznycer et al., 2025). Indeed, experimental evidence reveals crying makes individuals appear less aggressive (Hendriks & Vingerhoets, 2006) and more helpless (Zickfield et al., 2021), which increases observers' compassion (Bobowik et al., 2023) and motivations to help the crier (Zickfield et al., 2021). Not only do women cry more often, but they also more strongly desire comforting responses, compared to men, who desire greater avoidance (Vigil, 2008). These patterns indicate women not only more readily communicate their suffering through tears, but also prefer greater support in response.

Women also appear more willing than men to share their suffering with professionals. Relative to men, women hold more positive attitudes towards seeking professional psychological help (Nam et al., 2010; Wendt & Shafer, 2016). Moreover, women use more mental health services than men (Keene & Li, 2005; Wang et al., 2023). Even when men and women have the same psychiatric diagnoses, women more often seek medical care (Brand et al., 2019; Cox, 2014; Harris et al., 2016; Vesga-López et al., 2008) and obtain prescription medications (Xu et al., 2012). These patterns suggest women not only more readily share their suffering with close social partners, they also more often communicate distress to professionals.

Similar disparities manifest with physical health. In Norway, non-elderly women use more primary care services than non-elderly men (Kalseth & Halvorsen, 2020). In the UK, women use more community health, mental health, and social services (Keene & Li, 2005). In the US, women make more health care visits (Pinkhasov et al., 2010) and use more preventative care (Vaidya et al., 2012). Likewise, around the globe, women more often pursue dental care than

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men (Reda et al., 2018). These patterns reveal that compared to men, women more readily seek aid for their physical ailments, suggesting they better capitalize on social resources through institutions of care.

Not only are women more willing to disclose and seek treatment for their suffering, they also more strongly support social policies that promote aid to those who suffer. Across countries, women more strongly prioritize the moral domain of care, which emphasizes protecting others from suffering (Atari et al., 2020). Likewise, compared to men, women more strongly value egalitarianism than group-based hierarchies (Lee et al., 2011), suggesting a female aversion to unfavorable inequities. These values have downstream effects on policy endorsement: across Europe, women more strongly support the welfare state (Goossen, 2020; Langsæther & Knutsen, 2025) and in the US, women more strongly approve of governmental redistribution of income to the poor (Alesina & La Ferrara, 2005). These patterns suggest women espouse values and advocate for policies promoting aid to the vulnerable. Such preferences are congruent with niche-construction, whereby organisms shape environments to be advantageous for their own traits (Odling-Smee et al., 1996). That is, if women more often find themselves in precarious positions of need, then promoting values of compassion and aid further facilitates a social world hospitable to such positions of vulnerability. Alternatively, such ideological positions might signal kindness, which is highly valued by potential mates and female allies (Buss, 1989; Vigil, 2007).

Thus, not only do women more readily communicate their distress to friends and professionals, but they also more often pursue physical and psychological care, and more ardently support social policies promoting care to the vulnerable. These patterns suggest that relative to men, women show stronger inclinations to communicate their suffering to others, take

advantage of institutions of care, and advocate for a social world which provides aid to those in need.

Table 3

Support for Prediction 3: Communication of Suffering

Trait/Tendency	Effect Size	Sample Size	Population	Citation
Discuss problems with friends	OR = 2.78 (d ~ .56)	N = 510	Adolescents (grade 7 and 10)	Borowski & Rose, 2022
Disclose friends' mistreatment	d = .56	N = 309	US adults (MTurk)	Reynolds & Palmer-Hague, 2022
Co-rumination	d = .61	N = 175	US undergraduates	Ames-Sikora et al., 2017
	d = .46	N = 368	Early adolescents	Bastin et al., 2015
	d = .66	N = 314	Adolescents	Rose et al., 2014
	d = .55	N = 12,829	Meta-analysis (k = 38)	Spendelow et al., 2017
More frequent/intense crying		N = 4,249	Young adults (30 countries)	Byslma et al., 2008
	d_{freq} = *1.1* d_{intens} = *.9*	N = 523	US undergraduates	Lombardo et al., 2001
	$d_{frequency}$ = .81		Undergraduates across 37 countries	Fischer et al., 2004
More frequent crying /crying propensity	$d_{frequency}$ = .4 $d_{proneness}$ = .45	N = 186	Children (9-13)	Jellesma & Vingerhoets, 2012
	$d_{frequency}$ = .4 $d_{proneness}$ = 1.37	N = 481	Dutch adolescents (11-16)	Van Tilburg et al., 2002
Crying in response to anger	d = .79	N = 197	English adolescents (13-17)	Santiago-Menendez & Campbell, 2013
Crying in response to interpersonal conflict	OR = 1.8 (d ~ .33)	N = 4,249	Young adults (18-28) across 35 countries	Byslma et al., 2008
Desire comforting response to crying	OR = 1.76 (d ~ .31)	N = 200	US undergraduates	Vigil, 2008
Positive attitudes towards seeking therapy	d = .34	N = 5,713	Meta-analysis of 16 studies	Nam et al., 2010
		N = 927	US adults	Wendt & Shafer, 2016
Greater mental health service use	OR = 1.97 (d ~ .38)	N = 19,029	UK individuals	Keene & Li, 2005
	d = .13	N = 55,052	US individuals	Wang et al., 2023
Care seeking (among those with similar diagnoses)	d = .84	N = 591	Pathological gambling patients	Brand et al., 2019
	OR = 3.47 (d ~ .68)	N = 1,673	Canadians with Major Depressive Disorder	Cox, 2014

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	OR = 2.17 (*d* ~ .43)	*N* = 1,764	Australians with mental or substance use disorder	Harris et al., 2016
	OR = 1.66 (*d* ~ .28)	*N* = 1,757	US adults with Generalized Anxiety Disorder	Vesga-López et al., 2008
Obtaining prescriptions (among those with similar diagnoses)	*d* = .21	*N* = 1,983	US individuals with Social Anxiety Disorder	Xu et al., 2012
Primary care service use	*d* = .26	*N* = 4.993 million	Norwegian non-elderly adults	Kalseth & Halvorsen, 2020
Use of community, mental, and social health services	OR_{com}= *3.14* (*d* ~ .63) OR_{ment} = 1.97 (*d* ~ .37) OR_{soc} = 2.29 (*d* ~ .46)	N_{com}= 82,751 N_{ment}= 19,029 N_{soc}= 19,461	UK individuals	Keene & Li, 2005
Health care visits	*OR* = 2.21 (*d* ~ .44)	*N* = 93,222	US adults	Pinkhasov et al., 2010
Preventative care use (blood pressure check, cholesterol check, dental check, and flu shots)	OR_{BP}= *2.86* (*d* ~ .58) OR_{Ch}= *1.56* (*d* ~ .24) OR_{dent}= *1.41* (*d* ~ .19) OR_{Flu}= *1.41* (*d* ~ .19)	*N* = 33,066	US adults	Vaidya et al., 2012
Pursue dental care	*OR*= *1.18* (*d* ~ .09)	*N* > 7 million	Meta-analysis (*k* = 117)	Reda et al., 2018
Value care moral domain	d_1 = .3 d_2 = .26	N_1 = 336,691 N_2 = 11,969	Sample 1= 67 countries Sample 2= 19 countries	Atari et al., 2020
Value egalitarianism	*d* = .31	*N* = 52,826	Meta-analysis (*k* = 206)	Lee et al., 2011
Support welfare state		*N* = 38,319	21 European countries	Goossen, 2020
		N > 100,000	14 Western European countries	Langsæther & Knutsen, 2025
Approve government income redistribution		*N* > 50,000	US adults	Alesina & La Ferrara, 2005

