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Deconstructing self-fulfilling outcome measures in infertility treatment

Mayli Mertens[1,2] | Heidi Mertes[3]

[1]Department of Philosophy, Center for Ethics, University of Antwerp, Antwerp, Belgium

[2]Department of Public Health, Center for Medical Science and Technology Studies, University of Copenhagen, Copenhagen, Denmark

[3]Department of Philosophy and Moral Sciences, Ghent University, Ghent, Belgium

Correspondence
Mayli Mertens, Department of Philosophy, Center for Ethics, University of Antwerp, Antwerp, Belgium.
Email: mayli.mertens@uantwerp.be

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Abstract

The typical outcome measure in infertility treatment is the (cumulative) healthy live birth rate per patient or per cycle. This means that those who end the treatment trajectory with a healthy baby in their arms are considered to be successful and those who do not are considered to have failed. In this article, we argue that by adopting the healthy live birth standard as the outcome measure that defines a successful fertility treatment, it becomes an interpretative self-fulfilling prophecy: those who achieve the goal consider themselves successful and those who do not consider themselves failures. This is regardless of the fact that having children is only one out of many ways to alleviate the suffering related to infertility and that stopping fertility treatment can also be a positive decision to move on to other goals, rather than a form of "giving up," "dropping out," "nonadherence," or failure. We suggest that those seeking fertility treatment would be served better by an alternative outcome measure, which can be equally self-fulfilling, according to which a successful treatment is one in which people leave the clinic released from the suffering that accompanied their status as infertile when they first entered the clinic. This new outcome measure still implies that walking out with a healthy baby is a positive outcome. What changes is that walking out *without* a baby can also be a positive outcome, rather than being marked exclusively as a failure.

KEYWORDS
assisted reproduction, fertility treatment, outcome measures, parenthood, reproduction ethics, self-fulfilling prophecy

1 | INTRODUCTION

The typical outcome measure in infertility treatment is the (cumulative) healthy live birth rate (HLBR) per patient or per cycle. This means that those who end the treatment with a healthy baby in their arms are considered to be successful and those who do not are considered to have (been) failed. This perception is also mirrored in language such as "drop out rate" and "abandonment of treatment," when someone does not continue to pursue the goal of parenthood after a failed cycle.[1] This outcome measure is not surprising in itself. People come to a fertility clinic with the specific request to receive help in having a baby. However, by adopting the language of failure for those who do *not* end up with a baby in their arms, it becomes quite difficult

[1]Lee, I. T. (2022). The language of failure. *JAMA*, *327*(5), 425–426.

to convince those people that a life without (genetically and/or gestationally related) children can be as rewarding as a life with (genetically and/or gestationally related) children. In this article, we argue that by adopting the healthy live birth standard as the outcome measure that defines a successful fertility treatment, it becomes an interpretative self-fulfilling prophecy: those who achieve the goal consider themselves successful and those who do not consider themselves failures. This is regardless of the fact that having children is only one out of many ways to alleviate the suffering related to infertility and that stopping in vitro fertilization (IVF) treatment can also be a positive decision to move on to other goals, rather than a form of "giving up," "dropping out," "nonadherence," or "failure". We suggest a new outcome measure, which can be equally self-fulfilling, according to which a successful treatment is one in which people leave the clinic released from the suffering that accompanied their status as infertile when they first entered the clinic. This new outcome measure still implies that walking out with a healthy baby is a positive outcome. What changes is that walking out without a baby can also be a positive outcome, rather than being marked exclusively as a failure.

2 | WHAT IS SUCCESS ANYWAY?

