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**Income inequality and reproductive competition: Implications for consumption,  
status-seeking and women's self-sexualization**

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**Abstract**

We argue that inequality plays such an important role in shaping human behavior because of the strong effects it exerts on individual reproductive success and thus evolutionary fitness. Here we examine evidence of the relationship between economic inequality and reproductive incentives in men and women. Inequality has been shown to increase men's competition for status and respect, particularly among men who are younger and poorer. This competition is an important explanatory variable in rates of accidental death, addiction, violence, and property crime. We then focus on parallel links in women, summarizing evidence that high economic inequality increases women's investment of time and attention on competitive reproductive pursuits (such as improving physical and sexual attractiveness). We suggest that these behaviors are due to proximate desires to socially signal and socially climb, and may also reflect a concern with external approval. We show that these proximate mechanisms can be interpreted in terms of the ultimate function of achieving greater reproductive success via enhanced status, safety and material well-being in economically unequal environments.

*Keywords:* inequality; evolution; fitness; future discounting; hypergamy; mating effort; mate choice; resource holding

## Introduction

Inequality generates and amplifies incentives for individuals to strive to elevate or maintain their status, with consequences both for the individuals involved and for the societies in which they live (Andersen & Curtis, 2012; Cheung & Lucas, 2016; Oishi, Kesebir, & Diener, 2011; Wilkinson & Pickett, 2009). A great deal of excellent research, including the work reviewed in many of the chapters in this book, examines *how* inequality shapes incentives, motivations, and resulting patterns of behavior. What remains considerably less clear is *why* the relationships between inequality and behavior are as we find them. *Why* are certain kinds of inequality more salient than others? And *why* are some individuals more affected by inequality than others? Evolutionary theory presents a useful distinction between “how?” based, or *proximate* explanations, and these “why?” based, or *ultimate* explanations (Laland, et al., 2011; Mayr, 1961). In this chapter we attend to the latter end of this dichotomy to provide an ultimate explanation for why inequality motivates some behaviors more than others.

Ultimate explanations in evolution often relate to reproduction. And this is no less true when it comes to inequality: there exists a growing body of evidence that suggests that inequality has such strong effects on motivation and behavior because it affects reproductive success, thereby incentivizing particular reproductive strategies. In this chapter, we draw on literature from psychology, biology and economics to map a relationship between income inequality, status competition, and reproductive strategies for men and women. We begin by explaining why reproductive success is affected by economic inequality, drawing attention to the proximate mechanism of status competition. We then summarize evidence demonstrating the effects of inequality on male, and female, reproductive strategies.

**Reproductive success and economic inequality**

To understand the relationship between reproductive success and economic inequality, it is important first to understand what is meant by the terms “reproductive success” and “fitness”. The genes possessed by every individual living today were inherited from biological parents, grandparents, great-grandparents, and so forth, each of whom passed those genes on by reproducing. That is to say that everybody alive today descends from a staggering number of reproductively successful ancestors, and not a single reproductively unsuccessful individual. More than 160 years on from Darwin’s publication of his *Origin of Species* (Darwin, 1859) it is well established that, *ceteris paribus*, genes that enhance reproductive success tend to persist across generations, displacing genes that have no or negative effects on reproductive success (Jennions & Kokko, 2010). It is for this reason that evolutionary scientists can appear, to those not used to thinking in this way, to be preoccupied, or even obsessed, with sex and reproduction.

It is not correct, however, to leap to the conclusion that more offspring are necessarily always better. The *quality* of those offspring can matter every bit as much as their *quantity*. Offspring that have been cared for, and taught, are more likely to survive and reproduce in their own right, and thus to achieve reproductive success of their own. Evolutionary “fitness” is the success, over many generations, at producing offspring who go on to produce offspring in turn. Fitness is subject to a perennial trade-off between offspring quantity against quality, and natural selection optimizes this trade-off as a function of the species’ ecological way of life (Stearns, 1992). Supplementing this, individual reproductive investments also respond in fine-tuned fashion to the particular circumstances of that individual’s life (Kaplan et al., 2015; Stearns, 1992).

The fittest ancestors in human history tended to be those who not only enjoyed reproductive success (offspring quantity), but who also provided their children and grand-

children with the material and social circumstances that they, in turn, needed to survive, thrive and mate (offspring quality). Wealth and social status became important determinants of fitness with the advent of agriculture around 12,000 years ago. At this time, the economic circumstances of farming permitted families to generate surpluses and turn them into wealth that could be stored and passed on to children, as well as enabling families to own and pass on the land that generated that wealth (Betzig, 1994; Cashdan, 1993). Holding wealth and status not only improved one's survival and the survival of one's offspring, but it also thereby improved one's attractiveness to potential mates. Mate choice became a way of improving status and material wealth for oneself, and for one's offspring who could inherit both the wealth and status. Across many documented cultures, women tend to prefer male partners who have more resources, especially those in the form of status, money, and prestige (Buss, 1989; Cashdan, 1996; Hill & Hurtado, 1996). Likewise, across a variety of societies, the quantity of resources held by men (but not women) translates into more success reproductively (Betzig, 1994; Hopcroft, 2006).

