

Barbara Dolinska*

The algebra of fatherhood

Abstract: *Whereas women are sure of their biological maternity, men can never be fully certain of paternity and instead need to rely on indirect cues to assess whether they are likely to be father of their putative children. According to the psychological literature, men commonly use the information on the resemblance of offspring to self as an indicator of genetic relatedness. It seems, however, that in the absence of such a resemblance, similarity between a mother and a child might be important, because a man has additional reason to doubt his own biological paternity when the child is dissimilar to his partner. This assumption has been verified in two empirical studies.*

Key words: *fatherhood, paternity, resemblance, race*

The algebra of fatherhood

When considering that in humans, as in all mammals, fertilization occurs only in females, it is natural that men have greater doubts about their genetic relatedness to their offspring than women do. In the evolutionary past, there were no definitive means for men to verify their genetic relationship to their partners' children. Nowadays, although the riddle can be solved by genetic blood testing, men apply this solution very rarely for a number of reasons. It seems that even today a great majority of men estimate the probability of their own fatherhood by applying the same heuristics used by our ancestors.

Naturally, one of the obvious factors that a man takes into account is the time that elapsed between intercourse with a woman and the moment in which she gives birth to the child. It can be assumed that the greater the difference between this particular amount of time and the typical gestation period (i.e. nine months), the deeper the man's doubts will be as to his paternity. Paradoxically, however, there is no empirical evidence on how sensitive men are to information of this kind when assessing the probability of being a child's biological father.

In the psychological literature it is generally accepted that men base their confidence in the fatherhood on two other premises. The first indicator of a man's fatherhood is his belief that the child's mother has been a faithful sexual partner (Buss & Schmitt, 1993; Geary, 2000). A faithful woman simply does not have sexual contacts with other men, thus it is impossible for her to give birth to a child

whose father is some other man than her partner. Therefore, a man's belief that he is the father of the child should be stronger the greater his confidence is in the fidelity of his mate.

The second indicator is the resemblance in appearance and personality between the man and the child (Alexander, 1974; Heijkoop, Dubas, & van Aken, 2009; Dolinska, 2013). A man's confidence in his paternity should increase the more he perceives the child as resembling himself. Mothers seem to be aware of this fact, because they very often emphasize their baby's greater similarity to the fathers than to themselves (Daly & Wilson, 1982; McLain, Setters, Moulton, & Pratt, 2000).

It seems, however, that a man's inference of his own fatherhood on the basis of a child's similarity to him, is far more complex than described in the literature. The common assumption is that if a man sees that the child is totally unlike him, he begins to seriously doubt his biological paternity and worries that he has been deceived by his sexual partner. One may suggest, however, that the probability of such doubt and anxiety may be not a simple function of the resemblance between a man and a child. I would argue that it is rather a function of the resemblance between both of the parents and the child. Let us assume that the alleged father is aware that various features of a child's personality and physical appearance are inherited from both its father and its mother. So, if the child is not at all similar to a man while being similar to its mother, the man does not receive direct information confirming the hypothesis of his own fatherhood, but at the same time he

* Contact author at: bdolinska@swps.edu.pl; Department of Psychology, University of Wroclaw, Poland

gets no information that would disconfirm this hypothesis. In other words, if the child is very similar to its mother, those grounds alone are insufficient for conjecture as to who the real father is.

A completely different situation occurs, however, when the child is totally unlike both the mother and the alleged father. In this situation a man has no basis to think “this child did not inherit this particular trait (e.g., appearance) from me, but rather from its mother”. Instead, he should think “this child inherited this particular trait neither from me, nor from the mother. If so, this child must be similar to another man, who is the biological father”. In other words, a lack of similarity to both the child’s mother and the alleged father negates the paternity hypothesis of the latter. The easiest way to illustrate this rule could be with an example of people of different races. Imagine that we have a man who is white, and a woman who is black. If “their” child is born black, the man does not receive information that would either confirm or refute the hypothesis of his fatherhood. In this case, he can accept the thesis: “My (biological) child is similar to the mother.” However, if a child is born with Asian skin tone and Asian features, the man receives information inconsistent with the hypothesis of his own fatherhood. His reasoning should now be as follows: “The mother of this child is the woman with whom I am associated. The fact that the child does not resemble her implies that it is similar to the father. If, however, it is dissimilar to me, then the conclusion is that its biological father is someone else. I am entitled to assume that it must be an Asian individual.”

