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A Reexamination of the Nature of Male Parental Investment

Nathan R. Sell

Abstract: The role of male parental investment has recently been the subject of much research and debate in anthropology. By understanding the role of male parental care, its evolutionary development, function to the individual, and implications to the larger society, anthropologists can make better sense of observed cultural phenomena. This paper reviews the anthropological literature published on the different facets of male parental investment, and provide an overview of major trends in the research. The role of mating and parenting effort, cross-species comparisons of male parental care, and possible hormonal causations for male parental care are addressed. As a proxy for investment male hunting is examined against two competing hypotheses used to elucidate that activity, the cooperative pair-bonding model and the signaling model. It is demonstrated that the assumptions found in the "show-off" hypothesis do not adequately explain hunting in terms of male parental investment. From this analysis, it is proposed that male parental investment is best explained in terms of a combination of the pair-bonding model and a bargaining-model wherein males seek equilibrium between mating and parenting effort based on available environmental, constraints, both physical and social. Only by adjusting to these given circumstances can males effectively maximize their reproductive potential.

Introduction

Since Lovejoy's (1981) argument for male parental provisioning in response to female sexual selection as an explanation for the rise of bipedality in the human lineage, anthropologists have taken an interest in the causes and effects behind male parental investment. What exactly is male parental investment? What is the nature of male parental investment? What does the nature of male parental investment mean? These are some of the major questions that arise when inquiring about male parental care. This paper will show that male mating effort is not mutually exclusive with parenting effort. I will also show that males will react to a given set of circumstances depending on a suite of environmental and social variables.

These findings will illuminate anthropology's understanding about the nature of male parental investment overall, but also its implications to the development of past and present human social organization. This paper attempts to provide an overview and synthesize the components of male parental investment and qualitatively show which explanations and models operate best with the given literature.

What is male parental investment and why did it emerge?

Trivers (1972:136) classically defined parental investment as, "anything a parent does to nurture and protect an offspring which increases the offspring's chances of reproductive success at the cost of limiting the parent's ability to nurture and protect other offspring". For the purposes of this paper Trivers' definition of parental investment will be tweaked by replacing the generic "parent" with a male orientated term, thus male parental investment.

In a critical article, Lovejoy (1981) noted that during the course of hominid evolution one distinguishing trait, bipedality, emerged first. He proposed that early hominid females selected bipedality because males could provision for their offspring, and increase the offspring's chance of survival (Lovejoy 1981). Lancaster and Lancaster make no small statement about the male's role in this behavioral shift, "The human pattern is one in which specific human males relate to specific human females and their children. This relationship is...summed in the role of the 'husband/father (1983:43).'" They argue that this joint endeavor between human males and females reduced sexual selection and increased parental investment strategies in both sexes (Lancaster and Lancaster 1983). These notions of human evolution and the role parental investment played give a good backdrop to the theory behind why male parental investment may have come into existence, but they do not answer pragmatic questions about the mechanics of that behavior.

In cross-species comparisons, mammals rarely engage in any active form of male parental care (Gubernick and Terefi 2000). On the contrary, a majority of bird species have been shown to be functionally monogamous (Burley and Johnson 2002:241). While looking at avian parental investment is helpful, it may be more helpful by looking at a rare case study of a monogamous mammal. In Gubernick and Terefi (2000), it was found that among California mice, which pair bond, birth rates among female mice were similar if a male was bonded with the female or not, but the survivorship of the offspring of males who were present was 71 percent, compared to those who were not present at nine percent. The jump from rodents to primates can

be difficult. Fuentes (1998:897) notes, "There is no indication that this [monogamy] is the predominant form of social grouping or mating system in *Homo sapiens*".

