

An Attempt to Understand Gender and Gender Dysphoria. A Christian Approach

Tony Jelsma, Ph.D.
Department of Biology, Dordt University
November 2021

*Editor's Note: **GENDER: From Christian Perspectives***

Questions of gender identity and gender dysphoria have become prominent in our culture. Our churches are not exempt from this development, as Christians can also struggle with gender identity. What do we know about the biology of gender? What are Christian perspectives on gender and the trans experience? What are the important and unresolved questions?

Tony Jelsma, PhD (McMaster University), has written this essay that informs us about what we know and do not know about gender.

He is chair and professor of biology at Dordt University and has taught courses in human anatomy, physiology, biopsychology, and developmental biology. He has a research background in neuroscience and molecular biology, and a longstanding fascination with the brain and questions of faith and science. He is a fellow of the ASA and has given multiple presentations at ASA annual meetings on faith and science topics.

Readers are encouraged to take up one of the insights or questions in the invitation essay, or maybe a related one that was not yet mentioned, and draft an article (typically about 5,000-8,000 words) that contributes to the conversation. These can be sent as an attachment to Dr. Jelsma at Tony.Jelsma@Dordt.edu. An abstract should be included in the text of the email. He will send the best essays on to peer review and then we will select from those for publication in a theme issue of *Perspectives on Science and Christian Faith*.

The lead editorial in the December 2021 issue of *PSCF* outlines what the journal looks for in article contributions. For best consideration for inclusion in the theme issue, manuscripts should be received electronically before 30 April 2022.

Looking forward to your contributions,

James C. Peterson, Editor-in-Chief
Perspectives on Science and Christian Faith

The recent dramatic increase in both the number of cases and the prominence of transgender individuals in our culture raises many questions, particularly for Christians. Response from the church has been mixed, from outright condemnation to enthusiastic acceptance. How do we as Christians navigate this issue? As I have delved into this topic, I have focused on several areas that need further clarity and input. There may be more, and I welcome contributions that add to our understanding of this issue.

1. How do we come to see ourselves as male or female, or something in between, or neither? Is there a biological basis for gender incongruence? Is gender a social construct, biologically determined, or somewhere in between?
2. What is involved in transitioning? How do we decide on a course of action when someone presents with gender dysphoria? At what age should the transition start? What actions can be taken to transition and what are the consequences?
3. What is behind the recent increase in the number of cases of gender dysphoria, particularly in adolescent girls? Does this increase help us understand the condition better?
4. What are different approaches that Christians take on this issue?

This essay will address these various questions. Unfortunately, there often aren't clear answers and there is often vigorous disagreement in these areas. New studies are continually coming out, which have the potential to change perspectives. Unfortunately, the complexity of this topic and space limitations force me to oversimplify on occasion. This issue is highly polarized, even in the scientific literature. Often the language itself is value-laden, which is well-meaning but can be unhelpful. Moreover, every case is different, and generalizing can lead to mischaracterizations. This essay is intended as a call for papers that will provide added insights into a topic that is difficult for Christians to navigate. One of the blessings of the ASA is that it is an organization that values both science and Scripture and we look forward to contributions from those who share that perspective.

Glossary:

- Gender incongruence: incongruence between one's biological sex and one's gender. May present with or without dysphoria
- Gender dysphoria: the sense of distress resulting from gender incongruence.
- FtM: Female-to-Male transgender person or transition
- MtF: Male-to-Female transgender person or transition
- Binary: understanding sex and gender to be either male or female
- Nonbinary: allowing for a spectrum of sex and/or gender to be intermediate between male and female
- Passing: the ability of someone to be in public without others knowing that they are transgender
- GnRHa: gonadotropin-releasing hormone agonists (or analogs); these suppress sex hormone production. Originally developed to treat precocious puberty, these are used to suppress

puberty in the Dutch protocol or to stop endogenous testosterone production in MtF individuals (this is not needed in FtM, as testosterone has the same effect).

- WPATH: World Professional Association for Transgender Health
- USPATH: United States Professional Association for Transgender Health
- APA: American Psychological Association
- GIDS: Gender Identity Development Service, the part of the National Health Service in the UK that deals with cases of gender dysphoria.

The Biology of Sex and Gender

In this section, I will address the biological basis of sex, how one's sex affects brain development, and the biology of gender development. Before we begin, we first need to distinguish sex and gender. *Sex* refers to one's biological sex, which is genetically determined and normally causes both body and brain to be male or female. *Gender* refers to one's internal perception that one is male or female, which can vary with people who identify as gender-fluid. While determining sex of the body is relatively straightforward in most cases, when we look at brain development, our conclusions are by necessity more tentative because the human brain is difficult to study, particularly when it comes to gender.

The usual pattern of development is as follows. Males have a Y chromosome, which contains the *sry* gene. Around six weeks into embryonic development, this gene is activated, which causes an embryonic structure called the genital ridge to develop into testes. These testes then produce testosterone, which stimulates the development of the male internal and external reproductive organs. Females lack the *sry* gene, so ovaries develop instead, resulting in the development of the female internal and external reproductive organs before birth and secondary sexual characteristics at puberty.

What about the brain? The classical model for explaining sexual behaviors is that there is a two-stage process. The *organization* stage occurs before or around the time of birth, while the *activation* stage occurs at puberty. In the organization stage, neural pathways develop differently in boys and girls, under hormonal influence. These different neural pathways result, not only in different behaviors during childhood but also in different sexual behaviors in adolescence.¹ Our understanding is that the brain is masculinized by testosterone and possibly other hormones late in gestation, near the time of birth, while development of a female brain is the default pathway.²

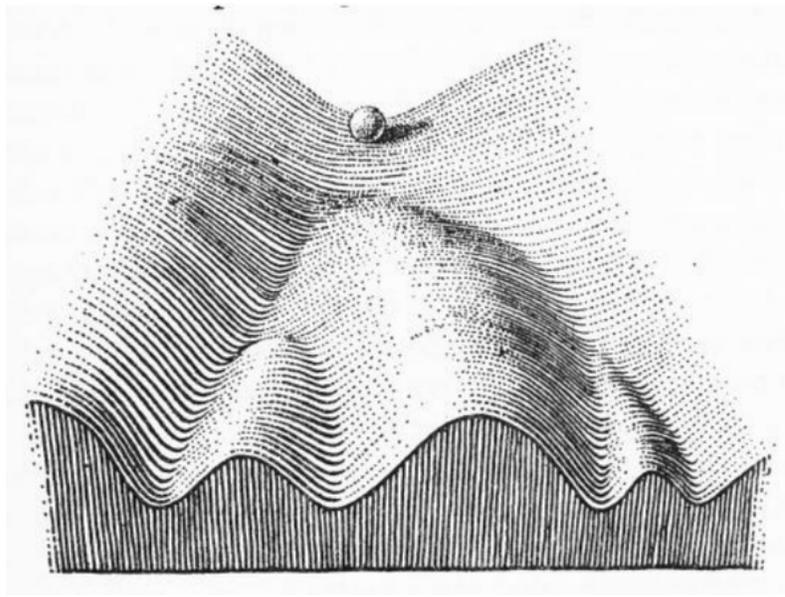
In contrast, Fausto-Sterling has proposed a dynamic systems framework for gender/sex³ development that is entirely based on conditioning.⁴ Fausto-Sterling describes three phases of a

child's gender/sexual identity. In the first phase (<15 months), the child is exposed to different stimuli, depending on their sex, which has an impact on brain development. From 15-18 months, there is this fluid period where this sense of gender/sex is developing but not yet apparent. After 18 months, the child has developed their sense of gender/sex and begins to act accordingly. While there are certainly environmental contributions to brain development, including sexual functions, they do not constitute everything. It is striking that Fausto-Sterling never mentions prenatal hormonal influences, dismissing those who argue for biological underpinnings of gender (and sexual orientation). Yet, these environmental influences that Fausto-Sterling describes are set in a context of previous brain development *in utero*, under the influence of different sex hormones. These hormones affect the expression of a large number of genes.⁵ Surely, they also have an influence on gender! Hormonal effects on gender will be addressed later.

Nevertheless, Fausto-Sterling's emphasis on the dynamic nature of sex and gender development is helpful, as it avoids a rigid essentialist understanding of gender. She also applies Waddington's epigenetic landscape model to gender/sex development. Waddington's landscape is a helpful way to understand the dynamic and stepwise nature of embryonic development.⁶ As an organism develops, cells progressively adopt cell fates by making developmental decisions. Waddington's analogy is that of balls rolling down an uneven slope, choosing different paths to descend, and thus ending in different places (Figure 1). There is a usual pattern but there is also an element of chance and variability, as the pathways that are chosen can be affected by the environment. Moreover, there is also relative stability once the pathway is followed. In brain development, these developmental changes primarily involve epigenetic control of gene expression, and the formation and refinement of synaptic connections, which presumably result in sex-typical behaviors. It is not difficult to imagine variability in the particular behaviors that are expressed, and to what degree, depending on which pathways were chosen. Note that this is an oversimplified explanation of a very complex process involving many interacting neural

pathways and many types of behaviors. There may be differences between the sexes, due to both hormones and other influences, but there is also much overlap in behaviors and preferences.