Why do women, but not men, tend to marry upward into families of greater status and wealth? One of the many, complex reasons is the widespread exclusion of women from holding the same wealth and status as men. Although this pattern is present in traditional foraging, herding and horticultural societies (Reiss, 1986), it grew stronger when technologies like the plough permitted the intensification of agriculture, opening up ever larger inequalities between the wealthiest and poorest families (Alesina, Giuliano, & Nunn, 2013). Acquiring wealth and status via one's spouse or consort became a particularly fruitful strategy (sometimes the only strategy) for women to achieve upward mobility. Even the freedom or opportunity for contemporary women to support themselves economically does not extend to all women across all cultures, and, to this day, many women still depend on marriage for survival and social mobility in even the most progressive societies. Variation in

wealth disparities between individuals and families is thus fundamentally relevant for reproductive success, though it tends to affect men and women differently. In the following sections we draw attention to the effects of economic inequality on reproductive success for men and for women.

### **Inequality and men's reproductive success**

The relationship between economic inequality, fitness, and subsequent behavior is more routinely researched among men than among women. In an influential series of studies, Martin Daly and Margo Wilson show that one effect of living in economically unequal environments is increased competitiveness that manifests in risky status-seeking and status-protecting behaviors among men (e.g., Daly, 2016; Daly & Wilson, 2001; Daly, Wilson, & Vasdev, 2001). Much evidence shows that this risk-taking accounts for the positive relationship between income inequality, violent crime, and homicide (Daly, 2016; Krahn, Hatnagel, & Gartrell, 1986; Penaherrera-Aguirre et al., 2018; Wilson & Daly, 1997).

A large proportion of male on male homicides are transparently competitive, involving real or imagined status threats and occurring in a context of material expropriation or sexual rivalry (Daly, 2016; Wilson & Daly 1985). These risk-taking strategies are particularly likely to manifest in young men who experience being relatively deprived (Greitemeyer & Sagioglou, 2017; Wilson & Daly, 1985). As others have argued, relative deprivation may lead people to appraise their situation in a way that shifts the balance of the cost-benefit ratio toward risk-taking and violence (Shah et al., 2012; Smith, Pettigrew, Pippin, & Bialosiewicz, 2012; see also Brown-Iannuzzi & McKee, **Chapter XX**; Sheehy-Skeffington, **Chapter XX**).

Another proximate mechanism by which inequality could incentivize risk-taking may be by encouraging men to discount the future. There is a tendency to view an inability or unwillingness to delay gratification as a psychological malady or weakness (Kacelnik, 1997).

Frederick et al., 2002; Kirby et al., 1999), but the problem of how and when to discount the future is an adaptive dilemma that all animals must confront. Delayed gratification and discounting reveal how the future is weighed when deciding the present allocation of effort, and weighing the present more steeply than the future is adaptive in particular situations (Kacelnik, 1997; see also Claassen, Corneille, & Klein, **Chapter XX**). Although individuals vary at a trait level in the degree to which they discount future rewards compared to present ones, future discounting covaries with many of the social ills associated with income inequality, such as inter-male violence, problem gambling, and early sexual onset (Canale et al., 2017; Daly et al., 2001; Wilson & Daly, 1997). It may be that cues of deteriorating wealth, or steep competitiveness, typical of high inequality milieus exacerbate the perceived need to expend effort to get ahead in the near-term, thus accounting for the negative effects of inequality on longer-term behavioral outcomes.

### **Income inequality and status-seeking among women**

Much less is known about how income inequality affects status-seeking and competitiveness among women. Might income inequality increase competition among women as it does among men? If so, how might that competition manifest?

Young men are the primary perpetrators and victims of violence, physical aggression, and crime in all societies for which data are available (UN Office on Drugs and Crime, 2013), but women can undoubtedly be aggressive and violent (Luke, 2008; Sommers & Baskin, 1994). Women's competitiveness against other women, however, is more often expressed in non-violent domains, particularly self-promotion and competitor derogation (Buss, 1988; Buss & Dedden, 1990; Buunk & Fisher, 2009; Campbell, 2004; Fisher & Cox, 2009). Women often compete with one another in the effort they apply to enhancing their physical attractiveness (Buss, 1988; Campbell, 2004; Fisher & Cox, 2009). Beauty is highly valued in women across cultures, and physically and sexually attractive women enjoy many benefits over their plainer

competitors (Barber, 1999; Buss, 1989), including higher social status, and greater value as a romantic partner (Barber, 1995).