8. Prediction 4: Efficacy in Evoking Care

If relative to male ancestors, female ancestors could have enhanced their inclusive fitness by evoking care through demonstrations of vulnerability, then modern women should be more

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effective at eliciting sympathy than modern men. That is, if the ancestral women who enticed aid were better able to nourish and protect both themselves and offspring relative to the women who appeared self-sufficient or unsympathetic, the pressures of social selection (West-Eberhard, 1979; 1983) should have shaped female traits to be especially sympathy-inducing. Modern women should tend to be the descendants of those who conveyed vulnerability successfully to evoke pity, support, protection, and resources.

Evidence from controlled experiments supports that individuals are biased towards experiencing stronger sympathy for and motivation to help women over men (Graso & Reynolds, 2024; Seager & Barry, 2019). People report a greater propensity to support women than men (Zickfeld et al., 2021) and experience greater pity when women are depicted suffering (Dijker, 2001). Using hypothetical vignettes, people assume women experience more pain (FeldmanHall et al., 2016; Reynolds et al., 2020), they feel more sympathy towards women (Reynolds & Palmer-Hague, 2022), and they preferentially provide life-saving help to women over men (Burnstein et al., 1994; Erlandsson et al., 2020). Third parties also more strongly disapprove of policies and interventions that inflict collateral harm onto women, compared to those inflicting identical harm unto men (Graso et al., 2023). When faced with the hypothetical trolley dilemma, individuals are less willing to push a woman than man to their death to save others' lives (FeldmanHall et al., 2016; Skulmowski et al., 2014). These controlled experiments suggest third parties show biases to experience greater sympathy and protective motivations towards women than men. However, they rely on hypothetical scenarios, which might diverge from real-world decisions and behaviors.

Yet, this preference to provide aid to women over men appears to extend beyond the hypothetical to observed social support. Relative to men, women report larger support networks

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(Dykstra & Fokkema, 2007; McLaughlin et al., 2010), more close social partners (Fuhrer & Stansfeld, 2002), more frequent contact with family and friends (Chatters et al., 2018), and lower levels of social isolation (Röhr et al., 2022, Wen et al., 2023, but see Dahlberg et al., 2024). To be sure, some of these disparities might result from modern contexts, as male hunter-gathers report frequent contact with other men when hunting and learning to make tools (Hill et al., 2014). Modern environments might not provide the same opportunities or demands for male sociality as those actively engaged in hunting or warfare. Even so, these disparities suggest men's social support might require buttressing from necessary activities, whereas women's does not.

Among existing relationships, social partners might be more inclined to provision their female than male social ties. Compared to their male counterparts, adolescent girls and young women report receiving more support from their friends (Colarossi, 2001; Galambos et al., 2018), and adult women report more support from their children (Shin & Park, 2023). Women also garner more support than do men when using online social networking sites (Tifferet, 2020). These patterns suggest that relative to men, women are more effective at recruiting social support.

Such supportive inclinations might generate asymmetries in the treatment of men and women in legal settings. Mock juror experiments reveal jurors feel more sympathy for, attribute lower guilt to, are less likely to convict, and more likely to dole out lenient sentences to female defendants relative to male defendants accused of identical crimes (Hodell et al., 2014; Mazzella & Feingold, 1994; Pozzulo et al., 2010; Ruva et al., 2023). These asymmetries are borne out in real courtrooms; relative to male defendants, female defendants are less likely to be sentenced (Rodriguez et al., 2006) and receive 12-33% shorter sentences, even after accounting for the nature of their crimes (Mustard, 2001; Philippe, 2020; Shields & Cochran, 2020). Other work

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finds female (versus male) defendants enjoy advantages at each stage of the judicial process: they receive lower bond amounts, are less likely to be detained pre-trial, and are less likely to be sentenced (Goulette et al., 2015). These disparities suggest that even in contexts where women are least likely to evoke sympathy—when they inflict harm—they more readily elicit compassion than men.

Inclinations to support and protect women might extend to larger societal patterns. For example, in academia, controlled experiments reveal faculty show a hiring bias in favor of women over men, despite identical resumes (Carlsson et al., 2021; Williams & Ceci, 2015). A meta-analysis uncovered a broad pro-female bias in hiring since 2009 (Carlsson et al., 2021). Despite women's advantages, forecasters overestimated the level of hiring discrimination against women (Carlsson et al., 2021). These patterns suggest women are perceived as being harmed, despite evidence to the contrary. Indeed, when people consider explanations for women's underrepresentation in certain careers (e.g., STEM), they tend to attribute these disparities to prohibitive social norms that ought to be changed, whereas they tend to attribute men's underrepresentation in other fields (e.g., nursing) to men's own diminished motivations (Block et al., 2019). Such asymmetries are consistent with a societal prioritization of helping women relative to men, whom they more often blame for their own disadvantages.

These protective inclinations even extend to symbolic forms of harm. Individuals perceive scientific research as more harmful and less important or rigorous if it uncovers women score lower than men in valued domains (e.g., drawing) or higher in undesirable domains (e.g., lying) compared to science uncovering the opposite patterns (Stewart-Williams et al., 2021; 2022). These asymmetries suggest chivalrous motivations to protect women extend to epistemology, such that women are protected from even empiricism portraying them

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unfavorably. Moreover, in these studies, people incorrectly assumed men would favor science uncovering male-favoring differences, when men favored science portraying women more favorably (Stewart-Williams et al., 2021; 2022). These patterns cohere with those found among hiring discrimination, whereby individuals tend to underestimate the social forces operating in women's favor and overestimate the social forces undermining them. This overestimation of female but not male harm is yet another demonstration of biased impulses towards protecting women. Such chivalry is congruent with the contention that women have faced selective pressures to appeal to social partners' sympathies and now possess phenotypic traits and tendencies that effectively elicit care.