Figure 1. Illustration of Waddington's landscape. The ball rolls down the "developmental" hill, making successive pathway decisions along the way. Depending on which path is chosen, the cell/ organ/individual will adopt a different fate.



Before proceeding further, we need to be clear that gender is not how one *acts*, as male or female; it is how one senses themselves to *be*. I frequently see references to gender as a social construct,⁷ which seems to me to be a confusion of gender roles versus gender perception. To be sure, one's gender would affect how one acts, e.g., clothing, mannerisms, choice of friends etc., but they *follow from* one's gender and are not equivalent to them. Gender roles are largely socially constructed but gender identity is not. As an example of this confusion, Meyer and Gelman argue against gender essentialism on the basis that it forces children to stereotypical behaviors depending on their gender, which can lead to power inequality.⁸ To be sure, rigid stereotypes of sex-specific behaviors are neither necessary nor helpful, but they do not change one's gender. We also need to distinguish gender from sexual orientation. The former is inwardly focused, the latter outwardly focused. Although these are distinct, it is possible that the two may be conflated by someone wondering whether they have gender incongruence.

Development of Gender

What do we know about the biological basis for gender? The organization/activation model used to describe sexual behaviors was originally developed and studied in animals, but gender cannot be measured in animals. By contrast, gender is one's *internal* sense of whether one is male or female. Moreover, since it cannot be objectively measured, gender is difficult to study. Still, there are indications of a possible role of biology in gender development.⁹

It is becoming more apparent that, despite our knowledge of the anatomy and circuitry of the brain, we don't really understand how it works in higher order processing on concepts like gender. As described by Cobb, there are numerous models describing how the brain works, including anatomy, circuitry, brain waves, and neurotransmitters, but none of them accurately describes how we think, let alone how we perceive gender.¹⁰ The tools available to study brain activity are far too crude to analyze complex neural pathways and synaptic rearrangements, which are key to understanding brain function. Thus, we are limited to looking for correlations. In this section, I will look at different ways to study the brain, and look for correlations with gender incongruence, to help us detect possible biological causes.

Biology of Gender - Anatomy

Is one's gender apparent in one's brain anatomy, and altered in gender incongruence? There are sexually dimorphic regions of the brain, which differ in size between males and females. Could studies in transgender people help us understand their role in gender? Indeed, numerous suggested that some of these structures in transgender individuals were intermediate or closer to their gender identity than their natal sex.¹¹ However, these findings must be interpreted with caution. While these regions are sexually dimorphic, there is considerable overlap and mosaicism between males and females, i.e., there is not a clear relationship between the sex of the individual and the anatomy of these regions.¹² Since these are postmortem studies, the number of samples is low and there was variability between individual subjects.¹³ Moreover, due to the plasticity of the brain, it is also possible that individuals who lived according to their identified gender may have had corresponding changes in brain anatomy as a result. Finally, we don't know how these particular structures may function in gender identity.

Biology of Gender – Brain Activity

One of the models for brain function that Cobb describes is a circuitry model. In this model, brain functions are not localized to a specific region but, using a wiring metaphor, brain functions result from different regions communicating with each other in a circuit. Such a circuit

could differ between the sexes. Consistent with this model, there are differences in the cortex and gray matter between males and females, and individuals suffering from gender dysphoria display an intermediate pattern.¹⁴

A characteristic of gender dysphoria is the sense that one's sexual organs (e.g., penis, breasts) do not belong to the body and greatly contribute to the dysphoria. This has been compared to xenomelia (formerly called body integrity identity disorder), which is the sense that an extremity does not belong to one's body and should be amputated. A study of FtM transgender individuals found differences in brain activation by stimulation of a sexed body part (breast) versus a non-sexed body part (hand) between transgender individuals and controls, suggesting differences in neural representation of the body in gender dysphoria.¹⁵ Another study found that gender dysphoria was associated with differences in cerebral networks mediating self-body perception.¹⁶ However, these findings may merely involve a shared neural aspect of these two disorders and not a causal link. Finally, a controversial proposal was made by Gliske, who suggested that gender dysphoria is a condition that involves the distress, social behavioral, and body-ownership networks.¹⁷

Autism rates are high in transgender people, but it is not clear if there is a common cause or cause-and-effect relationship.¹⁸ Gender incongruence may hinder development of people with autism, thus amplifying the disorder. Alternatively, autism and accompanying social deficits might make it difficult for children to develop a sense of gender (reminiscent of Fausto-Sterling's dyad model of gender/sex development, described above). Gender dysphoria symptoms are also seen in schizophrenia.¹⁹ Finally, an increased incidence of gender variance was also seen in children of both sexes with ADHD.²⁰

Biology of Gender - Hormones

As mentioned above, exposure to testosterone in the fetal brain masculinizes it, while absence of testosterone results in a female brain. There are multiple indications of an important role for sex hormones in gender development and alterations in this hormonal milieu could result in gender incongruence.²¹ For example, in a study of female patients with congenital adrenal hyperplasia (CAH), where high levels of androgens (male-acting hormones) are produced, a large proportion of them declared a male identity despite being raised as females.²² Second, males with androgen insensitivity. In a study examining androgen insensitivity, where males have testes and testosterone but have defective receptors and physically develop as females, all

(11/11) patients with complete androgen insensitivity identified as females but most (11/14) with partial insensitivity identified as males, despite having a female phenotype.²³ This strongly suggests that even a small response to testosterone can affect one's perception of gender. Third, polycystic ovary syndrome (PCOS) is accompanied by high levels of androgens in the blood. A study on FtM transgender individuals found a high proportion (39%) of PCOS in these patients.²⁴ High levels of fetal testosterone may also contribute to gender dysphoria in girls but not boys, which is consistent with the extreme male brain theory of autism.²⁵ Prenatal exposure to diethylstilbestrol (DES, a nonsteroidal synthetic estrogen prescribed to prevent miscarriage) causes sexual abnormalities and there are possible links to gender incongruence in females as well.²⁶ Finally, acetaminophen (paracetamol in the UK) taken in pregnancy has been associated with urogenital, reproductive, and neurodevelopmental defects in the offspring.²⁷ This article did not specifically mention gender dysphoria but it is possible that an abnormally high dose of acetaminophen at a critical time might be the cause of some cases of gender incongruence. Exposure to endocrine disruptors such as bisphenols A and F might also have an effect.²⁸

Greg Eilers' situation is another clue, albeit a surprising one, to the role of sex hormones in gender.²⁹ Eilers suffered lifelong gender dysphoria, which resulted in his resigning his position as a pastor, to transition to a woman. After his hormonal and surgical transition, his dysphoria resolved, and he sensed himself as a man again. His identifying as a man is (paradoxically) dependent on continuing to take estrogen.³⁰ While his situation does not help us understand *how* hormones regulate gender, it seems clear that hormonally regulated gene expression plays some role.

To summarize, there are many biological factors that may play a role in contributing to gender incongruence but none of these is definitive. Each of the above examples increases frequency of gender incongruence but only to a degree. The Waddington landscape may provide the best explanation, i.e., the developmental stages normally follow one pathway (where gender is congruent with sex), but sometimes external factors cause brain development to take a different path.

Are Sex and Gender Binary or a Spectrum?

The above descriptions imply that both sex and gender are binary. One is either one or the other. Yet there are arguments that both sex and gender are nonbinary, and even a spectrum.³¹

The development of one's sex described above occurs in most cases. However, sometimes the usual developmental pathway is not followed. Such cases are collectively called disorders of sexual development (DSDs) and occur in roughly 1 in 100 live births.³² This is a broad category and the incidence of conditions where one's sex is not readily apparent is much lower.³³ Examples include androgen-insensitivity syndrome (described above), where individuals are genetically male but do not respond to testosterone. Other conditions exist where gene mutations in the developmental pathways result in intermediate phenotypes. In some cases, it can be difficult to determine the sex at birth due to ambiguous genitalia. Still other DSDs result from a chromosomal abnormality, like Turner (XO) or Klinefelter (XXY) syndromes.

The existence of DSDs seems to be the exception that proves the rule. These conditions are a result of a developmental disorder, not normal variance. As Christians, we must acknowledge that people with these conditions exist, and we must love and support them. However, that does not mean that sex exists on a spectrum.

