Three-Parent Babies and Mitochondrial Replacement Techniques. An Institutional View of Moral Parenthood

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ABSTRACT

In this paper, I address the philosophical consistency of the term "three-parent babies," which is often used to describe children born through mitochondrial replacement therapy. I will argue that two primary arguments, based respectively on identity and causality, fail to exclude egg donors as candidates as moral parents due to their essential contribution to the child's existence (moral parenthood encompasses a set of rights and responsibilities that are not directly regulated by a legal system). Finally, I shall show how the potential extension of parental status to donors is conceivable, relying on the concept of "investment" in the procreative dynamic, and a conventional and institutional conception of parenthood.

1. Introduction

In several media and public discourses, children born through the mitochondrial replacement technique have been designated as "three-parent babies" or "three-person children" to emphasize that their conception required the contribution of mitochondrial DNA from an external donor. The aim of this paper is to ascertain whether this expression is philosophically consistent or represents a sensationalist approach to describing the effects of these technologies. From an intuitive standpoint, the expression appears to conflict with the standard principle according to which the number of parents for each child cannot exceed two (call this the "no more than two parents" principle).

After presenting a concise overview of mitochondrial replacement therapy, I will discuss two arguments that seem to exclude egg donors as candidates for

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parental roles, the argument from identity and the argument from causality. Both fail in their intent but are useful in highlighting the role that the concept of "investment" plays in the procreative dynamic (especially the argument from causality). I will then proceed to discuss the issue of the parental status of donors within an institutional framework, highlighting some ambiguities that this interpretation may generate.

My intention in this paper is rather limited. I do not intend to offer a new view on the conditions under which one becomes a "parent," nor to offer a new interpretation of this term. Instead, I will simply highlight the necessity, in the context of the biotechnological revolution, to abandon naturalistic criteria for defining who is a parent and embrace conventionalist ones. The status of being a parent is primarily attributed through social recognition processes that are largely conventional in nature, although they are constrained by collective interests and needs.

Before proceeding, I need to provide some clarifications. It is necessary to distinguish between the term "procreators," which refer to the biological cause of the existence of a child, and "parents," which I use to denote those to whom rights and responsibilities are attributed. For a procreator to be also a parent, they must have some characteristics satisfying a number of specified conditions that vary depending on the accepted theory[1]. Furthermore, there are at least two distinct forms of parenthood: moral and legal. A "moral parent" has a set of rights and responsibilities that are not directly regulated by a legal code but can serve as a basis for their transposition into laws. Moral parenthood confers a distinctive moral significance upon actions. For example, a parent is entitled to intervene (within defined limits) in their child's life choices if they believe the child is unable to accurately assess the potential harm involved. Other things being equal, a stranger has no such right. A parent who fails to feed their child is morally blameworthy, whereas a stranger is not obliged to do the same, at least unless they are in a special situation. This essay focuses on the moral implications of procreation, excluding the legal implications of discourse. As Millum claimed, an account of moral parenthood deals with:

[1] The procreators may be two, if it is a couple intending to reproduce, or there may be only one, if the law allows singles to have access to assisted reproductive technology. The "no more than two parents" principle does not exclude the possibility of there being fewer than two parents.

> how we acquire [parental rights and parental responsibilities] and in what they consist. Such a theory can help us identify who the parents are and tell us what they may do to and for their children, what they should and should not do, and what claims they have against others who might interfere or assist. (Millum, 2018, p. 3)

It is not my intention to present a comprehensive theory of moral parenthood; rather, my aim is more modest. I will address the question of whether there are valid moral reasons to consider all procreators involved in mitochondrial replacement techniques as moral parents, or whether egg donors can be excluded from this latter category. The following sections will present reasons for adopting an institutional investment approach to moral parenthood. It will be argued that this approach provides a basis for giving a philosophical meaning to the expression "three-parent babies." I admit that there is potential for skepticism regarding its ability to function as a general theory of moral parenthood. Consequently, it is possible that a pluralist approach (Bayne & Kolers, 2003) may prove more effective in this regard. The lesson gleaned from the biotechnological revolution is that nowadays procreation can occur through a multitude of different routes (Palacios-González et al., 2014). Additionally, other social practices, either when aided by technology (such as surrogacy) or occurring without the medium of technology (such as adoption) are recognized as legitimate means to become a parent. Even if it is reasonable to assume that there is not a singular pathway to becoming a moral parent, I shall argue that all the conceivable ways share the feature that they are forms of *investment* on a procreative future.

2. Mitochondrial Replacement Techniques

Mitochondria are membrane-bound organelles located within the cytoplasm of all cells in the human body. They are inherited matrilineally from the egg cell and contain a distinct form of DNA known as mitochondrial DNA (mtDNA), which has a lower base pair count than nuclear DNA. Nevertheless, they perform a vital function, supplying the body with energy and can occasionally contribute to the development of hereditary diseases due to the absence of sophisticated internal repair mechanisms and the "high free radical environment resulting from oxidative phosphorylation." These two conditions contribute to increase the probability of mutations occurring in the mitochondrial DNA,

thus elevating the risk of pathogenic mutations (Frazier, 2019; Mann et al., 2023, p. 18).

