

AFFIDAVIT OF QUENTIN L. VAN METER, M.D., F.C.P.

Sworn/Affirmed on 23 September, 2019

I, QUENTIN VAN METER, of the City of Atlanta, in the State of Georgia, United States of America, SWEAR/AFFIRM AND SAY THAT:

1. I received my medical degree from the Medical College of Virginia in 1973 and am a Medical Doctor who specializes in pediatric endocrinology, having completed my pediatric endocrine fellowship at Johns Hopkins in 1980. I now own and operate my own clinical practice in Atlanta, Georgia, and am an adjunct associate professor of Pediatrics at both the Emory University and Morehouse Schools of Medicine.
2. I am affiliated and hold positions with several Professional Societies, including the following:
 - Fellow, the American College of Pediatricians;
 - Member, the American Association of Clinical Endocrinologists;
 - Member, the American Diabetes Association;
 - Member, the Endocrine Society; and
 - Member, the Pediatric Endocrine Society.
3. My Board Certifications include:
 - American Board of Pediatrics, general Pediatrics; and
 - American Board of Pediatrics, sub-board of Pediatric Endocrinology.
4. Attached hereto and marked as **Exhibit "A"**, to this, my Affidavit, is a copy of my *curriculum vitae*, which details my education, expertise, research and publications.

Purpose of this Affidavit

5. I swear this Affidavit in order to respond to the facts of this case and to provide evidence including studies that will assist the Court in a potential judicial review application, and other relief sought in future and ongoing proceedings in this case. In my preparation of this affidavit, I have had the opportunity to review the facts of this case, and have been asked to respond to the topics identified in the headings below in this document.
6. I have reviewed the correspondence letters written by Mr. and Mrs. Rowe and Mrs. Grainger, headteacher in conjunction with Mrs. Bradshaw, chair of governors. I have also reviewed The Cornwall Transgender Guidance for Schools document.
7. I have been instructed to comment specifically on the following:
 - a. The minimum age below which a child will be unable to make decisions concerning gender
 - b. The dangers in permitting a child to transition to the opposite, desired sex prior to adulthood
 - c. The dangers of the use of puberty blockers in children
 - d. Whether dangers exist in adopting “gender-affirming” policies in schools which may interfere with a natural process
 - e. If so, what are the dangers associated with such an interference
 - f. In my professional opinion, what is the appropriate treatment for children suffering with gender dysphoria

The Special Report Sexuality and Gender

8. Attached hereto and marked as **Exhibit “B”**, to this, my Affidavit, is a 2016 report, titled “Sexuality and Gender, Findings from the Biological, Psychological, and Social Sciences” which exhaustively reviews the major world’s literature and emphatically

concludes that gender incongruence is a delusional disorder which will require extensive counseling to resolve.

The “Zucker” Study

9. Attached hereto and marked as **Exhibit “C”**, to this, my Affidavit, is a 2012 study, titled A Developmental, Biopsychosocial Model for the Treatment of Children with Gender Identity Disorder, which shows the results of extensive psychological evaluation and subsequent focused counseling in over 500 patients. This paper shows that the vast majority of patients so evaluated and treated desist and lose their gender incongruence as they pass through puberty.

The DSM-V Criteria

10. Attached hereto and marked as **Exhibit “D”**, to this, my Affidavit, is the most current version of the DSM which documents the results of Dr. Zucker’s work, verifying the high incidence of desistance by late adolescence as long as counseling is ongoing and works toward the goal of resolving gender incongruence. The fact that Zucker’s data is included in the DSM-V certainly counters the claim that his work does not reflect current thought. Dr. Zucker is a long-time advocate for the LGBTQ community.

“Gender Dysphoria in Children” (The American College of Pediatricians)

11. Attached hereto and marked as **Exhibit “E”**, to this, my Affidavit, is a copy of the American College of Pediatrician’s study, titled “Gender Dysphoria in Children.” This publication extensively reviews the literature with scientific basis and concludes that there is unquestionable proof of harm to children by promoting affirmation therapy, hormonal and surgical treatment to outwardly change the sex of the patient.

“The Dheine study” (Dheine C et al. Long-term follow-up of transsexual persons undergoing sex reassignment surgery: cohort in Sweden, PLoS ONE, 2011;6)

12. Attached hereto and marked as **Exhibit “F”**, to this, my Affidavit, is a copy of the 2011 review of the Swedish experience with long-term outcome of every single adult in Sweden who had affirmation, cross-sex hormone therapy and surgical manipulation of their body. This recent study is the only one of its kind in that every single patient was included, so there was no ascertainment bias. The suicide rate in these patients was 19 times higher than the general population as these individuals passed through a post-treatment period of relative happiness and after ten years, began to experience significant morbidity and regret.

13. I have been also asked to provide my professional medical opinion on the following:

Hormonal Manipulation with GnRH agonists (“Puberty blockers”) and cross-sex hormones: The Permanent Physical Harm to Children

14. GnRH agonists were developed to specifically interrupt signaling between the pituitary gland and the gonads in both males and in females. Their use in children has been in young children who experience central precocious puberty, that is, onset of true puberty before the age of 8 years in females and 9 years in males. In such cases, treatment is continued and then stopped in time to allow the child to re-enter puberty at a time when the majority of their age-matched peers will enter puberty (10.5 years for girls, and 11.5 years for boys). The discontinuation is important because puberty is an important, necessary event which allows the sex steroids (estrogen and testosterone) to be produced by the gonad. In adolescents who continue to be suppressed through their late teens, there is diminished calcium accretion in the bones which can’t be retrieved, resulting in osteoporosis in adulthood. The suppression also inhibits what would be the maturation of the adolescent brain in response to the innate sex steroids. The subsequent addition of cross-sex hormones (estrogen given to biological males or testosterone given to biological females) results in irreparable changes such as increased risk of cancers, heart

disease, and infertility. Concerns about the use of GnRH agonists and cross-sex hormones in children were specifically mentioned in the Endocrine Society Guidelines of 2009/2017 based on review of the known medical literature which addressed the above mentioned adverse outcomes. For anyone to suggest puberty blockers are harmless, is an error. Aside from the known-harmful effects of puberty blockers, other potential long-term effects continue to be largely unknown and will only become apparent as careful review of clinical experience continues to be scrutinized.

Gender Transitioning: The Harmful Psychological and Physical Effects on Children

15. Sex is binary. It is not assigned. It is manifest at the moment of conception. It is identified initially by the presence of genital structures (penis and scrotal testes in the male and vaginal orifice in the female). In rare instances of disorders of sexual differentiation (DSD), there can be some confusion, but the biological sex of the individual can be easily assessed using chromosome analysis, which is definitive. There are at least 1559 known differences between males and females that relate not just to sexual organs but also to other organs, such as the brain, skin and heart. A biological woman's skin is different from a man's skin. A biological woman's brain and heart and internal organs are different than a man's. Further, 6500 genes alone have been discovered which are expressed differently in men and women. External manipulation of genitals does not change the internal makeup of a person. The sex of a person is present on a genetic level. It is unalterable.

16. "Affirmation" is actually an attempt to *convert* one's sex. The idea that exclusive "affirmation" counseling, along with interruption of natural puberty and subsequent cross-sex hormone therapy and eventual surgical intervention will create a new sexual identity is sheer conjecture. The study from Sweden clearly proved that the long-term outcome of such treatments resulted in life-long psychological trauma and increased suicide. There are an emerging number of medically and surgically manipulated transgender adults who are warning that such treatment has brought them inexorable misery. In the realm of medical science, a single case report of such an adverse outcome

can shut down a treatment protocol overnight, based on the ethical guidelines of informed consent. There is ample evidence that irreparable harm has come to patients affirmed, hormonally manipulated and surgically altered.

17. The concept of gender was introduced by Dr. John Money in the 1950's to facilitate his plans to manipulate the sexual identity of patients with DSD. His suggested treatments failed and were subsequently appropriately discredited. The "rebirth" of his ideology is the work of the World Professional Association of Transgender Health (WPATH) which is a reincarnation of the former Harry Benjamin Society, which John Money helped found. WPATH requires that its members should share an interest in transgender medicine. There are no requirements for specific training or certification by professional boards. A review of their most recent bibliography shows no reference at all to the works of Dr. Kenneth Zucker or Dr. Paul McHugh. WPATH created treatment guidelines that superficially tout the need for review of the patient's mental health, but in actuality, they promote "affirmation" only.
18. Dr. Money's best-known patient was Bruce Reimer, a boy with an identical twin. Bruce Reimer accidentally had his penis severed as an infant, and was thereafter affirmed from a young age and raised as a girl (Brenda Reimer) in accordance with Dr. Money's directions, including hormone replacement therapy (estrogen).¹ Dr. Money claimed in his book, *Man & Woman, Boy & Girl*, that the experiment had been a complete success, despite having no contact with "Brenda" for twenty years. Dr. Money was unaware of the long-term effects on the patient, despite his claims of success.
19. In actuality, "Brenda" became David Reimer, husband and father of three children. The patient had resisted the efforts to transition him (even insisting on peeing standing up), and was told by his parents (on the advice of their psychiatrist) at the age of 15 after much suffering that he had, in fact, been born as a boy.² Mr. Reimer reported tremendous

¹ John Colapinto, *As Nature Made Him: the Boy Who Was Raised as a Girl* (New York, HarperCollins, 2000), p. 26-27

² *Ibid*, p. 55-60

relief at this revelation.³ Mr. Reimer was deeply scarred by Dr. Money's "therapy" sessions, which included acting out sexual intercourse with his identical twin brother in Dr. Money's presence to assert Brenda's "femininity".⁴ Mr. Reimer killed himself later in life.⁵

20. When the facts were known about the experiment on David Reimer, Dr. Money ceased to refer to the case, and never mentioned it again in his writings. Dr. Money's theories that everyone is internally a hermaphrodite and that it is possible to switch between sexes underpin popular gender theory. Dr. Money's theories have been shown by endocrinology to be medically and scientifically unsound.