Since humans are not a strictly monogamous species, male parental investment is in direct competition with mating effort. Bjorklund and Shackelford (1999:87) note the development of conflict of interest in humans between the sexes, "Both men and women shared a common reproductive goal, but the optimal level of investment to achieve that goal was unequal for the sexes". This disparity occurs because, "In most species a member of one sex invest more than members of the other and as a result are capable of producing fewer offspring than members of the opposite sex." (Irons 1979:27). This indifference in investment leads to different reproductive strategies by members of the opposite sex (Heath and Hadley 1998). Thus, males will optimally reproduce based on relative quantity, while females will optimally reproduce when relative quality is higher.

At a practical level, male parental investment is ultimately about the parent-child resource exchange. Draper and Harpending (1982) note that the presence or absence of a father during the critical developmental times in the child's life affects the behavior of the child in critical ways. Male children with an absent father were shown to be more aggressive, more exploitive of females, more critical of authority, and had better verbal skills at the expense of spatial skills than father present boys (Draper and Harpending 1982). Female children also were impacted by the presence of a father as they aged they showed higher sexual interest and less sexual self-control than father-present girls (Draper and Harpending 1982). These factors and others have real life impacts on the offspring of particular males.

What is the nature of male parental investment?

How does male parental investment actualize itself in the real world? Again, using Trivers' (1972) definition of parental investment to include any act that benefits one offspring at the expense of another potential offspring, one could easily reason that hunting is a direct form of provisioning by males in foraging societies that could be a measure of male parental investment within those societies. This is because that by taking the energy or capital to procure food, the hunter is doing this activity at the expense of seeking new mating opportunities. It is not quite this simple. Some important questions about hunting can lead to a greater understanding for the underpinnings of that activity, namely the role of male parental investment.

Two initial alternatives arise to explain male hunting activities. One is that males hunt to garner benefits for their offspring directly through caloric contribution or indirectly by establishing social relations with other members of a community that will be reciprocated back and benefit the offspring that way. This position is supported by Kim Hill and others and is called the cooperative pair-bonding model (Gurven and Hill 2009). The other alternative is to see males in a sense “showing off.” By being a better hunter they increase their mating opportunities, which has been dubbed the signaling model (Gurven and Hill 2009). While Kristen Hawkes is the main advocate for this model, Kaplan and Hill (1985) also before stipulations were introduced by Hill later in Gurven and Hill (2009), supported this notion of mating effort via hunting skill. They showed that Ache hunters who were deemed by the community to be good hunters have “increased survivorship of offspring and increased access to extramarital affairs through which illegitimate offspring are produced” (Kaplan and Hill 1985:132). The implications of each alternative are such: if the cooperative pair-bonding model is the best explanation then male hunters are actively engaging in an activity that benefits their offspring, but if the signaling model works better at explaining hunting behavior among foragers then males are not primarily supporting their children and are hunting to gain the extra benefits of signaling mating effort to the larger community. It is crucial to note that females play a vital role in each model. The cooperative pair-bonding model is built around both sexes acting in concert with one another, while the signaling model requires that both males and females send signals to one another.

Gurven and Hill (2009) note that the signaling model makes four major assumptions about the nature of male hunting: 1) males hunt for food that have lower yield to other potential food sources, 2) hunting is variable and in a sense dangerous to be used for provisioning, 3) food sharing does not benefit the hunters family directly or indirectly, and 4) females prefer gathering because it is a reliable source of food. They answer three of the four assumptions. Hunting was shown to have higher marginal nutritional value with regard to macronutrients, high-risk hunting activities supplement plant seasonality, and the lack of female hunting was explained through incompatibility with Brown’s childcare model (Gurven and Hill 2009). Gurven and Hill (2009) specifically mention studies among the Pilaga, Yanomamo, Dolgan and Nganasan that support the claim that food shared with the community by males is reciprocated back to their families. These results show that there are serious gaps in the signaling model, and this seems

to support that the cooperative pair-bonding model suggests males hunt to provision for their offspring (Gurven and Hill 2009).

