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Divorce Patterns and the Male-to-Female Mortality Ratio: Is Midlife Crisis the Death of Men?

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ABSTRACT

Beginning in infancy, males have a higher mortality rate than females– this sex-differentiated pattern holds across stages of life, but is exacerbated during years of peak courtship (adolescence and young adulthood), likely as a function of the fact that young males partake in risky behavior during courtship (Kruger & Nesse, 2007). The Male-to-Female Mortality Ratio (M:F MR) peaks at around age 25. The current analysis suggests that a drop in this ratio at this life stage may pertain to the fact that marriage occurs at about the age of 25 in modern Western societies and that married men have less of an evolutionary incentive than single men to participate in risky behavior. Past research (Kruger & Nesse, 2007) has found that the M:F MR increases slightly at around age 50. According to Kruger and Nesse (2006), this increase results partly from the fact that men at middle age are dying due to mainly internal causes, such as heart disease, which may result from prior risky behaviors during young adulthood (Kruger & Nesse, 2006); however, this explanation does not account for the fact that men at midlife also show an increase in mortality (relative to females) for external causes of death. Based on an analysis of divorce trends vis a vis M:F MR patterns, we propose that this increase in the M:F MR likely results, partly, from middle-aged, divorced men engaging in risky courtship behaviors that have physical costs.

KEYWORDS

Young Male Syndrome, Male-to-Female Mortality Ratio, M:F MR, Marriage, Divorce

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Across all stages of the human lifespan, males have a higher mortality rate than females. This sex-differentiated pattern is exacerbated during years of peak courtship (adolescence and young adulthood), likely as a function of the fact that young males partake in risky behavior during courtship (Kruger & Nesse, 2007). Across the lifespan, the Male-to-Female Mortality Ratio (M:F MR) peaks at around age 25 (Kruger & Nesse, 2007). From an evolutionary perspective, across most species, males tend to engage in less parental investment and females are more selective when choosing mates (Trivers, 1972). Based on the notion of *sexual selection* (Darwin, 1871), animals within a single sex compete in various ways for access to desirable mates of the other sex. This process, known as *intrasexual competition* (see Kruger & Nesse 2006), often plays out in fierce male/male competition during prime courtship years within a species.

In humans, a species that fits the patterns of low male parental investment (see Trivers, 1972) and male/male competition in early adulthood (see Buss & Schmitt, 1993), there is strong selective pressure for males to partake in aggressive and risky behavior during adolescence and young adulthood – since choosing a risky strategy demonstrates fitness and is likely to lead to increased mating opportunities with evolutionary benefits that counteract costs associated with risk and aggressive behavior (Wilson & Daly, 1985). Males often compete for mates by competing for catalysts of mating success such as social status (Kruger & Nesse, 2007). Males who achieve success in such a competitive context are more attractive to potential mates (see Buss, 2003), and are, thus, more likely to achieve reproductive success.

Courtship is Risky

Competition and courtship display mechanisms often include elements of risk, which are oftentimes driven by aggressive behavior: two bucks butting heads clearly explicates male/male competition that is both explicitly aggressive and risky (Betzig 1986). The winner of this kind of competition demonstrates fitness, which will most likely lead to increased opportunities to mate with females, but the male must risk potential injury or death in the process. Moreover, these courtship mechanisms are not always aggressive in nature (see Geher & Miller, 2008; Miller, 2000). In various species, humans included, displays designed to attract mates often include aesthetic, visual, acoustic, and/or behavioral displays. However, even such non-aggressive forms of displays have elements of physical risk associated with them.

A classic example of a non-violent behavior that may be considered risky is when male peacocks show off their plumage (Betzig 1986; Zahavi, 1977, 2003). While peacocks strut their plumage to display fitness, they concurrently put themselves in danger as predators may well notice the colorful display. The peacock with the brightest and most symmetrical plumage will receive more female attention, but he also is most likely to be killed by a predator (Zahavi, 1977, 2003). These examples illustrate how evolution is a process that encourages maximizing long-term benefits against a landscape of survival and reproduction-inhibiting costs.

In sexually reproducing species in which parental investments costs are higher for females, males invest more in courtship (Kruger & Nesse, 2007) and bear greater courtship-related risks as a result. In such species, reproductive success is more

variable for males than for females (Bateman, 1948) – an empirical reality that drives variability in within-sex competition. Simply: Males are more likely to be shut out of mating (compared with females), so males are, thus, more motivated to compete for mates – and, as a fatal consequence of these, oftentimes, risky behaviors, males are more likely to die as a result.