So the question arises of whether in estimating the probability of paternity people are guided exclusively by the degree of similarity between a man and a child, or if the process is more complex, with the child’s resemblance to the mother being taken into account. To find the answer to this question, I decided to conduct two empirical studies focusing on physical similarity in respect of race. In the first study, participants (men and women) were presented with a short story of a white man whose black partner had given birth to a child. Depending on the experimental conditions the child was presented as having white, black or yellow skin pigmentation. The participants were asked to estimate the probability that this man was the biological father of the child, and to determine how likely the described man believed he was the father. In the second study, the participants were solely males. The same story was presented as in Study 1, but this time the participants were asked to imagine that they were the alleged fathers.

Study 1

The participants, students of journalism at the University of Wrocław of both sexes (45 men and 45 women) aged from 19 to 30 years old, $M = 22.8$) were randomly divided into three groups and asked to read a short story:

John K. a young white man has been associated for over two years with a black female - Joanna B. He is in love with her, and there is no reason to believe that Joanna has betrayed him. Three days ago, Joanna gave birth to a child.

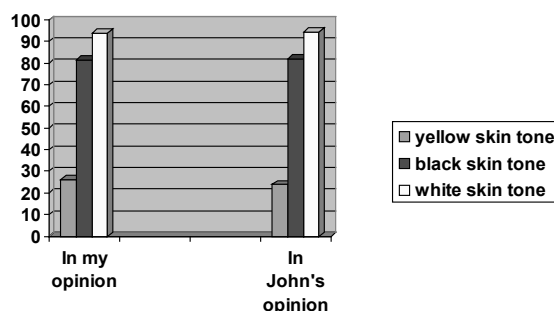
The boy is healthy and has a normal birth weight. His race is white (or black or Asian, depending on the experimental condition). Please, estimate as a percentage (from 0 to 100) the probability that John K. is the biological father of the child.

.....
Now, please consider how John K. estimates the probability that he is the father of the child
 (from 0 to 100)

Results

Preliminary analysis indicated that participants’ sex was irrelevant; judgments made by women did not differ from judgments formulated by male participants ($F < 1$ for the main effect and for participants’ sex x conditions interaction). Therefore the participant’s sex variable was dropped in further statistical analysis. ANOVA revealed only the main effect of experimental conditions: $F(2,84) = 249.16, p = .0001, \eta^2 = .856$. Participants estimated the probability that John K. is the biological father of the child as the highest when the child was white, and the lowest when the child was of yellow skin tone (all differences between the three aforementioned conditions are statistically significant). Beliefs about John K.’s estimation of his own paternity were also consistent with this principle: $F(2,84) = 203.48, p = .0001, \eta^2 = .822$) According to participants, John K. was almost sure that he was the biological father when his son was white, less convinced when the boy was black, and had serious doubts when the child had yellow skin tone. Figure 1 presents the average estimation of the probability that John K. is the biological father of the child and judgments concerning John K.’s thinking about his own fatherhood in the three experimental conditions.

Figure 1. The average estimation of probability that John K. is the biological father of the child and judgments concerning John’s thinking about his own fatherhood in three experimental conditions.



Discussion

The results of Experiment 1 showed that a resemblance between a child and its alleged father plays an important role in judgments about fatherhood. Participants estimated the probability that a white man was the biological father of a white boy as higher than in conditions in which the child was presented as non-white. This man was also perceived by participants as more certain of his paternity when the boy was similar to him than when it was dissimilar.

From the perspective of this article, of greater significance is that under conditions in which there was no similarity between the child and the man, information about the resemblance between mother and child appeared to be important. The estimation of probability of fatherhood was especially low for circumstances in which there was no similarity between a child and its mother.

In this experiment, the participants formulated their judgments from the perspective of external observers. The question arises whether a similar pattern of results would be obtained if respondents found themselves in the situation of the alleged fathers. As for obvious reason this situation can affect men but not women, a second study with only male participants was conducted.

Study 2

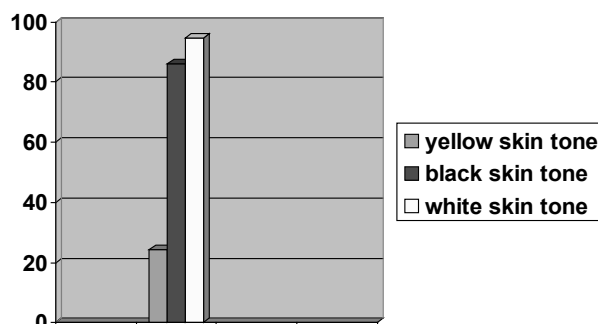
The participants (60 part-time students of journalism of University of Wrocław - white men aged from 19 to 56; $M = 29.7$) were presented with almost the same story as participants in Experiment 1. This time, however, the story began with the words: "Imagine that you have been associated for two years with a black female - Joanna B." The participants were then asked to imagine that they had learned of Joanna's giving birth to a child (depending on the conditions: of white, black or yellow skin tone), and were asked to estimate the probability (as a percentage from 0 to 100) that they were the biological father of this child.