The findings of Gurven and Hill (2009) seem to concur with Booth et al. (2000). Their article on “Biosocial Perspectives on the Family” states, “In men, a drop in basal testosterone immediately following the birth of a child has been noted” (Booth et al. 2000:2013). They suggest that this may have something to do with increasing nurturing feelings after their child’s birth, but it is not clear if this hormonal shift remains for any length of period after the birth (Booth et al. 2000). This supports the previously mentioned pair-bonding model by showing that their biology may predispose males to develop an interest in their offspring at the expense of their mating effort.

What actual advantages do males provide in terms of their investment? Marlowe (2003) shows that male parental investment has the highest impact during and after the pregnancy of a mate. He demonstrated that Hadza men who hunt and had a child of eight years of age or younger brought in more daily calories than men who did not (Marlowe 2003). Again, if males were simply concerned with mate acquisition and not with parental investment then one would expect Hadza men to show no variation in returns based on the age of their children, but this is not what happens. However, Marlowe does note that the signaling model might explain it as well: “Pair bonds could be a mate guarding strategy by males, but a way to get help with childrearing for females” (2003:226). The findings also show that Hadza men did not forage as effectively if they had a stepchild present instead of a biological one (Marlowe 2003). Stepchildren, cross-culturally, are shown to receive less investment from their stepfathers than if it was their biological father (Apicella and Marlowe 2004). This discrimination between the two types of familial children seems to suggest that males do engage in parenting effort and not only mating effort. If males were investing in the children of their mates that were not theirs it would confer the same favor from the male as if it were the male’s child, but because males differentiate between the two it suggests that they are concerned about a combination of mating and parenting effort.

Since paternity certainty is always a less sure thing than maternity certainty males must rely on different cues to assess the relatedness of themselves and their alleged offspring (Apicella and Marlowe 2004). Apicella and Marlowe (2004) interviewed male participants in a survey in London, United Kingdom about how much they thought their children resembled them and the perceived fidelity of their mates. They state that, “As men’s paternal resemblance and mate fidelity increases, so does their reported parental investment” (Apicella and Marlowe 2004:375). This seems

to fit with the previous example in Marlowe (2003) regarding stepchildren. If a male perceives or knows a child is not his biologically he will show less parental investment in that child, because he should try to maximize resource allocation to his children.

Greene brings up an interesting point: "If paternity uncertainty were sufficiently high, a male in fact, on average would be more related to his sister's offspring than to his spouse's offspring" (1978:152). This can occur because in theory if an individual is closely related enough it can, in effect, further the reproductive goals of that individual (Greene 1978). In essence, this predicts avuncular relationships through kin selection. This is brought up because in such instances a male is investing in his nieces and nephews at the expense of his spouse's children based on degrees of paternity uncertainty. Marlowe (2003), Apicella and Marlowe (2004) and Greene (1978) all point towards a picture of an active male who discriminates resource allocation based on any cues of relatedness to his spouse's offspring. This is quite contrary to the image of the males only concerned with mating effort in Hawkes et al. (2010).

The picture so far has been one where the nature of male's reproductive strategy is focused just as much on parenting effort as it is mating effort through focusing on direct and indirect benefits to his offspring through hunting in foraging societies, less interest in investing in stepchildren who might disadvantage potential or actual biological children, and interpretations of concern over paternity certainty as a means of insuring optimal allocation of resources in parenting effort. Gurven and Hill note that the cooperative pair-bonding model for hunting allows for "deadbeat dads" who essentially invest far below their mate; "It does not deny the benefits from an economy of scale" (2009:58). Also, hunting may perfectly fulfill both mating and parenting effort with the same act, which seems to suggest that males will opt for as much mating effort that they can attain without major expense to parenting effort (Gurven and Hill 2009). In this mode mates bargain with one another for parenting and reproductive effort, while trying to maintain an equilibrium and avoid passing any thresholds that might exist, such as the female's "minimum acceptable contribution" (Gurven and Hill 2009:58). This would also conform to Marlowe's (2003) assessment of Hadza male parental investment, in terms of caloric contribution being well below the average of female parental investment until the critical period surrounding pregnancy occurs.

