

## DEBATE

# “Think about it all the time”. Reproductive cues in a late and low fertility setting

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**ABSTRACT** The concept of *reproductive cues* is used to reflect on our childbearing landscape. Originating in life history theory within evolutionary biology, the term captures environmental signals for when it is a good time to have and raise offspring – but also, crucially, when it appears to be a very bad idea. The article discusses how bodily, social, institutional and technological cues for childbearing shape the timing of parenthood today. I argue that the bodies and minds of young women have evolved to be attuned to the examples of their peers, the support available from their kin and community and the status and encouragement – or discouragement – provided by the broader environment. Many economic, technological and institutional incentives favour ever later childbearing, but are increasingly at odds with biological fertility, leading to lower birth rates and involuntary childlessness. The pop song “I think about it all the time” serves to illustrate the search for the right time for motherhood today.

**KEYWORDS** Fertility • Reproduction • Decision-making • Fertility anxiety • Baby fever

*I think about it all the time  
That I might run out of time  
But I finally met my baby  
And a baby might be mine*

*Charli XCX, track from the “Brat” album 2024*

## The push and pull of fertility timing

Human reproduction is flexible and variable, but also very costly compared to reproduction for most other mammals. The presumptive mother bears most of the risks in procreation. Arguably, the bodies and minds of young women in particular have therefore evolved to be extremely sensitive to the timing of childbearing. The question is not only whether or not to have a child, but also when it is too early, or too late.

Here I wish to apply the concept of *reproductive cues* to our childbearing landscape. Originating in life history theory within evolutionary biology, the term captures

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environmental signals for when it is a good time to have and raise offspring – but also, crucially, when it appears to be a very bad idea. While reproductive cues may not be the key drivers of fertility, they can amplify or mitigate personal desires and opportunities, representing a visceral shortcut to the desirability and feasibility of parenthood. “I think about it all the time”, the pop song quoted under the title as well as later in this commentary, is by Charli XCX, a British singer and songwriter who was 32 years old when it appeared in 2024. The lyrics describe longing and hesitation regarding motherhood and will serve as a poetic window into the difficult search for the right time for motherhood today.

Several reproductive cues can coexist in a symphony of signals as to what timing would be optimal for a particular group or individual (McAllister et al., 2016). Primatologists talk about fruit scarcity versus fruit abundance as the periods when big apes eat, relax, play and have sex (van Schaik and Brockman, 2005). While humans are not as dependent on food seasonality as the other great apes are, it would be interesting to map what cues signal abundance to humans. Which environments make people feel that they want to have a child? It is likely that the human “high fruit season” involves having a feeling of security, being loved and well fed and being surrounded by family, friends, water and greenery. Given that humans are cooperative breeders, the presence of a partner, family members and other people who can help with childrearing is probably especially important for fertility desires, while a lack of resources and social loneliness convey that it makes more sense to stop, delay or forego having children (for social support, see Artamonova et al., 2024; for societal pessimism, see Ivanova and Balbo, 2024).

Medical research tells us that women’s bodies have evolved to be sensitive to environmental cues of adversity and threat. A low level of body fat will prevent a woman from menstruating as a way to avoid pregnancy when she cannot feed herself, let alone others. This physiological mechanism, assumed to have evolved in response to calorie scarcity, is not infrequent in contemporary, protein-abundant societies, as diets or exercise may induce amenorrhea (Caronia et al., 2011). Psychological stress can also lower the chances of pregnancy leading to a live birth (Wesselink et al., 2018), perhaps reflecting an evolved response to war and disasters. Later is better, goes the logic, obviously conditional on the near future looking brighter.

By contrast, persistently harsh times may advance reproduction, as the early and high birth rates of high-mortality populations indicate. From an evolutionary perspective, good times are optimal, but when they are not on offer sub-optimal conditions can be better than nothing at all. All organisms face trade-offs between when and how much to invest in their own growth and development, mating and reproduction. If your expected lifespan is very short, it should make biological sense to hurry up with reproduction (Wasser and Barash, 1983). This complicates the question of fertility cues considerably: a similar event – let’s say a global pandemic – can serve to suppress (psychological stress), advance (high-mortality environment) or delay (waiting for better times) childbearing, and these effects can vary in different demographic groups.