Wealthy, educated nations have made some progress in recent decades toward women having equal opportunities to men, including opportunities to achieve their goals without having to rely on their physical attractiveness. And yet many women still feel that their physical attractiveness is one of the most valuable resources they have. The tendency to disproportionately value one's own physical characteristics above one's other qualities is termed *self-objectification* (Fredrickson & Roberts, 1997), and it is manifestly something younger women engage in more so than older women or men of any age (Moradi & Huang, 2008). Alongside self-objectification, there is a growing tendency for women in Western cultures to also engage in *self-sexualization*, a trend where women publicly express behaviors usually seen in soft-core pornography, such as wearing sexy, revealing clothing with sexually suggestive slogans (Nowatzki & Morry, 2009).

A vast body of scholarly work suggests that self-objectification is driven by gender inequity. If women are valued more for their looks and less for their earning power, education, intelligence, then we might expect women to internalize these sources of value by self-objectifying and self-sexualizing. In a recent study, we drew attention to the role that income inequality may play in these outcomes. (Note that the gender equity and income inequality hypotheses are not mutually exclusive, and may in fact, be complementary.)

In this study, we recognized that a vast, untapped source of data on self-sexualization behavior exists in the form of "sexy selfie" pictures. Social media platforms such as Instagram and Twitter have enabled women to post pictures of themselves, groomed and often attractively or even scantily dressed, for public viewing. To test whether gender inequality and/or income inequality might be associated with women's investment in their physical and sexual attractiveness, we compiled and analyzed a large social media data set on



posting rates, and related these to properties of the local social and economic environment at three different geographic scales (Blake, Bastian, Denson, Grosjean, & Brooks, 2018). We measured the number of “sexy selfies” posted on the online social network sites Twitter and Instagram across 113 countries, and for convergent validity, also measured spending in beauty salons and women’s clothing stores in the United States. For further validity, we also examined sexy selfie posts across all US cities with populations greater than five thousand inhabitants, as well as all US counties with populations greater than twenty thousand inhabitants. We aimed to test the robustness of any resultant effects at different geographic scales.

We found the same pattern across all geographic levels: In areas of higher income inequality, women posted more sexy selfies online and spent more money in beauty salons and women’s clothing stores. Consistent with past work showing that sexualization and social media use are more common in reproductive aged women (Duggan & Brenner, 2013), we also found that regions with, on average, younger women have more sexy selfie posts. Further, we found that areas with poorer, uneducated, and unemployed women had more sexy selfie posts, whereas these same regions have fewer aggregate sales in beauty salons and women’s clothing stores. Using the most conservative estimates from these investigations, we can contextualize these findings as follows: For every one standard deviation increase in income inequality, the expected count of the number of sexy selfies in a city or county given its population increased by 31–34% (assuming all other factors are held constant). These effect sizes were modest but reliable: The same pattern of findings emerges in 85 of 86 robustness tests we conducted, including when we exclude WEIRD nations or used other statistical techniques (like Bayesian analyses).

**Explaining the inequality → attractiveness-preoccupation link**

Why might it be the case that women in areas of high economic inequality invest more time and attention in their physical and sexual attractiveness? One possibility is that this association is suggestive of a kind of conspicuous consumption, where women advertise their attractiveness to appear better off than the other members of their social circle. Several studies report that income inequality encourages households with smaller income to use debt to ensure their consumption level matches that of households with higher income gains, a spending pattern that seems to be motivated by social comparison (e.g., Clark, Kristensen, & Westergård-Nielsen, 2009). This literature informs us that people are more likely to infer another's social status by attending to their consumption of positional goods in economically unequal environments, thus incentivizing the consumption of goods that portray one is of higher status (Walasek, Bhatia, & Brown, 2018; Walasek & Brown, 2015; Chapter XX). If women perceive that beauty products, clothing, and sexy selfies are status markers, they might use these behaviors to signal high status.

There are arguments for and against this conspicuous consumption argument. On one hand, beauty and attractiveness can confer status benefits (Eagly, Ashmore, Makhijani, & Longo, 1991; Maestripieri, Henry, & Nickels, 2017), especially for women. This result supports the idea that women conspicuously consume beauty-related products to signal high status in environments preoccupied with social rank. On the other hand, women who wear revealing and sexualized clothing are perceived to *lack* status (Fiske, Cuddy, Glick, & Xu, 2002). Indeed, sexualized clothing encourages psychological processes which attribute wearers diminished degrees of those qualities so essential to being well-thought of, such as competence, prestige, and warmth (Blake, Bastian, & Denson, 2016). Though conspicuous consumption may account for covariation between income inequality, beauty salon and

women's clothing expenditure, on its own terms it seems a less satisfactory explanation for the sexualized selfie findings.