Table 4

Support for Prediction 4: Evoking Care

Finding	Effect Size	Sample Size	Population	Citation
Willingness to support	*d* = .09	*N* = 7,007	41 countries	Zickfeld et al., 2021
Pity for suffering		*N* = 141	Dutch students	Dijker, 2001
Assume experience pain	*d* = .98	*N* = 50		FeldmanHall et al., 2016
	d = .37	*N* = 214	US residents through MTurk	Reynolds et al., 2020
Sympathy	*d* = .26	*N* = 488	US residents through MTurk	Reynolds & Palmer-Hague, 2022
Life-saving help		*N* = 158	Japanese and American undergraduates	Burnstein et al., 1994
	d = .69	*N* = 150	Swedish undergraduates	Erlandsson et al., 2020
Disapprove of interventions inflicting collateral harm	*d* = .54	*N* = 233	MTurk	Graso et al., 2023
Willingness to push in trolley dilemma	*d* = .12	*N* = 152	US individuals from Mechanical Turk	FeldmanHall et al., 2016
	d = .44	*N* = 66	Undergraduates	Skulmowski et al., 2014
Support from friends	*d* = .68	*N* = 364	US adolescents (15-18)	Colarossi, 2001
	d = .52	*N* = 923	Canadian young adults	Galambos et al., 2018

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Support networks		N = 2,223	Dutch adults	Dykstra & Fokkema, 2007
	d = .44	N = 5,741	Australian adults in their 70s	McLaughlin et al., 2010
More close social partners	d = .08	N = 5,793	Civil servants in London (between 1985-1988)	Fuhrer & Stansfeld, 2002
More support from children	d = .48	N = 620	South Korean adults	Shin & Park, 2023
Lower social isolation	*OR= 0.18* (d ~ -.94)	N = 1,321	Older American adults	Chatters et al., 2018
	OR= 0.76 (d ~ -.15)	N = 9,392	German adults	Röhr et al., 2022
	OR= 0.72 (d ~ -.18)	N = 44,116	Meta-analysis (k = 12) of older adults	Wen et al., 2023
	Not supported (d = .25)	N = 3,439	Swedish older adults (77+)	Dahlberg et al., 2024
Online support	d = .14	N = 17,000	Meta-analysis (k = 30)	Tifferet, 2020
Conviction rate (mock jurors)	*OR* = .34 (d ~ -.6)	N = 189	US undergraduates	Hodell et al., 2014
Leniency for theft crimes (mock jurors)	d = .19	N = 4194	Meta-analysis (k = 21)	Mazzella & Feingold, 1994
Guilt rating (mock jurors)	d = -.24	N = 280	Canadian undergraduates	Pozzulo et al., 2010
Guilt verdict and sentence length (mock jurors)	OR_{gv} = .71 (d ~ -.19) d_{sent} = -.25	N = 513	US citizens (on Qualtrics)	Ruva et al., 2023
Criminal sentence	d = -.42	N = 4,876	Convicted offenders in Texas	Rodriguez et al., 2006
	d = -.62	N = 3,593	US felony cases	Goulette et al., 2015
Criminal sentence length	d = -1.79	N = 77,236	US sentenced federal offenders	Mustard, 2001
	d = -.24	N = 1,374,909	French convictions (2000-2003)	Philippe, 2020
	IRR = .79 (21% shorter)	N = 6,561 matched cases	Convicted felony sex offenders in Florida	Shields & Cochran, 2020
Bond amount, pre-trial detentions		N = 3,593	US felony cases	Goulette et al., 2015
Hiring likelihood	d = .1	N = 775	Faculty in Iceland, Norway, and Sweden	Carlsson et al., 2021
	d = .8-1.42	N = 363	US faculty	Williams & Ceci, 2015
Evaluations of science portraying women unfavorably	d_1 = -.5 d_2 = -.47	N_1 = 492 N_2 = 336	S1= Westerners on Prolific and Reddit S2= Southeast Asians	Stewart-Williams et al., 2021
	d = -.58	N = 303	US and UK adults on Prolific	Stewart-Williams et al., 2022

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9. Prediction 5: Female Psychopathology Communicates Need

If relative to male ancestors, female ancestors faced stronger selection pressures to seek support, communicate need, and signal vulnerability, then not only should modern women exhibit higher levels of these tendencies relative to men, but the tail ends of these distributions should more often be compromised of women. That is, if psychopathology reflects extreme levels of otherwise adaptive tendencies (Brüne, 2002; Nesse, 1994), then women's psychopathology should more often involve tendencies towards reassurance seeking, demonstrating vulnerability, and concerns over abandonment, to the degree that lower (subclinical) levels of these inclinations were advantageous across history. That is, if social and selective pressures shifted female distributions of traits towards communicating need and vulnerability, then the tail ends should reflect pathological levels of such inclinations. Mental illnesses more often afflicting women than men should reveal selection pressures operating more strongly on women and should more often involve tendencies to communicate need and recruit social support. Thus, psychopathologies with skews towards women might shed light on the selective pressures operating on female versus male ancestors.

Depression is a condition marked by sadness, guilt, lack of interest in activities, sleep disturbances, loss of energy, and suicidality (APA, 2022). Across cultures, major depression more commonly afflicts women, with odds ratios of 1.95-2.66 (Salk et al., 2017; Yan et al., 2024). Hagen (1999; 2002; 2003) contends that the evolutionary function of depression is a bargaining tactic, whereby through withdrawal, the depressed individual inflicts costs on social partners to renegotiate disadvantageous social arrangements. Consequently, depression should more often be experienced by those enduring costs from existing cooperative alliances and who

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cannot incentivize social partners through other means, such as aggression. Depression is therefore a negotiating strategy especially viable for the victimized and vulnerable. Indeed, beyond female sex, some of the strongest risk factors for depression include widowhood and job strain (Köhler et al., 2018), both cases wherein individuals might benefit from re-negotiating social arrangements to receive aid or extricate themselves from harm. Intimate partner violence is especially predictive of women's than men's depression (Spencer et al., 2019), supporting that depression allows women to communicate when they might require defense, extrication, or renegotiated relationships. In non-industrialized contexts, illness, deaths, and crop/animal loss precede depression (Gurven et al., 2024), supporting that depression is not merely a relic of modern life, but communicates desperation across cultural contexts.

Social support is a protective factor against depression in both modern (Gariepy et al., 2016) and non-industrialized contexts (Gurven et al., 2024), consistent with the notion that bargaining is less necessary among those already receiving adequate support. Genetically informed studies reveal women are more sensitive to the depressogenic effects of low social support than their male relatives (Kendler et al., 2005), suggesting female depression is especially responsive to levels of social aid.