Courtship Patterns and Mate Deception among Middle-Aged Men

Research suggests that on average, heterosexual males of middle age prefer women 5-15 years younger than themselves, while heterosexual women, on average, prefer a man that is 3-10 years older than themselves (Kenrick & Keefe, 1992). If a male is age 40, this would mean that he would prefer a mate between ages 25-35. If his mate of interest were on the younger end of the scale, age 25, she would most likely prefer a mate between ages 28-35. This would mean that the 40-year-old male would have to create different courtship tactics to overcome the age difference. He would have to prove his mate of interest that he has higher status, more access to resources, wealthier, and more physically fit than his younger counterparts.

One way that the middle-aged male could convey that he is of higher mate value than his younger competition, is through mate deception. Deceiving a mate is a type of non-violent risky behavior because, if discovered, it can take the deceiver out of the mating pool. If other potential mates find out about the deception, they will be less likely to mate with the deceiver. In a society where courtship does not necessarily have to take place face-to-face, deceiving a potential mate is relatively easy. Males and females alike can lie about their age, job, and physical appearance. In the example above, with the 40-year-old middle-aged male who wants a 25-year-old female mate, he will have to compete with males closer to her age group. He would have less of a motive to lie about his resources (as he probably has a higher-paying job, a nicer home, and generally more wealth than the average 28-year-old male), but be more motivated to lie about his physical fitness and age. Poor physical fitness and older age are indicators of poor genetic quality. If a potential mate, like the 25 year-old woman, thought that the 40-year-old male had poor physical fitness she would probably be less likely to mate with him.

To prevent older age and poor physical fitness from being a deterrent from a future partner, males of middle age would probably be more likely to lie about their age and fitness level compared to men of a younger age group or women of the same age. Males in general are more likely to lie about their financial assets (Buss, 2003; O'Sullivan, 2008). Lying about finances would indicate that the male has access to fewer resources than he is telling his potential mate about. This lying tactic would be beneficial to the male because the female would be more inclined to mate with him (Buss, 2003; O'Sullivan, 2008). If men are more willing to lie about financial resources to attract mates, then they might be more inclined to lie about physical fitness. Stronger physical fitness is an indicator of good genetic quality and health. Males of middle age might be more likely to lie about their physical health compared to younger males or females because they may feel threatened by younger males.

As stated before, mate deception is a risky practice because it can severely lessen the pool of potential mates. In a study about online dating, women, when compared to men, were most disturbed by deception about the age of their potential mate, specifically if the match lied about being younger than his actual age (Stieger, Eichinger, & Honeder, 2009). If a potential mate kept repeating this kind of behavior, he narrows his selection of females.

Aside from lying about physical traits, males in middle age may engage in more risky behaviors to demonstrate that they are able to "keep up" with their younger counterparts. If they are successful in their risk taking, that would make them more appealing to a younger potential partner. However, if they are unsuccessful, this behavior could put middle-aged males at risk for injury or death depending on the level of risk they participate in.

An Evolutionary Analysis of the M:F MR in Humans

Human males also participate in both violent and non-violent forms of competition. Human males display markers of wealth and earning potential during courtship (Buss & Schmitt, 1993), even if these displays are false and, thus, deceptive in nature (Kruger, 2008). In fact, a great deal of converging evidence suggests that males are, compared with females, relatively likely to lie about their finances to impress a member of the opposite sex (Barnacz, Amati, Fenton, Johnson, & Keenan, 2009). This pattern often leads to disagreements with other males in competitions over status – often leading to violent outcomes (Daly & Wilson, 1985). In fact, violence tied to several facets of the mating domain seems to be a predominantly male behavioral feature (Shackelford, Goetz**,** Buss, Euler, & Hoier, 2005; Buss, 2006).

In a highly influential set of studies on the topic of male/male competition, Kruger and Nesse (2006, 2007) analyzed large public data sets from the World Health Organization to examine the M:F MR from an evolutionary perspective in various cultures. These researchers found that the M:F MR is consistently biased against males, in all cultures, at all stages of the lifespan. However, this pattern is exacerbated during young adolescence, the prime courtship years.