Some years ago, we wanted to test the assumptions about reproductive timing in a contemporary, high-income population (Berg et al., 2020). Our hypothesis was that

some cues can serve to “push” or delay childbearing, while others will exercise a “pull” that advances childbearing. Using population-wide register data of mothers and fathers born in Finland between 1960 and 1980, we selected loss of income associated with the transition to parenthood as a push factor expected to delay parenthood. Income loss was assumed to be especially relevant for the timing among women, who face a higher parenthood penalty than men do, and among women from higher socioeconomic backgrounds, who face larger opportunity costs. As a pull factor favouring earlier births we investigated family mortality, or deaths of an individual’s parents, siblings or half-siblings. Here we expected those individuals whose parents or siblings had died to have earlier first births. Kin mortality was selected because an individual’s close relatives are the ones who are most interested in their reproduction, and who usually offer substantial help in childrearing. Mortality can also be a cue for an expected short lifespan. While our data could not distinguish between these possible effects (lack of kin help, shorter expected lifespan or both), both are expected to favour earlier births. The results from this study showed that both expected income progression and experiences of kin mortality influenced the timing of parenthood. We also found that both men and women with deaths in the family had their first child earlier, while those facing higher economic trade-offs from parenthood had later first births. The effects on the timing of the first birth of the reproductive pull factor of deaths in the family and the push factor of expected income gains worked independently of each other, suggesting there were indeed different mechanisms at play.

Table 1 outlines some of the bodily, social and institutional cues that can, based on existing evidence, be hypothesised to be at play in late and low fertility societies, representing both “pushes” and “pulls” that tend to advance or delay childbearing. The table is hardly exhaustive and only some of the posited mechanisms will be addressed in more detail below.

## Bodily and social reproductive cues

*I was walking around in Stockholm  
 Seriously thinking 'bout my future for the first time  
 It was ice cold, playing demos on my iPhone  
 I went to my friend's place and I met their baby for the first time  
 How sublime  
 What a joy, oh my, oh my  
 Standing there  
 Same old clothes she wore before, holding her child, yeah  
 She's a radiant mother and he's a beautiful father  
 And now they both know these things that I don't*

Charli XCX’s song plays with the double meaning of “baby”: “*I finally met my baby/and a baby might be mine*”. Having sex and falling in love are, unsurprisingly, strong cues that it is a good time to reproduce. Another important environmental reproductive cue is seeing

**Table 1** Reproductive cues in late and low fertility societies

<b>Reproductive cue affecting trade-offs between investments in self, mating and parenting</b>		<b>Push: childbearing is postponed or foregone</b>	<b>Pull: good time to have a(nother) child</b>
<i>Bodily</i>	Nutrition	Scarcity (e.g., amenorrhea)	Abundance
	Stress	Psychological stress and mental health diagnoses	Optimism about the future
<i>Bodily and social</i>	Sexual and romantic partner(s)	No partner, low prospects of finding a suitable partner	Having sex, falling in love, being in a steady and committed relationship
	Mortality	Low	Higher, e.g., death of close kin
	Fertility emotions	Fertility anxiety: fear of pregnancy, fear of loss of identity or freedom, fear of lower mating value	Baby fever: strong longing for a child and the rewards of parenting
<i>Social</i>	Baby copying	Little exposure to babies and happy parents	Exposure to babies and parents in peer groups and in general, live or online
	Kin and peer support	Social loneliness	Support in childrearing
<i>Institutional</i>	Economic incentives	Maternity and parenthood penalties	Policies compensating for costs of childbearing
	Social status of parenthood	Low or non-normative	High or normative
	Artificial reproductive technologies	Impression that later fertility is possible and preferable	Access to childbearing despite infertility or outside heterosexual relationships

and holding babies. The song starts out with the singer and her partner visiting close friends who had just become parents, as quoted above.

An impressive series of demographic studies have documented the contagious nature of fertility (e.g., Balbo and Barban, 2014; Bernardi and Klärner, 2014; Bergsvik, 2020; Buyukkececi et al., 2020). Exposure to babies born in peer groups – siblings, friends, neighbours, colleagues – is typically associated with increased individual fertility. News of weddings and pregnancies tends to ripple through our social networks. The term “baby copying” suggests that people take their reproductive cues from others in shaping their emotional or cognitive attitudes to parenthood (Adair et al., 2014). Peer group behaviour signals what people like me are expected to do, and at what point in the life course.