21. When young children and adolescents present with gender incongruence, it is a signal that there is underlying psychological disturbance which drives the patient to desire to change their sexual identity to "solve" the emotional issues. It was considered a delusional disorder until the publication of the DMS-V criteria (heavily influenced by WPATH).

Psychological Harm to Children to Otherwise Healthy Children who are exposed to Gender Ideology in the School System

22. If school systems promote Gender Ideology, the result, at its best, is the recruiting of vulnerable children and adolescents to further an unscientific and dangerous narrative. The result, at its worst, is to mentally harm both the gender incongruent child and his/her normal child peers. This is manifest as further mental health deterioration, profound unhappiness, and often suicide in the gender incongruent child, and by anxiety and depression in the otherwise healthy child who is forced by social and environmental regulation to accept the new "norm." Josiah and Caleb Rowe are just such victims.

³ *Ibid*, P. 55-60

⁴ <https://dianerehm.org/shows/2000-02-22/john-colapinto-nature-made-him-boy-who-was-raised-girl-harper-collins>

⁵ <https://slate.com/technology/2004/06/why-did-david-reimer-commit-suicide.html>

Conclusion: The Harmful Effects of Promotion of “affirmation,” hormonal manipulation and surgical mutilation of children and adolescents with gender incongruence, and the promotion of these interventions by GSA organizations without the knowledge and consent of the parents.

23. As an endocrinologist familiar with the scientific evidence on this subject, it is my opinion that “affirmation,” hormonal manipulation, and surgical mutilation to outwardly change the sexual appearance of a child is harmful to children. There is growing consensus developing among experts against these interventions among those who have undergone them and are now regretting their decision, including a dramatic increase in the risk of suicide, as well as cancer and osteoporosis. The evidence shows that puberty blockers can cause harm to children. Further, as those who have been subjected to puberty blockers and sex hormone treatments age further evidence will be available as to the long-term consequences to their mental and physical health.

24. I swear this affidavit to provide expert evidence for the purpose of a judicial review hearing and related proceedings in the within action, and for no improper purpose. I understand that in my role as an expert witness I have a duty to assist the court and not to advocate for any one party. I have made this affidavit in conformity with that duty, and will if called on to give oral or written testimony, give that testimony in conformity with that duty.

EXPERT DECLARATION

1. I understand that my duty in providing written reports and giving evidence is to help the Court, and that this duty overrides any obligation to the party by whom I am engaged or the person who has paid or is liable to pay me. I confirm that I have complied and will continue to comply with my duty.

2. I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.
3. I know of no conflict of interest of any kind, other than any which I have disclosed in my report.
4. I do not consider that any interest which I have disclosed affects my suitability as an expert witness on any issues on which I have given evidence.
5. I will advise the party by whom I am instructed if, between the date of my report and the trial, there is any change in circumstances which affect my answers to points 3 and 4 above.
6. I have shown the sources of all information I have used.
7. I have exercised reasonable care and skill in order to be accurate and complete in preparing this report.
8. I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.
9. I have not, without forming an independent view, included or excluded anything which has been suggested to me by others, including my instructing lawyers.
10. I will notify those instructing me immediately and confirm in writing if, for any reason, my existing report requires any correction or qualification.
11. I understand that:
 - a. My report will form the evidence to be given under oath or affirmation;
 - b. Questions may be put to me in writing for the purposes of clarifying my report and that my answers shall be treated as part of my report and covered by my statement of truth;
 - c. The Court may at any stage direct a discussion to take place between experts for the purpose of identifying and discussing the expert issues in the proceedings, where possible reaching an agreed opinion on those issues and identifying what action, if any, may be taken to resolve any of the outstanding issues between the parties;
 - d. The Court may direct that following a discussion between the experts that a statement should be prepared showing those issues which are agreed, and those

issues which are not agreed, together with a summary of the reasons for disagreeing;

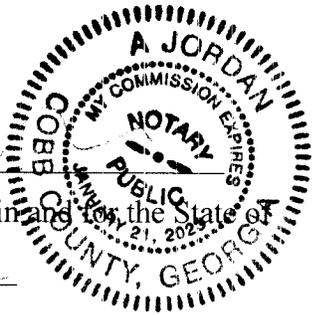
- e. I may be required to attend Court to be cross-examined on my report by a cross-examiner assisted by an expert;
- f. I am likely to be the subject of public adverse criticism by the judge if the Court concludes that I have not taken reasonable care in trying to meet the standards set out above

12. I have read Part 35 of the Civil Procedure Rules and Part 33 of the Criminal Procedure Rules, the accompanying practice direction and the Guidance for the instruction of experts in civil claims and I have complied with their requirements.

13. I am aware of the practice direction on pre-action conduct. I have acted in accordance with the Code of Practice for Experts.

SWORN/AFFIRMED BEFORE ME at the)
 City of Lawrenceville, in the State of Georgia, U.S.A.)
 This 25 day of [insert], 2019)

 A Notary Public in and for the State of)
Georgia)



 QUENTIN L. VAN METER

PERSONAL

Home Address: [REDACTED] Atlanta, GA 30309
Home Phone: [REDACTED]
Date of Birth: [REDACTED]
Place of Birth: Laramie, Wyoming
Citizenship: USA

EDUCATION:

Undergraduate: College of William & Mary, 1969
B.S. – 1969
Medical School: Medical College of Virginia, 1973
M.D. – 1973

CLINICAL TRAINING:

Institution: The University of California, San Francisco
Hospital: Naval Regional Medical Center, Oakland
Position: Pediatric Intern – 1973 – 1974
Pediatric Resident – 1974 – 1976

Institution: Johns Hopkins University
Hospital: Johns Hopkins Hospital
Position: Fellow, Pediatric Endocrinology 1978 – 1980
Fellowship Program Director: Claude Migeon, M.D.

Current Position: Pediatric Endocrinologist
Van Meter Pediatric Endocrinology, P.C.
1800 Howell Mill Road, Suite 475
Atlanta, Georgia 30318

PROFESSIONAL CERTIFICATION & SOCIETIES:

Diplomate, National Board of Medical Examiners, 1974

American Board of Pediatrics, certified in general pediatrics, 1978, sub-board certified in Pediatric Endocrinology, 1983

Fellow: American Academy of Pediatrics, Georgia Chapter 1975 -present
President, Uniformed Services West Chapter, 1987 – 1990
District VIII member, AAP Committee on Awards for
Excellence in Research, 1990-1994
Editor, The Georgia Pediatrician, 1994 – 1998

Chairman, Georgia Chapter Legislative Committee, 1996 – 2006

Fellow: The American College of Pediatricians, 2007 – present
Member of the Board of Directors, 2008- present
President, 2018-present

Member: Pediatric Endocrine Society, 1989 – present

Member: American Diabetes Association Professional Section, 1988 – present

Member: Endocrine Society, 1994-present

Member: Southern Pediatric Endocrine Society, 1992 – Present

Member: American Association of Clinical Endocrinologists, 2005 – present

Licensure: Georgia, #34734

FACULTY POSITIONS:

Institution: Morehouse School of Medicine
Position: Associate Clinical Professor, Pediatrics, 2004 – present

Institution: Emory University School of Medicine
Position: Associate Clinical Professor, Pediatrics, 1991 – present

Institution: University of California, San Francisco
Position: Associate Clinical Professor, Pediatrics, 1989 – 1991

Institution: University of California, San Diego, School of Medicine
Position: Assistant Clinical Professor, Pediatrics, 1980 – 1986

Institution: LSU School of Medicine, Clinical Instructor, Pediatrics, 1977 – 1978

MILITARY SERVICE:

Commission: Medical Corps, United States Navy, August 1971
Rank: Captain, retired
Duty Stations: Health Professional Scholarship Student, 1971 – 1974

Intern and Resident, Pediatrics, Naval Regional Medical Center,
Oakland, 1973 – 1976

Staff Pediatrician, Naval Regional Medical Center,
Oakland, 1976

Staff Pediatrician, Naval Regional Medical Center,
New Orleans, 1976 – 1978

Full time out-service fellow in Pediatric Endocrinology,
Johns Hopkins Hospital, 1978 – 1980

Staff Pediatric Endocrinologist, Naval Hospital San Diego,
1980 – 1986

Chairman and Director, Residency Training, Department of Pediatrics
Naval Hospital Oakland, 1986 – 1991

OTHER PROFESSIONAL ACTIVITIES:

Consultant, Pediatric Endocrinology,
Nellis Air Force Base Hospital, Las Vegas, Nevada
1981 – 1991

Consultant, Pediatric Endocrinology,
Naval Hospital Lemoore, CA
1986 – 1991

Consultant, Pediatric Endocrinology,
Letterman Army Medical Center, Presidio of San Francisco, CA
1990 – 1991

Consulting Endocrinologist,
Columbus Regional Medical Center, Columbus, GA
1991 – 1994

Pediatrician and Pediatric Endocrinologist, partner
Fayette Medical Clinic
Peachtree City, Georgia 30269
September 1991 – October 2003

Pediatric Endocrinologist Peer Reviewer 2006 – present
MCMC, LLC, Boston, MA
IMEDECS, Lansdale PA

Speaker's Bureau
Novo Nordisk, Pfizer, Endo, Abbvie
AAP Eqipp course on Growth- development committee- 2012

PUBLICATIONS: (Articles in Peer Reviewed Journals)

Riddick, JR, Flora R., Van Meter, QL:
“Computerized Preparation of Two-Way Analysis of Variance
Control Charts for Clinical Chemistry,” Clinical Chemistry,
18:250, March 1972.