The clinical manifestations of mitochondrial disorders are highly variable, both in terms of symptoms and the time of onset. In many cases, these disorders are multi-system pathologies, affecting various organs and tissues. Currently, there are no effective treatments for mitochondrial diseases. However, prenatal diagnosis and pre-implantation genetic diagnosis can be employed to prevent the birth of affected children, although these approaches raise ethical concerns and have specific technical limitations (Hellebrekers et al., 2012; Smeets et al., 2015). An alternative approach that has emerged in recent years is "mitochondrial replacement therapy" (MRT), which is still at an experimental stage. MRT can be performed using an unfertilized ovum or a zygote. Two major technologies can be identified: maternal spindle transfer (MST) and pronuclear transfer (PNT). In MST, the spindle (i.e., the nucleus) of the egg of the reproductive woman is transferred into a recipient egg from a healthy donor which has been denucleated. The reconstructed egg, composed of the reproductive woman's DNA and the donor's mtDNA, is then fertilized in a normal IVF cycle. In PNT, pronuclei are transferred from a healthy fertilized egg into the zygote carrying the pathogenic mutations. The resulting embryo is then implanted to continue the fertilization cycle. In both processes, the result is the formation of an embryo in which the mtDNA does not exhibit the pathological mutations present in the ovum (Rienzi et al., 2020; Mann et al., 2023).

However, two terms that are susceptible to ambiguities, naming *replacement* and *therapy*, appear in the description "mitochondrial replacement therapy". The term "mitochondrial replacement" may give the impression that the mitochondrial material carrying pathogenic mutations is replaced in the egg (or embryo) by material free of such mutations. Actually, there is no transfer of mtDNA, as what is implanted is the nucleus of the cell and therefore the so-called nuclear DNA. An alternative, more accurate description of these techniques would therefore be "nuclear genome transfer". This would help to elucidate the real impact of MRT, as they are technologies that modify the genetic germline and, thus, require a heightened level of ethical and legal scrutiny (Baylis, 2017, pp. 11–12; 2019, chap. 3).

Regarding the therapeutic goal, MRT is not a treatment for an existing disease; rather, it is a modification of the biological organization of an egg or an embryo at an early stage. This allows the correction of certain genetic traits, thereby *preventing* the future onset of disease. Nevertheless, despite the em-

phasis placed on the preventive aspect of the intervention, the therapeutic nature of mitochondrial replacement remains unclear. As some authors claimed, the non-identity problem seems to challenge the very premise of the therapeutic nature of mitochondrial replacement, for at least two reasons.

In both MST and PNT, the structural modification of the egg or zygote implies a substantial change in its capacity to persist over time as an organism with numerical identity. This leads to the cessation of its existence following the intervention, and the creation of a new organism. The egg, for instance, is regarded as a singular entity throughout its life cycle, provided that the processes occurring within its cytoplasm are uninterrupted. However, should these processes cease or be disrupted, the ovum is no longer considered the same entity. Denucleation has the effect of terminating the ovum's numerical continuity; the insertion of the pronuclei transforms the early embryo in PNT. Thus, the egg or zygote before the replacement is not the same egg or zygote after the intervention. Since an intervention is therapeutic as long as the individual undergoing it continues to exist, it seems that in this case, there is at least one reason to doubt that it is so (Liao, 2017; Cavaliere & Palacios-González, 2018, pp. 837–838).

Furthermore, the existence of the future child is contingent upon the decision to utilize this technique. This is evident when we consider the distinction between this intervention and one performed on a fetus to prevent the development of a disease that it would otherwise manifest. In the case of the fetus, if no intervention were to be undertaken, the child would still exist in the future, albeit in a state of illness. In contrast, the decision to utilize mitochondrial replacement is a determining factor in the child's existence. If this procedure is not performed, no child will exist (Rulli, 2017, pp. 369–371). From a moral standpoint, the use of the term "therapy" in these cases is inappropriate, despite its potential utility for other purposes, such as garnering public support and facilitating the transition from the experimental phase to clinical application.

With regard to "mitochondrial replacement", I concede that the description used is somewhat ambiguous. However, acknowledging this terminological vagueness does not in itself support any direct moral conclusion. Even if we accept that MRT alters the genetic germline, this does not necessarily imply that it is morally reprehensible. Rather, the moral status of MRT hinges on weighing the potential harms and benefits it may entail. Whether MRT is beneficial or harmful remains open to debate, as there are several ways in which the

harms and benefits of this technology can be interpreted; however, I will continue to utilize the term "mitochondrial replacement" as it is the most prevalent within the context of the ongoing debate.

I agree on the fact that mitochondrial replacement techniques do not cure or prevent pathologies in an individual. Rather, they constitute a means by which a couple can reproduce without passing a hereditary, untreatable pathology to their offspring. In short, they are techniques for bringing potentially[2] healthy children into the world, since only mitochondrial DNA comes from an egg donor. Again, refuting their therapeutic intent does not commit us to any claim on the moral acceptability of such technologies. Even if they have no clinical effect on a specific individual, there may be other moral justifications for considering them acceptable. For instance, it could be argued that they extend reproductive freedom for couples or individuals, or they reduce overall suffering in the world. It is important to note that MRT enables what other options are unable to provide: it offers a means of creating biological and genetic connections between reproducers and their children, which is not achievable through alternative methods such as adoption.