In the United States, at around age 25, there is a noticeable decrease in the M:F MR (Kruger & Nesse, 2006) – a fact that essentially means that the gap between males and females closes. Males older than this stage still may die (an obvious risk at any point during the lifespan), but the rate at which they die becomes less disproportionate from the rate at which females die. A proximate cause of this change in the mortality ratio is likely due to marriage – which occurs at about this age. Marriage likely has the effect of reducing courtship and competition – resulting in less injury and death associated with such outcomes. In fact, married males have been shown to be healthier than their non-married counterparts (Kiecolt-Glaser & Newton, 2001)

According to Kruger and Nesse (2006), the M:F MR continues to decrease steadily from about age 25 (M:F MR = 4) until around age 40, however, an increase in mortality rates was found from age 40 until about age 50 for both internal and external causes of death. Continuing a focus on male/male competition in early adulthood, Kruger and Nesse (2006) argue that this peak is the result of intense male/male competition during early adulthood. In making this argument, the authors point to the fact that this peak is particularly pronounced for

"internal causes" of death, such as heart disease, which may result from risky behaviors, such as smoking, early in adulthood – and which are only at this stage manifesting their deleterious consequences (Kruger & Nesse, 2006).

While this interpretation of the data in terms of lagged consequences of adolescent risk manifesting in internal consequences in mid-life is intriguing and matches the data well, it only speaks to the mid-life spike in the M:F MR function associated with internal causes. Kruger and Nesse's (2006) data demonstrates that a spike in the M:F MR resulting from external causes is also observed at this same mid-life point. This fact warrants study.

Hypothesis: Divorce Rate as Possibly Underlying the Mid-Life Spike in the M:F MR

According to Kruger and Nesse (2006), males in the midlife age range are more likely to die from internal causes brought on as a result of the risky behavior that the males had participated in while in young adulthood. However, this explanation does not address why men (relative to women) at this age die of external causes at a rate that exceeds the rates found in the years between 25 and 40.

CURRENT ANALYSIS

The current analysis varies from Kruger and Nesse's (2006) original work as it focuses specifically on why the rate for the M:F MR for external causes of death is still relatively high. Drawing upon past research from U.S. 2001 Census data for marriage (Kreider, 2005); psychological research concerning how marriage influences male behavior (Mazur & Michalek, 1998) and how risk-taking behavior is related to mate choice and marriage (Kruger & Nesse, 2006); and parental investment (Trivers, 1972), we predicted that marriage and divorce patterns would correspond to fluctuations in the M:F MR (Kruger & Nesse 2006). Essentially, we argue that the external causes of death spike found in males during midlife is likely the result of courtship conflict, much as the spike in late adolescence is. This timing of the midlife spike corresponds strongly to the timing of first and second divorces that are encountered by a high proportion of males as they enter into midlife (Kreider, 2005).

More generally, an analysis of divorce rates in males shows that divorce shows a dramatic increase in probability in males in their 40s (Kreider, 2005; Stevenson & Wolfe, 2007). This considerable increase in likelihood of divorce (or, per the relevant argument, being *single again*) maps strongly onto this second peak in the M:F MR documented by Kruger and Nesse (2006), which takes place primarily in one's 40s. Further, this function tends to level off at about age 50 – again, strongly consistent with Kruger and Nesse's (2006) data regarding age-related trends and the M:F MR. If a high proportion of adult males in midlife are single within a population at a given time, then a high proportion of midlife males, who are still reproductively viable, are predicted to engage in male-male competition seeking access to females; furthermore, a great deal of research shows that males in this scenario tend to seek

relatively younger females in this process (see Kenrick & Keefe,1992), suggesting the attraction to more viable mates is also present at this time.

So in light of standard divorce patterns, which leads to a high prevalence of midlife single males in the population, a significant amount of male/male competition is expected to manifest. And while this competition may be expected to reflect relatively mature behaviors and decisions, from an evolutionary perspective, a 45-year-old single male and a 20-year-old single male, actually have a lot in common. They are both members of the sex that invests minimally in parental investment (Buss & Barnes, 1986) and are both members of the sex that benefits more from engaging in short-term mating opportunities (Schmitt, 2005). And they are both members of the sex that has been shaped by evolution to engage in relatively physical competition (Buss, 2005) – ultimately as such physicality relates to the competition for mates. With this analysis, it is little wonder that midlife males who find themselves single would engage in the same kinds of behaviors that typically correspond to "Young Male Syndrome" (Daly & Wilson, 1985).

Patterns of divorce more generally, in fact, seem to map on well to the functions that explicate the M:F MR. Consider, for instance, that according to the 2001 U.S. Census, the average age for men to marry is 24 years (Kreider, 2005). And according to Kruger and Nesse (2006), the M:F MR begins to decrease around this time as well. Thus, marriage likely has an impact on the M:F MR. Once males get married they are less likely to participate in risky behavior. In fact, recent research shows that risk tolerance may well be a predictor of divorce in the first place (Light & Ahn, 2009).