While there has been extensive debate about the appropriate outcome measure in IVF, the debate has been mainly about making sure that people are not misguided about which treatment offers them the best chance of reaching the outcome that they desire, which is to achieve a healthy live birth.[2] Especially in the commercial setting, companies have been known to point, for example, to their treatment offering better implantation rates or lower miscarriage rates, although the cumulative birth rates are noticeably lower.[3] We want to state clearly that the cumulative HLBR is an important outcome measure in the context of comparing treatment options and that using alternative outcome measures to misguide prospective patients is highly problematic. However, what we would like to problematize is that the outcome measure of the *technical* procedure of IVF (or other reproductive technologies) is equated to the outcome measure of the *overall* successful treatment of the people seeking fertility care,[4] while the latter implies an additional normative judgment, which is widely overlooked. Oftentimes in medicine, the overlap between a successful treatment and a successful overall outcome is large. If you break your leg and a surgical intervention repairs it, this is a successful outcome for you. Sometimes, the overlap is more narrow. If you have cancer and a treatment succeeds in slowing down the cancer, but not in destroying it completely, whether or not you regard this as a successful outcome will depend on your expectations and desires (Are you gaining high quality life years or are you suffering longer? Did you hope to be cured or did you understand this to be a terminal condition?) On occasion, a successful treatment leads to a negative overall outcome. This can happen whenever the patient has misjudged the consequences of the intervention. For example, someone might undergo expensive cosmetic surgery expecting a positive impact on their self-esteem and social life, only to find out that it has the opposite effect, for example, because they are ridiculed by their peers. When judging the potential success of a treatment, one often assumes that the only uncertainty lies in whether or not the intervention can have the expected physiological effect. In previous work, one of us calls this physiological uncertainty. However, there is often also normative uncertainty, that is, uncertainty about whether the desired physiological effect will indeed constitute a valuable outcome and—conversely—whether *not* achieving the desired physiological effect will constitute a bad outcome.[5] This normative uncertainty applies to many interventions aimed at curing medicalized conditions but also to treatments that eradicate harmful symptoms without necessarily curing the underlying problem. For example, confronted with concerns about increased rates of depression after bariatric surgery to "cure" obesity, Alyahya and Alnujaidi recently wrote that "Surgeons often focus on weight loss and improvement of obesity-related conditions as a primary outcome after bariatric surgery. However, the success of bariatric surgery also relies on the improvement of mental health status."[6] In IVF treatment, the issue is not so much that a technically successful treatment outcome (a healthy live birth) is regularly associated with a negative outcome for the overall well-being of the person being treated—the contrary is in fact true.[7] Rather, we intend to illustrate that an unsuccessful treatment outcome (no healthy live birth) need not be associated with a (long term) negative outcome for the overall well-being of the person seeking treatment. While ending the treatment with a healthy live birth is a successful outcome, due to normative uncertainty, there are other outcomes that could and should also be considered successful, but currently are not. Specifically, we argue that those other outcomes might be considered failures at least partly *because* of the adopted outcome measure and its self-fulfilling mechanism. If people

[2]Maheshwari, A., McLernon, D., & Bhattacharya, S. (2015). Cumulative live birth rate: Time for a consensus? *Human Reproduction*, *30*(12), 2703–2707; Min, J. K., Breheny, S. A., MacLachlan, V., & Healy, D. L. (2004). What is the most relevant standard of success in assisted reproduction? The singleton, term gestation, live birth rate per cycle initiated: The BESST endpoint for assisted reproduction. *Human Reproduction*, *19*(1), 3–7.

[3]Wilkinson, J., Roberts, S. A., Showell, M., Brison, D. R., & Vail, A. (2016). No common denominator: A review of outcome measures in IVF RCTs. *Human Reproduction*, *31*(12), 2714–2722.

[4]The alternative outcome measure that we propose would require care beyond just treatment. Henceforth, we will therefore speak of fertility *care*.

[5]Mertens, M. (2021). Predicting medical futility after cardiac arrest. Pulling apart physiological and normative uncertainty. In *Responsible prediction under critical uncertainty* (pp. 64–87). Ipskamp.

[6]Alyahya, R. A., & Alnujaidi, M. A. (2022). Prevalence and outcomes of depression after bariatric surgery: A systematic review and meta-analysis. *Cureus*, *14*(6), e25651.

[7]Gameiro, S., van den Belt-Dusebout, A. W., Bleiker, E., Braat, D., van Leeuwen, F. E., & Verhaak, C. M. (2014). Do children make you happier? Sustained child-wish and mental health in women 11–17 years after fertility treatment. *Human Reproduction*, *29*(10), 2238–2246.

leave the fertility treatment released from the suffering that was brought about by their infertility, although they do not have a baby, this is also a successful outcome, but given the fact that this is largely ignored, people are unlikely to interpret it this way.[8] What is worse is that those not achieving parenthood are less likely to be released from that suffering, as the outcome measure doubles down on their (unfulfilled) desire for parenthood.

But, one might object, overcoming the pain caused by childlessness without becoming a parent is second best in the eyes of the person seeking treatment, whom we should be concerned about here. While a nonpaternalistic, nondirective approach of person-centered healthcare does indeed appear to plead for following the patient's definition of success, there are a couple of good arguments why, in this case, adopting a broader outcome measure is to be preferred, *particularly* from a patient-centered perspective. First, although fertility patients largely adopt the HLB outcome measure as their measure of success, this does not mean that pursuing an HLB at all costs is the non-paternalistic option serving their reproductive autonomy best. The physical, psychological, and socio-economical burdens involved are also relevant aspects for informed decision-making regarding the (continued) pursuit of fertility treatment. Several studies in different populations show that oftentimes, fertility patients experience difficulties in deciding to end treatment for various reasons, such as feeling so overwhelmed by their longing for a child that other purposes of life recede to the background, feeling pressured by societal norms and/or health care professionals to continue treatment even when they would prefer to stop, or because there is little room to reflect on the option of stopping treatment, being on a roller coaster beyond their control.[9] Second, people seeking infertility treatment may be misguided about (the scope of) the effects of (not achieving) parenthood on their personal well-being and the meaningfulness of their lives. Discussing and relativizing the common belief that parenthood is the only road leading to a happy and a meaningful life is more in line with respecting patient autonomy through informed consent than emboldening this idea by blindly going along with a quest to overcome infertility that is sometimes destined to fail. Third, adopting a broader measure of success does not negatively impact those who achieve success in the narrow sense (HLBR). It does not deny subfertile people the option of pursuing parenthood, but it does have a positive impact on those not achieving success in the narrow sense due to the phenomenon of the self-fulfilling prophecy. Thus, it improves the overall positive outcomes, without harming anyone. We will elaborate on these three arguments below.