Van Meter, QL, Gareis FJ, Hayes, JW, Wilson, CB:
“Galactorrhea in a 12 Year Old Boy with Chromophobe Adenoma,”
J. Pediatrics 90:756, May 1977.

Plotnick, LP, Van Meter, QL, Kowarski, AA, “Human Growth Hormone
Treatment of Children with Growth Failure and Normal Growth
Hormone Levels by Immunoassay: Lack of Correlation with
Somatomedin Generation: Pediatrics 71:324, March 1983.

Brawley, RW, Van Meter, QL, “Mebendazole Ascaris Migration,” W.J.
Med., 145:514015, October 1986.

Van Meter, QL, “The Role of the Primary Care Physician in Caring for
Patients with Type-1 Diabetes,” Comp Ther 1998; 24(2):93–101

Midyett LK, Rogol AD, Van Meter QL, Frane J, and Bright GM,
“Recombinant Insulin-Like Growth factor (IGF)-I Treatment in Short
Children with Low IGF-I Levels: First-Year Results from a Randomized
Clinical Trial,” J Clin Endocrinol Metab, 2010;95:611–619.

ABSTRACTS/LETTERS:

Van Meter, Q L, & Lee, PA: “Evaluation of Puberty in Male and Female
Patients with Noonan Syndrome,” Pediatric Research 14:485, 1980.

Van Meter, QL, et al: “Characterization of Pituitary Function in
Double Bolus GnRH Infusion as a Diagnostic Tool,” Pediatric Research
32:111, 1984.

Van Meter, QL, Felix, SD, Lin, FL: “Evaluation of the Pituitary-Adrenal
Axis in Patients Treated with nasal Beclomethasone,” (Presented at the
1991 Annual Meeting of the Endocrine Society and the 6th Annual Naval
Academic Research Competition, Bethesda, MD, 17 May, 1991).

Rogol AD Midyett LK Van Meter Q, Frane J, Baily J, and Bright GM,
Recombinant Human IGF-1 for Children with Primary IGF-1 Deficiency
(IGFD): Safety Data from Ongoing Clinical Trials (presented at the PAS
2007, Toronto).

Van Meter Q, Midyett LK, Deeb L et al, Prevalence of primary IGFD among untreated children with short stature in a prospective, multicenter study (Poster POO715) ICE Rio de Janeiro, Brazil 2008.

G.M. Bright¹, W.V.Moore², J.Nguyen³, G. Kletter⁴, B. S. Miller⁵, Q. L. Van Meter⁶, E. Humphriss¹, J.A. Moore⁷ and J.L. Cleland¹ Results of a Phase 1b Study of a new long-acting human growth hormone (VRS-317) in pediatric growth hormone deficiency (PGHD). PAS 2014 May 2014

Van Meter Q, Welstead B and Low J, Characteristics of a Population of Obese Children and Adolescents: Suggesting a New Paradigm, presented at ESPE meeting, Dublin 2014.

Wayne V. Moore¹, Patricia Y. Fechner², Huong Jil Nguyen³, Quentin L. Van Meter⁴, John S. Fuqua⁵, Bradley S. Miller⁶, David Ng⁷, Eric Humphriss⁸, R. W. Charlton⁸, George M. Bright⁸ Safety and Efficacy of Somavaratan (VRS-317), a Long-Acting rhGH, in Children with Growth Hormone Deficiency (GHD): 3-Year Update of the VERTICAL & VISTA Trials, presented at the 2017 Endocrine Society meeting in Orlando FL

Bradley S. Miller¹, Wayne V. Moore², Patricia Y. Fechner³, Huong Jil Nguyen⁴, Quentin L. Van Meter⁵, John S. Fuqua⁶, David Ng⁷, Eric Humphriss⁸, R. W. Charlton⁸, George M. Bright⁸, 3-Year Update of the Phase 2a and Long-term Safety Studies (VERTICAL and VISTA) of Somavaratan (VRS-317), a Long-acting rhGH for the Treatment of Pediatric Growth Hormone Deficiency, presented at the 2017 IMPE meeting in Washington D.C.

Laidlaw MK, Van Meter QL, Hruz PW, Von Mol A, and Malone WJ, Letter to the Editor: "Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline," J Clin Endo Metab 2019;104: 1-2.

ADDITIONAL PRESENTATIONS/LECTURES:

Pediatrics Update, CME Associates, San Diego – Orlando Annual Conferences: Lectures on Pediatric Endocrine Subjects – 1986 – 2001. Course Moderator, 1997, 1998, 1999, 2000, 2001

Endocrine and Gastroenterology Update, CME Associates, Maui HI Nov 2001, Lecturer and Course Moderator

Lecture on Panhypopituitarism, Pharmacia Conference, Nashville TN April 2002.

Family Medicine Review Course, Orlando, FL, 1992 – 2001

Pediatric Grand Rounds, Tanner Medical Center, October 1997

Pediatric Grand Rounds, Hughes Spaulding Children's Hospital, September, 2003

Pediatrics in the Park, Fall CME meeting for the Georgia Chapter of the American Academy of Pediatrics, November 2003

Pediatric Grand Rounds, Columbus Regional Medical Center, January 2004

Frontiers in Pediatrics CME Course, sponsored by the Atlanta Children's Health Network, Atlanta, March 2004.

Pediatric Grand Rounds, Eggleston Children's Hospital, May 2004.

Sue Schley Matthews Pediatric Conference, Columbus Regional Medical Center, September 2004

56th Annual Scientific Assembly and Exhibition of the Georgia Academy of Family Physicians, Nov 2004

Program Co-Chairman: Southern Pediatric Endocrine Society Annual meeting, Nov 2004, November 2014

Presentations on Diabetes, Growth Failure, and Thyroid Disease to the Postgraduate Pediatric Nurse Practitioner Program, Georgia State University, Nov 2005, June 2006, May 2007

Issues in Medicine, US Medical Congress Conference and Exhibition, Las Vegas, meeting planner and speaker, June, 2006

CME Presentations for the Georgia Chapter of the American Academy of Pediatrics Spring and Fall Meetings 2004-present

Pediatric Grand Rounds, Columbus Regional Medical Center, Columbus, GA, 2011-present

Human Growth Foundation Regional CME Conference, Atlanta GA
March 2013, February 2014 Columbus Georgia

International Federation of Therapeutic Counseling Choice: Transgender Medicine, IFTCC Launch, October 15, 2018 London, Third International Congress, October 25 2018 Budapest.

Southern Pediatric Endocrine Society, Orlando FL, Feb 2019

Matthew Bulfin Conference, Indianapolis IN April 2019

CMDA annual conference, Ridgecrest NC, May 2019

Support 4 Family conference, London, UK June 2019

Audio Digest Pediatrics - ① v. 41, no. 4; ② v. 41, no. 20; ③ v. 43, no. 17

Audio Digest Family Practice - ① v. 42, no. 5; ② v. 44, no. 11; ③ v. 44, no. 44; ④ v. 45, no 15

Audio Digest Otolaryngology - ① v. 32, no. 14

CURRENT HOSPITAL APPOINTMENTS:

Eggleston/Scottish Rite Children's Hospitals, active
staff, Pediatric Endocrinology

PAST AND CURRENT CLINICAL RESEARCH:

2006	Sanofi-Aventis HMR1964D/3001	study completed 2007
2006	Tercica MS301-	study completed 2008
2007	Tercica MS310-	study completed 2008
2007	Tercica MS306-	study completed 2010
2007	Tercica MS316-	study completed 2012
2008	EMD Serono 28358	study completed 2009
2012	Versartis 12VR2	study completed 2014
2012	Debiopharm 8206-CPP-301	study started July 2012
2013	Versartis 13 VR3	study started Dec 2013
2014	Novo-Nordisk Elipse	study started 2014
2015	Versartis 14 VR4	study completed 2017
2017	Mannkind MKC-TI-155	study started 2017

LEGAL EXPERT WITNESS:

- 2017 North Carolina Legislature- transgender bathroom bill
- 2018 Jessica Siefert transgender case, Cincinnati, OH
- 2018 Alberta, Canada school system transgender case
- 2018 Decatur GA School Board transgender case
- 2019 British Columbia transgender case
- 2019 Gavin Grimm transgender case, Gloucester County, VA
- 2019 Rowe vs Isle of Wight School Board, UK
- 2019 Younger transgender case, Dallas, TX

THE NEW ATLANTIS

A JOURNAL OF TECHNOLOGY & SOCIETY

~ SPECIAL REPORT ~

Sexuality and Gender

Findings from the Biological,
Psychological, and Social Sciences

Lawrence S. Mayer, M.B., M.S., Ph.D.