An overlapping view, and one with more focus on *ultimate* causation, is that women's investment in their attractiveness in economically unequal environments is partly driven by an increased motivation to socially climb, and potentially their long-term fitness prospects, by attracting well-off men. Attracting high quality romantic partners, or at least sexual interest from high-quality men who may become important allies (see Maestripieri, Henry, & Nickels, 2017), might allow women to *achieve* higher status. Though the reasons women are preoccupied with their physical appearance and wear revealing clothing are complex and varied, many women report engaging in these behaviors to attract and capture the attention of men (Smolak, Murnen, & Myers, 2014; Yost & McCarthy, 2012). Women frequently compete with one another by enhancing their physical appearance, including by wearing revealing clothing (Barber, 1999; Buss, 1988). There is also some evidence that priming female-female competition increases women's interest in conspicuously consuming luxury brands of clothing and accessories (Hudders, Backer, Fisher, & Vyncke, 2014; Wang & Griskevicius, 2014). In times of economic threat (such as when incomes are unequal), women may adjust their behavior by adopting strategies designed to attract and align themselves with men with greater economic potential than themselves, an explanation that is also consistent with the social role theory of gender (Eagly & Wood, 1999).

Supporting evidence for the idea that the intensity of female-female competition is driven by the variance in male resource-holding comes from a surprising source: Data on environments that exacerbate competition among female non-human animals. A key framework in evolutionary biology holds that relationships between male and female animals can be considered a kind of marketplace. Work in this field shows that competitive behavior among females depends on the quality of the males available in that market: When male

resource holdings are highly variable, females compete most avidly to attract the males holding the most resources (Jennions & Petrie, 1997). Returning to human animals, because household income inequality is more reflective of variation in male income across households than it is variation in female income (Kimhi, 2008), economically unequal environments may reflect the same conditions of variation in male resource holding that motivates female-female competition in non-human animals. Environments with high income inequality, therefore, may amplify women's incentives to invest more time and energy in attracting well-off men and out-doing their romantic competitors.

The link between high inequality and women's appearance-related competition also comes from the so-called "lipstick effect". Although consumer spending usually declines during times of economic recession, one specific product category appears to reliably experience surprising growth: the consumption of beauty products (Nelson, 2001). In a series of studies, Hill, Rodeheffer, Griskevicius, Durante, and White (2012) demonstrate that economic recession primes increase women's desire to buy beauty products. Hill et al. (2012) showed that economic insecurity increases beauty product expenditure *because* it elevates women's desire for resource-rich male partners. Rather than merely signaling the desire for cheap indulgences, the "lipstick effect" extends toward all products which increase women's self-perceived desirability to men, regardless of their cost (Hill et al., 2012). Women's own socioeconomic status was also not a driver of the lipstick effect, suggesting that an increased interest in beauty products is not due to women's lower status generally. The implication is that economically uncertain environments encourage a beauty-focused competitiveness among some women because attractiveness-enhancement is a strategy that women use to achieve status.

Recent work in economics shows convergent support for this idea. At least since Becker (1981), economists have found much benefit to be gained by considering romantic

relationships as subject to social exchange. The idea is that men and women, acting as agents in a marketplace, exchange sex for other resources in that market (e.g., time, affection, love). One way in which economists measure outcomes in that market is by tracking the percentage of single-parent households and children born to young mothers. They reason that such outcomes provide insight into the bargaining power of men and women, as women are less likely to have casual sex, and men are less likely to abandon their romantic partners, when marketplace conditions favor women over men (Barber, 2001). Between 1970 and 1990, rising wage inequality among men in the U.S.A. led directly to decreased probabilities of women marrying and an increase in women's age at marriage (Loughran, 2002). These effects were attributed to the greater benefits of searching for a marriage partner rather than settling, as securing a high-earning partner becomes more important under higher inequality (Loughran, 2002). In other words, when the quality among potential male partners was highly disparate, women delayed marriage in order to maximize their chances of securing the highest quality male partner available.