Postpartum depression (PPD) coheres with this bargaining model, insofar as new mothers face increased demands on their care, time, and resources. Moreover, mothers with low social support and whose infants face increased risks (e.g., difficult births) are particularly vulnerable (Hagen, 1999). That is, women in greater need more often experience PPD, in line with the contention that it functions to recruit critical support. By withdrawing, the depressed mother might credibly signal her willingness to disinvest from caretaking, incentivizing those who have shared interests in the child to provide additional aid. Mothers' postpartum depression is

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associated with male partners' increased investment in childcare (Hagen, 2002), granting tentative support that depression can effectively incentivize social partners to augment provisioning. Moreover, social partners tend to respond to expressions of sadness and crying with sympathy and motivations to help (Marsh & Ambady, 2007; Zickfield et al., 2021), suggesting depressive features beyond diminished productivity, anhedonia, and withdrawal can further evoke aid.

Evidence reveals a close, bi-directional relationship between anxiety and depression (Jacobson & Newman, 2017), with similar genetic underpinnings (Waszczuk et al., 2014). Worldwide, anxiety disorders more often afflict women than men, with odds ratios of 1.6-1.7 (Chen et al., 2025; Kessler et al., 2005; Seedat et al., 2009). Beyond female sex, some of the stronger risk factors for anxiety disorders include low self-esteem, child abuse, early traumatic experiences, and low education (Blanco et al., 2014; Fullana et al., 2020; Gardner et al., 2019). Like depression, these risk factors suggest more vulnerable and victimized individuals more often experience anxiety.

From an evolutionary perspective, excessive anxiety might reflect one side of a tradeoff, whereby individuals prioritize loss aversion and protection from harm, but risk foregone opportunities (Nesse, 2022a). Anxiety might therefore have been favored due to its protective benefits, and these tendencies might have served as pre-adaptations, which could be elaborated by the support they elicit. In social contexts, anxiety might promote submissive behaviors, which can de-escalate conflict, reducing the odds of harm or loss (Sloman et al., 2006). Those experiencing stronger social anxiety less often make eye contact and perceive themselves as lacking conversational skills (Howell et al., 2016). Thus, social anxiety might inhibit offensive and domineering social behaviors to reduce the risk of disapproval, rejection, or aggression

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(Leary & Kolanski, 1997). Individuals with anxiety disorders tend to excessively seek reassurance about decisions, the security of their relationships, and threats generally (Rector et al., 2019), suggesting anxiety might compel social support recruitment. And indeed, social partners tend to respond to others' fear with sympathy and inclinations to help (Marsh & Ambady, 2007). In the context of romantic relationships, partners perceive their highly (versus less) anxious partners to be more strongly hurt by offenses, which induces stronger guilt (Overall et al., 2014). These patterns suggest anxiety might compel anxious individuals to emote or behave in ways that recruit tenderness, reassurance, or aid from social partners.

Post-traumatic stress disorder (PTSD) is the anxiety disorder exhibiting the strongest female skew with odds ratios from 1.98 to 2.6 across countries (Seedat et al., 2009; Tolin & Foa, 2006). PTSD is a condition following exposure to traumatic events characterized by flashbacks, nightmares, hypervigilance, and distress at reminders of the trauma (Yehuda et al., 2015). PTSD more often afflicts women, despite men's greater risk of exposure to traumatic events, suggesting heightened female vulnerability (Tolin & Foa, 2006). It is possible that men's historic involvement in hunting and warfare selected against their vulnerability to PTSD, if associated symptoms compromised their capacity to accrue status and attract mates. Common predictors of PTSD in women include childhood sexual abuse, sexual assault in adulthood, intimate partner violence, and unexpected death of a loved one (Kessler et al., 2017; Tolin & Foa, 2006). These patterns suggest interpersonal contexts for which women might benefit from signaling vulnerability, need, and suffering are common antecedents of PTSD.

Symptoms of PTSD might compel the sufferer to behave in ways that communicate their need to social partners. For example, although distress and hypervigilance might facilitate threat detection and avoidance, they might also prompt women to behave in ways that reveal their

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suffering to others. Nightmares and flashbacks might maintain the vividness of the memories, thereby perpetuating impairment and prolonging signals of need to social partners. Risk factors of PTSD beyond female sex include being unmarried, lower income, unemployed, and younger (Koenen et al., 2017). These patterns suggest those who are especially vulnerable more often experience PTSD, congruent with the contention that symptoms communicate need. Compared to men diagnosed with PTSD, women with PTSD experience lower irritability, hostility, and aggression (Castillo et al., 2002), but higher levels of guilt cognitions (Galovski et al., 2013). These differences suggest diminished externalizing symptoms among women, which might dissuade social partners from providing aid. It is possible guilt cognitions lead women to make more self-effacing disclosures, which might prompt greater tenderness from social partners. Indeed, guilt tends to promote prosociality, cooperation, and yielding among the guilty (De Hooge et al., 2007; Wietzker et al., 2012), which evokes positive responses from others (O'Malley & Greenberg, 1983).

Just as with the mood disorders that more often afflict women, personality disorders more often afflicting women tend to consist of symptoms that recruit and maintain social support. Perhaps most characteristic of such tendencies is Dependent Personality Disorder (DPD), which reflects a pervasive need to be taken care of, leading to difficulty making decisions, expressing disagreement, or being alone (APA, 2022). DPD more often afflicts women than men, with an odds ratio of 1.67 (Trull et al., 2010). Women with DPD behave in submissive ways in social interactions, even after receiving assertiveness training (Leising et al., 2006). DPD was found to predict risk of postpartum depression (Akman et al., 2007), in line with the contention that both disorders aim to recruit social support. Interpersonal dependence is associated with suicidality

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and suicide attempts (Bornstein & O'Neill, 2000), suggesting individuals can turn to extreme measures to avoid abandonment and incentivize investment from social partners.

Suicidality is also very common among borderline personality disorder (BPD), which more often afflicts women (OR = 1.11-1.26; Tomko et al., 2014; Trull et al., 2010). BPD is characterized by emotion dysregulation, instability in relationships and self-perceptions, impulsivity, and suicidality. Indeed, one estimate found 90% of patients with borderline had self-harmed and 75% attempted suicide (Goodman et al., 2017). BPD's constellation of symptoms consists of both distress and externalizing components (Eaton et al., 2011), the latter of which might contribute to why this disorder is not more female-skewed. However, compared to men with BPD, women with BPD experience stronger feelings of emptiness and hopelessness, more frequent suicidal and self-harm behavior, lower impulsivity, and more frequent reliance on social support (Amerio et al., 2023; Hoertel et al., 2014). These patterns suggest that women not only experience BPD differently from men, but that their experience is more often comprised of behaviors that might elicit care from social partners.