Given the unusually high stakes associated with childbearing, *how* your friends are coping with parenthood is also important. Charli’s friend is described as radiant, as having recovered physically and as being happy with her partner in a “sublime” scene of family bliss. Newspaper stories inform us that the song is autobiographical, and that the Stockholm friend is a musician herself, which is not coincidental: friends with similar professions, values and aspirations forecast more reliably how one’s own life would be affected.

## Baby contagion and competition

*And they're exactly the same, but they're different now  
And I'm so scared I'm missin' out on something*

How does baby contagion actually work? The Finnish Family Barometer surveys have repeatedly asked respondents about their experiences of “baby fever”, a term referring to a strong longing to have a child, and about the life situations that trigger the emotion. Across survey years, most respondents recalled that their baby longing first appeared when they were trying to achieve pregnancy, in no particular situation, or in their youth. This suggests that hormones, personality and bodily cues, many of which may be unconscious or hard to remember, play important roles (Rotkirch, 2007). When asked about identifiable and distinct triggers, around one in seven respondents aged 20–59 reported first experiencing baby fever when they were falling in love or were in a steady relationship, and a similar proportion indicated that they first experienced baby fever when a friend or a relative had a child. While the share of respondents who reported ever feeling baby fever was much lower in 2023 than in 2007, mirroring the steep rise in childlessness over that period, the relative prominence of the different situations inciting the emotion for the first time was quite similar. These results indicate falling in love and seeing a baby born to family and friends were important cues for baby fever, together accounting for around 30% of the onset in self-reported survey data (Rotkirch et al. 2011; unpublished 2023 Family Barometer data).

Adair and co-authors (2014) analysed social media posts on Twitter using the hashtag “baby fever”. Most content about baby fever in their sample was posted by females and was emotionally positive, with the majority of the positive mentions appearing to refer to meeting babies in real life or seeing images of babies. Another study from the United States tested whether merely seeing pictures of parents and children could induce baby fever. In a psychological experiment, young adults exposed to positive parenting images reported experiencing a stronger longing to have a baby of their own when compared to control groups. The link between exposure to parenting pictures and reporting baby fever was largely due to the feeling of empathy the pictures evoked (Nelson-Coffey and Cavanaugh, 2022). In a similar vein, a recent Chinese study found that watching more online baby videos was associated with stronger fertility desires. While it is likely that the causal arrows largely point from pre-existing interest in babies to watching videos of them, qualitative evidence from this Chinese study described how seeing positive examples of families with young children also made viewers appreciate the benefits of parenthood in new ways, and strengthened their desire to have a child (Zhou and Zhao, 2024). It thus appears that exposure to babies provides a strong, archaic impetus to at least think about reproduction, and that this signal works even when it is digitally mediated. While this may seem self-evident, changes in exposure to babies have, to my knowledge, not been investigated in an urbanised setting.

Moreover, childbearing desires are not removed from status seeking and the competition for resources – indeed, an evolutionary demographic perspective would argue that human competition for status and resources is ultimately driven by competition for the means to

reproduce, in the form of access to partners and the means to raise children (e.g., [Mace 2008](#)). Hence, alongside baby contagion there runs an undercurrent of peer competition. The “fear of losing out” looms large in Charli’s reflections, rendered with disarming self-irony. “Now they both know these things that I don’t”; “I’m so scared I’m missin’ out on something”. Will I miss out, will they do better – and could I do it at least as well as they can? The Twitter study mentioned above found signs not only of baby copying, but also of intra-female reproductive competition. While most #babyfever posts expressed positive sentiments and baby longing, a minority of posts featured negative reactions, such as jealousy, envy or regret. Negative comments using the baby fever hashtag were found only among women, and especially among women who were not in committed relationships ([Alidair et al., 2014](#)).

Social media have increased the extent to which people are interacting with peers they do not know and are not related to. Therefore, young adults are encountering more signals about the pros and cons of partnership and parenthood from people they are not related to and with whom they share no real-life community. I have talked to young mothers who are surprised that posting on Instagram about having a baby is creating fewer “likes” than posting about a fancy holiday trip. Last year, a *Vogue* article asking “Is having a boyfriend embarrassing now?” garnered much online praise (the answer was affirmative). In other words, young adults are increasingly taking their reproductive cues from people or platforms with no real interest or stakes in their family formation goals ([Newson et al., 2007](#)).