A large body of work showing that economic conditions that narrow the pool of suitable male bachelors (i.e., reducing the "supply" of suitable men in the market) also erodes the incentive for those men to maintain committed romantic relationships (i.e., because supply outweighs demand), strengthening men's bargaining position for casual sex (e.g., Angrist, 2002). Autor, Dom, and Hanson (in press) recently showed that when international manufacturing competition in the years 1990-2014 caused men's earnings to drop dramatically relative to women's in parts of the U.S.A., it also caused a drop in marriage rates, and a rise in single parenting. The implication is that in economic conditions that result in many men seeming worse off than their competitors, the pool of desirable male bachelors is restricted to those at the higher ends of the income distribution. This reduced supply of suitable men increases competition among women vying for economic advancement through

marriage, thus incentivizing behaviors aiming to attract the relatively few high-quality male potential partners. This market-based account provides a novel perspective for why fertility is higher and more variable, and why there are more teenage pregnancies, in communities with higher income inequality (Chiavegatto, Alexandre, & Kawachi, 2015; Colleran, Jasienska, Nenko, Galbarczyk, & Mace, 2015; Gold et al., 2004; Santelli, Song, Garbers, Sharma, & Viner, 2017). It also explains why these outcomes can disproportionately affect relatively deprived women (Kearney & Levine, 2014; Noah, Yang, & Wang, 2018), who are more reliant on gaining social status and economic security through attracting male partners, and thus suffer the potentially negative consequences of casual sex most acutely.

We have highlighted economic and biological accounts for understanding women's sexy selfies in economically unequal environments, but these accounts are neither the only interpretations, nor do they exclude other, often more proximate, kinds of accounts. One such proximate explanation that we cannot dismiss is that women's investment in attractiveness-enhancement in these environments—rather than directly aiming to convey high status—reflects a mindset focused on obtaining external approval. Deci and Ryan (2000) explain that threats to basic needs such as for autonomy, competence, and relatedness can compel people to move away from inherently fulfilling activities toward those that compensate by providing an interim experience of need satisfaction (e.g., approval via fame and attractiveness). Economic inequality has been shown to lower the likelihood that self-determination needs are met (Di Domenico & Fournier, 2014), raising the possibility that women's investment in attractiveness-enhancement in economically unequal environments may reflect a compensatory reaction to unfulfilled self-determination needs. In this sense, the aim of increased spending in beauty salons and clothing stores, as well as posting more sexy selfies, is not to gain status directly. The aim is, instead, to gain external approval from others by fulfilling cultural standards of physical and sexual attractiveness, thus satisfying one's own

thwarted psychological needs for self-determination. Attempts to resolve both how and why inequality has the effects that it does on women's self-sexualization and other behaviors will require patient experimental work, as well as a willingness to differentiate and understand both proximate and ultimate causation.

## **Conclusion**

One of the ways that income inequality affects humans psychologically is by stoking status anxiety and competitiveness. These psychological effects can incentivize particular behaviors, including motivating a desire to do better than others and protect one's social position. We have drawn attention to the importance of these inequality-driven incentives in the context of reproduction, especially competition for and attraction of romantic partners. While the effects of inequality on male competition through future discounting, risk-taking and occasionally violent jockeying for status and respect is relatively well-established (Wilson & Daly, 1985; Wilson & Daly, 1997), we propose that income inequality has commensurable effects on women's motivation to enhance their physical attractiveness, and to compete by presenting themselves in conspicuous and often sexualized ways, including by posting sexy images of themselves online. We suggest that these behaviors are due to proximate desires to signal high status and socially climb, and can also reflect a mindset focused on obtaining external approval. Moreover, we interpret these proximate mechanisms in terms of the ultimate function of enhancing status and reproductive success by securing the highest status and/or wealthiest available mates and male allies. More research mapping the specific psychological effects of income inequality as they pertain to women's appearance-enhancement would allow a comprehensive understanding of these patterns.

It is also worth noting that increased sexualization in economically unequal environments may derive from a combination of supply and demand factors. In addition to

incentivizing women to use their sexual attractiveness to socially climb (i.e., increased supply), income inequality may elevate men's desire for sexualization (i.e., increased demand). Thus, when we see income inequality changing women's behavior in particular ways that suggest attraction goals have been activated, we should remember that this could partly reflect women adjusting their behavior to suit what they think is desirable in that environment. This type of market-based theorizing is well developed in other fields, though it is under-utilized in social psychology. Contextualizing individual behavior as occurring inside a market that incentivises particular outcomes has much to offer future social psychological work, especially as it pertains to understanding the effects of income inequality on behavioral outcomes.