I will not elaborate further on this point here, but it should be acknowledged as a preliminary hypothesis: Mitochondrial replacement technologies are not intended to have a therapeutic purpose; rather, they are designed to facilitate reproduction. They do so by ensuring that the resulting child (a) will be free of pathogenic mitochondrial mutations and (b) will be genetically related to the reproductive woman via nuclear DNA. Henceforth, I use the acronym MRTs to stand for "Mitochondrial Replacement Techniques," without any reference to their therapeutic effect[3].

[2] I prefer to say "potentially", as prospective parents cannot be guaranteed to have a perfectly healthy child; rather, they can only be guaranteed to give birth to a child free of mitochondrial diseases.

[3] If the therapeutic effect is not essential in defining MRTs, this could potentially open the door to other justifications for resorting to these techniques, even in the absence of a risk of transmitting a mitochondrial disease to the offspring. For instance, it might be possible to extend access to these technologies to lesbian couples where both partners want to ensure that they have a genetic link with their children (Cavaliere & Palacios-González, 2018).

3. Identity, Causation, and the Donors' Contribution

As previously stated in the introduction, I have thus far eschewed direct reference to the term "parents" and instead employed circumlocutions such as "reproductive couple" to designate those who deliberately initiate the reproductive process through the use of MRT, and "reproductive woman" to refer to the female member of the couple responsible for providing the nuclear DNA from her eggs. The embryo resulting from the replacement procedure contains DNA from three different individuals: the DNA from each member of the reproductive couple and the mtDNA from the egg donor. The term "three-parent babies" and the like imply that the mitochondrial genetic link between the egg donor and the child is sufficient to establish a non-biological, yet moral, relationship between them.

The distinctive genetic make-up of children conceived through MRTs raises the prospect that they "might acknowledge egg donors as genetic parents, demanding from them what is legally and morally required from egg and sperm donors" (Ishii & Palacios-González, 2017, p. 2).

There are at least two sets of arguments that can be used to exclude the possibility of an egg donor being considered a genuine "parent." I will refer to the first argument as the "argument from identity" and the second as the "argument from causality."

1.1. *The Argument from Identity*

It is possible to construct the argument from identity based on a specific view of the criteria for personal individuation and identification. The fundamental premise is that our identity is shaped by our genetic makeup, which distinguishes each one of us from others. The specific combination of genes not only differentiates Tim from Gina but also enables us to designate Tim as an individual with unique attributes. In light of this premise, the individual (x) who is causally responsible for the genetic constitution of another individual (y) occupies a fundamental role, as their biological contribution affects y's personal identity in an essential way, thus making y who they are. Consequently, we may establish a criterion for identifying x as the moral parent of y. However, the genetic contribution must be of the appropriate kind. To elucidate the criteria for the *right kind* of contribution, it is useful to cite a passage from the Nuffield Council of Bioethics's report on the ethical issues raised by MRTs:

> Normal mitochondrial functioning and replication involve both genes in the cell nucleus and genes in the mitochondria working together. The 20-30,000 genes (approximately) – around 99.9 per cent of our genes in total – typically contained in the nucleus of a cell provide the basis for how human bodies are built and for many of our unique personal characteristics. By contrast, the 37 genes contained in the mitochondria (around 0.1 per cent of our genes in total) are thought to be restricted to governing the actions of the mitochondria. (Nuffield Council on Bioethics, 2012, pp. 18–19)

According to the Nuffield Council, the «unique personal characteristics» are the result of the action of nuclear DNA, while the genes contained in the mitochondria govern the creation of energy and other functions that remain largely unknown. Therefore, while mtDNA is indispensable for the maintenance and regulation of the organism, it is solely nDNA that endows the organism with its distinctive identity, rendering it a unique entity separate from other unique entities. Although there are various conceptions of "genetic parenthood" and the conditions under which a significant genetic derivation of children from their parents can be established (Douglas & Devolder, 2019; Simkulet, 2021), we can conclude that x is the moral parent of y if x contributes to y's individual identity via nuclear DNA. This suggests that donors who contribute solely via mtDNA cannot be regarded as the child's moral parents.

Nevertheless, this view may undervalue the role of mtDNA in shaping identity. The nuclear genetic component is undoubtedly a relevant factor in the development of individual personal identity, yet it is not the sole determining element. From a narrative perspective, personal identity cannot be reduced to somatic traits determined by nDNA; rather, it is the result of a complex interplay of factors of which the genetic side is only one ingredient. The process of identity formation is influenced by numerous biological factors, as well as epigenetic influences and the individual's biographical experiences. Although, from a biological standpoint, the role of mtDNA is primarily regulatory, mitochondrial abnormalities play a pivotal role in the formation of one's identity, because the state of one's health constitutes a significant aspect of one's personal identity.

Let us consider a child, A, born through the use of MRTs. This child is not only numerically distinct from another child, B, who could have been born if the couple had decided to resort to natural reproduction, but also has a different life narrative due to the impact of mitochondrial pathology on relationships

and experiences. Mitochondrial identity *affects* personal identity because it contributes to make who we are (Baylis, 2013, p. 532). The Nuffield Council acknowledges that MRTS can impact self-conception in two ways: Firstly, by preventing the transmission of an inherited disorder; secondly, by generating individuals who can understand themselves as a "particular variant of donor-assisted conception" (Nuffield Council on Bioethics, 2012, p. 53). The key point is that it is not the change in mtDNA itself that is of paramount importance, but rather its impact on the child's self-perception in relation to illness and health (Scully, 2017); in order to differentiate between a straightforward genetic conception of parenthood and the one advanced in the argument from identity, I propose to call the latter "identity-conferring genetic view" and the relation it presupposes "identity-conferring genetic relatedness".