Paul R. McHugh, M.D.

NUMBER 50 ~ FALL 2016 ~ \$7.00

www.TheNewAtlantis.com

THE NEW ATLANTIS

A JOURNAL OF TECHNOLOGY & SOCIETY

NUMBER 50 ~ FALL 2016

Editor's Note: Questions related to sexuality and gender bear on some of the most intimate and personal aspects of human life. In recent years they have also vexed American politics. We offer this report—written by Dr. Lawrence S. Mayer, an epidemiologist trained in psychiatry, and Dr. Paul R. McHugh, arguably the most important American psychiatrist of the last half-century—in the hope of improving public understanding of these questions. Examining research from the biological, psychological, and social sciences, this report shows that some of the most frequently heard claims about sexuality and gender are not supported by scientific evidence. The report has a special focus on the higher rates of mental health problems among LGBT populations, and it questions the scientific basis of trends in the treatment of children who do not identify with their biological sex. More effort is called for to provide these people with the understanding, care, and support they need to lead healthy, flourishing lives.

Preface 4
Lawrence S. Mayer

Executive Summary 7

SEXUALITY AND GENDER

Findings from the Biological, Psychological, and Social Sciences

Lawrence S. Mayer, M.B., M.S., Ph.D. and Paul R. McHugh, M.D.

Introduction 10

Part 1: Sexual Orientation 13

Abstract 13

Problems with Defining Key Concepts 15

The Context of Sexual Desire 19

Sexual Orientation 21

Challenging the “Born that Way” Hypothesis 25

Studies of Twins 26

Molecular Genetics	32
The Limited Role of Genetics	33
The Influence of Hormones	34
Sexual Orientation and the Brain	39
Misreading the Research	41
Sexual Abuse Victimization	42
Distribution of Sexual Desires and Changes Over Time	50
Conclusion	57

Part 2: Sexuality, Mental Health Outcomes, and Social Stress **59**

<i>Abstract</i>	59
Some Preliminaries	60
Sexuality and Mental Health	60
Sexuality and Suicide	66
Sexuality and Intimate Partner Violence	70
Transgender Health Outcomes	73
Explanations for the Poor Health Outcomes: The Social Stress Model	75
<i>Discrimination and prejudice events</i>	77
<i>Stigma</i>	79
<i>Concealment</i>	81
<i>Testing the model</i>	82
Conclusion	85

Part 3: Gender Identity **86**

<i>Abstract</i>	86
Key Concepts and Their Origins	87
Gender Dysphoria	93
Gender and Physiology	98
Transgender Identity in Children	105
Therapeutic Interventions in Children	106
Therapeutic Interventions in Adults	108

Conclusion **114**

Notes **117**

Lawrence S. Mayer, M.B., M.S., Ph.D. is a scholar in residence in the Department of Psychiatry at the Johns Hopkins University School of Medicine and a professor of statistics and biostatistics at Arizona State University. *Paul R. McHugh, M.D.* is a professor of psychiatry and behavioral sciences at the Johns Hopkins University School of Medicine and was for twenty-five years the psychiatrist-in-chief at the Johns Hopkins Hospital. He is the author or coauthor of several books, including, most recently, *Try to Remember: Psychiatry's Clash over Meaning, Memory, and Mind* (Dana Press, 2008).

THE NEW ATLANTIS

A JOURNAL OF TECHNOLOGY & SOCIETY

The New Atlantis (1627) was the title Francis Bacon selected for his fable of a society living with the benefits and challenges of advanced science and technology. Bacon, a founder and champion of modern science, sought not only to highlight the potential of technology to improve human life, but also to foresee some of the social, moral, and political difficulties that confront a society shaped by the great scientific enterprise. His book offers no obvious answers; perhaps it seduces more than it warns. But the tale also hints at some of the dilemmas that arise with the ability to remake and reconfigure the natural world: governing science, so that it might flourish freely without destroying or dehumanizing us, and understanding the effect of technology on human life, human aspiration, and the human good. To a great extent, we live in the world Bacon imagined, and now we must find a way to live well with both its burdens and its blessings. This very challenge, which now confronts our own society most forcefully, is the focus of this journal.

EDITOR

ADAM KEIPER

MANAGING EDITOR

SAMUEL MATLACK

ASSOCIATE EDITORS

BRENDAN P. FOHT

M. ANTHONY MILLS

ASSISTANT EDITOR

MICHAEL W. BEGUN

SENIOR EDITORS

CAITRIN NICOL KEIPER

YUVAL LEVIN

CHRISTINE ROSEN

ARI N. SCHULMAN

EDITOR-AT-LARGE

ERIC COHEN

CONTRIBUTING EDITORS

JAMES C. CAPRETTA

MATTHEW B. CRAWFORD

ALAN JACOBS

PETER AUGUSTINE LAWLER

WILFRED M. McCLAY

GILBERT MEILAENDER

CHARLES T. RUBIN

DIANA SCHAUB

ROGER SCRUTON

STEPHEN L. TALBOTT

RAYMOND TALLIS

ALGIS VALIUNAS

ADAM J. WHITE

ROBERT ZUBRIN

EDITORIAL OFFICE:

The New Atlantis

1730 M Street N.W., Suite 910

Washington, D.C. 20036

Telephone: (202) 682-1200

Fax: (202) 408-0632

E-mail: editor@thenewatlantis.com

SUBSCRIPTION OFFICE:

Postmaster and subscribers, please send subscription orders and address changes to:

The New Atlantis Subscription Services,
P.O. Box 3000, Denville, N.J. 07834-3000,
or call toll-free at (866) 440-6916.

Rate: \$24/year (4 Issues). Please add \$10 for delivery outside the United States.

ADVERTISING INFORMATION:

Those interested in placing advertisements should contact Samuel Matlack, Managing Editor, at ads@thenewatlantis.com.

SUBMISSIONS:

Manuscripts and proposals should be directed to Samuel Matlack by e-mail (submissions@thenewatlantis.com) or by post to our editorial office.

The New Atlantis (ISSN 1543-1215) is published quarterly in the Spring, Summer, Fall, and Winter by the Center for the Study of Technology and Society in partnership with the Ethics and Public Policy Center in Washington, D.C. It is printed by Global Printing and distributed by Ingram Periodicals, Inc.

Preface

This report was written for the general public and for mental health professionals in order to draw attention to—and offer some scientific insight about—the mental health issues faced by LGBT populations.

It arose from a request from Paul R. McHugh, M.D., the former chief of psychiatry at Johns Hopkins Hospital and one of the leading psychiatrists in the world. Dr. McHugh requested that I review a monograph he and colleagues had drafted on subjects related to sexual orientation and identity; my original assignment was to guarantee the accuracy of statistical inferences and to review additional sources. In the months that followed, I closely read over five hundred scientific articles on these topics and perused hundreds more. I was alarmed to learn that the LGBT community bears a disproportionate rate of mental health problems compared to the population as a whole.

As my interest grew, I explored research across a variety of scientific fields, including epidemiology, genetics, endocrinology, psychiatry, neuroscience, embryology, and pediatrics. I also reviewed many of the academic empirical studies done in the social sciences including psychology, sociology, political science, economics, and gender studies.

I agreed to take over as lead author, rewriting, reorganizing, and expanding the text. I support every sentence in this report, without reservation and without prejudice regarding any political or philosophical debates. This report is about science and medicine, nothing more and nothing less.

Readers wondering about this report's synthesis of research from so many different fields may wish to know a little about its lead author. I am a full-time academic involved in all aspects of teaching, research, and professional service. I am a biostatistician and epidemiologist who focuses on the design, analysis, and interpretation of experimental and observational data in public health and medicine, particularly when the data are complex in terms of underlying scientific issues. I am a research physician, having trained in medicine and psychiatry in the U.K. and received the British equivalent (M.B.) to the American M.D. I have never practiced medicine (including psychiatry) in the United States or abroad. I have testified in dozens of federal and state legal proceedings and regulatory hearings, in

most cases reviewing scientific literature to clarify the issues under examination. I strongly support equality and oppose discrimination for the LGBT community, and I have testified on their behalf as a statistical expert.

I have been a full-time tenured professor for over four decades. I have held professorial appointments at eight universities, including Princeton, the University of Pennsylvania, Stanford, Arizona State University, Johns Hopkins University Bloomberg School of Public Health and School of Medicine, Ohio State, Virginia Tech, and the University of Michigan. I have also held research faculty appointments at several other institutions, including the Mayo Clinic.

My full-time and part-time appointments have been in twenty-three disciplines, including statistics, biostatistics, epidemiology, public health, social methodology, psychiatry, mathematics, sociology, political science, economics, and biomedical informatics. But my research interests have varied far less than my academic appointments: the focus of my career has been to learn how statistics and models are employed across disciplines, with the goal of improving the use of models and data analytics in assessing issues of interest in the policy, regulatory, or legal realms.