## References

- Alesina, A., Giuliano, P., & Nunn, N. (2013). On the origins of gender roles: Women and the plough. *The Quarterly Journal of Economics*, *128*(2), 469–530.
- Andersen, R., & Curtis, J. (2012). The polarizing effect of economic inequality on class identification: Evidence from 44 countries. *Research in Social Stratification and Mobility*, *30*(1), 129–141.
- Angrist, J. (2002). How do sex ratios affect marriage and labor markets? Evidence from America's second generation. *The Quarterly Journal of Economics*, *117*(3), 997–1038.
- Autor, D., Dom, D., & Hanson, G. (in press). When work disappears: Manufacturing decline and the falling marriage-market value of young men. *American Economic Review: Insights*.
- Barber, N. (1995). The evolutionary psychology of physical attractiveness: Sexual selection and human morphology. *Ethology and Sociobiology*, *16*(5), 395–424.
- Barber, N. (1999). Women's dress fashions as a function of reproductive strategy. *Sex Roles*, *40*(5/6), 459–471.
- Barber, N. (2001). On the relationship between marital opportunity and teen pregnancy - The sex ratio question. *Journal of Cross-Cultural Psychology*, *32*(3), 259–267. doi:10.1177/0022022101032003001
- Becker, G. S. (1981). *A Treatise on the Family*. Cambridge, MA: Harvard University Press.
- Betzig, L. (1994). Sex, succession, and stratification in the first six civilizations. In L. Ellis (Ed.), *Social Stratification and Socioeconomic Inequality* (pp. 37–74). Westport, CT: Praeger.
- Blake, K. R., Bastian, B., & Denson, T. F. (2016). Perceptions of low agency and high sexual openness mediate the relationship between sexualization and sexual aggression. *Aggressive Behavior*, *42*(5), 483–497.
- Blake, K. R., Bastian, B., Denson, T. F., Grosjean, P., & Brooks, R. C. (2018). Income inequality not gender inequality positively covaries with female sexualization on social media. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(35), 8722–8727. doi:10.1073/pnas.1717959115
- Buss, D. M. (1988). The evolution of human intrasexual competition: Tactics of mate attraction. *Journal of Personality and Social Psychology*, *54*(5), 616–628.
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, *12*(1), 1–49.
- Buss, D. M., & Dedden, L. A. (1990). Derogation of competitors. *Journal of Social and Personal Relationships*, *7*(3), 395–422.
- Buunk, A. P., & Fisher, M. (2009). Individual differences in intrasexual competition. *Journal of Evolutionary Psychology*, *7*(1), 37–48.
- Campbell, A. (2004). Female competition: causes, constraints, content, and contexts. *Journal of Sex Research*, *41*(1), 16–26.
- Canale, N., Vieno, A., Lenzi, M., Griffiths, M. D., Borraccino, A., Lazzeri, G., . . . Santinello, M. (2017). Income inequality and adolescent gambling severity: Findings from a large-scale Italian representative survey. *Frontiers in Psychology*, *8*, 1–12.
- Cashdan, E. (1993). Attracting mates: Effects of paternal investment on mate attraction strategies. *Ethology and Sociobiology*, *14*(1), 1–23.

- Cashdan, E. (1996). Women's mating strategies. *Evolutionary Anthropology: Issues, News, and Reviews*, 5(4), 134–143.
- Cheung, F., & Lucas, R. E. (2016). Income inequality is associated with stronger social comparison effects: The effect of relative income on life satisfaction. *Journal of Personality and Social Psychology*, 110(2), 332–341.
- Chiavegatto, F., Alexandre, D. P., & Kawachi, I. (2015). Income inequality is associated with adolescent fertility in Brazil: A longitudinal multilevel analysis of 5,565 municipalities. *BMC Public Health*, 15, 103–110.
- Clark, A. E., Kristensen, N., & Westergård-Nielsen, N. (2009). Economic satisfaction and income rank in small neighborhoods. *Journal of the European Economic Association*, 7(2–3), 519–527.
- Colleran, H., Jasienska, G., Nenko, I., Galbarczyk, A., & Mace, R. (2015). Fertility decline and the changing dynamics of wealth, status and inequality. *Proceedings of The Royal Society B — Biological Sciences*, 282(1806), 1–9.
- Daly, M. (2016). *Killing the competition: Economic inequality and homicide*. New Brunswick, CA: Transaction Publishers.
- Daly, M., & Wilson, M. (2001). Risk-taking, intrasexual competition, and homicide. In J. A. French, A. C. Kamil, & D. W. Leger (Eds.), *Vol. 47 of the Nebraska Symposium on Motivation: Evolutionary Psychology and Motivation* (pp. 1–36). Lincoln, NE: University of Nebraska Press.
- Daly, M., Wilson, M., & Vasdev, N. (2001). Income inequality and homicide rates in Canada and the United States. *Canadian Journal of Criminology*, 43, 219–236.
- Darwin, C. (1859). *On the origin of species by means of natural selection or the preservation of favoured races in the struggle for life*. London, UK: Murray.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Di Domenico, S. I., & Fournier, M. A. (2014). Socioeconomic status, income inequality, and health complaints: A basic psychological needs perspective. *Social Indicators Research*, 119(3), 1679–1697.
- Duggan, M. & Brenner, J. (2013). *The demographics of social media users - 2012*. Retrieved from <http://pewinternet.org/Reports/2013/Social-media-users.aspx>
- Eagly, A. H., Ashmore, R. D., Makhijani, M. G., & Longo, L. C. (1991). What is beautiful is good, but . . . : A meta-analytic review of research on the physical attractiveness stereotype. *Psychological Bulletin*, 110(1), 109–128.
- Eagly, A. H., & Wood, W. (1999). The origins of sex differences in human behavior: Evolved dispositions versus social roles. *American Psychologist*, 54(6), 408–423.
- Fisher, M., & Cox, A. (2009). The influence of female attractiveness on competitor derogation. *Journal of Evolutionary Psychology*, 7(2), 141–155.
- Fiske, S. T., Cuddy, A. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82(6), 878–902.
- Frederick, S., Loewenstein, G. & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature*, 40, 351–401.
- Fredrickson, B. L., & Roberts, T.-A. (1997). Objectification theory. *Psychology of Women Quarterly*, 21(2), 173–206.