The mitochondrial donor plays a role in determining one aspect of the child's narrative identity, namely their health condition, which is (partly) determined by their mtDNA. Thus, according to the argument from identity, mitochondrial donors have a claim to be involved as moral parents. As argued in the introduction, while identity-conferring genetic relatedness is not a necessary condition for establishing parenthood, it may nevertheless be a sufficient one.

1.2. *The Argument from Causality*

The "causalist conception" of moral parenthood claims that being the cause of a child's existence constitutes a sufficient condition for that individual to be deemed the moral parent of the child. The relevance of causality in establishing parental ties will be addressed in the following section. For now, however, this discussion will concentrate on the straightforward interpretation of parental causalism. To be recognized as a moral parent, an individual must first be the cause of their offspring's existence[4].

The argument from causality reveals a main deficiency inherent in the causalist view: it is counterintuitive, as it implies that too many subjects should be regarded as moral parents of a child. In both "natural" and "artificial" procreation, several individuals, beyond the procreators, are involved in the birth of a

[4] For various defenses of the causal view, see Nelson, 1991; Weinberg, 2008; Prusak, 2011; Porter, 2014.

child, first and foremost the medical personnel. Theoretically, if having a causal role is deemed sufficient, even a minor contribution to the generation of a child could lead to an attribution of moral parenthood. Paradoxically, even the taxi driver who transports a woman in labor to the hospital could be considered a potential parent of the newborn.

If we find the proliferation of parental figures undesirable, we can restrict the number of moral parents by adopting more nuanced conceptions of causality. For example, a specific version of the regularity theory suggests that the action of the taxi driver is an insufficient but necessary part of a unnecessary but sufficient set of conditions (INUS) for the child's existence (Porter, 2012, pp. 68–69). It is classified as insufficient because it must be accompanied by other conditions, such as the action of the procreators; it is necessary in the sense that, had the taxi driver been busy and had not picked up the woman in labor, the child could not have existed. While this action is part of a cluster of conditions that is not necessary (as it could be replaced by a different cluster in which the procreators' role is substituted with that of a doctor performing an in-vitro fertilization) it is sufficient for the child to be born in the given situation. Although the taxi driver's action is an INUS condition, it cannot be regarded as the definitive cause of the child's existence without considering the causal field.

A causal field encompasses the set of fixed background circumstances that cannot be counted as causes, because a cause is the factor that enables deviation from the norm established by the causal field. Generally, when procreators engage in an unprotected sexual intercourse or undergo IVF resulting in a fertilization event, they alter the normal course of events; this elucidates the phenomenon we are trying to explain: the emergence in the world of a new individual who previously did not exist. But how does this selection process occur? In the original formulation of the causal theory that employs INUS conditions, Mackie emphasizes that identification relies on «some conversational or other purpose of the speaker« (Mackie, 1974, p. 36). In other words, who poses the question "What is the cause of this event?" has a particular interest that guides the selection of a condition as a cause. Consequently, while the taxi driver's actions can be recognized as a contributing factor to the child's existence, they do not qualify as a cause in the context of a causal investigation into the child's existence as such.

What a causal theory cannot do is exclude donors from the pool of candidates for moral parenthood. The donor's egg is an INUS condition, but it can

also be cited as a cause in so far as it helps to explain the existence of a child in the particular instance of a birth from MRTs, compared to other causal fields. Even if we accept a counterfactual theory, it seems that the contribution of the donors is fundamental. If x's egg had not been donated, the resulting child, y, would not have been conceived. It is plausible that the mitochondrial DNA from another donor, z, would have been utilized instead, resulting in a child with a genetic identity distinct from that of y.

While this inclusion may seem counterintuitive, it is crucial to recall that the discussion centers on the appropriateness of the wording "three-parent babies," which is undoubtedly at odds to what I termed the standard "no more than two parents" principle.

A supporter of a causal approach can reply in two different ways. They can argue that while gamete donors, doctors, and any other actors apart from the procreators contribute to the child's creation, they occupy particular social roles and engage in specific contractual relationships that exclude them from being considered parents. Alternatively, they can bite the bullet and accept the multiplication of parental figures. Jason Hannah defends the first argumentative line in response to what he calls the "too many parents problem" (Hanna, 2019, pp. 269–270). I will return to this argument later, as it undoubtedly has its merits. The second argumentative line, on the other hand, is pursued by Michael W. Austin. He endorses a pluralistic conception of parenthood, where causation plays a large role. He is content to work with a commonsense understanding of causation: «genetic (and perhaps gestational) parents [are] the primary and proximate cause of the existence of their children» (Austin, 2007, p. 39).