3 | SOCIAL EXPECTATIONS REGARDING PARENTHOOD AND THE PURSUIT OF FERTILITY TREATMENT

Choosing a life without children, either as the preferred option (for those who have no desire for children) or as a fall-back option (for those desiring to become parents, but meeting difficulties in achieving that goal, e.g., due to infertility), remains a choice that is oftentimes met with negative sentiments, rather than positive ones, despite the fact that the number of voluntarily childfree people is steadily increasing around the world.[10] Research on people who decide to remain childfree indicates that this group is negatively stereotyped and stigmatized for standing "in violation of a powerful social norm,"[11] set by a dominant pronatalist ideology, resulting in labels such as maladjusted, selfish, irresponsible, and less psychologically fulfilled.[12] Childfree people, and particularly childfree women, report needing to justify their decision to remain childfree, in contrast to women who choose to become parents,[13] which illustrates that choosing not to have children is considered as a deviant act[14] and that parenthood is perceived as a moral imperative.[15] While people who opt to stop fertility treatment should not expect the same levels of stigmatization and stereotyping of voluntarily childfree people, the underlying ideology that positively values parenthood also affects them.[16] Especially in pronatalist cultures, patients may find it very

[8]In this paper, we problematize the "live birth" part of the "healthy live birth" outcome measure. It is important to mention that the "healthy" part is also controversial. While this specification has advantages in terms of signaling that one should adopt high safety standards (the focus on safety has, e.g., led to more clinics adopting a single embryo transfer strategy, rather than double [or triple] embryo transfer, leading to less complications in mothers and newborns), it ignores the fact that the birth of a child with health problems can also be valued as a positive outcome. The observations that (a) many fertility patients are willing to accept significant risks for their offspring's health, that (b) many people with disabilities report high levels of well-being, (c) that significant portions of their suffering can be alleviated by addressing societal obstacles, rather than their physical or psychological condition as such, and (d) that what some see as disabilities, others see as diversity, argue for an interpretation of the "healthy" criterion in the HLB outcome measure that goes beyond a purely medical definition.

[9]Peddie, V. L., van Teijlingen, E., & Bhattacharya, S. (2005). A qualitative study of women's decision-making at the end of IVF treatment. *Human Reproduction*, *20*(7), 1944–1951; Harwood, K. (2007). *The infertility treadmill: Feminist ethics, personal choice, and the use of reproductive technologies*. University of North Carolina Press; Rauprich, O., Berns, E., & Vollmann, J. (2011). Information provision and decision-making in assisted reproduction treatment: Results from a survey in Germany. *Human Reproduction*, *26*(9), 2382–2391; Carson, A., Webster, F., Polzer, J., & Bamford, S. (2021). The power of potential: Assisted reproduction and the counterstories of women who discontinue fertility treatment. *Social Science & Medicine*, *282*, 114153; Daniluk, J. C. (2001). "If we had to do it over again…": Couples' reflections on their experiences of infertility treatments. *The Family Journal*, *9*(2), 122–133.

[10]Agrillo, C., & Nelini, C. (2008). Childfree by choice: A review. *Journal of Cultural Geography*, *25*(3), 347–363.

[11]Ibid: 351.

[12]Ibid.; Hintz, E. A., & Brown, C. L. (2020). Childfree and "bingoed": A relational dialectics theory analysis of meaning creation in online narratives about voluntary childlessness. *Communication Monographs*, *87*(2), 244–266; Ashburn-Nardo, L. (2017). Parenthood as a moral imperative? Moral outrage and the stigmatization of voluntarily childfree women and men. *Sex Roles*, *76*(5), 393–401; Gotlib, A. (2016). "But you would be the best mother": Unwomen, counterstories, and the motherhood mandate. *Journal of Bioethical Inquiry*, *13*, 327–347.

[13]Ibid.

[14]Blackstone, A., & Stewart, M. D. (2012). Choosing to be childfree: Research on the decision not to parent. *Sociology Compass*, *6*(9), 718–727; Park, K. (2002). Stigma management among the voluntarily childless. *Sociological Perspectives*, *45*(1), 21–45.

[15]Ashburn-Nardo, op. cit. note 12.