- Gold, R., Connell, F. A., Heagerty, P., Bezruchka, S., Davis, R., & Cawthon, M. L. (2004). Income inequality and pregnancy spacing. *Social Science & Medicine*, *59*(6), 1117–1126.
- Greitemeyer, T., & Sagioglou, C. (2017). Increasing wealth inequality may increase interpersonal hostility: The relationship between personal relative deprivation and aggression. *The Journal of Social Psychology*, *157*(6), 766–776.
- Hill, K., & Hurtado, A. M. (1996). *Aché life history: The ecology and demography of a foraging people*. *Foundations of human behavior*. New York: Aldine de Gruyter.
- Hill, S. E., Rodeheffer, C. D., Griskevicius, V., Durante, K., & White, A. E. (2012). Boosting beauty in an economic decline: Mating, spending, and the lipstick effect. *Journal of Personality and Social Psychology*, *103*(2), 275–291.
- Hopcroft, R. L. (2006). Sex, status, and reproductive success in the contemporary United States. *Evolution and Human Behavior*, *27*(2), 104–120.
- Hudders, L., Backer, C. de, Fisher, M., & Vyncke, P. (2014). The rival wears Prada: Luxury consumption as a female competition strategy. *Evolutionary Psychology*, *12*(3), 570–587.
- Jennions, M.D. & Kokko, H. (2010). Sexual selection. In D.F. Westneat & C.W. Fox (Eds.), *Evolutionary Behavioral Ecology* (pp. 343–364). New York: Oxford University Press.
- Jennions, M. D., & Petrie, M. (1997). Variation in mate choice and mating preferences: A review of causes and consequences. *Biological Review*, *72*, 283–327.
- Kacelnik, A. (1997). Normative and descriptive models of decision making: Time discounting and risk sensitivity. In G. Bock & G. Cardew (Eds.), *Characterizing human psychological adaptations* (pp. 51–70). London, UK: Wiley.
- Kaplan, H.S., Bock, J.A., & Hooper, P.L. (2015). Fertility theory: Embodied-capital theory of life history evolution. In J. Wright (Ed.), *International encyclopedia of the social & behavioral sciences* (pp. 28–34, 2nd ed). Oxford, UK: Elsevier.
- Kearney, M. S., & Levine, P. B. (2014). Income inequality and early nonmarital childbearing. *Journal of Human Resources*, *49*(1), 1–31.
- Kimhi, A. (2008). *Male income, female income, and household income inequality in Israel: A decomposition analysis: Working paper 46293*. Jerusalem, IL: Hebrew University of Jerusalem. Retrieved from [http://departments.agri.huji.ac.il/economics/en/publications/discussion\\_papers/2008/kimhi-male.pdf](http://departments.agri.huji.ac.il/economics/en/publications/discussion_papers/2008/kimhi-male.pdf)
- Kirby, K. N., Petry, N. M. & Bickel, W. K. (1999). Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology General*, *128*, 78–87.
- Krahn, H., Hatnagel, T. F., & Gartrell, J. W. (1986). Income inequality and homicide rates: Cross-national data and criminological theories. *Criminology*, *24*(2), 269–294.
- Laland, K. N., Sterelny, K., Odling-Smee, J., Hoppitt, W., & Uller, T. (2011). Cause and effect in biology revisited: Is Mayr's proximate-ultimate dichotomy still useful? *Science*, *334*(6062), 1512–1516.
- Loughran, D. S. (2002). The effect of male wage inequality on female age at first marriage. *Review of Economics and Statistics*, *84*(2), 237–250.
- Luke, K. P. (2008). Are girls really becoming more violent? A critical analysis. *Affilia*, *23*(1), 38–50.