Moreover, Austin contends that only "primary and proximate causes" can be recognized as parents, effectively ruling out other causal influence such as the assistance of healthcare professionals or the transportation provided by a taxi driver to the hospital. For instance, a laboratory technician who combines gametes in vitro should not be regarded as a moral parent, despite being a causal factor in the fertilization process. Primarily, children conceived through IVF typically express no desire to know the laboratory technician, whereas they often wish to know the gamete donor. Furthermore, while the specific causal actions of the parents are necessary, for the child's existence, the actions performed by a laboratory technician are interchangeable with those of any other laboratory technician: «The child would not exist apart from the causal acts of its causal parents, but numerous other lab technicians could have played the

relevant causal role» (Austin, 2007, p. 53)[5]. The distinction suggests that the causal relationship links token relata in the case of the parents, while it links type relata in the case of the laboratory technician; this difference is crucial to attribute a greater causal relevance to procreators.

To what extent can the situation of egg donors be considered comparable to that of the laboratory technician or the taxi driver? In addressing various potential objections to this causal approach, Austin also confronts the counterintuitiveness of extending moral parenthood to gamete donors due to their causal role. What seems absurd from the perspective of the "no more than two parents" principle becomes an argument in favor of his causal conception. Donating gametes is a morally significant act in virtue of its effect: the birth of a child with interests, needs, and desires. Although gamete donation is unlikely to be legally banned, these considerations should lead to the conclusion that such a practice is morally problematic, at least when the child has a strong desire to know their biological origin and to form a relationship with the individual who supplied the gamete. Austin's argument extends beyond the mere existence of a child's right to know their gamete donor. He argues that donors have additional moral obligations, including the duty to know who will raise the child and to ensure their capacity to do so with love, and care and, to a lesser extent, the duty to participate in the child's life in some manner (Austin, 2007, pp. 52–53).

4. From Causation to Investment

Both the argument from identity and the argument from causality fail to provide a rationale for the excluding egg donors from the category of moral parents. It is important to note, however, that the genetic view can be reduced to the causal conception. If identity-conferring genetic relatedness is relevant for attributing parenthood because of the informational content it guarantees – specifically, the correspondence between genetic traits and phenotypic identity–then a paradox arises: anyone sharing those genetic traits is in a morally significant relationship with the child. As previously highlighted, since mtDNA

[5] In another passage, Austin seems committed to a minimal counterfactual view of causation: If x causes y's existence, y has a special interest in having x has a parent, because y «would not exist and be in need of [x] of [x] had not helped to cause her to come into existence» (Austin, 2007, p. 44).

is not subject to recombination at fertilization, the same mitochondria are present in both the mother and the daughter. Consequently, a child born through MRTs shares mtDNA with both the egg donor and the donor mother, who should therefore be considered a child's parent (Sparrow et al., 2023, pp. 41–42).

We can avoid this outcome by abandoning an informational conception; however, we must then ask ourselves what makes proximity or genetic derivation decisive aspects for conferring identity on children. It seems that, in addition to this particular relationship, another aspect is also necessary: the procreators must be the *cause* of the existence of their children, meaning that the acts they perform must be sufficient to bring about the child's existence. The donor's mother does not perform any act that causes the birth of a child through MRTs. Rather, it is the egg donation that serves as a prerequisite for this outcome. Thus, the "identity-conferring genetic view" is a subspecies of the causal view. It specifies the kind of causality that is necessary for a parental relationship to exist: It is genetic causality, because it makes it possible to isolate a subset of candidates for the role of parents, thus remaining faithful to the principle of "no more than two parents".

It follows that the only viable option is the causal view. The reason why the causal relation is morally relevant can be explained by appealing to the fact that if x causes y's existence, it also produces y's needy condition, thereby acquiring a special duty to care about y's needs (a view of this sort is stated by Henry Sidgwick, for example). Alternatively, the attribution of moral relevance to the causal relation can depend on social expectations. The individual who is causally responsible for a child's existence is in the best position to address their needs, as societal expectations and predictions indicate that she will fulfil this role. Millum has presented some convincing critiques of the view of responsibility for needs (Millum, 2018, pp. 83–87). Furthermore, it could be argued that this view would give rise to an additional moral issue. If we accept that the individual who creates a need is also responsible for addressing it, it raises the possibility that, in the presence of other individuals who could satisfy these needs more effectively, there is a *prima facie* moral reason to prefer these individuals to the procreators as entitled to assume responsibility. Indeed, why should the individual's role as a causal agent place one in the best position to meet the created person's needs? If another individual is available who is better equipped, in terms of skills and resources, to care for the child, this may be a compelling reason to consider the causal relationship irrelevant. To deny the

child the opportunity to be better cared for may be considered an act of wrongdoing towards the child (Gheaus, 2021; Shields, 2022).

An alternative interpretation of the causal view is that by causing the existence of children, parents acquire a property right over them. This neo-Lockian theory, according to which ownership is acquired through production or transformation, is problematic insofar as it reduces children to mere objects, susceptible to being possessed by others. Such a perspective effectively denies children a special moral status. A supporter of this interpretation may be willing to accept that the right of ownership over children does not entail complete arbitrariness. However, the logical framework for attributing such rights and responsibilities would remain the same in the case of children as it does for objects, thus undermining the possibility of drawing a distinction between these two categories.