[16]Parry, D. C. (2005). Work, leisure, and support groups: An examination of the ways women with infertility respond to pronatalist ideology. *Sex Roles*, *53*, 337–346.

difficult to discontinue treatment before all possible treatment options have been explored.[17]

4 | BUNDLES OF JOY AND THE MEANING OF LIFE

Currently, in developed countries, we can assume that the majority of people seeking fertility treatment prefer to have (biologically related) children because they believe that having children will somehow improve their lives (in terms of happiness, meaningfulness, life satisfaction, etc.), despite the enormous investments and challenges that raising children entails. Guedes et al developed a child-bearing motivations scale in which they group motivations into four categories: emotional/psychological, social/normative, economic/utilitarian, and biological/physical.[18] With the exceptions of external pressure, seeking proof of fertility, and (arguably) seeking economic support, all other motivations on the scale relate to well-being and meaningfulness. Also, Billari[19] and Billari and Kohler[20] have previously reported that an anticipated increase in subjective well-being is likely to be an important driver for parenthood intentions. Many people quite easily assume that children are sources of happiness and meaningfulness, while infertility and childlessness are associated with suffering and "missing out" on something fundamental.[21] If this strict dichotomy would be a truthful picture of parenthood, then alleviating the suffering caused by infertility by other means than by having children would always be suboptimal and a moral equivalence between the two measures of success (HLBR vs. alleviation of suffering) would be misguided.

Things are a bit more complicated though. Whether or not infertility is linked to suffering is highly desire dependent[22] and also the assessment of the extent to which parenthood gives meaning to someone's life depends on personal values and goals. If someone greatly desires to have children, and this desire is thwarted by infertility or subfertility, then this will have a substantial negative effect on that person's well-being.[23] However, people who do not desire to have children experience no negative effects on their well-being due to the lack of children. When negative effects are reported, they are the consequence of stigma and societal expectations, rather than the fact of not having children in itself.[24] Also, in people (especially women) who conceive naturally, on average, there does not appear to be a positive impact on their level of subjective well-being (either in terms of happiness or in terms of life satisfaction), a phenomenon that is known as the "parenthood paradox" or the "parenthood happiness puzzle," as it is seems paradoxical that so many people choose to reproduce nevertheless.[25] However, those who are faced with infertility and go through fertility treatment do report a positive impact of parenthood on their subjective well-being, although the fertility treatment in itself is associated with a substantial decrease in their mental health.[26] Several explanations for this finding can be given. First, selection bias may be relevant here: those people who value parenthood very highly are more likely to go through (multiple cycles of) fertility treatment and more likely to respond well to the transition into parenthood, whereas in the general population also those who value parenthood less become parents. Second, cognitive biases such as cognitive dissonance and the confirmation bias can be expected to have a substantial impact: once people have invested a great deal of time and money in the pursuit of parenthood, they might not leave much room for negative thoughts or emotions related to parenthood and will automatically start valuing it more. The belief that parenthood is the road to happiness thus becomes a self-fulfilling prophecy for this group of people. While this is not problematic for those who end up with a healthy live birth, what concerns us is the group of people who are less lucky and for whom treatment fails. They were also subjected to the same psychological mechanisms reinforcing the importance of parenthood and tying parenthood to happiness and life satisfaction, which, in their case, is more likely to lead to a more negative impact on their subjective well-being when they reach the end of their treatment journey being childless. Note that this is not a negligible group. According to the latest SART data (of 2019), 46% did not achieve a live birth (ranging between 36.3% in women below 35 years of age and 93% in women above 42 years of age, after an average of 3.7 cycles per patient, using their own eggs).[27]

Relying on a theory for analyzing self-fulfilling prophecies in healthcare, we will suggest an alternative approach of infertility treatment, aimed at improving overall outcomes in terms of the well-being of all those seeking treatment, not just the successful ones.

[17]Abramov, M., Shalom-Paz, E., & Benyamini, Y. (2022). Persevering in fertility treatments despite failures: Unrealistic optimism and the reality of a pronatalist culture. *International Journal of Behavioral Medicine*, *29*(2), 209–219; Roberts, L., Renati, S., Solomon, S., & Montgomery, S. (2020). Women and infertility in a pronatalist culture: Mental health in the slums of Mumbai. *International Journal of Women's Health*, *12*, 993–1003.

[18]Guedes, M., Pereira, M., Pires, R., Carvalho, P., Canavarro, M. C. (2015). Childbearing motivations scale: Construction of a new measure and its preliminary psychometric properties. *Journal of Child and Family Studies*, *24*, 180–194.

[19]Billari, F. C. (2009). *The happiness commonality: Fertility decisions in low-fertility settings. How generations and gender shape demographic change* (Vol. 7, p. 38). https://drupal-main-staging.unece.org/DAM/pau/_docs/ggp/2008/GGP_2008_GGConf_Publ_1.pdf#page=13

[20]Billari, F. C., & Kohler, H. P. (2009). Fertility and happiness in the XXI century: Institutions, preferences, and their interactions. Paper presented at the Annual Meeting of the Population Association of America, Detroit, MI, April 30–May 2, 2009.

[21]Hansen, T. (2012). Parenthood and happiness: A review of folk theories versus empirical evidence. *Social Indicators Research*, *108*(1), 29–64.

[22]Gameiro, S., et al., op. cit. note 7.

[23]Domar, A. D., & Gordon, K. (2011). The psychological impact of infertility: Results of a national survey of men and women. *Fertility and Sterility*, *95*(4), S17; Gameiro, S., et al., op. cit. note 7.