## Fertility anxiety

*Would it make me miss all my freedom?*

Alongside baby fever, the classic pull factor for having children, societal discourses today also promote fertility scepticism, which may lead women to question, fear or reject motherhood. Arguably, discourses focusing on the bodily and mental toll of maternity gained strength in tandem with the spread of social media and the fertility decline of the 2010s. A series of Chinese studies have analysed “fertility anxiety”, which includes fears of pregnancy and of giving birth, as well as concerns about maternal mental health and the lack of gender equality and social support ([Yang et al., 2024](#), [Li and Zhou, 2025](#), [Xiang and Sun, 2025](#)). Fertility anxiety also captures worries about body image, thinness, sexual attractiveness and losing one’s identity after becoming a mother ([Li and Zhou, 2025](#)). In a pioneering study of similar fertility anxiety discourses outside of China, Woodthorp and Gray ([2025](#)) analysed a collection of TikToks associated with the hashtags #childfree, #childfreebychoice and #childfreetiktok. The key themes they identified were that parenthood is no longer seen as attractive, concerns about the physical consequences of pregnancy and labour, concerns about free time and a lack of any urge to have children.

Charli XCX, commenting on her song “Think about it all the time” in *Rolling Stone* magazine, appeared to be torn between longing for motherhood and assessing its perceived costs, saying she doesn’t “feel that I can make that decision”:

Am I less of a woman if I don't have a kid? Will I feel like I've missed out on my purpose in life? I know we're not supposed to say that, but it's this biological and social programming. There's a lot of pressure on women to not talk about that stuff openly, especially not in pop music or in music generally, we're supposed to be sexy and free and fun and wild.

The pop singer describes a society in which wanting to have a child is seen as “biological and social programming”, but simultaneously as something of a taboo that one is not supposed to mention. According to this account, a woman of prime reproductive age should not be a mother, nor should she talk about sacrificing her prime fertile years to pursue her career. Instead, a pop star should be “sexy and free and fun”, which apparently is not compatible with having children. It goes without saying that a world-famous musician faces unusually high trade-offs between creativity and domesticity. Yet judging by the comment sections on reddit and YouTube, Charli's worries about “being less of a woman” and “missing out” if she remains childless, coupled with concerns about losing herself and missing her previous freedoms if she has a child, resonate broadly among many ordinary young people today.

## Institutional cues for late reproduction

*So, we had a conversation on the way home  
Should I stop my birth control?*

Late fertility has several well documented advantages (Sobotka and Beaujouan, 2017), in particular a better income trajectory for women. In our study of reproductive timing in Finland described earlier, the economically optimal timing of motherhood for women born in 1960–1980 to parents from a high socioeconomic background would have been 32.2 years. At the time, the mean age at first birth for mothers from a high socioeconomic background was three years earlier, at 29.2 years (Berg, Lawson and Rotkirch, 2020). Since then, the mean age at first birth has risen, and is currently above 31 years for women with higher education in Finland. This is much closer to the previously identified economically optimal age at first birth, though it is intertwined with much lower birth rates and higher lifetime childlessness overall (Hellstrand et al., 2021). These patterns suggest that people respond to the economic incentives surrounding them.

In addition to providing economic benefits, later and lower fertility have, until recently, been part of the favoured narrative of many policy bodies. From the United Nations to corporate employers, institutional narratives during the last 50 years have favoured and incentivised small families and later fertility, with religious institutions being the notable exception. Western societies provide young adults with guidance regarding education and careers, but similar societal signposts for family formation goals appear to be weaker and more scattered than ever before. The stepping stones of courtship, marriage and child-bearing that regulated reproductive behaviour in traditional societies have given way to individual choice, which can feel both empowering and bewildering. Young adults are

taught how to plan their career progression and “optimise” their exercise and eating habits, but they are rarely instructed in how to plan for parenthood.

The alter ego of Charli XCS tells us that she had not even seriously thought about motherhood before, and that it was only after visiting friends in Stockholm that she and her partner “had a conversation” about stopping “her” birth control. In the song, parenthood arises as a decision that is being made by a very small unit: the new couple, or perhaps only the woman. Such an attitude prevails more broadly. I hear young women discussing whether having a child is “their thing”, or whether they are “suited to having babies”, without any mention of a larger community or time span. Taken to the cultural extreme, this means that men in the United States sometimes do not even want to state their own wishes regarding fatherhood when dating women, as the decision about whether and when to have a child is seen not only as the woman’s right, but also as her sole responsibility (Berg and Wiseman, 2025).