Further, marriage actually has been shown to correspond to significant hormonal changes in males. After marriage, men seem to have a decrease in testosterone, as compared to unmarried males of the same age, a fact that may relate to aggressive behavior (Mazur & Michalek, 1998). Along these lines, it is noteworthy that unmarried men are more likely to participate in criminal activities and other antisocial behavior (Mazur & Michalek, 1998). Conversely, married men may be generally out of courtship mode, ending up largely removed from relatively intense and potentially physical competition with other males for mates (Mazur & Michalek, 1998).

In terms of the M:F MR, after marriage, males are less likely to die from the same kinds of external causes (accidents, homicides, suicides, etc.) that are the *primary* cause of death of young men from birth to age 25 (Kruger & Nesse 2006). So being mated and concomitant testosterone levels may well explain why the M:F MR for external causes is relatively low between the ages of 25-40, and why it shows a clear spike during the infamous midlife stage.

Divorce Patterns and Specific External Causes of Death

Kruger and Nesse (2006) break the M:F MR for external causes into different categories of automobile accidents, other kinds of accidents, suicides, and homicides. Of these causes, accidents (both auto and non-auto) both show a slight increase in midlife – and homicide shows a larger increase (see, Kruger & Nesse 2006).

Divorced, single males experiencing a "midlife crisis" may be more likely to take risks in various ways – this pattern would result in increased deaths from accidents (vehicular and otherwise). The stereotype of a man in midlife crisis depicts him with a fast car or motorcycle (the ultimate vehicle of youth and rebellion) and a young

woman. Although this *is* a stereotype, it may well be empirically accurate as well. However, further research is needed to examine this issue.

DISCUSSION

The Male-to-Female Mortality Ratio provides a major marker of sex differences in mortality across the lifespan – and evolutionary approaches to understanding sex differences in mortality by examining this ratio have been quite illuminating (Kruger & Nesse, 2006; Kruger & Nesse, 2007). Prior research on this topic has not explicitly addressed the potential role of divorce patterns on this ratio. Specifically, we examined divorce patterns as possibly playing a role in the increase in M:F MR that emerges during the midlife years.

Kruger and Nesse (2006) argue that this increase is largely a delayed result of risky male behavior that is expressed in late adolescence and early adulthood in a courtship context. They specifically argue that early death in midlife may be the result of such risky behaviors as alcohol and drug consumption from earlier in life. While this explanation addressed the spike in the M:F MR for internal causes found in the data, it does not address the additional spike in external causes that also emerges in midlife in the same data set.

By examining data speaking to divorce trends, we were able to show that male divorce patterns seem to correspond strongly to the midlife M:F MR spike in external causes documented by Kruger and Nesse (2006). We suggest that males at midlife who find themselves single are, from an evolutionary perspective, in a very similar situation to young adult males who are engaged in the mate-selection process. Thus, the same explanation that Kruger and Nesse (2006) employ to explain the increase in the M:F MR in the late teens / early 20s may apply to the spike in the M:F MR in midlife. Recently single midlife men may be in their 40s and 50s chronologically, but from an ecological and evolutionary standpoint, they still suffer from Young Male Syndrome (Daly & Wilson, 1985). In effect, this analysis paints a portrait of the midlife crisis from an evolutionary perspective.

Testable Hypotheses for Future Research

While the current analysis provides support for the midlife increase in M:F MR regarding external causes of death, the work here does not provide data to directly address several proximate issues that may underlie this explanation. As a guide for future researchers on this topic, we propose the following testable hypotheses that are predicted by the model provided in this work.

Hypothesis 1: Recently divorced males manifest higher levels of testosterone compared with married men from the same demographic group.

Hypothesis 2: Recently divorced males make relatively risky decisions compared with married men from the same demographic group.

Hypothesis 3: Recently divorced males are particularly affected by status-related primes (e.g., expensive cars, younger women) relative to comparable increases in married men from the same demographic group.

Hypothesis 4: Recently divorced males are particularly affected by signals of being dominated in social contexts relative to comparable increases in married men from the same demographic group.

Hypothesis 5: All these predicted effects regarding recently divorced males are predicted to be exacerbated in the presence of attractive females (e.g. females with symmetrical faces, small waist-to-hip ratio, etc.) relative to comparable increases in married men from the same demographic group.

We hope that future research concerning the impact of marriage and divorce can benefit from this heuristic framework.

CONCLUSION

In sum, males at middle age are a unique and understudied population. Evolutionary psychology provides an interesting and intellectually fruitful framework for understanding middle-aged male psychology and behavior. The current analyses suggest that a return to courtship-like behaviors during middle age may well account for patterns of the M:F MR during this lifestage. Clearly, this work, then, has important health and societal implications.