[24]Corbett, L. (2018). Other than mother: The impact of voluntary childlessness on meaning in life, and the potential for positive childfree living. *International Journal of Existential Psychology and Psychotherapy*, *7*(2), 20; Stahnke, B., Blackstone, A., & Howard, H. (2020). Lived experiences and life satisfaction of childfree women in late life. *The Family Journal*, *28*(2), 159–167; Shenaar-Golan, V., & Lans, O. (2022). Measuring differentiation of self to evaluate subjective well-being in women who are childfree by choice. *The Family Journal*, *31*(2), 278–287.

[25]Hansen, op. cit. note 21; Kohler, H. P., & Mencarini, L. (2016). The parenthood happiness puzzle: An introduction to special issue. *European Journal of Population*, *32*, 327–338.

[26]Repokari, L., Punamaki, R. L., Poikkeus, P., Vilska, S., Unkila-Kallio, L., Sinkkonen, J., Almqvist, F., Tiitinen, A., & Tulppala, M. (2005). The impact of successful assisted reproduction treatment on female and male mental health during transition to parenthood: A prospective controlled study. *Human Reproduction*, *20*(11), 3238–3247.

[27]SART. (2020). *FInal national summary report for 2019*. https://www.sartcorsonline.com/rptCSR_PublicMultYear.aspx?reportingYear=2019#live-birth-patient

5 | HOW OUTCOME MEASURES IN FERTILITY TREATMENT ARE SELF-FULFILLING

Currently, the prophecy that is present in the context of fertility treatment is that successful treatment will lead to the birth of a child, which will lead to a more happy and meaningful life. If this is indeed a self-fulfilling prophecy, people will experience the birth of a child as a successful outcome and notice an improvement in their subjective well-being when a birth occurs. Although this can be seen as one prophecy P (treatment will lead to a better subjective well-being through the birth of a child), it can also be seen as two separate prophecies: undergoing fertility treatment will lead to a child (P1) and a child will lead to an increase in subjective well-being (P2). P2 also invokes a "mirror prophecy" (P2′) that not having a child will result in a suboptimal level of subjective well-being. As will be clarified below, P1 ignores physiological uncertainty, while P2 ignores normative uncertainty. In analyzing the overarching prophecy P, we will occasionally zoom in specifically on P1, P2, or P2′ for clarity's sake.

In previous work, one of us analyzed the four requirements for self-fulfilling prophecies in healthcare, and in practical and automated prediction more broadly: credibility, employment, employment sensitivity, and, finally, self-fulfillment.[28] We argue that outcome measures for prediction of success in infertility treatment are commonly subject to these four elements and that, in cases where they are, the mechanisms of a self-fulfilling prophecy are indeed at work. We should stress, however, that whether our suggested alternative will be equally self-fulfilling is to be confirmed or refuted in clinical practice.

First, for a prediction to be given credibility, it is sufficient for a statement, no matter how uncertain or unlikely, to be taken as sufficiently plausible that one would rely on it for further action. Typically, predictions are statements about what will happen in the future. Fertility clinics tend to adopt a language of hope and focus on positive outcomes, sending both explicit and implicit messages that a person pursuing fertility treatment will have a child in the future. People seeking treatment also report being socialized to expect a happy ending,[29] thus giving credibility to P1. Other statements are not so easily recognized as predictions but they are assertive judgments that are given credibility as predictions just the same. This is especially true with value judgments, for which the degree of uncertainty often remains hidden. As explained above, the belief in a positive impact of the birth of a child (P2) is likely to already be present in the great majority of people.

The overall prediction P is thus easy enough to believe. A person seeking IVF treatment *wants* to give birth to a healthy child. They already consider that outcome as a success without anyone telling them so. The prediction is agreeable. Additionally, experts say that they can help. The expert's trustworthy, or at least authoritative status is likely to strengthen reliance on the statement. Finally, although there is a degree of uncertainty, the aspiring parent(s), practitioners, and bystanders like friends and family all tend to use a high degree of assertion in order to express their support and their hope for the birth of a healthy child. In short, the credibility of P is high enough to fulfill the first requirement.

Second, once a prediction can be relied upon, it can inform further action (also known as "employment"). In this case, both practitioners and those receiving treatment are oftentimes willing to go through multiple treatment cycles and to go beyond the limits that they had set at the beginning of treatment (e.g., financial limits or limits on the kind of treatments that they are willing to consider).[30] There appears to be a belief that if one is simply persistent enough, P1 will eventually be fulfilled. Furthermore, P2 could be said to function as the carrot inspiring such persistence, as the reward will be worth the effort. The prediction that the birth of a healthy child can be achieved and that it will lead to an increased well-being is first taken to heart by the aspiring parent(s), resulting in specific expectations. Second, it is acted upon through enormous physical, psychological, and oftentimes financial investments in the prediction.