There is a third option for interpreting the causal view. This view may appear attractive because, behind the acts of a couple or individual in the creation of a new child, whether through natural or artificial procreation, lies the idea of *investment*. The intentional creation of a child may be considered analogous to the creation of works of art, whereby the value of the final product is determined, or at least strengthen, by the intentional investment. The act of ruining a work of art results in a loss of value precisely because it frustrates the investment that characterizes its origin. The concept of causality is significant in this context because it encompasses a series of acts that are morally relevant as they signify the investment of the reproducers in a life project.

Millum partially captures this point. He establishes a correlation between the acquisition of parental rights and the investment in care work, with the objective of promoting and safeguarding the well-being of children. Millum seems to oscillate between two distinct meanings of the term "investment." One is pre-conception causal engagement, the other is care work that presumably begins post-conception and continues for the rest of the child's life. These elements could provide the basis for a unified view of the source of parental rights and responsibilities, based on the principle of investment. The acquisition of parental rights and responsibilities is contingent upon the investment in the creation of parenting bonds with the child and in meeting their subsequent needs. This act of investment can thus be manifested in two ways: either through the actual creation of the child, or through the willingness to provide care for the child when they are alone. In considering the role of donors, the first sense seems to be the significant one. Given that multiple individuals are

involved in these processes, it is essential to identify a criterion that distinguishes the investment of the donors, the gynecologist, and other subjects from that of the reproducers.

One potential way to establish that criterion may be found in Millum's arguments concerning "preconception work," as well as the distinction he introduces between natural and artificial duties. Millum asks whether all preconception work can be considered an investment. He writes: «If it does, the biological fathers, sperm and egg donors, and the physicians performing in vitro fertilization (IVF) will all be doing parental work and will start with some stake in the child» (Millum, 2018, p. 32). This implication is ruled out thanks to the contract voluntarily signed by the IVF technician, in which «explicitly or implicitly, [they agreed] to work on behalf of the people who are receiving the fertility treatment» (ibid.). Consequently, at the pre-conception stage, it is a *conventional* transaction that excludes certain individuals from the list of those who can aspire to parental rights.

Millum defends a conventionalist view more explicitly in the case of parental responsibilities; here, he claims that parental responsibilities can be classified as either natural or artificial duties. In the former case, responsibilities arise from natural relations as causation, yet this derivation gives rise to several moral concerns, as previously discussed. If, on the other hand, parental responsibilities are to be grounded in artificial duties, «they can only be acquired because of social conventions regarding their acquisition» (Millum, 2018, p. 87). For example, in certain circumstances one can acquire a duty through an act of consent, whether verbal or not-verbal (indeed, consent can be expressed even through gestures such as handshaking or nodding). This power to establish obligations is grounded in the individual's act of consent and in the social conventions that attribute a special meaning to it. Millum sets forth a series of conditions that must be satisfied for an action to be considered an assumption of an artificial duty. My action A is a taking on an artificial duty if and only if:

(1) I know (or should know) that I'm performing my action;
(2) I'm not unduly pressured to do A;
(3) A is intentional (under some description);
(4) there is a social convention that A constitutes taking on R;
(5) I know (or should know) the existence of such a social convention. (Millum, 2018, p. 88)

A long-standing tradition attributes parental responsibilities to biological parents, partly due to the natural history of our species, in which biological ties enforce affective attachment, and to the fact that intentional sexual acts are considered such as to meet responsibility conditions. It is not considered morally appropriate to view donors as parents. Social conventions dictate that donors are excluded from the pool of potential parents. They provide assistance to couples who wish to have children, but their role is distinct from that of procreators. Millum notes that the mere existence of a disagreement about whether donors should be regarded as mere "enablers" of the procreative process is indicative of the lack of an established social convention regarding donors' assumption of parental responsibilities (Millum, 2018, pp. 92–94; Hanna, 2019, pp. 269–271).

Finally, unlike Millum, I believe that the causal view has something to say with respect to the acquisition of parental rights and responsibilities insofar as it signifies an investment in the creation of a new individual. However, like Millum, I claim that it is precisely this investment that helps to bring into focus why the causal conception has relevance against the backdrop of a set of conventional norms. It is these conventions that establish that sexual acts, the access to an in vitro fertilization clinic, and the choice to adopt are actions that highlight a significant form of investment, which makes some individuals moral parents, whereas other behavior, such as the assistance of doctors and lab technicians, the taxi driver who takes the woman to the hospital, and egg donors, are not. The kind of investment they make is not conventionally regarded as being relevant for establishing bonds of parenthood. It is thus necessary to gain a deeper comprehension of the conventional notion of moral parenthood and the implications of donor's exclusion.

5. Conventions and the Institutional Nature of Moral Parenthood

In this paragraph, I aim to situate the conventionalist considerations on parenthood within an institutionalist framework.