I have been published in many top-tier peer-reviewed journals (including *The Annals of Statistics*, *Biometrics*, and *American Journal of Political Science*) and have reviewed hundreds of manuscripts submitted for publication to many of the major medical, statistical, and epidemiological journals (including *The New England Journal of Medicine*, *Journal of the American Statistical Association*, and *American Journal of Public Health*).

I am currently a scholar in residence in the Department of Psychiatry at Johns Hopkins School of Medicine and a professor of statistics and biostatistics at Arizona State University. Up until July 1, 2016, I also held part-time faculty appointments at the Johns Hopkins Bloomberg School of Public Health and School of Medicine, and at the Mayo Clinic.

An undertaking as ambitious as this report would not be possible without the counsel and advice of many gifted scholars and editors. I am grateful for the generous help of Laura E. Harrington, M.D., M.S., a psychiatrist with extensive training in internal medicine and neuroimmunology, whose clinical practice focuses on women in life transition, including affirmative treatment and therapy for the LGBT community. She contributed to the entire report, particularly lending her expertise to the sections on endocrinology and brain research. I am indebted also to Bentley J. Hanish, B.S., a young geneticist who expects to graduate medical school in 2021 with an M.D./Ph.D. in psychiatric epidemiology.

He contributed to the entire report, particularly to those sections that concern genetics.

I gratefully acknowledge the support of Johns Hopkins University Bloomberg School of Public Health and School of Medicine, Arizona State University, and the Mayo Clinic.

In the course of writing this report, I consulted a number of individuals who asked that I not thank them by name. Some feared an angry response from the more militant elements of the LGBT community; others feared an angry response from the more strident elements of religiously conservative communities. Most bothersome, however, is that some feared reprisals from their own universities for engaging such controversial topics, regardless of the report's content—a sad statement about academic freedom.

I dedicate my work on this report, first, to the LGBT community, which bears a disproportionate rate of mental health problems compared to the population as a whole. We must find ways to relieve their suffering.

I dedicate it also to scholars doing impartial research on topics of public controversy. May they never lose their way in political hurricanes.

And above all, I dedicate it to children struggling with their sexuality and gender. Children are a special case when addressing gender issues. In the course of their development, many children explore the idea of being of the opposite sex. Some children may have improved psychological well-being if they are encouraged and supported in their cross-gender identification, particularly if the identification is strong and persistent over time. But nearly all children ultimately identify with their biological sex. The notion that a two-year-old, having expressed thoughts or behaviors identified with the opposite sex, can be labeled for life as transgender has absolutely no support in science. Indeed, it is iniquitous to believe that all children who have gender-atypical thoughts or behavior at some point in their development, particularly before puberty, should be encouraged to become transgender.

As citizens, scholars, and clinicians concerned with the problems facing LGBT people, we should not be dogmatically committed to any particular views about the nature of sexuality or gender identity; rather, we should be guided first and foremost by the needs of struggling patients, and we should seek with open minds for ways to help them lead meaningful, dignified lives.

LAWRENCE S. MAYER, M.B., M.S., Ph.D.

Executive Summary

This report presents a careful summary and an up-to-date explanation of research—from the biological, psychological, and social sciences—related to sexual orientation and gender identity. It is offered in the hope that such an exposition can contribute to our capacity as physicians, scientists, and citizens to address health issues faced by LGBT populations within our society.

Some key findings:

Part One: Sexual Orientation

- The understanding of sexual orientation as an innate, biologically fixed property of human beings—the idea that people are “born that way”—is not supported by scientific evidence.
- While there is evidence that biological factors such as genes and hormones are associated with sexual behaviors and attractions, there are no compelling causal biological explanations for human sexual orientation. While minor differences in the brain structures and brain activity between homosexual and heterosexual individuals have been identified by researchers, such neurobiological findings do not demonstrate whether these differences are innate or are the result of environmental and psychological factors.
- Longitudinal studies of adolescents suggest that sexual orientation may be quite fluid over the life course for some people, with one study estimating that as many as 80% of male adolescents who report same-sex attractions no longer do so as adults (although the extent to which this figure reflects actual changes in same-sex attractions and not just artifacts of the survey process has been contested by some researchers).
- Compared to heterosexuals, non-heterosexuals are about two to three times as likely to have experienced childhood sexual abuse.

Part Two: Sexuality, Mental Health Outcomes, and Social Stress

- Compared to the general population, non-heterosexual sub-populations are at an elevated risk for a variety of adverse health and mental health outcomes.
- Members of the non-heterosexual population are estimated to have about 1.5 times higher risk of experiencing anxiety disorders than members of the heterosexual population, as well as roughly double the risk of depression, 1.5 times the risk of substance abuse, and nearly 2.5 times the risk of suicide.
- Members of the transgender population are also at higher risk of a variety of mental health problems compared to members of the non-transgender population. Especially alarmingly, the rate of lifetime suicide attempts across all ages of transgender individuals is estimated at 41%, compared to under 5% in the overall U.S. population.
- There is evidence, albeit limited, that social stressors such as discrimination and stigma contribute to the elevated risk of poor mental health outcomes for non-heterosexual and transgender populations. More high-quality longitudinal studies are necessary for the “social stress model” to be a useful tool for understanding public health concerns.

Part Three: Gender Identity

- The hypothesis that gender identity is an innate, fixed property of human beings that is independent of biological sex—that a person might be “a man trapped in a woman’s body” or “a woman trapped in a man’s body”—is not supported by scientific evidence.
- According to a recent estimate, about 0.6% of U.S. adults identify as a gender that does not correspond to their biological sex.
- Studies comparing the brain structures of transgender and non-transgender individuals have demonstrated weak correlations between brain structure and cross-gender identification. These correlations do not provide any evidence for a neurobiological basis for cross-gender identification.

- Compared to the general population, adults who have undergone sex-reassignment surgery continue to have a higher risk of experiencing poor mental health outcomes. One study found that, compared to controls, sex-reassigned individuals were about 5 times more likely to attempt suicide and about 19 times more likely to die by suicide.
- Children are a special case when addressing transgender issues. Only a minority of children who experience cross-gender identification will continue to do so into adolescence or adulthood.
- There is little scientific evidence for the therapeutic value of interventions that delay puberty or modify the secondary sex characteristics of adolescents, although some children may have improved psychological well-being if they are encouraged and supported in their cross-gender identification. There is no evidence that all children who express gender-atypical thoughts or behavior should be encouraged to become transgender.

Sexuality and Gender

Findings from the Biological, Psychological, and Social Sciences

Lawrence S. Mayer, M.B., M.S., Ph.D. and Paul R. McHugh, M.D.

Introduction

Few topics are as complex and controversial as human sexual orientation and gender identity. These matters touch upon our most intimate thoughts and feelings, and help to define us as both individuals and social beings. Discussions of the ethical questions raised by sexual orientation and gender identity can become heated and personal, and the associated policy issues sometimes provoke intense controversies. The disputants, journalists, and lawmakers in these debates often invoke the authority of science, and in our news and social media and our broader popular culture we hear claims about what “science says” on these matters.

This report offers a careful summary and an up-to-date explanation of many of the most rigorous findings produced by the biological, psychological, and social sciences related to sexual orientation and gender identity. We examine a vast body of scientific literature from several disciplines. We try to acknowledge the limitations of the research and to avoid premature conclusions that would result in over-interpretation of scientific findings. Since the relevant literature is rife with inconsistent and ambiguous definitions, we not only examine the empirical evidence but also delve into underlying conceptual problems. This report does not, however, discuss matters of morality or policy; our focus is on the scientific evidence—what it shows and what it does not show.

We begin in Part One by critically examining whether concepts such as heterosexuality, homosexuality, and bisexuality represent distinct, fixed, and biologically determined properties of human beings. As part of this discussion, we look at the popular “born that way” hypothesis, which

posits that human sexual orientation is biologically innate; we examine the evidence for this claim across several subspecialties of the biological sciences. We explore the developmental origins of sexual attractions, the degree to which such attractions may change over time, and the complexities inherent in the incorporation of these attractions into one's sexual identity. Drawing on evidence from twin studies and other types of research, we explore genetic, environmental, and hormonal factors. We also explore some of the scientific evidence relating brain science to sexual orientation.

In Part Two we examine research on health outcomes as they relate to sexual orientation and gender identity. There is a consistently observed higher risk of poor physical and mental health outcomes for lesbian, gay, bisexual, and transgender subpopulations compared to the general population. These outcomes include depression, anxiety, substance abuse, and most alarmingly, suicide. For example, among the transgender subpopulation in the United States, the rate of attempted suicide is estimated to be as high as 41%, ten times higher than in the general population. As physicians, academics, and scientists, we believe all of the subsequent discussions in this report must be cast in the light of this public health issue.

We also examine some ideas proposed to explain these differential health outcomes, including the “social stress model.” This hypothesis—which holds that stressors like stigma and prejudice account for much of the additional suffering observed in these subpopulations—does not seem to offer a complete explanation for the disparities in the outcomes.

Much as Part One investigates the conjecture that sexual orientation is fixed with a causal biological basis, a portion of Part Three examines similar issues with respect to gender identity. Biological sex (the binary categories of male and female) is a fixed aspect of human nature, even though some individuals affected by disorders of sex development may exhibit ambiguous sex characteristics. By contrast, gender identity is a social and psychological concept that is not well defined, and there is little scientific evidence that it is an innate, fixed biological property.