The binary nature of gender is more difficult to assert because the issues are more complex. First, gender is difficult to define because it is entirely self-reported. While one's experience of gender may be very real for those suffering from gender dysphoria, there are no objective criteria for assessing gender, and studies that are done to assess gender need further development to improve reliability.³⁴ It seems that most cases of gender dysphoria involve a gender binary but, assuming a developmental process of gender formation, one can certainly imagine exceptions to this pattern.³⁵ Note that, as mentioned earlier, we must still distinguish between variations in sex-typical behaviors and one's gender. Just because someone has preferences that do not conform to most others of that person's sex, doesn't mean they are nonbinary, let alone transgender.

The Process of Transitioning

Transitioning is a big step to take and must not be taken lightly. Transitioning involves multiple steps, psychotherapy, hormone treatments, non-genital surgery, and genital surgery, each of which is progressively more aggressive. The later stages are also costly and largely irreversible (but see below). Even with the extensive surgeries and lifelong hormone treatments, it can be difficult to "pass" as a member of the opposite sex. Despite these concerns, many deem the process to be essential, to relieve them of the dysphoria they experience. Which treatments

that are done, and in what order, can depend on the individual. Many transition socially but do not undergo surgery. Social transitioning can involve changes in hair and clothing, name change, and coaching to modify mannerisms and speech to the desired gender.

The World Professional Association for Transgender Health (WPATH) has laid out guidelines to determine if a patient is ready for surgery:³⁶

- Patient's gender dysphoria is persistent and well documented
 - Patient has the capacity to make a fully informed decision and consent for treatment
 - Patient is the legal age of majority in a given country
 - Patient's medical or mental health comorbidities, including any psychiatric disorders, are "reasonably well controlled" (for chest surgery) or "well controlled" for genital surgery.
- Obviously, surgery should not be performed on actively psychotic patients.

The initial steps include confirmation that the patient meets the criteria for gender dysphoria, assessment by mental health professionals, psychotherapy, and social transition for at least three months before hormone therapy is initiated.³⁷ Although these guidelines are clear, these are just guidelines, and may not always be followed.³⁸ A culture of gender "affirmation" may be encouraging transition instead of using it as a last resort when other options have been excluded.

Hormone treatments are the next step in transitioning. Gonadotropin-releasing hormone analogs (GnRHa) act on the pituitary to suppress the release of luteinizing hormone and follicle-stimulating hormone, which in turn prevents the production of estrogen in females and testosterone in males. GnRHa was originally developed to treat precocious puberty but is also used off-label in this context. Female-to-male (FtM) patients receive testosterone, administered in various ways, sometimes with GnRHa or the less cost-prohibitive progestin to suppress endogenous estrogen production. Male-to-female (MtF) patients require GnRHa and estrogen, and can be associated with more adverse events, including blood clots. In the US, the diuretic spironolactone is commonly used off-label instead of GnRHa because it also blocks the effect of testosterone and is much less expensive. However, it also blocks the activity of aldosterone in the kidney (for which it was originally developed) so patients need to be closely monitored for adverse effects.³⁹ WPATH guidelines call for the individual to be on hormone treatments for a year before surgery.⁴⁰ Recent reviews of studies on the effects of hormone treatments on gender dysphoria, quality of life, and psychological functioning found mixed results.⁴¹

Non-genital surgery focuses on the outward appearance, to help the individual “pass” as the opposite sex in public. In MtF cases, this includes hair removal, voice modification surgery, and facial feminization surgery. Other surgeries include body contouring by fat redistribution (the particulars depend on the desired sex) and mastectomy. Genital surgery in both MtF and FtM cases removes the testes or ovaries, which means the individual needs to take sex hormones for life.

While the goal of genital surgery in FtM patients is to produce a phallus that can become erect, allow standing urination, and have both tactile and erogenous sensation, none of the available surgeries can accomplish this goal.⁴² There are two main options for FtM genital surgery. Metoidioplasty is the least complicated and involves enlargement of the clitoris through hormone therapy and using local skin and tissues to construct a penis and scrotum, which will have testicular prostheses. While metoidioplasty maintains sensation and allows standing urination, the neo-phallus is small and generally does not allow penetrative sex. The alternative is phalloplasty, in which tissue is grafted from elsewhere in the body (forearm, back, leg, or groin). This procedure is more technically challenging and complex. While phalloplasty results in an anatomically sized neo-phallus and allows for standing urination, erogenous sensation is poor or lacking. Penetrative sex is only possible if an inflatable prosthesis is included or if bone or cartilage are included in the graft. This latter option means the neo-phallus is permanently rigid, which can cause other complications. In all cases of phalloplasty, the donor site is considerably altered. Despite these challenges, genital surgery has a high level of satisfaction, most likely because it resolves incongruence between sex and gender.⁴³

Like the FtM situation, the goal of genital surgery in MtF patients in constructing a vagina that can achieve pleasurable penetrative sex has not been achieved. This surgery involves the removal of the penis and the construction of a vagina. There are two options for constructing a vagina, neither of which generates a surface that is designed for penetrative sex. The interior walls of the vagina contain an epithelium that can withstand abrasion (stratified squamous) but also provides lubrication, due to the seeping of fluid through the epithelium in arousal, to provide lubrication for intercourse (in addition to mucus produced by vestibular glands). A mucous vaginal interior can be accomplished by grafting part of the small or large intestine. These tissues contain mucus-producing cells but are designed for absorption, not to withstand abrasion. Instead, in most cases, skin from the penis and perineum is used to construct the vagina. This

surface is better able to withstand abrasion but does not produce any liquids or mucus for lubrication. Moreover, the amount of skin is limited, and dilation is needed, more so if the patient received puberty blockers before transitioning, which prevented the normal enlargement of the penis during puberty. Not surprisingly, pain in intercourse is common. The construction of a clitoris with erogenous sensitivity and labia majora are more straightforward but constructing labia minora is more challenging.⁴⁴ Complications of the surgery are common and wide-ranging, often requiring secondary procedures.⁴⁵ Urinary complications are also common.

Thankfully, the incidence of regret is low (approximately 1%) and appears to be linked to the physical and functional results of the surgery.⁴⁶ Detransitioning surgery in cases of regret is possible after MtF transitions, resulting in a phallus that provided improved esthetic and psychological status.⁴⁷ However, that type of surgery (phalloplasty) does not provide erogenous sensation.

Recent Controversies in Gender Incongruence

Increase in adolescent girls

It is difficult to determine the frequency of gender dysphoria, but estimates range from 0.5-1.3%,⁴⁸ although one recent study had roughly 10% of high school respondents claim to be gender-diverse.⁴⁹ More recently however, the number of adolescent girls presenting with gender dysphoria has increased considerably, with less of an increase in boys or adults of both sexes.⁵⁰ There are several possible explanations for these changes.

One possibility is better diagnosis. With the increased prominence and social acceptance of LGBT individuals in our culture, more people are aware of gender dysphoria, may see themselves as having this condition as well, and present to gender clinics. The increased use of the internet and particularly social media makes information on gender dysphoria readily available. Yarhouse and Sadusky, citing Hacking, describe a “looping effect,” where the naming of a condition (like gender dysphoria) results in an increase in the number of people identifying with that condition, which in turn increases the number of institutions and experts who deal with that condition.⁵¹ This is not meant to invalidate gender dysphoria but does provide a possible explanation for its relative sudden increased prominence.

The increased study of gender dysphoria has presumably also resulted in better evaluation criteria for diagnosis. One study carefully examined this possibility for the Swedish population

from 2005 – 2015 but found similar results: a slight increase in diagnoses in both sexes aged 18-30, a severalfold increase in females aged 10-17, but no corresponding increase in males of that age.⁵²

It is not clear why the incidence of gender dysphoria is higher in adolescent girls. One possible explanation is that the social consequences of transitioning are higher for boys than girls, thus suppressing the number of cases in boys.⁵³ However, if the dysphoria persists, then one would expect a later increase in boys, which was not seen.