Distributions of self-harm and suicide further align with the contention that female psychopathology communicates need to recruit support. Girls and women are more likely to attempt suicide (OR = 1.67-1.96), but boys and men are more likely to commit suicide (OR = 2.5; Miranda-Mendizabal et al. 2019). Such disparities align with both a female self-protective strategy (Benenson et al., 2022) and attempts to recruit care. That is, if suicide attempts elicit sympathy and support, girls and women might more often employ these behaviors. Yet, if girls and women have faced stronger selective pressures to preserve their safety, their attempts should be credible, but less life-threatening than men's.

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Because of its costs, self-injury is hypothesized to credibly signal need to motivate social partners to provide aid (Hagen et al., 2008; Nock, 2008). In the ethnographic literature, social conflict and powerlessness tend to precede suicidality, and if the suicidal behavior is non-lethal, victims often improve their outcomes (Syme et al., 2016). Such patterns suggest credible threats of self-harm can effectively improve one's treatment, in line with the bargaining model (Hagen et al., 2008). Hopelessness is often associated with suicidal ideation and attempts, supporting that these motivations stem from desperation (Ribeiro et al., 2018). Beyond female sex, risk factors for suicide ideation include abuse victimization (Franklin et al., 2017) and perceptions of low social support (Coppersmith et al., 2019), both contexts whereby individuals might benefit from negotiating better treatment. Relative to their male counterparts, girls and women more often disclose their suicidal ideation to others (Hallford et al., 2023; Husky et al., 2016), suggesting greater inclination to communicate distress to social partners.

Likewise, girls and women are more likely than their male counterparts to harm themselves (OR = 1.72, Gillies et al., 2018; OR = 1.5, Bresin & Schoenleber, 2015). Larger sex differences in self-harm are found among clinical compared to community samples (Bresin & Schoenleber, 2015), suggesting the possibility girls/women are not only more likely to self-harm, but also more likely to seek treatment. These patterns align with the contention that an integral aspect of women's psychopathology is communicating suffering to others. Beyond female sex, other risk factors for self-harm include physical ailments, bullying victimization, and adverse childhood experiences (Wang et al., 2022), suggesting contexts whereby individuals might benefit from recruiting support or advertising costs from existing relationships. Self-harmers can experience increased social support (Turner et al., 2016) and improved relationships (Hilt et al.,

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2008) when others discover their wounds. These patterns tentatively support that self-harm can effectively bargain for better treatment.

Self-harm also manifests in other female-skewed conditions. For example, Munchausen's Syndrome (or Factitious Disorder Imposed on Self- FDIS), characterizes individuals who deceptively present themselves as ill by falsifying or inducing symptoms. Although true prevalence rates are difficult to discern, estimates suggest women more often experience Munchausen's Syndrome than men (OR = 1.93, Berar et al., 2023; OR = 2.6, Krahn et al., 2003; OR = 3.5, Liu et al., 2025). This disparity suggests women are more willing than men to feign their own illness to receive medical (and likely also social) care. Indeed, in online support groups, individuals with factitious disorder report fantasizing about "the affection they expected to receive" (Lawlor & Kirakowski, 2014).

Munchausen Syndrome is a risk factor for experiencing Munchausen Syndrome by Proxy (or Factitious Disorder Imposed on Another- FDIA), whereby an individual induces or feigns another's illness and symptoms (Yates & Bass, 2017). The overwhelming manifestation of Munchausen Syndrome by Proxy is mothers feigning their children's illnesses (95% of cases, Yates & Bass, 2017). Although most deny their perpetration, some perpetrators report craving the attention a sick child brought them or using their child's suffering as a cry for help (Schrier, 2002). Although these disorders are rare, their prevalence patterns suggest that relative to men, women are more willing to feign their own or their child's illness to extract social support and care.

Self-harm is also an integral component of eating disorders, whereby sufferers of anorexia nervosa restrict their eating to achieve low body weights and those of bulimia nervosa purge (e.g., vomit, use laxatives) or exercise excessively following binging to avoid weight gain.

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Relative to men, women are substantially more likely to experience both anorexia nervosa (OR = 15.5) and bulimia nervosa (OR = 3.2, Qian et al., 2022). Both conditions are heritable, supporting their responsivity to selection (Bulik et al., 2010). Personality correlates of eating disorders reveal heightened concern with social acceptance: perfectionism, sensitivity to social rewards, and harm avoidance (Dahlenburg et al., 2019; Farstad et al., 2016). If social partners are more inclined to help thinner than heavier women (Randall et al., 2017; Swami et al., 2008a), it is possible that one function of eating disorders is to maintain a more pitiable body weight. Indeed, female thinness is perceived as more youthful (Andrews et al., 2017) and youth evokes pity and help (Dijker, 2001). Thus, people might be more inclined to provide aid and care to individuals exhibiting cues they are undernourished. In modern contexts, individuals suffering from eating disorders commonly live with, substantially interact with, and place great burden on caregivers, suggesting they receive extensive care resulting from their illnesses (Anastasiadou et al., 2014).

Although more work is needed to illuminate the social responses to female psychopathology, the aforementioned patterns suggest psychiatric illnesses more often afflicting girls and women tend to involve strong concerns with social acceptance and demonstrations (through behavior or physical appearance) of need. If these illnesses represent the extreme ends of otherwise adaptive inclinations, then these female-skews suggest women more often than men experienced selective pressures to recruit aid through communicating vulnerability. Considering the selection pressures favoring such inclinations might offer insights into efficacious interventions and treatments. For example, social support is more effective in alleviating women's psychopathology than men's (Kayrouz et al., 2025), in line with the argument that these

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pathologies advertise desperation to recruit social aid. Additional therapies congruent with this theoretical framework might consider social skills training or involvement of social partners.