Further evolutionarily informed research regarding middle-aged men may help provide insight as to the mechanisms that are linked to their behavior. Further, importantly, such future work may well have potential to impact behavior in a positive manner (e.g., reducing risky behaviors), thereby having positive health impacts at a societal level.

REFERENCES

Barnacz, A., Amati, F., Fenton, C., Johnson, A., & Keenan, J. P. (2009). Deception and dating: Knowledge of tactics may improve detection accuracy. *Journal of Social, Evolutionary & Cultural Psychology, 3(1)*, 1-8.

Bateman, A.J. (1948). Intra-sexual selection in Drosophila. *Heredity, 2*, 349-368.

Betzig, L. (1986). *Despotism and differential reproduction: A Darwinian view of history.* New York: Aldine de Gruyter.

Buss, D. M., Schmitt D.P, (1993). Sexual Strategies Theory: An evolutionary perspective on human mating. *Psychological Review*, *100*(2), 204-232.

Buss, D. M. (2003). *The evolution of desire: Strategies of human mating*. New York: Basic Books.

Buss, D. M. (2006). *The murderer next door: Why the mind was designed to kill*. New York: Penguin Books.

Darwin, C. (1871). *The descent of man and selection in relation to sex*. London: John Murray.

Geher, G., & Miller, G. (Eds.) (2008). *Mating Intelligence: Sex, relationships, and the mind's reproductive system*. New York: Lawrence Erlbaum Associates.

Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in human reproductive strategies. *Behavioral and Brain Sciences, 15*, 75-133 .

Kiecolt-Glaser, J. K., & Newton T. L. (2001). Marriage health: His and hers. *American Psychological Association. 127*(4) 472-503.

Kreider, R. M. (2005). Number, timing, and duration of marriages and divorces: 2001, Tables 3, 9. *Current Population Reports*, P70-97. Washington, D. C.: U.S. Census Bureau.

Kruger, D. J. (2008). Young adults attempt exchanges in reproductively relevant currencies. *Evolutionary Psychology*, *6(1)*, 204-212.

Kruger, D. J., & Nesse R. M. (2006). An evolutionary life-history framework for understanding sex differences in human mortality rates. *Human Nature*, *17*(1), 74–97.

Kruger, D. J., & Nesse R. M. (2007). Economic transition, male competition, and sex differences in mortality rates. *Evolutionary Psychology*, *5*(2), 411-427

Light, A., & Ahn, T, (2009). Divorce as risky behavior. *Humanities, Social Sciences, and Law*, *47*(4), 895-921.

Mazur, A., & Michalek, J. (1998). Marriage, divorce, and male testosterone. *Social Forces, 77*(1), 315-330.

Miller, G. F. (2000). *The mating mind: How sexual choice shaped the evolution of human nature*. New York: Doubleday.

O'Sullivan, M. (2008). Deception and self deception as strategies in short-term and long-term mating. In G. Geher & G. Miller, *Mating Intelligence* (135-159). New York: Lawrence Erlbaum Associates.

Schmitt, D. P**.** (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences, 28*, 247-275

Shackelford, T. K., Goetz, A. T**.,** Buss, D. M., Euler, H. A., & Hoier, S. (2005). When we hurt the ones we love: Predicting violence against women from men's mate retention tactics. *Personal Relationships, 12*, 447-463.

Stevenson, B., & Wolfers, J. (2007). Marriage and divorce: Changes and their driving forces. *Journal of Economic Perspectives*, *21*(2), 27-52.

Strieger, S., Eichinger, T., & Honeder, B. (2009). Can mate choice explain sex differences. *Social Psychology*, *40*, 16-25.

Trivers, R. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual Selection and the Descent of Man: 1871-1971* (pp. 136-179). Chicago: Aldine.

Willis, S. L., & Reid J. D. (1998). *Life in the middle: psychological and social development in middle age.* Academic Press.

Wilson, M., & Daly, M. (1985). Competitiveness, risk-taking and violence: The young male syndrome. *Ethology and Sociobiology, 6,* 59-73.

Zahavi, A. (1977). Reliability in communication systems and the evolution of altruism. In B. Stonehouse & C. M. Perrins (Eds.), *Evolutionary Ecology* (pp. 253–59). London, England: Macmillan Press.

Zahavi, A. (2003). Indirect selection and individual selection in sociobiology: My personal views on theories of social behaviour. *Animal Behaviour, 65,* 859–863.

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