A controversial explanation of social contagion was first proposed by Lisa Littman, who described transitioning in clusters of friends, often encouraged by YouTube videos and other social media.⁵⁴ This phenomenon of Rapid Onset Gender Dysphoria (ROGD) was picked up by others, including the popular press, in both the US and the UK.⁵⁵ The Littman paper was critiqued on methodological grounds,⁵⁶ but the phenomenon exists⁵⁷ and an explanation for the higher rates in this segment of the population remains elusive. In a similar vein, an increase in Tourette's-like tics was linked to the viewing of TikTok videos of Tourette's Syndrome by teenage girls and young women during the Covid-19 pandemic.⁵⁸

What might be the role of environmental factors like social media on gender? The possible perturbation of Waddington's epigenetic landscape was described earlier in the context of gender development in the fetus (the organization stage). Can it also function in adolescence, to provide an explanation for late-onset gender dysphoria? Fausto-Sterling discussed brain plasticity in the context of child development but the dramatic changes in the brain that occur during puberty, with the rise in the levels of sex hormones, may also occasion further changes in brain organization and behavior. Intrinsic stressors, like depression or eating disorders, or extrinsic stressors, like family trauma or social isolation, may contribute to instability in the epigenetic landscape and contribute to gender dysphoria.⁵⁹

Desistance and Early Transition

Another controversy in this field is the question of desistance, i.e., children whose childhood gender dysphoria resolved in puberty or adolescence. Littman and Shrier suggested that many of the adolescent girls did not have genuine gender dysphoria, based on reports that most childhood gender dysphoria desists when the individual reaches puberty, with some having same-sex attraction instead.⁶⁰ This raises further questions about diagnosis and treatment.

Is there a difference between those cases that desist and those that persist? Are they qualitatively or quantitatively different? Clearly, if we can determine which cases will desist, we can spare them from irreversible disfiguring treatments. The criteria generally used to determine which cases are likely to persist are that the dysphoria is persistent, consistent, and insistent. These criteria are not that clear cut however, given different personalities of these children, and there is considerable debate and a dearth of high-quality studies to provide clarity.⁶¹

In one report, Steensma et al., studied 53 adolescents who had gender dysphoria, 24 of whom desisted, to see whether there were differences related to their psychosexual development.⁶² Both groups were similar before puberty, being indifferent up to age 5 (which is inconsistent with other studies showing dysphoria at younger ages) but identifying with the other sex around age 6/7. The difference between persisters and desisters became apparent at puberty, starting around age 10. For persisters, the dysphoria intensified with the social and physical changes and the beginnings of sexual attraction that accompanied puberty, while the same changes resulted in dissipation of dysphoria in desisters. There was also a difference in the sense of gender of the two groups before they reached puberty. Those who persisted asserted that they *were* the opposite gender, whereas those who desisted *wanted to be* the opposite gender. A follow-up study by the same researchers also found that the intensity of the dysphoria was greater in the persisters than the desisters.⁶³ Despite this promising finding, others have not described a similar phenomenon and it remains unclear how reliably one can predict persistence or desistance.

Clearly, the question of desistance presents a dilemma for treatment.⁶⁴ Given that most children with gender dysphoria will desist, early transitioning will result in transitioning in someone who would not have otherwise persisted. The permanent nature of some aspects of transitioning, including hormone therapy, argues that unnecessary treatments should be avoided. Despite this concern, the WPATH and USPATH have issued a joint statement supporting the use of puberty blockers for children with gender dysphoria.⁶⁵

Another concern with treating gender dysphoria in children is the question of consent. Our brains undergo considerable development in puberty and adolescence, which has a profound impact on behavior.⁶⁶ Can a prepubescent child understand well enough who they are, what the process of transitioning will be like, and what the final consequences will be (including loss of normal sexual function and fertility), to provide truly informed consent?

Moreover, what is the effect of counseling on a child's (or parent's) decision to transition? Concerns about "conversion therapy" are well founded; the consensus is that counseling alone cannot resolve genuine cases of gender dysphoria. However, given that gender *affirmation* is the prescribed approach to counseling,⁶⁷ how many children proceed along the pathway of transition when they do not have gender incongruence? As mentioned above, there are significant comorbidities with gender dysphoria; (how) is the counselor addressing them?

On the other hand, waiting until puberty, known as "watchful waiting," can make transitioning more difficult, as the development of secondary sex characteristics (bone structure, breasts, body hair, etc.) is more difficult to undo and makes it more difficult for the person to "pass." Additionally, the individual would experience an extended time of distress and further social consequences before transitioning.

The "Dutch protocol" involves treatment at the beginning of puberty, using GnRHa to block puberty.⁶⁸ As their name suggests, They can either be used at the beginning of puberty or in adolescence as part of the transitioning process.

When administered at the beginning of puberty, the goal is to buy time for gender dysphoric children before the physical changes of puberty exacerbate their dysphoria. Moreover, puberty blockers would eliminate the need for many surgical procedures to treat the irreversible secondary sex characteristics that develop in puberty. However, side effects include a reduction in height⁶⁹ (when accompanied by cross-sex hormones) and weight gain,⁷⁰ and reductions in bone density.⁷¹ A further complication is that puberty blockers prevent the normal growth of the penis, providing insufficient skin for the construction of a neo-vagina from the penis.⁷²

The use of puberty blockers has proved to be controversial because they may also block desistance. In a study of 70 patients taking puberty blockers, none of them desisted (when a large proportion would be expected), although there were fewer emotional problems and depressive symptoms.⁷³ The reasons for the lack of desistance are unclear but may have been partly due to more stringent selection criteria for inclusion in this study. Alternatively, if the changes in hormone levels that occur in puberty are responsible for desistance, then it shouldn't be surprising that puberty blockers would block desistance. Turban et al. claim that the use of puberty blockers in adolescents improves mental health and reduces suicidal ideation.⁷⁴ However, this conclusion has also been challenged, citing weak data and confounding factors

like comorbidities.⁷⁵ In a systematic review, Vrouenraets et al. report disagreement on the use of puberty blockers, citing numerous areas in which our understanding is incomplete.⁷⁶

The treatment of gender-dysphoric children has been highly contentious in the UK, centering around the services provided by the Gender Identity Development Service (GIDS). It is claimed that these services are overwhelmed and that providers are unable to adequately judge the suitability of a patient to consent to puberty blockers.⁷⁷ Indeed, former GIDS employees and others have compiled a book to protest perceived inappropriate services provided by GIDS.⁷⁸ In response to a lawsuit filed by Keira Bell, who was prescribed GnRHa and transitioned to a male before detransitioning some time later, the British High Court banned the prescription of puberty blockers to patients below the age of 16, citing their inability to provide truly informed consent.⁷⁹ This ruling is being appealed and the National Health Service (NHS) has announced an independent review of the gender identity services for children and young people.⁸⁰ In the US, a recent survey of a listserv of providers of gender-affirming care found overwhelming support for medical interventions before age 18.⁸¹

Christian Perspectives

Having covered many potentially controversial aspects of the science of gender dysphoria and various treatments, we need to see how a Christian perspective can inform us on how to approach these controversies. Sadly, this topic has become highly polarized, and whatever position is taken by one will result in disappointment and possible hurt for others. Various denominations and individuals have expressed Christian perspectives on this topic.⁸²

Although the Bible does not directly address transgender issues, we can nevertheless use Scriptural guidelines to help us. First, as Christians who are called to love God above all and our neighbor as ourselves, we need to act in a manner that is consistent with Scripture and in the person's best interest. All human beings are created in the image of God and deserve our love and care, particularly those who are suffering. To this end, one can appreciate the desire to destigmatize gender dysphoria. Moreover, assigned gender roles, whether by our culture or perceived biblical standards, can exacerbate the stress in someone who does not fit their gender stereotype.

Second, the binary of sex and gender are rooted in creation. Although he does not directly address gender dysphoria, Christopher West, in his book on Pope John Paul II's Theology of the

Body, describes how the creational structure woven throughout Scripture is one of (binary) complementarity and relationship.⁸³ To list just a few examples, marriage and sexual union are depicted in the Garden of Eden (Genesis 2:23), the first sin marred that relationship (Genesis 3:12), an entire book of the Bible (Song of Songs) is about sex, Jesus' incarnation was a conception (Luke 1:35), his first miracle was at a wedding (John 2:11), and the church is the bride of Christ (Revelation 22:17). One of the most grievous sins is adultery (e.g., Genesis 6, Exodus 32, and Numbers 25, not to mention the many references in the epistles). Idolatry is depicted as adultery, e.g., Hosea, and both idolatry and adultery are prohibited in the Ten Commandments. Moreover, one's sex is integral to one's identity, even after death. For example, biblical characters in the intermediate state (Samuel, Elijah, and Moses) or after resurrection (Jesus) retained their sex, apart from the body. However, despite this pattern of complementarity, there clearly are exceptions. Not all humans live in a complementary relationship. Some, either by choice or by circumstance, never marry. Indeed, Paul describes the ability to remain single as a gift from God (I Corinthians 7:7). But these are exceptions. Does being transgender or nonbinary also fall into the category of a legitimate exception to the pattern?