Table 5

Support for Prediction 5: Female Psychopathology

Psychopathology	Effect Size	Sample Size	Population	Citation
Major depression	OR = 1.95 (d ~ .37)	N > 1.7 million	Meta-analysis (k = 65)	Salk et al., 2017
	OR = 2.66 (d ~ .54)	N > 3.5 billion	Meta-analysis across 204 countries (Global Burden Disease 2019)	Yan et al., 2024
Anxiety disorders	OR= 1.71 (d ~ .3)	N > 3.5 billion	Meta-analysis across 204 countries (Global Burden Disease 2021)	Chen et al., 2025
	OR= 1.6 (d ~ .26)	N = 5,596	US adults	Kessler et al., 2005
	OR= 1.7 (d ~ .29)	N = 72,933	15 countries	Seedat et al., 2009
PTSD	OR= 2.6 (d ~ .53)	N = 72,933	15 countries	Seedat et al., 2009
	OR= 1.98 (d ~ .38)		Meta-analysis (k = 52)	Tolin & Foa, 2006
PTSD Symptoms: Lower irritability, hostility, and aggression	d_{irrit} = -.84 d_{host} = -.75 d_{agg} = -.59	N = 106	85 male veterans with PTSD 21 women with PTSD from sexual trauma	Castillo et al., 2002
More guilt	d = .49	N = 69	Assault survivors with PTSD	Galovski et al., 2013
Dependent Personality Disorder	OR = 1.67 (d ~ .28)	N > 40,000	US adults	Trull et al., 2010
Borderline Personality Disorder	OR = 1.26 (d ~ .13)	N = 34,481	US adults	Tomko et al., 2014
	OR = 1.11-1.25 (d ~ .06-.12)	N > 40,000	US adults	Trull et al., 2010
Suicide attempts	OR = 1.96 (d ~ .37)	N > 1 million	Meta-analysis (k = 24)	Miranda-Mendizabal et al., 2019
Disclose suicide ideation		N > 1 million	Meta-analysis (k = 94)	Hallford et al., 2023
	OR = 1.47 (d ~ .21)	N = 4,156	French individuals with suicidal ideation	Husky et al., 2016
Self-harm	OR = 1.72 (d ~ .3)	N = 597,548	Meta-analysis (k = 172)	Gillies et al., 2018

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	OR = 1.5 (d ~ .22)	N = 245,506	Meta-analysis (k = 120)	Bresin & Schoenleber, 2015
Factitious Disorder Imposed on Self (Munchausen's Syndrome)	OR = 1.93 (d ~ .36)	N = 2,232	French insurance cases with FDIS	Berar et al., 2023
	OR = 2.6 (d ~ .53)	N = 93	Patients diagnosed with FDIS	Krahn et al., 2003
	OR = 3.5 (d ~ .69)	N = 115	Scoping review (k = 72)	Liu et al., 2025
Factitious Disorder Imposed on Other (Munchausen's Syndrome by Proxy)	OR = 858 (d ~ 3.8)	N = 796	Perpetrators of medical child abuse	Yates & Bass, 2017
Anorexia Nervosa	OR = 15.5 (d ~ 1.51)	N = 315,877	Meta-analysis (k = 33)	Qian et al., 2022
Bulimia Nervosa	OR = 3.2 (d ~ .64)	N = 315,877	Meta-analysis (k = 33)	Qian et al., 2022

10. Secular Increases in Female Psychopathology

If throughout human history, the women who more effectively communicated vulnerability more often received care, food, or protection relative to those who signaled fortitude and independence, then the fitness consequences of this support should have incentivized competition among women to appeal to others' sympathies. If resources and aid were limited, then differences among women in their vulnerabilities (both real and apparent) might have made the difference between who received aid, and thus, survived versus perished. Because natural selection operates through relative differences, it matters less whether women were pitiable in an absolute sense than whether they were *relatively* more pitiable than the other women in the group, who might have also benefitted from provisioning or care. The relative nature of these social processes might have generated competitive mechanisms among women, whereby adaptations that communicate vulnerability (e.g., depression) or recruit support (e.g., reassurance-seeking) are activated by cues of heightened competition or cues that women are relatively less well off than their same-sex peers. If so, then if the social world becomes

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increasingly competitive, women might experience more frequent and severe vulnerability-signaling and support-recruiting symptoms, irrespective of their absolute levels of resources or power. Likewise, if these adaptations are sensitive to relative position, cues that women are doing relatively poorly, such as exposure to more successful same-sex peers, should exacerbate these ailments.

Female suffering does appear to be sensitive to social inputs. For example, women's psychopathology more readily subsides following social support than does men's (Kayrouz et al., 2025; Kendler et al., 2005). Relative to men, women are more susceptible to the nocebo effect and less susceptible to the placebo effect (Enck & Klosterhalfen, 2019; Vambheim & Flaten, 2017), indicating that through suggestion, female physiology can more readily generate suffering than improvement. Depression travels through social networks, but spreads more easily from women than from men (Rosenquist et al., 2011). That is, a female friend's becoming depressed increases the probability of their social partner's depression by 142%, whereas a male friend's depression has no significant effect. This disparity suggests women's low mood states might be more socially contagious than men's. Experiments of emotional contagion find that compared to men, women readily adopt others' sadness, but not happiness (Juszkiewicz et al., 2020). Likewise, longitudinal studies reveal that compared to boys'/men's dieting, girls'/women's dieting is more sensitive to that of their friends and roommates (Eisenberg & Neumark-Sztainer, 2010; Keel et al., 2013; Paxton et al., 2006). These findings raise the possibility that female psychopathology is both more communicable and susceptible to social contagion than male psychopathology.

Secular trends suggest that many mental illnesses to which women are more prone have been increasing over time, and especially among women. For example, the gender difference in

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depression widened from 1991 to 2014 (Salk et al., 2017). Among US undergraduates, increases in depression, anxiety, and self-harm from 2007-2018 were more pronounced among women than men (Duffy et al., 2019). Likewise in England, girls and women aged 16-24 showed the strongest increases in self-harm between 2000 and 2014 (McManus et al., 2019). Depression has been increasing among American female (versus male) adolescents from 2009-2019 (Daly, 2022). Internalizing and emotional problems have been increasing for Swedish and Finnish female adolescents (from 1998-2018, Mishina et al., 2025; from 2007-2024, Nilsson et al., 2025), suggesting these patterns are not unique to the US. Moreover, across countries, anxiety increased among women, but decreased among men from 1990-2005 (Chen et al., 2025), suggesting these sex-differentiated secular changes are also not solely a product of social media.

Although among individuals, depression and anxiety tend to be associated with social disadvantage, across countries, increases in women's symptoms tend to be associated with *higher* standards of living. These divergent patterns might suggest mental suffering results from relative comparisons between individuals and relevant peers. For example, sex differences in negative emotions tend to be larger in contexts with higher living conditions (Herlitz et al., 2025), revealing a developmental paradox. Likewise, gender differences in emotions and well-being expand in countries with greater equality (Guo et al., 2024; Wollast et al., 2025), indicating a gender egalitarian paradox. Similarly, sex differences in depression are wider in countries that are wealthier and where women hold more positions of power (Salk et al., 2017), suggesting both gender equality and developmental paradoxes. Although some work has not uncovered a gender egalitarian paradox in depression (Brackle et al., 2020), it relied upon only European countries, raising the possibility range restriction constrained variance to detect effects.