Late fertility can also promote women’s independence and reproductive choice. Generations have grown up listening to their mothers and grandmothers express regrets about having foregone professional pathways and being economically dependent on their husbands. That these lessons appear lost among the new “trad wife” subcultures and conservative feminists who idealise life in the 1950s is ahistorical and regrettable. However, the surge in traditional family values in the 2020s may also tap into a longing for norms and standards regarding couples, family life and parenting. Arguably, actual reproductive choice should also include the option of becoming a parent before age 30 without experiencing excessive economic penalties or social stigma.

## Limits to late fertility?

*I think about it all the time  
That I might run out of time*

Later childbearing conveys many economically and culturally appealing cues for successful parenting. But it cannot go on forever. And as the saying goes: if something cannot go on forever, it must stop. “Will I run out of time?” asks the popstar, aware of the biological constraints to reproduction. If a heterosexual couple aim to have two children with a high probability of a natural conception leading to a live birth, they should, on average, start trying to get pregnant well before the woman turns 30 (Habbema et al., 2015).

Peak female fertility is in the early twenties, with an exponential decline setting in at around 35 years on average. For decades, the mean age at first birth in many Western societies crept up from the mid-twenties to the later twenties and early thirties. It was possible to delay the timing of births somewhat to reap the individual well-being and economic benefits of postponement, while still having the around two children most people wanted. Crucially, however, that momentum may have exhausted itself in recent years. Since 2010, fewer women are becoming mothers before age 30, but the proportion who have their first child after age 35 has been mostly stable (Beaujouan, 2020 and 2023), despite advances in reproductive technologies and increasing access to them.

Likely for a multitude of reasons besides biological constraints (e.g., the lack of a partner, other health issues, affordability), fertility rates in low fertility countries today show a striking rigidity at later ages. In the majority of societies across historical eras, most children were born to women who were in their twenties, and were thus at peak fertility. As institutional and economic incentives favour later childbearing, the limits of later fertility are becoming stretched. Nowhere do we currently witness a “recuperation” of births at ages 35 and above that would compensate for the decline in births among women under age 30. The seventies may be the new fifties in terms of health and activity, but the thirties are not the new twenties in terms of fecundity.

Artificial reproductive technologies (ART) have improved and become more widely available, partly mitigating the effects of ageing on fecundity. The proportion of babies born with the aid of ART has been rising in many societies, with the contribution of such births to total fertility rates ranging from 3% to almost 9% depending on the country, and on whether various counterfactual scenarios are taken into account (see, e.g., [Sobotka et al, 2008](#); [Cozzani et al., 2025](#); [Chanfreau, Goisis and Kravdal, 2025](#)). ART has offered new opportunities to become a parent to people suffering from infertility, same-sex couples and single women. How reproductive technologies affect the road to parenthood varies starkly between demographic groups ([Chanfreau, Goisis and Kravdal, 2025](#)). Nevertheless, the overall fertility effect of access to ART on the population level may be negative. Young adults have low awareness of limits to fertility, including ART-assisted fertility. Media analyses and infertility doctors report that involuntary childlessness often stems from unrealistic hopes of conceiving after age 35, or even after age 45 ([Willson et al., 2019](#)).

Current reproductive technologies can delay the biological age limit by at most a few years, but they cannot remove it ([Habbema et al., 2015](#)). This is not only because fecundity decreases with age, but also because health challenges such as obesity increase with age. These conditions further reduce the chances of conception leading to a live birth ([Penzias et al., 2021](#)) and raise the health risks of mothers and children during pregnancy and birth ([Saccone et al., 2022](#)).

In the reproductive roulette, many people will meet their fertility goals and have healthy babies even if they wait until after age 30 to start trying to conceive – often with the help of ART – but others will not. Increasingly many people will “miss out on something” by waiting too long and thus failing to have the children they desire, despite technological advances.