Yarhouse and Sadusky describe three approaches that Christians take toward transgender questions, the *integrity*, *disability*, and *diversity* approaches.⁸⁴

The *integrity* approach holds that God created a binary of sex and gender. Any deviation from that binary is sin and the goals of treatment must be conformity of gender to one's biological sex. If that is not possible, then the dysphoria must be a burden to carry because of the Fall.⁸⁵ The integrity position sometimes points to Deuteronomy 22:5, which is a prohibition of people wearing clothes of the opposite sex. However, Eilers argues that this verse is irrelevant to the transgender discussion because it refers to deception (avoiding or entering military service, or men gaining access to women's spaces) and does not apply to gender dysphoria.⁸⁶ Cross-dressing by people with gender dysphoria is palliative, done to relieve distress, and not done for deception. Those holding the integrity position must be careful to appreciate fully the possible biological causes of the condition and the inability of some people to relieve their dysphoria without transitioning. There are people who have detransitioned as part of their religious conversion,⁸⁷ but one cannot generalize from a few examples to all who suffer from gender dysphoria.

The *disability* approach likewise holds to a binary of sex and gender as rooted in creation, but recognizes that we live in a fallen world, and sometimes we need to make allowances for that fact. Sometimes sex and gender are incongruent, and the dysphoria cannot simply be wished away or endured. As was mentioned earlier, suicide rates in gender-dysphoric individuals is frighteningly high.

The *diversity* approach holds that while the sex/gender binary in creation are *descriptive*, they are not *prescriptive*. A spectrum of sex and gender are welcome, not as a disability but as part of the diversity in creation.⁸⁸ This position is consistent with the WPATH and APA standards of care, which describe gender incongruence as an aspect of diversity, not pathology.⁸⁹ However, depathologizing a condition like gender incongruence (which this approach and WPATH and APA do) may also be unhelpful, if the treatment for it is so radical that it involves loss of fertility, disfiguring surgery, and lifelong hormone treatments.

How do we deal with situations that do not conform to the usual pattern? The integrity and disability approaches argue that we should maintain a holistic view of ourselves, where possible maintaining consistency between gender and sex. The body is not irrelevant. Many transgender people instinctively agree, which is why they undergo hormonal treatments and surgeries to relieve their dysphoria and align their gender and sex. The challenge is in knowing what should be changed when there is incongruence. Do we maintain a conservative approach, doing only as much as is needed to relieve the dysphoria (if that is possible), or is the goal a full transition?

Can we get guidance by comparing transitioning for gender dysphoria to other health conditions? It is not comparable to same-sex attraction. We do not encourage someone who is same-sex attracted to act on those impulses because the Bible forbids *any* sex outside of marriage. The fact that there is a biblical prohibition indicates that it is possible to withstand these temptations (I Corinthians 10:13). Alternatively, a possible comparison may be someone with cancer. We generally support cancer treatments that may require the removal of a body part or the use of chemotherapeutic drugs that will affect one's quality of life because these treatments achieve the greater goal of saving the patient's life. A still closer (but rare) comparison may be xenomelia (or body integrity identity disorder), in which a body part is felt not to belong to the body and therefore must be amputated. In both cases there is the prospect of body-altering surgery on an individual who is otherwise physically and psychologically healthy

but has this particular psychological trauma. By making an analogy to gender dysphoria, a case has been made in favor of surgery (amputation) for xenomelia.⁹⁰

On the other hand, Robles, publishing in a Catholic bioethical journal, argues that transition, "...violates the body-soul union, disregards the principle of totality and integrity, and debases the dignity of humanity."⁹¹ While there is merit in opposing transgender *ideology*, one must also consider that transitioning may be making the best of a difficult situation.

How did we go from a situation where people with gender dysphoria were shunned from society to an ideology where sex changes are celebrated? Carl Trueman in *The Rise and Triumph of the Modern Self* traces the importance of one's personal identity, from Rousseau, through Nietzsche, Sartre, de Beauvoir, Freud, to the present day.⁹² There isn't space in this article to outline his arguments, but one wonders how much these cultural changes have affected the attitudes of Christians as well, when it comes to our understanding of sex and gender.

In conclusion, gender incongruence/dysphoria is a very real condition, which causes considerable distress in those who suffer from it. As Christians, we cannot ignore it, either in our churches or from our task in the society at large. As agents of restoration, we are called to do what we can to help those suffering from this condition. While we recognize that in this life we may make only small beginnings in that task, we can look forward to the time when Christ will return to make all things new.

¹ Arthur P. Arnold, "The Organizational-Activational Hypothesis as the Foundation for a Unified Theory of Sexual Differentiation of All Mammalian Tissues," *Hormones and Behavior* 55, no. 5 (May 2009): 570–78, <https://doi.org/10.1016/j.yhbeh.2009.03.011>.

² Katherine A. O'Hanlan, Jennifer C. Gordon, and Mackenzie W. Sullivan, "Biological Origins of Sexual Orientation and Gender Identity: Impact on Health," *Gynecologic Oncology* 149, no. 1 (April 1, 2018): 33–42, <https://doi.org/10.1016/j.ygyno.2017.11.014>; Julie Bakker, "The Role of Steroid Hormones in the Sexual Differentiation of the Human Brain," *Journal of Neuroendocrinology* n/a, no. n/a (n.d.): e13050, <https://doi.org/10.1111/jne.13050>; Julie Bakker and Michael J. Baum, "Role for Estradiol in Female-Typical Brain and Behavioral Sexual Differentiation," *Frontiers in Neuroendocrinology* 29, no. 1 (January 1, 2008): 1–16, <https://doi.org/10.1016/j.yfrne.2007.06.001>. The situation is more complicated in rodents, on whom most studies have been done, where testosterone in the brain is converted to estrogen by the enzyme aromatase. Although aromatase is also found in the human brains, the importance of estrogen in human brain sexualization is unclear.

³ Fausto-Sterling uses the term gender/sex to indicate the interconnectedness of sex and gender, which I welcome.

-
- ⁴ Anne Fausto-Sterling, “A Dynamic Systems Framework for Gender/Sex Development: From Sensory Input in Infancy to Subjective Certainty in Toddlerhood,” *Frontiers in Human Neuroscience* 15 (2021): 150, <https://doi.org/10.3389/fnhum.2021.613789>.
- ⁵ The entire January/February 2017 issue of the *Journal of Neuroscience Research* (70 articles) is dedicated to sex differences on nervous system function. See: <https://onlinelibrary.wiley.com/toc/10974547/2017/95/1-2>
- ⁶ “Epigenetic Landscape | The Embryo Project Encyclopedia,” accessed September 9, 2021, <https://embryo.asu.edu/pages/epigenetic-landscape>.
- ⁷ E.g. Kumar Ravi Priya and Ajit Kumar Dalal, *Qualitative Research on Illness, Wellbeing and Self-Growth: Contemporary Indian Perspectives* (Routledge, 2016); “Gender and Health,” accessed September 29, 2021, <https://www.who.int/westernpacific/health-topics/gender>.
- ⁸ Meredith Meyer and Susan A. Gelman, “Gender Essentialism in Children and Parents: Implications for the Development of Gender Stereotyping and Gender-Typed Preferences,” *Sex Roles* 75, no. 9 (November 1, 2016): 409–21, <https://doi.org/10.1007/s11199-016-0646-6>.
- ⁹ Tinca J. C. Polderman et al., “The Biological Contributions to Gender Identity and Gender Diversity: Bringing Data to the Table,” *Behavior Genetics* 48, no. 2 (March 1, 2018): 95–108, <https://doi.org/10.1007/s10519-018-9889-z>.
- ¹⁰ Matthew Cobb, *The Idea of the Brain: The Past and Future of Neuroscience*, Illustrated edition (Basic Books, 2020).
- ¹¹ Reviewed by Antonio Guillamon, Carme Junque, and Esther Gómez-Gil, “A Review of the Status of Brain Structure Research in Transsexualism,” *Archives of Sexual Behavior* 45, no. 7 (October 1, 2016): 1615–48, <https://doi.org/10.1007/s10508-016-0768-5>.
- ¹² Daphna Joel et al., “Sex beyond the Genitalia: The Human Brain Mosaic,” *Proceedings of the National Academy of Sciences* 112, no. 50 (December 15, 2015): 15468, <https://doi.org/10.1073/pnas.1509654112>; Lise Eliot et al., “Dump the ‘Dimorphism’: Comprehensive Synthesis of Human Brain Studies Reveals Few Male-Female Differences beyond Size,” *Neuroscience & Biobehavioral Reviews* 125 (June 1, 2021): 667–97, <https://doi.org/10.1016/j.neubiorev.2021.02.026>. This point needs some clarification. There were several responses to this paper, arguing that while male and female brains are indeed mosaics, i.e., some structures are more “female-sized” while others are more “male-sized,” based on the overall anatomical differences, one could predict the sex from the anatomy (but not the other way around). Thus, there are differences but there is no diagnostic anatomical feature that reliably indicates the sex of the brain. See <https://www.pnas.org/content/113/14/E1969>
- ¹³ Alberto Frigerio, Lucia Ballerini, and Maria Valdés Hernández, “Structural, Functional, and Metabolic Brain Differences as a Function of Gender Identity or Sexual Orientation: A Systematic Review of the Human Neuroimaging Literature,” *Archives of Sexual Behavior*, May 6, 2021, <https://doi.org/10.1007/s10508-021-02005-9>.
- ¹⁴ Baudewijntje P.C. Kreukels and Antonio Guillamon, “Neuroimaging Studies in People with Gender Incongruence,” *International Review of Psychiatry* 28, no. 1 (January 2, 2016): 120–28, <https://doi.org/10.3109/09540261.2015.1113163>.
- ¹⁵ Laura K. Case et al., “Altered White Matter and Sensory Response to Bodily Sensation in Female-to-Male Transgender Individuals,” *Archives of Sexual Behavior* 46, no. 5 (July 1, 2017): 1223–37, <https://doi.org/10.1007/s10508-016-0850-z>.
- ¹⁶ A. Manzouri and I. Savic, “Possible Neurobiological Underpinnings of Homosexuality and Gender Dysphoria,” *Cerebral Cortex (New York, N.Y.: 1991)* 29, no. 5 (May 1, 2019): 2084–2101, <https://doi.org/10.1093/cercor/bhy090>.
- ¹⁷ “A New Theory of Gender Dysphoria Incorporating the Distress, Social Behavioral, and Body-Ownership Networks | ENeuro,” accessed October 13, 2021, <https://www.eneuro.org/content/6/6/ENEURO.0183-19.2019>. This paper was retracted by the editors (under the objection of the author), “because of major flaws, including circular reasoning, the lack of supporting evidence in the literature, a noncritical use of the available literature, and confusion in terminology...”
- ¹⁸ Yulia Furlong, *Autism and Gender Identity, Autism Spectrum Disorder - Profile, Heterogeneity, Neurobiology and Intervention* (IntechOpen, 2021), <https://doi.org/10.5772/intechopen.97517>.
- ¹⁹ Jarosław Stusiński and Michał Lew-Starowicz, “Gender Dysphoria Symptoms in Schizophrenia,” *Psychiatria Polska* 52, no. 6 (December 29, 2018): 1053–62, <https://doi.org/10.12740/PP/80013>.