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To be sure, some evidence suggests gender equality is acting upon male, but not female, wellbeing. For example, across countries, gender equality corresponds to decreases in men's depression (Hopcroft & McLauglin, 2012) and increases in boys' subjective wellbeing (Guo et al., 2024), thereby widening gender gaps. Yet, other evidence suggests gender gaps in psychological symptoms (e.g., feeling low, feeling nervous, sleep difficulties) widened over the past 20 years in more gender egalitarian countries, due to larger increases among girls (de Looze et al., 2025). Likewise, secular increases in women's anxiety are positively associated with income and education (Fei et al., 2025) supporting that female psychopathology is increasing alongside improved conditions. Mothers' burnout has also increased in countries endorsing greater egalitarianism (Roskam et al., 2022). Similar patterns emerge among adolescents, whereby girls' body dissatisfaction has increased in countries with higher gender equality, income, and individualism (Napp, 2026). At first glance, these patterns appear paradoxical. Why would girls and women feel worse when they have more resources and power? Or at minimum, why would girls' and women's wellbeing not increase alongside their male counterparts as they become less constrained?

Perhaps increased gender equality, wealth, and living conditions are correlated with increases in societal competitiveness. If so, girls' and women's increased suffering result not from greater access to resources and power, but rather, responses to perceptions they are falling behind relevant social comparisons. If cues of heightened social competition can activate competitive mechanisms, and if competitive adaptations are sex-differentiated, sex differences should widen in such traits as the social world becomes more competitive. If these particular forms of suffering are adaptations selected to help women outcompete conspecifics in recruiting pity and aid, female suffering might worsen as social competition intensifies. Indeed, some data

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suggest increased schoolwork pressure can account for the greater increase in girls' (but not boys') psychological symptoms in gender equal contexts (de Looze et al., 2025), tentatively supporting that female mental health worsens alongside heightened social competition.

Population density is associated with both wealth and gender equality across countries (De la Croix & Gobbi, 2017), raising the possibility that the number of immediate social competitors might contribute to decrements in female wellbeing. It is much easier to outcompete 10 than 100 rivals. Higher population density promotes more future-oriented thinking and investment in education (Sng et al., 2017), suggesting greater prestige striving in conditions with more social competitors. In more dense populations, the associations between well-being and both objective and subjective measures of social status strengthen (Tan et al., 2020). In other words, when populations are denser and social comparisons become more consequential, people place greater emphasis on their relative social positions. Lower subjective social status prospectively corresponds to later depression, suicidal ideation, and suicide attempts (Madigan & Daly, 2023), supporting that when individuals perceive themselves as relatively worse off than others, they experience impaired wellbeing. Similarly, unfavorable social comparisons have been linked to both depression and anxiety symptoms in clinical populations (McCarthy & Morina, 2020). Beyond increases in the quantity of social competitors, socially prescribed perfectionism has increased from 1989 to 2016 across three countries (Curran & Hill, 2019), suggesting heightened assumptions that individuals must be perfect to receive societal approval. That these increases predated the advent of social media suggests competitive social pressures were already intensifying. Altogether, these patterns suggest secular decrements to female wellbeing occur alongside secular increases in the quantity of social competitors, sensitivity to status comparisons, and the societal standards individuals feel compelled to attain.

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Although some evidence indicates social competition intensified prior to social media, social media has likely exacerbated perfectionistic and competitive pressures because it offers a mechanism through which individuals might compare themselves to more successful peers. Indeed, using social media for social comparisons, and especially upwards social comparisons, is predictive of depression more so than time spent on platforms (Yoon et al., 2019). Across countries, nations with more internet use, schoolwork pressure, and obesity tended to show greater secular increases in adolescents' psychological complaints (Boer et al., 2023). These patterns suggest competitive pressures to keep up with online peers, perform academically, and remain thin exacerbate mental suffering.

Social media may be especially detrimental to girls' than boys' mental health (Kelly et al., 2018; Twenge et al., 2022). Such patterns would be consistent with the contention that when girls/women experience unfavorable social comparisons, mental mechanisms to signal vulnerability and need (e.g., depression) are activated. However, to be sure, other longitudinal work suggests the reverse direction, whereby adolescent girls' depression predicts their social media use (Heffer et al., 2019). If so, a stronger female tendency to turn to social media when distressed might present a similar pattern as co-rumination, whereby common female coping strategies worsen rather than improve mental health (Calmes & Roberts, 2008; Stone et al., 2011; Tudder et al., 2023). Such inclinations might have been favored if they effectively communicate distress to social partners and recruit aid. That is, if women more often disclose their distress to in-person and online friends when depressed, then such tendencies might facilitate support, even if they perpetuate suffering. As noted by Nesse (2022b), "Natural selection does not give a fig about our happiness."

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However, other work from the US suggests girls' increase in depressive affect differs across ideological lines and is most pronounced among liberal girls (Gombrone et al., 2022). If this left-wing identification corresponds to lower religiosity (Shorrocks, 2018), then some portion of this diminished wellbeing might reflect reduced social support (Hovey et al., 2014), to which female depression is especially sensitive. Alternatively, the content of progressive beliefs may reflect greater attunement to societal inequities, which is associated with reduced well-being (Lima et al., 2025). If so, then greater depression among liberal girls might be confounded by the individual differences that predict adoption of the ideology. Indeed, higher neuroticism is associated with liberal identification (Burton et al., 2015), suggesting those sensitive to negative information also attend to negative societal outcomes. Yet, some data suggest the gender gap in ideology is widening over time (Van Ditmars, 2023), with women shifting leftward in more gender egalitarian countries (Nennstiel & Hudde, 2025). Such trends mirror those with mental health, raising the possibility that girls' and women's endorsement of left-leaning viewpoints increase alongside social competition. Such patterns grant support for the contention that female tendencies towards ideologies directing care to those in need are competitive adaptations to construct social worlds compassionate to the vulnerable. An alternative interpretation is that these ideologies signal compassion, which if favored by mates and female allies alike, should increase as social competition amplifies.

Altogether, secular trends reveal increases in girls' and women's depression, self-harm, and anxiety despite country-level increases in wealth and gender equality. If women's depression, self-harm, and anxiety are competitive adaptations to signal need and recruit support, then such increases are to be expected in a world with more competitors, social-comparisons, prestige striving, and perfectionism. That is, these adaptations are responsive to relative

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comparisons (Prediction 5; Table 6). As the social world becomes more competitive, the likelihood that any girl or woman perceives herself as falling short increases. As a result, girls and women are expected to show tendencies towards signaling vulnerability and recruiting social support. Hence, a critical and tentatively supported prediction of the Greater Female Vulnerability Hypothesis is that girls' and women's mental health will continue to worsen, insofar as social competition intensifies (Prediction 6; Table 6). If this hypothesis is supported, then to improve girls' and women's wellbeing, unfavorable social comparisons should be minimized, such as through avoiding social media, moving to less competitive environments (e.g., lower income, rural), or fostering gratitude (perhaps through downward social comparisons).