- Maestriperi, D., Henry, A., & Nickels, N. (2017). Explaining financial and prosocial biases in favor of attractive people: Interdisciplinary perspectives from economics, social psychology, and evolutionary psychology. *Behavioral and Brain Sciences*, *40*, e19.
- Mayr, E. (1961). Cause and effect in biology: Kinds of causes, predictability, and teleology are viewed by a practicing biologist. *Science*, *134*(3489), 1501–1506.
- Moradi, B., & Huang, Y. P. (2008). Objectification theory and psychology of women: A decade of advances and future directions. *Psychology of Women Quarterly*, *32*(4), 377–398.
- Nelson, E. (2001, November 26). Rising lipstick sales may mean pouting economy and few smiles. *The Wall Street Journal*.
- Noah, A. J., Yang, T.-C., & Wang, W.-I. (2018). The black-white disparity in sexually transmitted diseases during pregnancy: How do racial segregation and income inequality matter? *Sexually Transmitted Diseases*, *45*(5), 301–306.
- Nowatzki, J., & Morry, M. M. (2009). Women's intentions regarding, and acceptance of, self-sexualizing behavior. *Psychology of Women Quarterly*, *33*(1), 95–107.
- Oishi, S., Kesebir, S., & Diener, E. (2011). Income inequality and happiness. *Psychological Science*, *22*, 1095–1100.
- Penaherrera-Aguirre, M., Hertler, S. C., Figueredo, A. J., Fernandes, H. B. F., Cabeza de Baca, T., & Matheson, J. D. (2018). A social biogeography of homicide: Multilevel and sequential canonical examinations of intragroup unlawful killings. *Evolutionary Behavioral Sciences*, *12*(1), 1–24.
- Reiss, I. L. (1986). A sociological journey into sexuality. *Journal of Marriage and the Family*, *48*(2), 233–242.
- Santelli, J. S., Song, X., Garbers, S., Sharma, V., & Viner, R. M. (2017). Global trends in adolescent fertility, 1990-2012, in relation to national wealth, income inequalities, and educational expenditures. *Journal of Adolescent Health*, *60*(2), 161–168.
- Shah, A. K., Mullainathan, S., & Shafir, E. (2012). Some consequences of having too little. *Science*, *338*(6107), 682–685.
- Smith, H. J., Pettigrew, T. F., Pippin, G. M., & Bialosiewicz, S. (2012). Relative deprivation: A theoretical and meta-analytic review. *Personality and Social Psychology Review*, *16*(3), 203–232.
- Smolak, L., Murnen, S. K., & Myers, T. A. (2014). Sexualizing the self: What college women and men think about and do to be “sexy”. *Psychology of Women Quarterly*, *38*(3), 379–397.
- Sommers, I. R.A., & Baskin, D. R. (1994). Factors related to female adolescent initiation into violent street crime. *Youth & Society*, *25*(4), 468–489.
- Stearns, S.C. (1992). *The evolution of life histories*. Oxford, UK: Oxford University Press.
- UN Office on Drugs and Crime. (2013). *Global Study on Homicide*. Retrieved from <https://www.unodc.org/gsh/>. Accessed 01 Aug 2016.
- Walasek, L., Bhatia, S., & Brown, G. D. A. (2018). Positional goods and the social rank hypothesis: Income inequality affects online chatter about high- and low-status brands on Twitter. *Journal of Consumer Psychology*, *28*(1), 138–148.
- Walasek, L., & Brown, G. D. A. (2015). Income inequality and status seeking: Searching for positional goods in unequal U.S. States. *Psychological Science*, *26*(4), 527–533.

- Wang, Y., & Griskevicius, V. (2014). Conspicuous consumption, relationships, and rivals: Women's luxury products as signals to other women. *Journal of Consumer Research*, *40*(5), 834–854.
- Wilkinson, R. G., & Pickett, K. E. (2009). Income inequality and social dysfunction. *Annual Review of Sociology*, *35*, 493–511.
- Wilson, M., & Daly, M. (1985). Competitiveness, risk-taking, and violence - The young male syndrome. *Ethology and Sociobiology*, *6*(1), 59–73.
- Wilson, M., & Daly, M. (1997). Life expectancy, economic inequality, homicide, and reproductive timing in Chicago neighbourhoods. *The BMJ*, *314*(7089), 1271.
- Yost, M. R., & McCarthy, L. (2012). Girls gone wild? Heterosexual women's same-sex encounters at college parties. *Psychology of Women Quarterly*, *36*(1), 7–24.