Part Three also examines sex-reassignment procedures and the evidence for their effectiveness at alleviating the poor mental health outcomes experienced by many people who identify as transgender. Compared to the general population, postoperative transgender individuals continue to be at high risk of poor mental health outcomes.

An area of particular concern involves medical interventions for gender-nonconforming youth. They are increasingly receiving therapies that affirm their felt genders, and even hormone treatments or surgical

modifications at young ages. But the majority of children who identify as a gender that does not conform to their biological sex will no longer do so by the time they reach adulthood. We are disturbed and alarmed by the severity and irreversibility of some interventions being publicly discussed and employed for children.

Sexual orientation and gender identity resist explanation by simple theories. There is a large gap between the certainty with which beliefs are held about these matters and what a sober assessment of the science reveals. In the face of this complexity and uncertainty, we need to be humble about what we know and do not know. We readily acknowledge that this report is neither an exhaustive analysis of the subjects it addresses nor the last word on them. Science is by no means the only avenue for understanding these astoundingly complex, multifaceted topics; there are other sources of wisdom and knowledge—including art, religion, philosophy, and lived human experience. And much of our scientific knowledge in this area remains unsettled. However, we offer this overview of the scientific literature in the hope that it can provide a shared framework for intelligent, enlightened discourse in political, professional, and scientific exchanges—and may add to our capacity as concerned citizens to alleviate suffering and promote human health and flourishing.

Part One

Sexual Orientation

While some people are under the impression that sexual orientation is an innate, fixed, and biological trait of human beings—that, whether heterosexual, homosexual, or bisexual, we are “born that way”—there is insufficient scientific evidence to support that claim. In fact, the concept of sexual orientation itself is highly ambiguous; it can refer to a set of behaviors, to feelings of attraction, or to a sense of identity. Epidemiological studies show a rather modest association between genetic factors and sexual attractions or behaviors, but do not provide significant evidence pointing to particular genes. There is also evidence for other hypothesized biological causes of homosexual behaviors, attractions, or identity—such as the influence of hormones on prenatal development—but that evidence, too, is limited. Studies of the brains of homosexuals and heterosexuals have found some differences, but have not demonstrated that these differences are inborn rather than the result of environmental factors that influenced both psychological and neurobiological traits. One environmental factor that appears to be correlated with non-heterosexuality is childhood sexual abuse victimization, which may also contribute to the higher rates of poor mental health outcomes among non-heterosexual subpopulations, compared to the general population. Overall, the evidence suggests some measure of fluidity in patterns of sexual attraction and behavior—contrary to the “born that way” notion that oversimplifies the vast complexity of human sexuality.

The popular discussion of sexual orientation is characterized by two conflicting ideas about why some individuals are lesbian, gay, or bisexual. While some claim that sexual orientation is a choice, others say that sexual orientation is a fixed feature of one’s nature, that one is “born that way.” We hope to show here that, though sexual orientation is not a choice, neither is there scientific evidence for the view that sexual orientation is a fixed and innate biological property.

A prominent recent example of a person describing sexual orientation as a choice is Cynthia Nixon, a star of the popular television series *Sex and the City*, who in a January 2012 *New York Times* interview explained, “For me it’s a choice, and you don’t get to define my gayness for me,” and commented that she was “very annoyed” about the issue of whether or not gay people are born that way. “Why can’t it be a choice? Why is that any less legitimate?”¹ Similarly, Brandon Ambrosino wrote in *The New Republic* in

2014 that “It’s time for the LGBT community to stop fearing the word ‘choice,’ and to reclaim the dignity of sexual autonomy.”²

By contrast, proponents of the “born that way” hypothesis—expressed for instance in Lady Gaga’s 2011 song “Born This Way”—posit that there is a causal biological basis for sexual orientation and often try to bolster their claims with scientific findings. Citing three scientific studies³ and an article from *Science* magazine,⁴ Mark Joseph Stern, writing for *Slate* in 2014, claims that “homosexuality, at least in men, is clearly, undoubtedly, inarguably an inborn trait.”⁵ However, as neuroscientist Simon LeVay, whose work in 1991 showed brain differences in homosexual men compared to heterosexual men, explained some years after his study, “It’s important to stress what I didn’t find. I did not prove that homosexuality is genetic, or find a genetic cause for being gay. I didn’t show that gay men are ‘born that way,’ the most common mistake people make in interpreting my work. Nor did I locate a gay center in the brain.”⁶

Many recent books contain popular treatments of science that make claims about the innateness of sexual orientation. These books often exaggerate—or at least oversimplify—complex scientific findings. For example, in a 2005 book, psychologist and science writer Leonard Sax responds to a worried mother’s question as to whether her teenage son will outgrow his homosexual attractions: “Biologically, the difference between a gay man and a straight man is something like the difference between a left-handed person and a right-handed person. Being left-handed isn’t just a phase. A left-handed person won’t someday magically turn into a right-handed person. . . . Some children are destined at birth to be left-handed, and some boys are destined at birth to grow up to be gay.”⁷

As we argue in this part of the report, however, there is little scientific evidence to support the claim that sexual attraction is simply fixed by innate and deterministic factors such as genes. Popular understandings of scientific findings often presume deterministic causality when the findings do not warrant that presumption.

Another important limitation for research and for interpretation of scientific studies on this topic is that some central concepts—including “sexual orientation” itself—are often ambiguous, making reliable measurements difficult both within individual studies and when comparing results across studies. So before turning to the scientific evidence concerning the development of sexual orientation and sexual desire, we will examine at some length several of the most troublesome conceptual ambiguities in the study of human sexuality in order to arrive at a fuller picture of the relevant concepts.

Problems with Defining Key Concepts

A 2014 *New York Times Magazine* piece titled “The Scientific Quest to Prove Bisexuality Exists”⁸ provides an illustration of the themes explored in this Part—sexual desire, attraction, orientation, and identity—and of the difficulties with defining and studying these concepts. Specifically, the article shows how a scientific approach to studying human sexuality can conflict with culturally prevalent views of sexual orientation, or with the self-understanding that many people have of their own sexual desires and identities. Such conflicts raise important questions about whether sexual orientation and related concepts are as coherent and well-defined as is often assumed by researchers and the public alike.

The author of the article, Benoit Denizet-Lewis, an openly gay man, describes the work of scientists and others trying to demonstrate the existence of a stable bisexual orientation. He visited researchers at Cornell University and participated in tests used to measure sexual arousal, tests that include observing the way pupils dilate in response to sexually explicit imagery. To his surprise, he found that, according to this scientific measure, he was aroused when watching pornographic films of women masturbating:

Might I actually be bisexual? Have I been so wedded to my gay identity—one I adopted in college and announced with great fanfare to family and friends—that I haven’t allowed myself to experience another part of myself? In some ways, even asking those questions is anathema to many gays and lesbians. That kind of publicly shared uncertainty is catnip to the Christian Right and to the scientifically dubious, psychologically damaging ex-gay movement it helped spawn. As out gay men and lesbians, after all, we’re supposed to be sure—we’re supposed to be “born this way.”⁹

Despite the apparently scientific (though admittedly limited) evidence of his bisexual-typical patterns of arousal, Denizet-Lewis rejected the idea that he was actually bisexual, because “It doesn’t feel true as a sexual orientation, nor does it feel right as my identity.”¹⁰

Denizet-Lewis’s concerns here illustrate a number of the quandaries raised by the scientific study of human sexuality. The objective measures the researchers used seemed to be at odds with the more intuitive, subjective understanding of what it is to be sexually aroused; our own understanding of what we are sexually aroused by is tied up with the entirety of our lived experience of sexuality. Furthermore, Denizet-Lewis’s insistence

that he is gay, not bisexual, and his concern that uncertainty about his identity could have social and political implications, points to the fact that sexual orientation and identity are understood not only in scientific and personal terms, but in social, moral, and political terms as well.

But how do categories of sexual orientation—with labels such as “bisexual” or “gay” or “straight”—help scientists study the complex phenomenon of human sexuality? When we examine the concept of sexual orientation, it becomes apparent, as this part will show, that it is too vague and poorly defined to be very useful in science, and that in its place we need more clearly defined concepts. We strive in this report to use clear terms; when discussing scientific studies that rely on the concept of “sexual orientation,” we try as much as possible to specify how the scientists defined the term, or related terms.

One of the central difficulties in examining and researching sexual orientation is that the underlying concepts of “sexual desire,” “sexual attraction,” and “sexual arousal” can be ambiguous, and it is even less clear what it means that a person identifies as having a sexual orientation grounded in some pattern of desires, attractions, or states of arousal.

The word “desire” all by itself might be used to cover an aspect of volition more naturally expressed by “want”: I want to go out for dinner, or to take a road trip with my friends next summer, or to finish this project. When “desire” is used in this sense, the objects of desire are fairly determinate *goals*—some may be perfectly achievable, such as moving to a new city or finding a new job; others may be more ambitious and out of reach, like the dream of becoming a world-famous movie star. Often, however, the language of desire is meant to include things that are less clear: indefinite *longings* for a life that is, in some unspecified sense, different or better; an inchoate sense of something being missing or lacking in oneself or one’s world; or, in psychoanalytic literature, unconscious dynamic forces that shape one’s cognitive, emotional, and social behaviors, but that are separate from one’s ordinary, conscious sense of self.