Population-level fertility effects of ART use are documented only among women younger than age 35, but most ART users are older than that (see, e.g., for Norway, [Chanfreau et al., 2025](#)). Furthermore, women who manage to have one child with ART seldom go on to have more children ([Beaujouan, 2023](#); [Chanfreau et al., 2025](#)). In recent years, egg freezing for non-medical reasons has been sold as a way to delay motherhood, as epitomised in the dystopic encouragement to “freeze your eggs, free your career”. This medical intervention has been offered by some employers and even some governments, including France and Korea. While egg freezing does raise the chances of conception leading to a live birth after age 40, it is an expensive medical procedure with a limited success rate ([Katsani et al., 2024](#)), a non-trivial risk of medical complications and no proven effects on increasing fertility on the population level. Furthermore, the mere act of freezing eggs likely

disincentivises childbearing in the years immediately following the procedure (Stone, 2025). Two opposite effects may be at play: medical progress enables some births, but the cultural signal this feeds into lowers fertility overall.

## The wobbly capstone

*'Cause my career feels so small  
in the existential scheme of it all*

*I think about it all the time*

The ongoing debates about low and late fertility have a fixed feature whereby politicians or billionaires want women to have more children and ordinary young women feel patronised. The starting point of any scientifically informed analysis of low fertility should be that young adults behave rationally for our species and respond to what they perceive to be in their own best interests, based on the reproductive cues surrounding them.

Young adults will not decide to reproduce because somebody they never met, be it a prime minister or a scholar, advised them to. Instead, their bodies and minds have evolved to be attuned to the examples of their peers, the support available from their kin and community and the status and encouragement – or discouragement – provided by institutions and the broader environment surrounding them, which nowadays also include cues from the online environment. When later born children receive more resources and better education, and hence have better prospects of finding a suitable partner and having a family themselves, investing in only a few children will be a winning strategy from an evolutionary standpoint as well (Mace, 2008). However, barring a radical transformation of human reproduction, all societies will eventually reach the point at which the biological drawbacks of late fertility outweigh its social and economic benefits at both the individual and the community level.

It is sometimes said that prevalent parenting norms have shifted family formation from its traditional position as a cornerstone of adulthood to a capstone that crowns the adult life, if it ever arrives. Andrew Cherlin's (2005) famous concept of "capstone marriage" described the cultural ideal of settling down and committing as a late peak of young adulthood. No longer a foundation but a crowning achievement, contemporary marriage is preceded by education, skills development, labour market experience and self-development. "Capstone childbearing" has been suggested as an analogue trend for childbearing (Stone, 2023).

The problem with the idea of a "capstone model" for fertility is that the goal keeps shifting. The first child is not a capstone to a building with clear dimensions, but rather one with ever more stories and side buildings. There is no limit to the investments in personal growth, dating, studying, travelling and working one can make before parenthood – but there is a limit to female fertility.

The childbearing capstone is, therefore, worryingly ephemeral. A capstone signals something that may arrive late but is nonetheless self-evident. Policymakers do not present

outlandish solutions to the production of capstones. To my knowledge, housebuilders rarely wonder whether they even want a capstone or regret that they started moving their capstone into position at the wrong time. Few would say they are pleased to have avoided placing a capstone, or, conversely, that having placed the capstone was the most important and meaningful thing they ever did. Although some social status competition may be architectural, no songs have been written about capstones in the “existential scheme of it all”.

Shortly before I wrote this, Elisa Gebhard, a politician from the Social Democratic party in Finland, suggested that Finland should follow France in making egg freezing available to all women for free (SDP, 2025). This politician, who is 32 years old, has argued that egg freezing would raise fertility. I can sense and sympathise with the undercurrent of despair in her plea. Dreams of extending the reproductive window can feel like the solution to the dilemma young women find themselves in: institutions, values and economic realities favour later reproduction, but they know that they may run out of time. It is nevertheless surprising and saddening to me that parts of the feminist left sound so similar to the techno-utopian right. Postponement coupled with medicalisation is presented as the desirable way forward – not changing a lifestyle template increasingly at odds with women’s bodies.

## Acknowledgments

The author is grateful to Eva Beaujouan and Tomas Sobotka for organising the Late Fertility conference in 2024 and for commenting on different versions of this article. I also thank Venla Berg, Marie Compans, Kristiina Tammissalo and Jasmin Wittig for comments and inspiration and Alva Roos for alerting me to the “Brat” album. Research was funded by the Strategic Research Council within the Research Council of Finland (Nr 364382 and 364371).

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