Heath and Hadley (1998) conduct an examination of high-quality versus low-quality males and reproductive success via the number of offspring produced and the survivorship of those offspring from records of

polygynous Mormon populations in Utah. Their findings conclude that high-quality males, defined by relative amounts of monetary wealth, produced more offspring total and had greater survivorship total, while low-quality males focused more on parenting effort and yielded more offspring per wife and more survivorship of those offspring per wife than high-quality males (Heath and Hadley 1998). Their conclusion was that, "Males who control large amounts of wealth best serve their fitness interest by maximizing mating effort," and they found that low-quality males were still maximizing their fitness with their available resources at hand by switching to more parental investment (Heath and Hadley 1998:372).

What does the nature of male parental investment mean?

On one hand the cooperation pair-bond model for hunting, which I have extrapolated to mean the focus on an activity such as hunting, to either or both parenting effort or mating effort, has been supported by Gurven and Hill's (2009) findings about the nature of hunting and the focus of males to invest preferentially in their biological offspring. When paternity is perceived to be in doubt, males parlay their resources to the next closest member of the descending generation, meaning the male's sister's offspring. It has also been shown by Booth et al. (2000) that there may be hormonal instigators for parenting effort.

Can Gurven and Hill's (2009) bargaining theory for hunting, which I expanded to mean that males will exhibit a cost/benefit comparison depending on their circumstances both environmental and social, explain male parental investment? I argue that males will attempt to maximize both if possible, such is the case with hunting in Gurven and Hill (2009) because it fulfills both mating and parenting effort, or make adjustments to reach a state of equilibrium without breaching a threshold of some sort, as is the case in Heath and Hadley (1998). As is the case with Gurven and Hill's isofitness framework to explain the division of labor, I suggest it holds to be the most solid argument for all the intricacies of male parental investment. The framework in Gurven and Hill is shaped by "key functional relationships" (2009:8) that bend what should be equilibrium (or in other words a fifty-fifty split) between mating and parental investment for both mates, into a curve that puts emphasis from one aspect, in the case of male reproductive strategies mating or parenting effort, to another.

Conclusion

Male parental investment is not wholly focused on mating as is predicted by the signaling model. Males are also not completely focused on parenting effort either, as could be indicated in any number of the articles reviewed, (Marlowe (2003) as one example). Rather, reproductive strategies are composed of two opposing factors proposed by Trivers (1972), mating versus parenting effort. A task may actualize the benefits of both factors, as examined in Gurven and Hill (2009), and be non-mutually exclusive. If, however, both factors cannot be satisfactorily met, then the male will seek to maximize parental investment or mating effort as seen in Heath and Hadley (1998) and Marlowe (2003).

This paper showed how the presence of stepchildren in Marlowe (2003) and perceived child dissemblance or mate infidelity as in Apicella and Marlowe (2004) might be viewed as signatures of parenting effort, because they show males discerning and discriminating between resource allocation at the expense of mating effort. This occurs in relative degrees until a threshold is crossed where perceived paternity uncertainty is too great, and the male begins allocating resources to the next closest member of the child in question's generation. Males seek as much equilibrium between mating and parenting as is allowed by key functions, which can be in the formed by the physical or socio-cultural environments.

This paper only represents a preliminary analysis of the literature. Further research should be done to see under what conditions male parental investment highest or lowest, such as environment, subsistence patterns, and post-marital residence, to name a few. Other topics could include modeling of parental behavior in the context of a bargaining theory model, how polyandry figures into the equation of male parental investment, and others. As for now, this paper offers an overview of the available anthropological literature as it pertains to male parental investment strategies, its implications, its nature, and its meaning.

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