This more full-blooded notion of desire is, itself, ambiguous. It might refer to a hoped-for state of affairs like finding a sense of meaning, fulfillment, and satisfaction with one’s life, a desire that, while not completely clear in its implications, is presumably not entirely out of reach, although such longings may also be forms of fantasizing about a radically altered or perhaps even unattainable state of affairs. If I want to take a road trip with my friends, the steps are clear: call up my friends, pick a date, map out a route, and so on. However, if I have an inchoate longing for change, a hope for sustainable intimacy, love, and belonging, or an unconscious conflict

that is disrupting my ability to move forward in the life I have tried to build for myself, I face a different sort of challenge. There is not necessarily a set of well-defined or conscious goals, much less established ways of achieving them. This is not to say that the satisfaction of these longings is impossible, but doing so often involves not only choosing concrete actions to achieve particular goals but the more complex shaping of one's own life through acting in and making sense of the world and one's place in it.

So the first thing to note when considering both popular discussions and scientific studies of sexuality is that the use of the term "desire" could refer to distinct aspects of human life and experience.

Just as the meanings that might be intended by the term "desire" are many, so also is each of these meanings varied, making clear delineations a challenge. For example, a commonsense understanding might suggest that the term "sexual desire" means wanting to engage in specific sexual acts with particular individuals (or categories of individuals). Psychiatrist Steven Levine articulated this common view in his definition of sexual desire as "the sum of the forces that incline us toward and away from sexual behavior."¹¹ But it is not obvious how one might study this "sum" in a rigorous way. Nor is it obvious why all the diverse factors that can potentially influence sexual behavior, such as material poverty—in the case of prostitution, for instance—alcohol consumption, and intimate affection, should all be grouped together as aspects of sexual desire. As Levine himself points out, "In anyone's hands, sexual desire can be a slippery concept."¹²

Consider a few of the ways that the term "sexual desire" has been employed in scientific contexts—designating one or more of the following distinct phenomena:

1. States of physical arousal that may or may not be linked to a specific physical activity and may or may not be objects of conscious awareness.
2. Conscious erotic interest in response to finding others attractive (in perception, memory, or fantasy), which may or may not involve any of the bodily processes associated with measurable states of physical arousal.
3. Strong interest in finding a companion or establishing a durable relationship.
4. The romantic aspirations and feelings associated with infatuation or falling in love with a specific individual.

5. Inclination towards attachment to specific individuals.
6. The general motivation to seek intimacy with a member of some specific group.
7. An aesthetic measure that latches onto perceived beauty in others.¹³

In a given social science study, the concepts mentioned above will often each have its own particular operational definition for the purposes of research. But they cannot all mean the *same* thing. Strong interest in finding a companion, for example, is clearly distinguishable from physical arousal. Looking at this list of experiential and psychological phenomena, one can easily envision what confusions might arise from using the term “sexual desire” without sufficient care.

The philosopher Alexander Pruss provides a helpful summary of some of the difficulties involved in characterizing the related concept of sexual attraction:

What does it mean to be “sexually attracted” to someone? Does it mean to have a tendency to be aroused in their presence? But surely it is possible to find someone sexually attractive without being aroused. Does it mean to form the belief that someone is sexually attractive to one? Surely not, since a belief about who is sexually attractive to one might be wrong—for instance, one might confuse admiration of form with sexual attraction. Does it mean to have a noninstrumental desire for a sexual or romantic relationship with the person? Probably not: we can imagine a person who has no sexual attraction to anybody, but who has a noninstrumental desire for a romantic relationship because of a belief, based on the testimony of others, that romantic relationships have noninstrumental value. These and similar questions suggest that there is a cluster of related concepts under the head of “sexual attraction,” and any precise definition is likely to be an undesirable shoehorning. But if the concept of sexual attraction is a cluster of concepts, neither are there simply univocal concepts of heterosexuality, homosexuality, and bisexuality.¹⁴

The ambiguity of the term “sexual desire” (and similar terms) should give us pause to consider the diverse aspects of human experience that are often associated with it. The problem is neither irresolvable nor unique to this subject matter. Other social science concepts—aggression and addiction, for example—may likewise be difficult to define and to

operationalize and for this reason admit of various usages.* Nevertheless, the ambiguity presents a significant challenge for both research design and interpretation, requiring that we take care in attending to the meanings, contexts, and findings specific to each study. It is also important to bracket any subjective associations with or uses of these terms that do not conform to well-defined scientific classifications and techniques.

It would be a mistake, at any rate, to ignore the varied uses of this and related terms or to try to reduce the many and distinct experiences to which they might refer to a single concept or experience. As we shall see, doing so could in some cases adversely affect the evaluation and treatment of patients.

The Context of Sexual Desire

We can further clarify the complex phenomenon of sexual desire if we examine what relationship it has to other aspects of our lives. To do so, we borrow some conceptual tools from a philosophical tradition known as phenomenology, which conceives of human experience as deriving its meaning from the whole context in which it appears.

The testimony of experience suggests that one's experience of sexual desire and sexual attraction is not voluntary, at least not in any immediate way. The whole set of inclinations that we generally associate with the experience of sexual desire—whether the impulse to engage in particular acts or to enjoy certain relationships—does not appear to be the sole product of any deliberate choice. Our sexual appetites (like other natural appetites) are experienced as given, even if their expression is shaped in subtle ways by many factors, which might very well include volition. Indeed, far from appearing as a product of our will, sexual desire—however we define it—is often experienced as a powerful force, akin to hunger, that many struggle (especially in adolescence) to bring under direction and control. Furthermore, sexual desire can impact one's attention involuntarily or color one's day-to-day perceptions, experiences, and encounters. What seems to be to some extent in our control is how we choose to live with this appetite, how we integrate it into the rest of our lives.

But the question remains: What *is* sexual desire? What is this part of our lives that we consider to be given, prior even to our capacity to

* "Operationalizing" refers to the way social scientists make a variable measurable. Homosexuality may be operationalized as the answers that survey respondents give to questions about their sexual orientation. Or it could be operationalized as answers to questions about their desires, attractions, and behavior. Operationalizing variables in ways that will reliably measure the trait or behavior being studied is a difficult but important part of any social science research.

deliberate and make rational choices about it? We know that some sort of sexual appetite is present in non-human animals, as is evident in the mammalian estrous cycle; in most mammalian species sexual arousal and receptivity are linked to the phase of the ovulation cycle during which the female is reproductively receptive.¹⁵ One of the relatively unique features of *Homo sapiens*, shared with only a few other primates, is that sexual desire is not exclusively linked to the woman's ovulatory cycle.¹⁶ Some biologists have argued that this means that sexual desire in humans has evolved to facilitate the formation of sustaining relationships between parents, in addition to the more basic biological purpose of reproduction. Whatever the explanation for the origins and biological functions of human sexuality, the lived experience of sexual desires is laden with significance that goes beyond the biological purposes that sexual desires and behaviors serve. This significance is not just a subjective add-on to the more basic physiological and functional realities, but something that pervades our lived experience of sexuality.

As philosophers who study the structure of conscious experience have observed, our way of experiencing the world is shaped by our “embodiment, bodily skills, cultural context, language and other social practices.”¹⁷ Long before most of us experience anything like what we typically associate with sexual desire, we are already enmeshed in a cultural and social context involving other persons, feelings, emotions, opportunities, deprivations, and so on. Perhaps sexuality, like other human phenomena that gradually become part of our psychological constitution, has roots in these early meaning-making experiences. If meaning-making is integral to human experience in general, it is likely to play a key role in sexual experience in particular. And given that volition is operative in these other aspects of our lives, it stands to reason that volition will be operative in our experience of sexuality too, if only as one of many other factors.

This is not to suggest that sexuality—including sexual desire, attraction, and identity—is the result of any deliberate, rational decision calculus. Even if volition plays an important role in sexuality, volition itself is quite complex: many, perhaps most, of our volitional choices do not seem to come in the form of discrete, conscious, or deliberate decisions; “volitional” does not necessarily mean “deliberate.” The life of a desiring, volitional agent involves many tacit patterns of behavior owing to habits, past experiences, memories, and subtle ways of adopting and abandoning different stances on one's life.

If something like this way of understanding the life of a desiring, volitional agent is true, then we do not deliberately “choose” the objects of our

sexual desires any more than we choose the objects of our other desires. It might be more accurate to say that we gradually guide and give ourselves over to them over the course of our growth and development. This process of forming and reforming ourselves as human beings is similar to what Abraham Maslow calls self-actualization.¹⁸ Why should sexuality be an exception to this process? In the picture we are offering, internal factors, such as our genetic make-up, and external environmental factors, such as past experiences, are only ingredients, however important, in the complex human experience of sexual desire.

Sexual Orientation

Just as the concept of “sexual desire” is complex and difficult to define, there are currently no agreed-upon definitions of “sexual orientation,” “homosexuality,” or “heterosexuality” for purposes of empirical research. Should homosexuality, for example, be characterized by reference to desires to engage in particular acts with individuals of the same sex, or to a patterned history of having engaged in such acts, or to particular features of one’s private wishes or fantasies, or to a consistent impulse to seek intimacy with members of the same sex, or to a social identity imposed by oneself or others, or to something else entirely?