-
- ²⁰ John F. Strang et al., “Increased Gender Variance in Autism Spectrum Disorders and Attention Deficit Hyperactivity Disorder,” *Archives of Sexual Behavior* 43, no. 8 (November 1, 2014): 1525–33, <https://doi.org/10.1007/s10508-014-0285-3>.
- ²¹ Ramesh Babu and Utsav Shah, “Gender Identity Disorder (GID) in Adolescents and Adults with Differences of Sex Development (DSD): A Systematic Review and Meta-Analysis,” *Journal of Pediatric Urology* 17, no. 1 (February 2021): 39–47, <https://doi.org/10.1016/j.jpuro.2020.11.017>.
- ²² Reiner W.G., “Gender Identity and Sex-of-Rearing in Children with Disorders of Sexual Differentiation,” *Journal of Pediatric Endocrinology and Metabolism* 18, no. 6 (2005): 549–54, <https://doi.org/10.1515/JPEM.2005.18.6.549>.
- ²³ Maria Sol Touzon et al., “Androgen Insensitivity Syndrome: Clinical Phenotype and Molecular Analysis in a Single Tertiary Center Cohort,” *Journal of Clinical Research in Pediatric Endocrinology* 11, no. 1 (February 20, 2019): 24–33, <https://doi.org/10.4274/jcrpe.galenos.2018.2018.0185>.
- ²⁴ Tsuyoshi Baba et al., “Association between Polycystic Ovary Syndrome and Female-to-Male Transsexuality,” *Human Reproduction* 22, no. 4 (April 1, 2007): 1011–16, <https://doi.org/10.1093/humrep/del474>.
- ²⁵ Rebecca M. Jones et al., “Brief Report: Female-To-Male Transsexual People and Autistic Traits,” *Journal of Autism and Developmental Disorders* 42, no. 2 (February 1, 2012): 301–6, <https://doi.org/10.1007/s10803-011-1227-8>.
- ²⁶ <https://diethylstilbestrol.co.uk/studies/des-and-gender-identity/> DES was prescribed to pregnant mothers to prevent miscarriage. As their daughters grew up, they developed a variety of sexual abnormalities. This website claims that gender identity was also affected. However, in a recent study, Troisi et al., (2020) found no evidence of increased gender incongruity in DES-exposed individuals. See also <https://desaction.org/lgbtq/> for a more careful discussion of this question.
- ²⁷ Ann Z. Bauer et al., “Paracetamol Use during Pregnancy — a Call for Precautionary Action,” *Nature Reviews Endocrinology*, September 23, 2021, 1–10, <https://doi.org/10.1038/s41574-021-00553-7>. While this article does not mention gender dysphoria, and normal acetaminophen use is unlikely to cause any issues, inappropriate use, especially late in pregnancy, might have consequences.
- ²⁸ Yuki Fujiwara et al., “The Effects of Low-Dose Bisphenol A and Bisphenol F on Neural Differentiation of a Fetal Brain-Derived Neural Progenitor Cell Line,” *Frontiers in Endocrinology* 9 (2018): 24, <https://doi.org/10.3389/fendo.2018.00024>.
- ²⁹ Greg Eilers, *A Roller Coaster Through a Hurricane: One Wild Ride: My Journey with Gender Identity*, 2019.
- ³⁰ Eilers.
- ³¹ “Gender Spectrum: A Scientist Explains Why Gender Isn’t Binary,” Cade Hildreth, August 14, 2021, <https://cadehildreth.com/gender-spectrum/>.
- ³² Valerie A. Arboleda, David E. Sandberg, and Eric Vilain, “DSDs: Genetics, Underlying Pathologies and Psychosexual Differentiation,” *Nature Reviews Endocrinology* 10, no. 10 (October 1, 2014): 603–15, <https://doi.org/10.1038/nrendo.2014.130>.
- ³³ Ieuan A. Hughes et al., “Consequences of the ESPE/LWPES Guidelines for Diagnosis and Treatment of Disorders of Sex Development,” *Best Practice & Research. Clinical Endocrinology & Metabolism* 21, no. 3 (September 2007): 351–65, <https://doi.org/10.1016/j.beem.2007.06.003>; I A Hughes et al., “Consensus Statement on Management of Intersex Disorders,” *Archives of Disease in Childhood* 91, no. 7 (July 2006): 554–63, <https://doi.org/10.1136/adc.2006.098319>.
- ³⁴ Sarah Joy Bowman et al., “Assessing Gender Dysphoria: A Systematic Review of Patient-Reported Outcome Measures,” *Psychology of Sexual Orientation and Gender Diversity*, 2021, No Pagination Specified-No Pagination Specified, <https://doi.org/10.1037/sgd0000486>.
- ³⁵ Thomas D. Steensma et al., “Desisting and Persisting Gender Dysphoria after Childhood: A Qualitative Follow-up Study,” *Clinical Child Psychology and Psychiatry* 16, no. 4 (October 1, 2011): 499–516, <https://doi.org/10.1177/1359104510378303>. One patient in this study partially desisted and remained as nonbinary.
- ³⁶ Miriam Hadj-Moussa, Dana A. Ohl, and William M. Kuzon, “Feminizing Genital Gender-Confirmation Surgery,” *Sexual Medicine Reviews* 6, no. 3 (July 2018): 457–468.e2, <https://doi.org/10.1016/j.sxmr.2017.11.005>.
- ³⁷ Miriam Hadj-Moussa, Dana A. Ohl, and William M. Kuzon, “Evaluation and Treatment of Gender Dysphoria to Prepare for Gender Confirmation Surgery,” *Sexual Medicine Reviews* 6, no. 4 (October 1, 2018): 607–17, <https://doi.org/10.1016/j.sxmr.2018.03.006>.