Results

ANOVA revealed the main effect of experimental conditions $F(2,57) = 110.46, p = .0001, \eta^2 = .795$. In a situation in which white respondents had to imagine that the child was also white, they were more likely to perceive that they were the biological fathers of the child than in the conditions in which the child had a different skin color [$F(1,58) = 22.61, p = .0001, \eta^2 = .280$]. More importantly, there was also a statistically significant difference between the two conditions, the second in which participants had to imagine that the child was totally unlike them. The average estimated probability that they were the real fathers of children was lower in the conditions in which the child was not similar to the mother (i.e., when it had yellow-toned skin) than in conditions when it was similar to her (i.e., when the child skin was black) - $F(1,38) = 98.00, p = .0001, \eta^2 = .723$.

Figure 2 shows the participants' mean estimations of their paternity in three experimental groups.

Figure 2. Participants' average estimations of their paternity in three experimental groups.



Discussion

The results of Experiment 2 showed that under conditions in which there is no similarity between the child and the man who is the alleged father, information about similarity between mother and child becomes important. If in such situations there is no resemblance between child and mother, the perceived likelihood that man could be the biological father is particularly low. This pattern of results thus supports the conclusion presented in the discussion of Study 1. This time, however, participants presented judgments concerning their own (albeit hypothetical) situation.

General Discussion

In the two experiments presented in this article, it was demonstrated that the resemblance between men and their putative children is important factor in men's assessment of their biological paternity. This effect is well-known and well-documented in the literature (see: Alexander, 1974; Apicella & Marlowe, 2004, 2007; Burch & Gallup, 2000). We have obtained clear evidence, however, that at least in some cases resemblance between mothers and children might play an important role. More specifically, it turned out that in the conditions in which the child is not similar to the man, the resemblance between mother and child might be of great importance. In such a situation the estimated probability that the man is the child's biological parent is particularly low when the child is not similar to the mother.

Several limitations of this study need to be acknowledged. First, we restricted our sample to white university students. It raises the question of how universal the pattern of results recorded might be. Second, the experiments were based on hypothetical stories presented to participants. This certainly differs from real-life situations in which men estimate the probability that they are the biological fathers of children they are linked to. I am, of course, aware of this weakness, but carrying out such a study on people who have children who are extremely dissimilar to both parents and asking them questions about their biological paternity would be both very difficult as

well as questionable from an ethical point of view. Third, only physical resemblance (and only based on race) was investigated. Additional studies are needed that take into account other aspects of physical resemblance, as well as similarity of personality.

References

- Alexander, R.D. (1974). The evolution of social behavior. *Annual Review of Ecology and Systematics*, 5, 325-383.
- Apicella, C.L., & Marlowe, F.W. (2004). Perceived mate fidelity and paternal resemblance predict men's investment in children. *Evolution and Human Behavior*, 25, 371-378.
- Apicella, C.L., & Marlowe, F.W. (2007). Men's reproductive investment decisions. Mating, parenting, and self-perceived mate value. *Human Nature*, 18, 22-34.
- Burch, R.L., & Gallup, G.G. (2000). Perceptions of paternal resemblance predict family violence. *Evolution and Human Behavior*, 21, 429-435.
- Buss, D.M., & Schmitt, D.P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100, 204-232.
- Dolinska, B. (2013). Resemblance and investment in children. *International Journal of Psychology*, 48, 285-290. DOI:10.1080/00207594.2011.645482.
- Daly, M., & Wilson, M. (1982). Evolutionary psychology and family homicide. *Science*, 242, 519-524.
- Geary, D.C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin*, 126, 55-77.
- Heijkoop, M., Dubas, J.S., & van Anken, M.A.G. (2009). Parent-child resemblance and kin investment: Physical resemblance or personal similarity? *European Journal of Developmental Psychology*, 6, 64-69.
- McLain, D.K., Setters, D., Moulton, M.P., & Pratt, A.E. (2000). Ascription of resemblance of newborns by parents and nonrelatives. *Evolution and Human Behavior*, 21, 11-23.