I will primarily utilize John Searle's theory in the field of social ontology, albeit with some modifications. In short, institutionalism contends that some peculiar facts emerge exclusively within the context of social interaction and from the power of individuals over objects and other agents. These social facts are distinct in nature from "brute facts" in that they entail an ascription of status and the constitution of specific normative relations. It is the status and norma-

tive relations—what Searle terms "deontic powers"—that facilitate the performance of certain functions. Social facts exhibiting these attributes are designated by Searle as "institutional facts," namely, «typically objective facts, but oddly enough, they are only facts by human agreement or acceptance. Such facts require institutions for their existence» (Searle, 2011, p. 10). Searle defines an institution as a system of constitutive rules, that is, rules that take the form: "X is to counts as Y in context C." One of the most illustrative examples of how institutional facts operate is the fact of being the President of the United States. Ronald Reagan counts as the President of the United States, given that Ronald Reagan received the majority of votes in a valid election, as set forth in the Constitution. (Searle claims that a declaration, understood as a performative utterance, is the means through which the institutional fact is constituted.) In order for an Ronald Reagan to become the President of the United States, a number of prerequisites must be met. Firstly, a declaration must state that anyone who is a valid candidate and receives a specific number of votes in a valid election is eligible for that role. Secondly, it is necessary that some brute facts have occurred (Ronald Reagan must have actually received the specified number of votes). This process attributes to the individual who becomes the President of the United States a status with normative relations (or deontic powers) (Searle, 2011, pp. 11–15).

I suggest that that the status of "parent" is an example of this kind of institutional fact (Lifshitz, 2014). Searle himself has on occasion advanced a similar perspective. For example, he wrote:

> Often the institutional facts evolve out of the natural facts. Thus, there is a biological family consisting of parents and their biological offspring. But humans have imposed on this underlying biology a rather elaborate formal and informal institutional structure, involving the respective statuses of the mother, the father, and the children. In so-called 'extended families' authority relationships and other status functions may include not only the parents and children but sundry other relatives. Furthermore, given the institutional structures, one may have families with parents and children where no one is biologically related to anyone else. (Searle, 2005, p. 11)

Later, he confirmed the view that family relations are "basic forms" of institutional facts:

> The most basic forms of Institutional Facts in such things as private property, marriage, family, and political power are natural outgrowths of more biologically primitive forms of social organization. Once you have pair bonding among human males and females, marriage is not a very big step; it simply institutionalizes the pre-institutional relation. Such is also the case with parenthood: "male parent" refers to a biological relation, and in our society, "fatherhood" adds an institutional component. (Searle, 2014, pp. 25–26)

According to Searle, there are certain brute facts, such as being a biological parent, that are transformed into institutional facts, namely, that of being a father or a mother, a status imbued with normative relations. It is noteworthy that the brute facts in question do not necessarily have to be of a biological nature. Extended families, which perform status functions, are constituted by individuals who are not necessarily related biologically to one another. It is now possible to discern the point of conjunction between the institutional view and the conventional view previously outlined. It is the investment that serves as a brute fact upon which the normative status of parenthood is superimposed by social conventions.

Before turning to the role of donors, I'd like to spend a few words on an essential ingredient in the Searlean perspective on institutional facts. To have an institutional status, facts need to be also collectively recognized or accepted. The role of attitudes of this kind in creating social facts with function status and normative powers is well illustrated when an institutional fact is produced without the presence of an institution. Searle imagines a tribe building a wall to protect the huts in virtue of its height; from year to year, the wall decays until it becomes nothing but a line of stones. The members of the tribe, as well as the outsiders, continue to consider this line of stones as a boundary that cannot be crossed without authorization, so that it can keep performing its functional role. It is the collective acceptance of the line of stones as a symbol for the original wall that allows setting out social obligations. In more structured contexts, the acceptance can be directed not to the single institutional fact as such but to the constitutive rule or system of constitutive rules that produces the social existence of the fact (Searle, 2011, pp. 8, 58–60, 94–96).

Generally, parents are procreators who invest in creating parenting bonds and are *collectively* recognized as such (directly or indirectly). This view of parenthood closely aligns with Teresa Baron's notion of "social parenthood," (Baron, 2023, pp. 51-53) but with some important differences. Firstly, Baron is particularly interested in *subjective* expectations of the actors involved in the procreative enterprise, specifically how gestational women or gametes donors conceptualize their roles and their relationship to the child. Furthermore, according to Baron, "parent" is not a mere descriptive term but has also a normative content, as one *must* be recognized as a parent to be able to assume that role. This form of recognition is not, as in Searle's institutionalism, an act of collective acceptance, but a more complex placement of the individual within a network of social norms and normative expectations. Disentangling this network is not an empirical enterprise but a conceptual one. For Baron, traditionally, biological and social parenthood went hand in hand, and biological parents are expected to fulfill the social role of parents. Thus, becoming «a social parent is therefore a process that intersects not only with broader social views about who should rear children but also moral and legal rules that regulate custodial rights, adoption, and rights to reproduce». These rules are also designed to «mediate the *divergence* of biological and social parenthood», as when a social parent lacks a genetic or gestational connection to the child (Baron, 2023, p. 55).

To complete the picture, we can add another detail. Any institutionalist theory should pursue two different projects: the grounding project and the anchoring one. The grounding project targets the problem of specifying the various conditions things should be satisfied to have a property, or to be member of a kind, or to be identical to other things. The anchoring project, on the other hand, is an inquiry into the reasons why certain instantiation and identity conditions are the conditions for a specific social thing. The latter aims to answer questions as: «why is *this* the property or kind that we have introduced or created? What have we done—or what facts are there in the world—that put a given property or kind, having these instantiation and identity conditions, in place? As I will term it, what facts *anchor* the property or kind?» (Epstein, 2014, p. 43).