Third, for a prediction to have any impact on the outcome, whether self-fulfilling or self-defeating, the outcome or something in the way the outcome is achieved has to be sensitive to the prediction. There are two general kinds of sensitivity: substantive sensitivity and interpretative sensitivity.[31] In the case of substantive sensitivity, the prediction leads to a chain of events leading to an outcome in line with the prediction based on objective observations. In this case, for P1, this would imply that patients and practitioners who embrace the prophecy that the treatment will lead to a healthy live birth are indeed more likely to achieve one. For P2, this would imply that people who believe that they will experience an increase in their subjective well-being after having a child will indeed experience this benefit. For P1, contrary to the beliefs of many practitioners and IVF recipients, hopeful thinking does not appear to lead to better outcomes based on a reduction in stress and anxiety levels.[32] In fact, sometimes, the opposite appears to be true.[33] However, substantive sensitivity may still apply in the sense that the "believers" are more likely to go through multiple treatment cycles, which does increase the chances of achieving a healthy live birth. The outcome itself would be influenced by the prediction, and the overall attitude that "patients will have a successful outcome in the form of a healthy

[28]Mertens, M. (2021). When hidden mistakes impede learning… Taking practical and epistemic responsibility for self-fulfilling prophecies. In *Responsible prediction under critical uncertainty* (pp. 130–159). Ipskamp; King, O. C., & Mertens, M. (2023). The self-fulfilling prophecy in Practical and Automated Prediction. *Ethical Theory and Moral Practice*, *26*, 127–152.

[29]Daniluk, op.cit. note 9.

[30]Ibid.

[31]Mertens, op. cit. note 28; King & Mertens, op. cit. note 28.

[32]Negris, O., Lawson, A., Brown, D., Warren, C., Galic, I., Bozen, A., Swanson, A., & Jain, T. (2021). Emotional stress and reproduction: What do fertility patients believe? *Journal of Assisted Reproduction and Genetics*, *38*, 877–887. https://doi.org/10.1007/s10815-021-02079-3; Zweifel, J. E., & Lawson, A. K. (2020). Psychological aspects of infertility. In *Textbook of assisted reproduction* (pp. 597–603). Springer.

[33]de Klerk, C., Hunfeld, J. A. M., Heijnen, E. M. E. W., Eijkemans, M. J. C., Fauser, B. C. J. M., Passchier, J., Macklon, N. S. (2008). Low negative affect prior to treatment is associated with a decreased chance of live birth from a first IVF cycle. *Human Reproduction*, *23*(1), 112–116, https://doi.org/10.1093/humrep/dem357

birth" would effectively lead to an increase in healthy live births. For P2, substantive sensitivity would imply that for those people who adopt the prediction that the birth of a child will lead to higher degrees of subjective well-being, this will indeed be the case. As mentioned above, this assertion is likely to be true based on common cognitive biases and is also in line with the finding that people investing a great deal of effort into having a child (going through fertility treatment), motivated by the expected trade-offs, are remarkably resistant to child-related stressors that counteract the correlation between parenthood and an increase in subjective well-being in the general population.[34] But for P2, the outcome is also particularly sensitive to the prediction in the second form of sensitivity: interpretative sensitivity. This kind of sensitivity depends on whether the subject can interpret the outcome as being in line with the prediction. With evaluative predictions such as "parenthood (in this case through successful IVF treatment) will lead to an increase in subjective well-being," the sensitivity is typically interpretative.[35] This is due to normative uncertainty or "the uncertainty whether the (foreseen) physiological effects of the treatment constitute an acceptable [or desirable] outcome."[36] The fact that P2, both in the general population and in the IVF population, remains a widely believed and vehemently defended prophecy, despite not being corroborated by empirical findings, can most likely be ascribed to the interpretation sensitivity of the prediction. When young parents are asked what makes them happy or what makes their lives meaningful, it makes perfect sense for them to refer to their children, given the exceptional bond that commonly exists between parents and their offspring, which appears to confirm the prediction (children leading to an increase in subjective well-being). However, this response tells us nothing about the simultaneous negative impact of some aspects of parenthood on subjective well-being (e.g., in terms of marital satisfaction[37] and work and leisure satisfaction[38]) and the counterfactual situation in which they would not have children and would have set different life goals leading to different rewards in terms of subjective well-being. In other words: it can simultaneously be true that parenthood has a positive impact on well-being in some ways *and* a negative one in other ways and it can simultaneously be true that parenthood has positive pay-offs *and* that being childfree has positive pay-offs. While it may thus not be in line with empirical findings that there is a positive correlation and causal relationship between parenthood and subjective well-being, this does not necessarily stop people from interpreting the prophecy as being fulfilled. Thus, our self-fulfilling prophecy P also meets the fourth requirement: self-fulfillment.

Importantly for the focus of this paper, and unfortunately for those who do not end their fertility treatment with a baby in their arms, also the interpretative sensitivity of P2′—childlessness will result in a suboptimal level of subjective well-being—is high for those believing the prophecy: high levels of depression and anxiety are measured in this group.[39] While the prophecy is not fulfilled for people in the general population who are childfree by choice because they do not believe that having children will lead to higher levels of well-being (they do not adopt the prophecy as true), it is fulfilled for those who are involuntarily childless because they do believe that having children will lead to higher levels of well-being (they do adopt the prophecy as true). For women, remaining childless after treatment has been shown to have a negative impact on mental health.[40] However, this negative impact can be overcome by those who are able to set new goals in life, but is difficult to overcome by those who do not succeed in refocusing their attention away from the pursuit of having children.[41] Obviously, believing that having children is the (only) road to happiness and having a meaningful life makes it more difficult to let go of the dream of parenthood.