- ³⁸ Melinda Chen, John Fuqua, and Erica A. Eugster, “Characteristics of Referrals for Gender Dysphoria Over a 13-Year Period,” *Journal of Adolescent Health* 58, no. 3 (March 2016): 369–71, <https://doi.org/10.1016/j.jadohealth.2015.11.010>.
- ³⁹ Hadj-Moussa, Ohl, and Kuzon, “Evaluation and Treatment of Gender Dysphoria to Prepare for Gender Confirmation Surgery.”
- ⁴⁰ Wylie C. Hembree et al., “Endocrine Treatment of Transsexual Persons: An Endocrine Society Clinical Practice Guideline,” *The Journal of Clinical Endocrinology & Metabolism* 94, no. 9 (September 1, 2009): 3132–54, <https://doi.org/10.1210/jc.2009-0345>.
- ⁴¹ Taylah R. van Leerdam, Jeffrey D. Zajac, and Ada S. Cheung, “The Effect of Gender-Affirming Hormones on Gender Dysphoria, Quality of Life, and Psychological Functioning in Transgender Individuals: A Systematic Review,” *Transgender Health*, September 6, 2021, trgh.2020.0094, <https://doi.org/10.1089/trgh.2020.0094>; “Evidence Review: Gonadotrophin Releasing Hormone Analogues for Children and Adolescents with Gender Dysphoria” (National Institute for Health and Care Excellence (NICE); NHS England; NHS Improvement, March 11, 2021), <https://arms.nice.org.uk/resources/hub/1070905/attachment>.
- ⁴² Miriam Hadj-Moussa et al., “Masculinizing Genital Gender Confirmation Surgery,” *Sexual Medicine Reviews* 7, no. 1 (January 2019): 141–55, <https://doi.org/10.1016/j.sxmr.2018.06.004>.
- ⁴³ Ulrike Ruppin and Friedemann Pfäfflin, “Long-Term Follow-Up of Adults with Gender Identity Disorder,” *Archives of Sexual Behavior* 44, no. 5 (July 1, 2015): 1321–29, <https://doi.org/10.1007/s10508-014-0453-5>.
- ⁴⁴ Hadj-Moussa, Ohl, and Kuzon, “Feminizing Genital Gender-Confirmation Surgery.”
- ⁴⁵ Hadj-Moussa, Ohl, and Kuzon.
- ⁴⁶ Anne A. Lawrence, “Factors Associated with Satisfaction or Regret Following Male-to-Female Sex Reassignment Surgery,” *Archives of Sexual Behavior* 32, no. 4 (August 1, 2003): 299–315, <https://doi.org/10.1023/A:1024086814364>.
- ⁴⁷ Miroslav L. Djordjevic et al., “Reversal Surgery in Regretful Male-to-Female Transsexuals After Sex Reassignment Surgery,” *The Journal of Sexual Medicine* 13, no. 6 (June 1, 2016): 1000–1007, <https://doi.org/10.1016/j.jsxm.2016.02.173>. I have not seen reports of reversal of FtM transitions.
- ⁴⁸ American Psychological Association, “Guidelines for Psychological Practice with Transgender and Gender Nonconforming People.,” *American Psychologist* 70, no. 9 (December 2015): 832–64, <https://doi.org/10.1037/a0039906>.
- ⁴⁹ Kacie M. Kidd et al., “Prevalence of Gender-Diverse Youth in an Urban School District,” *Pediatrics* 147, no. 6 (June 1, 2021), <https://doi.org/10.1542/peds.2020-049823>.
- ⁵⁰ Madison Aitken et al., “Evidence for an Altered Sex Ratio in Clinic-Referred Adolescents with Gender Dysphoria,” *The Journal of Sexual Medicine* 12, no. 3 (March 1, 2015): 756–63, <https://doi.org/10.1111/jsm.12817>; J. Arcelus et al., “Systematic Review and Meta-Analysis of Prevalence Studies in Transsexualism,” *European Psychiatry* 30, no. 6 (2015): 807–15, <https://doi.org/10.1016/j.eurpsy.2015.04.005>; Nastasja M. de Graaf et al., “Evidence for a Change in the Sex Ratio of Children Referred for Gender Dysphoria: Data From the Gender Identity Development Service in London (2000–2017),” *The Journal of Sexual Medicine* 15, no. 10 (October 1, 2018): 1381–83, <https://doi.org/10.1016/j.jsxm.2018.08.002>; Malin Indremo et al., “Validity of the Gender Dysphoria Diagnosis and Incidence Trends in Sweden: A Nationwide Register Study,” *Scientific Reports* 11, no. 1 (August 9, 2021): 16168, <https://doi.org/10.1038/s41598-021-95421-9>.
- ⁵¹ Mark A. Yarhouse, *Emerging Gender Identities: Understanding the Diverse Experiences of Today’s Youth* (Brazos Press, 2020). pp 27-42
- ⁵² Indremo et al., “Validity of the Gender Dysphoria Diagnosis and Incidence Trends in Sweden: A Nationwide Register Study.”
- ⁵³ Riittakerttu Kaltiala-Heino et al., “Two Years of Gender Identity Service for Minors: Overrepresentation of Natal Girls with Severe Problems in Adolescent Development,” *Child and Adolescent Psychiatry and Mental Health* 9, no. 1 (April 9, 2015): 9, <https://doi.org/10.1186/s13034-015-0042-y>.
- ⁵⁴ Lisa Littman, “Parent Reports of Adolescents and Young Adults Perceived to Show Signs of a Rapid Onset of Gender Dysphoria,” *PLOS ONE* 13, no. 8 (August 16, 2018): e0202330, <https://doi.org/10.1371/journal.pone.0202330>; Georgia Wells Seetharaman Jeff Horwitz and Deepa, “Facebook Knows Instagram Is Toxic for Teen Girls, Company Documents Show,” *Wall Street Journal*, September 14, 2021, sec. Tech, <https://www.wsj.com/articles/facebook-knows-instagram-is-toxic-for-teen-girls-company-documents-show-11631620739>.

-
- ⁵⁵ Abigail Shrier, *Irreversible Damage: The Transgender Craze Seducing Our Daughters* (Regnery Publishing, 2021); Michele Moore and Heather Brunskell-Evans, *Inventing Transgender Children and Young People* (Cambridge Scholars Publishing, 2020).
- ⁵⁶ Arjee Javellana Restar, “Methodological Critique of Littman’s (2018) Parental-Respondents Accounts of ‘Rapid-Onset Gender Dysphoria,’” *Archives of Sexual Behavior* 49, no. 1 (January 1, 2020): 61–66, <https://doi.org/10.1007/s10508-019-1453-2>.
- ⁵⁷ Anna Hutchinson, Melissa Midgen, and Anastassis Spiliadis, “In Support of Research into Rapid-Onset Gender Dysphoria,” *Archives of Sexual Behavior* 49, no. 1 (January 1, 2020): 79–80, <https://doi.org/10.1007/s10508-019-01517-9>; Lisa Marchiano, “Outbreak: On Transgender Teens and Psychic Epidemics,” *Psychological Perspectives* 60, no. 3 (July 3, 2017): 345–66, <https://doi.org/10.1080/00332925.2017.1350804>.
- ⁵⁸ Caroline Olvera et al., “TikTok Tics: A Pandemic Within a Pandemic,” *Movement Disorders Clinical Practice* n/a, no. n/a, accessed October 21, 2021, <https://doi.org/10.1002/mdc3.13316>; Tamara Pringsheim et al., “Rapid Onset Functional Tic-Like Behaviors in Young Females During the COVID-19 Pandemic,” *Movement Disorders* n/a, no. n/a, accessed October 21, 2021, <https://doi.org/10.1002/mds.28778>; Isobel Heyman, Holan Liang, and Tammy Hedderly, “COVID-19 Related Increase in Childhood Tics and Tic-like Attacks,” *Archives of Disease in Childhood* 106, no. 5 (May 1, 2021): 420–21, <https://doi.org/10.1136/archdischild-2021-321748>.
- ⁵⁹ Kaltiala-Heino et al., “Two Years of Gender Identity Service for Minors: Overrepresentation of Natal Girls with Severe Problems in Adolescent Development.”
- ⁶⁰ Steensma et al., “Desisting and Persisting Gender Dysphoria after Childhood: A Qualitative Follow-up Study”; Devita Singh, Susan J. Bradley, and Kenneth J. Zucker, “A Follow-Up Study of Boys With Gender Identity Disorder,” *Frontiers in Psychiatry* 12 (2021): 287, <https://doi.org/10.3389/fpsy.2021.632784>; Madeleine S. C. Wallien and Peggy T. Cohen-Kettenis, “Psychosexual Outcome of Gender-Dysphoric Children,” *Journal of the American Academy of Child & Adolescent Psychiatry* 47, no. 12 (December 1, 2008): 1413–23, <https://doi.org/10.1097/CHI.0b013e31818956b9>.
- ⁶¹ Baer Karrington, “Defining Desistance: Exploring Desistance in Transgender and Gender Expansive Youth Through Systematic Literature Review,” *Transgender Health*, May 31, 2021, <https://doi.org/10.1089/trgh.2020.0129>.
- ⁶² Steensma et al., “Desisting and Persisting Gender Dysphoria after Childhood: A Qualitative Follow-up Study.”
- ⁶³ Thomas D. Steensma et al., “Factors Associated with Desistance and Persistence of Childhood Gender Dysphoria: A Quantitative Follow-Up Study,” *Journal of the American Academy of Child & Adolescent Psychiatry* 52, no. 6 (June 1, 2013): 582–90, <https://doi.org/10.1016/j.jaac.2013.03.016>.
- ⁶⁴ Teresa Baron and Geoffrey Dierckxsens, “Two Dilemmas for Medical Ethics in the Treatment of Gender Dysphoria in Youth,” *Journal of Medical Ethics*, May 30, 2021, medethics-2021-107260, <https://doi.org/10.1136/medethics-2021-107260>.
- ⁶⁵ Walter Pierre Bouman and Marci Bowers, “WPATH EXECUTIVE COMMITTEE,” n.d., 1.
- ⁶⁶ Sarah-Jayne Blakemore, Stephanie Burnett, and Ronald E. Dahl, “The Role of Puberty in the Developing Adolescent Brain,” *Human Brain Mapping* 31, no. 6 (2010): 926–33, <https://doi.org/10.1002/hbm.21052>; Satoru M. Sato et al., “Adolescents and Androgens, Receptors and Rewards,” *Hormones and Behavior*, Androgens in Health and Disease: new insights into roles and mechanisms of action, 53, no. 5 (May 1, 2008): 647–58, <https://doi.org/10.1016/j.yhbeh.2008.01.010>.
- ⁶⁷ Eli Coleman et al., “Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7,” *International Journal of Transgenderism* 13 (August 1, 2012): 165–232, <https://doi.org/10.1080/15532739.2011.700873>.
- ⁶⁸ Simone Mahfouda et al., “Puberty Suppression in Transgender Children and Adolescents,” *The Lancet Diabetes & Endocrinology* 5, no. 10 (October 1, 2017): 816–26, [https://doi.org/10.1016/S2213-8587\(17\)30099-2](https://doi.org/10.1016/S2213-8587(17)30099-2); Hembree et al., “Endocrine Treatment of Transsexual Persons.”
- ⁶⁹ Peggy T. Cohen-Kettenis et al., “Puberty Suppression in a Gender-Dysphoric Adolescent: A 22-Year Follow-Up,” *Archives of Sexual Behavior* 40, no. 4 (August 1, 2011): 843–47, <https://doi.org/10.1007/s10508-011-9758-9>.
- ⁷⁰ Stephanie A Roberts and Jeremi M Carswell, “Growth, Growth Potential, and Influences on Adult Height in the Transgender and Gender-Diverse Population,” *Andrology*, May 2021, <https://doi.org/10.1111/andr.13034>.
- ⁷¹ Michael Biggs, “Revisiting the Effect of GnRH Analogue Treatment on Bone Mineral Density in Young Adolescents with Gender Dysphoria,” *Journal of Pediatric Endocrinology and Metabolism* 34, no. 7 (2021): 937–39, <https://doi.org/10.1515/jpem-2021-0180>.