Table 6

Additional Testable Predictions

Testable Predictions
1. Women's intrasexual gossip will portray rivals as the converse of pitiable: agentic, malevolent, misusing aid, or already receiving aid.
2. Women who are more muscular, tall, or heavy will be perceived as less physically attractive, pitiable, and deserving of aid relative to their smaller counterparts.
3. Psychopathologies that more often afflict women (e.g., anorexia, anxiety) evoke more sympathy and aid than those more often afflicting men (e.g., ADHD, antisocial personality disorder).
4. During times of accomplishment (demonstrated agency), women will minimize their agency and credit support received more than will men.
5. Women's psychopathology (e.g., depression, anxiety, self-harm) is sensitive to relative social position (e.g., more accomplished/advantaged peers)
6. Women's psychopathology (e.g., depression, anxiety, self-harm) increases in contexts with higher living standards and greater gender equality due to intensified social competition.
7. People feel more sympathy and helping motivation in response to cues of malnourishment or illness among women than men.

11. Conclusion

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Across human history, female ancestors faced their unique set of challenges. They were responsible for the burdens of pregnancy, and thus, faced increased caloric needs alongside constraints on foraging. They were responsible for nursing and contributed the preponderance of childcare, further impinging upon their capacity to feed themselves or dependent children. They were physically vulnerable to men's sexual and physical violence due to their smaller statures and greater reproductive contributions. These demands should have increased women's reliance on social partners.

Mating and friendship preferences suggest the women most likely to win the favor of social partners were those who signaled vulnerability over agency. Men's preferences for youth, sexual chastity, and smaller statures might have shaped women's physical features and behaviors to convey neoteny and submissiveness. Women's intrasexual preferences for kindness, diminished competitiveness, and lower or equal status might have incentivized women's displays of tenderness and vulnerability over cruelty and success. Thus, existing social preferences suggest women faced selective pressures from men and women alike to signal vulnerability, submissiveness, and innocence over dominance, competitiveness, or cruelty.

Evidence supports that compared to men, women are more concerned about their social approval, perceive themselves as experiencing greater physical and mental impairments, more readily disclose their suffering to social partners and professionals, more often pursue treatment, and more ardently support social policies that favor aid for the vulnerable. Women are more effective than men at recruiting support and protection from their immediate social networks and broader society. From hypothetical studies to courtrooms, to societal perceptions of disadvantage, to opposition to scientific discoveries, people show greater protective inclinations towards women than men in similar positions. Female-skewed patterns of psychopathology

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further suggest women have experienced social pressures to communicate need and recruit aid. More women than men experience depression, anxiety, PTSD, self-harm, suicidal ideation, suicidal attempts, disordered eating, dependence, and illness-feigning. And although these ailments generally show correlations with social disadvantage at the level of individuals—congruent with the contention that they communicate desperation—across countries, these ailments are increasing among women in the most socially advantaged contexts. Such patterns suggest these pathologies reflect sensitivity to one's *relative* social position. Indeed, these secular decrements in women's wellbeing manifest alongside secular increases in perfectionism, status comparisons, and exposure to successful peers. These patterns align with the contention that adaptations to signal need are more strongly activated by detection that one is doing less well than one's peers.

Inspections of the magnitude of sex differences within Tables 1-5 reveal some effects are especially pronounced. First, sex differences in the facets of neuroticism—anxiety, apprehension, and vulnerability—suggest men and women particularly diverge in vigilance to threat, congruent with a self-protective strategy (Benenson et al., 2022; Campbell, 1999) as well as inability to cope and reliance on social partners, congruent with greater female dependence on social support. Second, robust sex differences emerge in crying, co-rumination, and problem disclosures, supporting female behavioral inclinations to communicate need to close social partners. Third, in the realm of psychopathology, sex differences are most pronounced for eating disorders and factitious disorders. These disparities likely reflect sex-differentiated cost benefit ratios. Given that these conditions entail substantial costs because they compromise the health of the afflicted individuals, perhaps girls or women were primarily able to reap the associated benefits of increased care. The tendencies to provide lifesaving help to girls/women over

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boys/men (see Table 4), suggests females who exhibited overt cues of undernourishment or infirmity might have been especially compelling to social partners. Future research might further address this possibility by examining sex-differentiated sympathy and helping motivations in response to physical cues of malnourishment and illness (Prediction 7, Table 6).

Altogether, evidence supports that women more strongly pursue social support and are more effective at recruiting it, in line with the contention that women have been selected to communicate vulnerability to others. That much of this support is furnished from large, cross-cultural analyses and meta-analyses (see Tables 1-5) suggests these patterns are not solely relics of societal treatment, but rather, reliably emerge across cultures. Yet, as reviewed in Table 4, societies are likely to be more permissive and responsive to female than male demonstrations of vulnerability. However, because sex differences widen rather than condense as women are afforded greater opportunities and resources, such patterns undermine explanations that these divergences entirely reflect sex-based differences in treatment.

Although any isolated sex difference might not be especially impressive, when the body of evidence is considered in amalgam, it presents a stronger case that women have faced distinct social pressures from men. When sex differences are considered simultaneously, they reveal much larger divergences in male and female distributions compared to when considering any single trait in isolation (Del Giudice, 2009; Eagly & Revelle, 2022). Thus, if the sex differences in facial morphology, stature, emotions, support seeking, policy support, sympathy recruitment, and psychopathology are considered concurrently, they present the possibility of a substantial departure between the female and male human phenotypes. Although more evidence is warranted, perhaps especially on social responses to suffering and the sources of secular increases in suffering, the Greater Female Vulnerability Hypothesis offers a testable and cohesive

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theoretical framework for understanding women's physical and behavioral traits. It is not enough to interpret sex differences through the selective pressures operating on men. Our female ancestors faced their own set of challenges and opportunities, worthy of scientific scrutiny.

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Footnotes

1. Although Anderson et al., (2023) claimed 57% of 63 foraging societies practiced intentional female hunting, a reanalysis of their data found only 14% of those showed evidence of female large game hunting (Venkataraman et al., 2024). Moreover, bias in selection of societies has

likely overinflated even this updated estimate. More conservative estimates suggest 7% of foraging societies show evidence of female hunting (Gurven & Hill, 2009).

2. AI (Perplexity) was used to assist in calculating sex differences when these estimates were not provided in the cited work, but the relevant information to calculate them was.

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