There are at least two potential answers to the anchoring question. One is the Searlean collective acceptance thesis, and the other is Humean conventionalism. A Humean answer accounts for the introduction of social kinds or properties by referring to the dynamics between needs and interests of human na-

ture and the conventions necessary to meet them. For example, ownership of land has been tied to the first occupants *because* this structure secured mutual benefits. The condition to be a landowner is to be the first occupier of the land (grounding project), but the reason why this is the instantiation condition of land ownership consisted in the shared beliefs about the mutual benefit of such a practice (anchoring project). The Searlean view is different because the anchoring is not the shared beliefs but the collective recognition or acceptance of the instantiation conditions for land ownership. It's an attitude, not a belief (ibid.).

In my view, the Humean answer to the anchoring project fits perfectly in explaining why investment can ground moral parenthood and why donors are excluded from the pool of candidates to it. Attributing parenthood is a way to reconcile interests, trying to ensure the highest possible quality of life for the subjects involved. On one hand, procreators have an interest in pursuing a reproductive project (investment); on the other the potential child has an interest to find an optimal family framework for their development. An institutional view of parenthood links the need for coordinating those interests to the attribution of a function status and relative normative powers. The collective acceptance of constitutive rules that create the institutional fact of parenthood follows such a belief as its product.

To recap, to be a parent, one has to invest in some way in a procreative project and meet social normative expectations about their role. Which form of investment is sufficient to be a parent is not decided by appealing to some natural feature but can be identified only against the background of a complex web of social normative expectations. For example, an egg donor in MRTs can acknowledge her causal role in producing the existence of a healthy child without investing much more in the reproductive project. Ordinarily this kind of investment is deemed insufficient to be a moral parent but necessary to be qualified as an aid to procreation (and can carry with it special duties and rights). Who is excluded is a matter of convention. MRTs do not necessarily introduce a "triple parenthood," but nothing prevents us from imagining future scenarios where donors are also given normative powers and responsibilities. As Sparrow et al. rightly put:

> To the extent that being a parent is a matter of social practice, it may be that mitochondrial parenthood is yet to emerge as a relationship that structures people's interactions, but it does not seem impossible that it might. Cultural and legal understandings of parenthood have already

> evolved to accommodate other new ways of reproducing; presumably they could also evolve to accommodate MRT. (Sparrow et al., 2023, p. 42)

They cite two reasons to prevent such an extension. Having more than two parents can lead to moral confusion about relationships in the child; furthermore, creating three-parent babies is an unnatural practice and hence is morally troubling. As also the authors recognize, the argument from nature has an ambiguous weight, and the potential detrimental effects of such an arrangement have to be empirically verified. Anyway, any reshaping of traditional family structures should be judged against the double axis of interests, and donors should invest in the procreative enterprise in a more substantial way to be moral parents: They should see themselves as such.

6. Extending Moral Parenthood: An Unsolved Ambiguity?

In this final section, I would like to present two potential implications of an institutional view of moral parenthood. Firstly, recognizing every genetic link as potentially significant for attributing parenthood can contribute to the ongoing process of geneticization in society. MRTs would accelerate this process by indulging the desire of prospective parents to have a child genetically tied to them and, in extending moral parenthood to donors, could exacerbate the reduction of family bonds to biological links. Sometimes, this implication is presented as an objection to the morality of technologies as MRTs (Baylis, 2017, pp. 12–15, 2019, pp. 29–34; Rulli, 2016). It can be replied that many women and couples have a strong desire to have a genetically related child, and part of their psycho-physical well-being depends on being able to pursue this plan (Noohi et al., 2022, pp. 599–600). Even if there is no valid public reason to regard the biological link as the unique basis for constituting a parental relationship, people should have the right to choose techniques that preserve the biological link with their offspring or other procedures that do not ensure this outcome. If the set of social expectations and rules were to change to the extent that consenting donors are considered prospective parents, the same right should be extended to them.

The second implication is connected to the previous one and reveals a deeper ambiguity in the potential extension of moral parenthood. Currently, in MRTs, donors are simultaneously considered an essential part of the procreative process and excluded from it as parents. As Catherine Mills argued, MRTs

act as Derridean supplements: they add something to something incomplete—the nuclear family—and reveal its incompleteness. The mtDNA is simultaneously essential to reproduction and inessential to form individual identity. Egg donors are necessary to the reproductive project but also extraneous to the nuclear reproductive unit (Mills, 2021; Gurnham, 2012; Griffiths, 2016). Moving away from the model of the nuclear family, and hence abandoning the "no more than two parents" principle, highlights the insufficiency of such a model and the relevance of one component of it, namely, the underlying biological view. After all, donors could be considered parents only by virtue of their genetic relatedness to the child. If the extension of moral parenthood appears on the surface to be a counternarrative to the traditional construction of the nuclear family, it conceals a deeper commitment to a bioconservative view. I must confess that I do not know how to resolve this tension between the progressive and conservative implications of extending parenthood. Perhaps emphasizing the investment significance of biological ties rather than the genetic nature of that connection could help overcome conservative and reductionist temptations. Nevertheless, it seems more advantageous to discuss the merits and demerits of extending parenthood from a conventional and institutional perspective rather than from a normative-naturalistic one.

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