-
- ⁷² Hadj-Moussa et al., “Masculinizing Genital Gender Confirmation Surgery.”
- ⁷³ Annelou L.C. de Vries et al., “Puberty Suppression in Adolescents with Gender Identity Disorder: A Prospective Follow-Up Study,” *The Journal of Sexual Medicine* 8, no. 8 (August 1, 2011): 2276–83, <https://doi.org/10.1111/j.1743-6109.2010.01943.x>.
- ⁷⁴ Jack L. Turban et al., “Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation,” *Pediatrics* 145, no. 2 (February 1, 2020): e20191725, <https://doi.org/10.1542/peds.2019-1725>.
- ⁷⁵ Michael Biggs, “Puberty Blockers and Suicidality in Adolescents Suffering from Gender Dysphoria,” *Arch Sex Behav* 49, no. 7 (October 2020): 2227–29, <https://doi.org/10.1007/s10508-020-01743-6>.
- ⁷⁶ Lieke Josephina Jeanne Johanna Vrouenraets et al., “Early Medical Treatment of Children and Adolescents with Gender Dysphoria: An Empirical Ethical Study,” *Journal of Adolescent Health* 57, no. 4 (October 1, 2015): 367–73, <https://doi.org/10.1016/j.jadohealth.2015.04.004>.
- ⁷⁷ “Puberty Blockers Do Not Alleviate Negative Thoughts in Children with Gender Dysphoria, Finds Study | The BMJ,” accessed October 4, 2021, <https://www.bmj.com/content/372/bmj.n356>.
- ⁷⁸ Moore and Brunskell-Evans, *Inventing Transgender Children and Young People*.
- ⁷⁹ “Bell-v-Tavistock-Judgment.Pdf,” accessed October 4, 2021, <https://www.judiciary.uk/wp-content/uploads/2020/12/Bell-v-Tavistock-Judgment.pdf>.
- ⁸⁰ “NHS England » NHS Announces Independent Review into Gender Identity Services for Children and Young People,” accessed October 4, 2021, <https://www.england.nhs.uk/2020/09/nhs-announces-independent-review-into-gender-identity-services-for-children-and-young-people/>.
- ⁸¹ Landon D. Hughes et al., “‘These Laws Will Be Devastating’: Provider Perspectives on Legislation Banning Gender-Affirming Care for Transgender Adolescents,” *Journal of Adolescent Health* 0, no. 0 (October 6, 2021), <https://doi.org/10.1016/j.jadohealth.2021.08.020>.
- ⁸² For example, Mark A. Yarhouse, *Understanding Gender Dysphoria: Navigating Transgender Issues in a Changing Culture* (Downers Grove, Illinois: IVP Academic, 2015); Preston Sprinkle, *Embodied* (Colorado Springs: David C Cook, 2021); Greg Eilers, *Ministering to Transgender Christians: A Resource for the Christian Church* (Greg Eilers, 2020); “CTQ 79-1,2.Pdf,” 19, accessed October 16, 2021, <https://ctsfwmedia.s3.amazonaws.com/CTQ/CTQ%2079-1%2C2.pdf>; Nancy R. Pearcey, *Love Thy Body: Answering Hard Questions about Life and Sexuality*, Reprint edition (Baker Books, 2019); “Human_sexuality_report_2021.Pdf,” accessed October 18, 2021, https://www.crcna.org/sites/default/files/human_sexuality_report_2021.pdf; “Gender Dysphoria - a Pastoral Letter (16.031.02).Pdf,” Dropbox, accessed October 18, 2021, <https://www.dropbox.com/s/0ty25hwjgctjzc4/Gender%20Dysphoria%20-%20a%20pastoral%20letter%20%2816.031.02%29.pdf?dl=0>.
- ⁸³ Christopher West, *Theology of the Body for Beginners: Rediscovering the Meaning of Life, Love, Sex, and Gender*, Updated, Revised, and Expanded edition (North Palm Beach, Florida: Wellspring, 2018). West does not specifically address gender dysphoria in this book.
- ⁸⁴ Yarhouse, *Emerging Gender Identities*. pp79ff
- ⁸⁵ “CTQ 79-1,2.Pdf.”
- ⁸⁶ Eilers, *Ministering to Transgender Christians*. pp67ff
- ⁸⁷ 700 Club Interactive, *Transgender to Transformed | Laura Perry’s Story*, 2019, <https://www.youtube.com/watch?v=ucdLJi8j50>; “Walt Heyer Ministries | Rethinking Transgenderism,” accessed October 16, 2021, <https://waltheyer.com/>.
- ⁸⁸ “AustenHartke.Com,” www.AustenHartke.com, accessed October 18, 2021, <http://austenhartke.com>.
- ⁸⁹ Coleman et al., “Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7”; American Psychological Association, “Guidelines for Psychological Practice with Transgender and Gender Nonconforming People.”
- ⁹⁰ Rianne M. Blom, Valeria Guglielmi, and Damiaan Denys, “Elective Amputation of a ‘Healthy Limb,’” *CNS Spectrums* 21, no. 5 (October 2016): 360–61, <https://doi.org/10.1017/S1092852916000456>; Tim Bayne and Neil Levy, “Amputees by Choice: Body Integrity Identity Disorder and the Ethics of Amputation,” *Journal of Applied Philosophy* 22, no. 1 (2005): 75–86, <https://doi.org/10.1111/j.1468-5930.2005.00293.x>.
- ⁹¹ Monique Robles, “The Bioethical Dilemma of Gender-Affirming Therapy in Children and Adolescents,” *The Linacre Quarterly* 88, no. 3 (August 2021): 259–71, <https://doi.org/10.1177/0024363921989475>.
- ⁹² Carl R. Trueman, *The Rise and Triumph of the Modern Self: Cultural Amnesia, Expressive Individualism, and the Road to Sexual Revolution* (Wheaton, Illinois: Crossway, 2020).