6 | NEW OUTCOME MEASURE, NEW SELF-FULFILLING PROPHECY

By upholding a narrow idea of success in fertility treatment, half of the treatment-seeking population—those for whom the treatment is physiologically futile[42]—is disadvantaged because the normative futility[43] of their outcome has been overlooked: for this group, the treatment does not only fail technically, but the outcome measure that was used also leads to an unacceptable outcome, as it does not contribute to their well-being and may even worsen it.

Imagine an alternative practice in which a person seeking IVF treatment is told that they will receive help and that they can expect to walk out released from the suffering that currently accompanies their status as infertile. This successful outcome can then be achieved in various ways. A prospective parent may walk out with a healthy baby, they may change their perspective regarding the importance of having a genetic relation with one's child and successfully pursue adoption, or they may change their perspective regarding the

[34]Repokari, L., et al., op. cit. note 26.

[35]One might question whether the apparent substantive sensitivity in P2 is not rather interpretative sensitivity "in disguise," as subjective well-being is notoriously difficult to measure in any objective way.

[36]Mertens, op. cit. note 5.

[37]Twenge, J. M., Campbell, W. K., & Foster, C. A. (2003). Parenthood and marital satisfaction: A meta-analytic review. *Journal of Marriage and Family*, *65*(3), 574–583; Doss, B. D., Rhoades, G. K., Stanley, S. M., & Markman, H. J. (2009). The effect of the transition to parenthood on relationship quality: An 8-year prospective study. *Journal of Personality and Social Psychology*, *96*(3), 601.

[38]Bernardi, L., Bollmann, G., Potarca, G., & Rossier, J. (2017). Multidimensionality of well-being and spillover effects across life domains: How do parenthood and personality affect changes in domain-specific satisfaction? *Research in Human Development*, *14*(1), 26–51.

[39]Gameiro, S., et al., op. cit. note 7.

[40]Ibid.

[41]Ibid.; Gameiro, S., & Finnigan, A. (2017). Long-term adjustment to unmet parenthood goals following ART: A systematic review and meta-analysis. *Human Reproduction Update*, *23*(3), 322–337; Verhaak, C. M., Smeenk, J. M., Evers, A. W., Kremer, J. A., Kraaimaat, F. W., & Braat, D. D. (2007). Women's emotional adjustment to IVF: A systematic review of 25 years of research. *Human Reproduction Update*, *13*(1), 27–36; Verhaak, C. M., Smeenk, J. M. J., Nahuis, M. J., Kremer, J. A., & Braat, D. D. M. (2007). Long-term psychological adjustment to IVF/ICSI treatment in women. *Human Reproduction*, *22*(1), 305–308.

[42]A physiological futility is a "judgment of medical futility based on the observation (or prediction) that the proposed treatment cannot (or is unlikely to) physiologically achieve the desired effect" (Mertens, op. cit. note 5, p. 69).

[43]A normative futility judgment is a "judgment of medical futility based on the observation (or prediction) that the (foreseen) physiological effects of the treatment do not (or are unlikely to) constitute an acceptable outcome" (Mertens, op. cit. note 5, p. 69).

importance of having children all together. For example, they might come to realize that they can also lead happy, fulfilling, and meaningful lives without having children, and that regardless of the potential disadvantages of a childless life, there are also important advantages. In any case, success is presented in multiple possible ways, rather than one.

Crucial to our argument, this alternative outcome measure, comprising a broad inclusion of successful outcomes, can be equally self-fulfilling. Going over the four criteria again (credibility, employment, employment sensitivity, and self-fulfillment), we can say that first, the prophecy can be credible, at least if sufficient attention is paid to the inclusion of psychological support to people going through the trajectory of fertility care. By providing people seeking treatment with the existing evidence of success for both people who became parents and those who did not, they are given the information required to adapt their beliefs to be more realistic but also more optimistic. This would increase both authoritative as well as agreeable credibility, the former based on the credibility given to expert evidence and the latter because the information is in line with existing hopes.

The second condition, employment, will not be as evident as for the current outcome measure. One might expect that many people seeking IVF treatment are resistant to the idea of taking steps toward alternatives for parenthood while they are still undergoing treatment to have a baby. Directed effort will thus be needed to meet the employment criterion. However, it is not impossible to achieve. Recent research indicates that 9 out of 10 patients are willing to discuss the possibility of an unsuccessful outcome (according to the current outcome measure, so: IVF treatments not reaching their goal of leading to a healthy live birth) as part of routine infertility care.[44] Once the outcome measure becomes the "alleviation of suffering," one would expect a larger emphasis on psychological counseling, rather than a narrow focus on the physical treatment, which can attune a person seeking fertility care to a variety of potential successful outcomes. In response to this optimistic prediction, they could then pursue a variety of goals. Say that they go through with IVF treatment but simultaneously look into adoption procedures or life projects that are not related to having children. As a result, they may want to set a limit in advance to how many IVF cycles they are willing to go through before prioritizing a different route (see Harrison et al. for a qualitative evaluation of the acceptability and feasibility of such an approach[45]). Note that with the old outcome measure, there are no other routes to start with.

Third, there is very likely to be employment sensitivity. The interpretative sensitivity shifts to the other direction when the idea (P2′) that not having a child results in a suboptimal level of subjective well-being is no longer reinforced, and is instead replaced with the prediction that "also not having a child can lead to optimal levels of subjective well-being." Furthermore, if people are informed about the positive effects of refocusing their life goals on their mental well-being and if they are systematically supported in identifying potential alternative goals by not focusing exclusively on the "(biological) child option," then we can expect a substantive effect on the outcome of the treatment. At the moment when people decide to stop fertility treatment, they will no longer be in a position where they have to make a 180° turn from a profound focus on establishing parenthood at all costs to seeking out other goals. On the contrary, rather than falling into an existential void, merely one of their possible roads into the future will be blocked, but others will not be.

Finally, the resulting self-fulfillment would lead to outcomes that are much more in line with the new alternative outcome measure and much less with the current one. Of course, some people will not be able to "let go" of the desire for biological parenthood. Thus, while the prophecy might not self-fulfill for *all* infertile people, it will for a large proportion of them. Seeing the performative effect that the broader outcome measure of "alleviation of suffering" may have on the overall outcomes of the treatment-seeking population, there is a moral incentive to adopt the new outcome measure.

Returning to the observation that there are strong social expectations regarding parenthood, a final important remark is that the success of this new outcome measure will not only be determined by the approach of the fertility clinic but also by the social network of the patients and by society at large. The current trend toward an increase in the number of voluntarily childfree people will hopefully provide concrete examples of how a childfree life can be as meaningful and fulfilling as a life as a parent. If patients experience less societal pressure to focus exclusively on the trajectory toward parenthood, and are instead inspired by their environment to explore new opportunities, their chances of being released from the suffering attached to their infertility, and thus reaching the goal of the new outcome measure, can be expected to increase substantially.

7 | CONCLUSION

In this paper, we apply the theory of self-fulfilling prophecies to the outcome measures for success used in fertility treatment, illustrating how both the narrow outcome measure of "healthy live birth" and the broad outcome measure of "alleviation of suffering" have the potential to self-fulfill. We argue that the current focus on a healthy live birth as the only good outcome of fertility care is doing a disservice to a large group of people. In essence, the current practice ignores the existence of normative uncertainty about the common outcome measure (i.e., is the birth of a child the only good outcome?) and the ways in which it becomes self-fulfilling, thereby disadvantaging half of the people it is seeking to help. For them, the effects of the treatment do not currently constitute an acceptable outcome, as the treatment leaves them without a healthy birth, an outcome that was furthermore validated as being negative throughout the trajectory. This is unnecessary since normative evaluations of

[44]Sousa Leite, M., Costa, R., Figueiredo, B., & Gameiro, S. (2023). Discussing the possibility of fertility treatment being unsuccessful as part of routine care offered at clinics: Patients' experiences, willingness, and preferences. *Human Reproduction*, *38*(7), 1332–1344.

[45]Harrison, C., Gameiro, S., & Boivin, J. (2023) Qualitative evaluation of the acceptability and feasibility among healthcare professionals and patients of an ART multi-cycle treatment planning and continuation intervention prototype. *Human Reproduction*, *38*(3), 430–443.

parenthood can differ and we know which (psychological) interventions alleviate suffering caused by childlessness.[46] Yet, these interventions are currently only offered as an afterthought, when all else fails. We advocate for fertility care practices to adopt the broad outcome measure "alleviation of suffering" and, as such, offer supporting interventions from the start, as an integrated part of the overall care trajectory. Due to its self-fulfilling characteristic, this outcome measure would significantly increase success rates, as those for whom treatment is currently considered a "failure" can walk away successfully—even without a child.

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ORCID

Mayli Mertens http://orcid.org/0000-0002-9883-9167
Heidi Mertes http://orcid.org/0000-0003-3029-2158

[46]Gameiro, S., et al., op. cit. note 7.

AUTHOR BIOGRAPHIES

Mayli Mertens is a Marie Skłodowska-Curie Fellow at the Philosophy Department of the University of Antwerp. Her research interest lies in how sense-making, through human and artificial cognition, impacts the physical world. Her main scientific interest is in epistemology, prediction, and global bioethics. She teaches bias, critical thinking, and responsible innovation.

Heidi Mertes is an associate professor in medical ethics at Ghent University, where she is affiliated with the Bioethics Institute Ghent and the Metamedica platform. Her research interests include the ethics of medically assisted reproduction, embryo research, genetic parenthood, genetics, fertility education, and disruptive innovation in healthcare.

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