As early as 1896, in a book on homosexuality, the French thinker Marc-André Raffalovich argued that there were more than ten different types of affective inclination or behavior captured by the term “homosexuality” (or what he called “unisexuality”).¹⁹ Raffalovich knew his subject matter up close: he chronicled the trial, imprisonment, and resulting social disgrace of the writer Oscar Wilde, who had been prosecuted for “gross indecency” with other men. Raffalovich himself maintained a prolonged and intimate relationship with John Gray, a man of letters thought to be the inspiration for Wilde’s classic *The Picture of Dorian Gray*.²⁰ We might also consider the vast psychoanalytic literature from the early twentieth century on the topic of sexual desire, in which the experiences of individual subjects and their clinical cases are catalogued in great detail. These historical examples bring into relief the complexity that researchers still face today when attempting to arrive at clean categorizations of the richly varied affective and behavioral phenomena associated with sexual desire, in both same-sex and opposite-sex attractions.

We may contrast such inherent complexity with a different phenomenon that can be delineated unambiguously, such as pregnancy. With very few exceptions, a woman is or is not pregnant, which makes classification

of research subjects for the purposes of study relatively easy: compare pregnant women with other, non-pregnant women. But how can researchers compare, say, “gay” men to “straight” men in a single study, or across a range of studies, without mutually exclusive and exhaustive definitions of the terms “gay” and “straight”?

To increase precision, some researchers categorize concepts associated with human sexuality along a continuum or scale according to variations in pervasiveness, prominence, or intensity. Some scales focus on both intensity and the objects of sexual desire. Among the most familiar and widely used is the Kinsey scale, developed in the 1940s to classify sexual desires and orientations using purportedly measurable criteria. People are asked to choose one of the following options:

- 0 - Exclusively heterosexual
- 1 - Predominantly heterosexual, only incidentally homosexual
- 2 - Predominantly heterosexual, but more than incidentally homosexual
- 3 - Equally heterosexual and homosexual
- 4 - Predominantly homosexual, but more than incidentally heterosexual
- 5 - Predominantly homosexual, only incidentally heterosexual
- 6 - Exclusively homosexual²¹

But there are considerable limitations to this approach. In principle, measurements of this sort are valuable for social science research. They can be used, for example, in empirical tests such as the classic “t-test,” which helps researchers measure statistically meaningful differences between data sets. Many measurements in social science, however, are “ordinal,” meaning that variables are rank-ordered along a single, one-dimensional continuum but are not intrinsically significant beyond that. In the case of the Kinsey scale, this situation is even worse, because it measures the self-identification of individuals, while leaving unclear whether the values they report all refer to the same aspect of sexuality—different people may understand the terms “heterosexual” and “homosexual” to refer to feelings of attraction, or to arousal, or to fantasies, or to behavior, or to any combination of these. The ambiguity of the terms severely limits the use of the Kinsey scale as an ordinal measurement that gives a rank order to variables along a single, one-dimensional continuum. So it is not clear that this scale helps researchers to make even rudimentary classifications among the relevant groups using qualitative criteria, much less to rank-order variables or conduct controlled experiments.

Perhaps, given the inherent complexity of the subject matter, attempts to devise “objective” scales of this sort are misguided. In a critique of such approaches to social science, philosopher and neuropsychologist Daniel N. Robinson points out that “statements that lend themselves to different interpretation do not become ‘objective’ merely by putting a numeral in front of them.”²² It may be that self-reported identifications with culturally fraught and inherently complex labels simply cannot provide an objective basis for quantitative measurements in individuals or across groups.

Another obstacle for research in this area may be the popular, but not well-supported, belief that romantic desires are sublimations of sexual desires. This idea, traceable to Freud’s theory of unconscious drives, has been challenged by research on “attachment theory,” developed by John Bowlby in the 1950s.²³ Very roughly, attachment theory holds that later affective experiences that are often grouped under the general rubric “romantic” are explained in part by early childhood attachment behaviors (associated with maternal figures or caregivers)—not by unconscious, sexual drives. Romantic desires, following this line of thought, might not be as strongly correlated with sexual desires as is commonly thought. All of this is to suggest that simple delineations of the concepts relating to human sexuality cannot be taken at face value and that ongoing empirical research sometimes changes or complicates the meanings of the concepts.

If we look at recent research, we find that scientists often use at least one of three categories when attempting to classify people as “homosexual” or “heterosexual”: sexual *behavior*; sexual *fantasies* (or related emotional or affective experiences); and *self-identification* (as “gay,” “lesbian,” “bisexual,” “asexual,” and so forth).²⁴ Some add a fourth: inclusion in a community defined by sexual orientation. Consider, for example, the American Psychological Association’s definition of sexual orientation in a 2008 document designed to educate the public:

Sexual orientation refers to an enduring pattern of emotional, romantic and/or sexual *attractions* to men, women or both sexes. Sexual orientation also refers to a person’s sense of *identity* based on those attractions, related *behaviors*, and membership in a *community* of others who share those attractions. Research over several decades has demonstrated that sexual orientation ranges along a *continuum*, from exclusive attraction to the other sex to exclusive attraction to the same sex.²⁵ [Emphases added.]

One difficulty with grouping these categories together under the same general rubric of “sexual orientation” is that research suggests they often

do not coincide in real life. Sociologist Edward O. Laumann and colleagues summarize this point clearly in a 1994 book:

While there is a core group (about 2.4 percent of the total men and about 1.3 percent of the total women) in our survey who *define themselves* as homosexual or bisexual, have same-gender *partners*, and express homosexual *desires*, there are also sizable groups who do not consider themselves to be either homosexual or bisexual but have had adult homosexual experiences or express some degree of desire.... [T]his preliminary analysis provides unambiguous evidence that no single number can be used to provide an accurate and valid characterization of the incidence and prevalence of homosexuality in the population at large. In sum, homosexuality is fundamentally a multidimensional phenomenon that has manifold meanings and interpretations, depending on context and purpose.²⁶ [Emphases added.]

More recently, in a 2002 study, psychologists Lisa M. Diamond and Ritch C. Savin-Williams make a similar point:

The more carefully researchers map these constellations—differentiating, for example, between *gender identity* and *sexual identity*, *desire* and *behavior*, *sexual* versus *affectionate* feelings, early-appearing versus late-appearing *attractions* and *fantasies*, or social *identifications* and sexual *profiles*—the more complicated the picture becomes because few individuals report uniform inter-correlations among these domains.²⁷ [Emphases added.]

Some researchers acknowledge the difficulties with grouping these various components under a single rubric. For example, researchers John C. Gonsiorek and James D. Weinrich write in a 1991 book: “It can be safely assumed that there is no necessary relationship between a person’s sexual behavior and self-identity unless both are individually assessed.”²⁸ Likewise, in a 1999 review of research on the development of sexual orientation in women, social psychologist Letitia Anne Peplau argues: “There is ample documentation that same-sex attractions and behaviors are not inevitably or inherently linked to one’s identity.”²⁹

In sum, the complexities surrounding the concept of “sexual orientation” present considerable challenges for empirical research on the subject. While the general public may be under the impression that there are widely accepted scientific definitions of terms such as “sexual orientation,” in fact, there are not. Diamond’s assessment of the situation in 2003 is still true today, that “there is currently no scientific or popular consensus on

the exact constellation of experiences that definitively ‘qualify’ an individual as lesbian, gay, or bisexual.”³⁰

It is owing to such complexities that some researchers, for instance Laumann, proceed by characterizing sexual orientation as a “multidimensional phenomenon.” But one might just as well wonder whether, in trying to shoehorn this “multidimensional phenomenon” into a single category, we are not reifying a concept that corresponds to something far too plastic and diffuse in reality to be of much value in scientific research. While labels such as “heterosexual” and “homosexual” are often taken to designate stable psychological or even biological traits, perhaps they do not. It may be that individuals’ affective, sexual, and behavioral experiences do not conform well to such categorical labels because these labels do not, in fact, refer to natural (psychological or biological) kinds. At the very least, we should recognize that we do not yet possess a clear and well-established framework for research on these topics. Rather than attempting to research sexual desire, attraction, identity, and behavior under the general rubric of “sexual orientation,” we might do better to examine empirically each domain separately and in its own specificity.

To that end, this part of our report considers research on sexual desire and sexual attraction, focusing on the empirical findings related to etiology and development, and highlighting the underlying complexities. We will continue to employ ambiguous terms like “sexual orientation” where they are used by the authors we discuss, but we will try to be attentive to the context of their use and the ambiguities attaching to them.

Challenging the “Born that Way” Hypothesis

Keeping in mind these reflections on the problems of definitions, we turn to the question of how sexual desires originate and develop. Consider the different patterns of attraction between individuals who report experiencing predominant sexual or romantic attraction toward members of the same sex and those who report experiencing predominant sexual or romantic attraction toward members of the opposite sex. What are the causes of these two patterns of attraction? Are such attractions or preferences innate traits, perhaps determined by our genes or prenatal hormones; are they acquired by experiential, environmental, or volitional factors; or do they develop out of some combination of both kinds of causes? What role, if any, does human agency play in the genesis of patterns of attraction? What role, if any, do cultural or social influences play?

Research suggests that while genetic or innate factors may influence the emergence of same-sex attractions, these biological factors cannot provide a complete explanation, and environmental and experiential factors may also play an important role.

The most commonly accepted view in popular discourse we mentioned above—the “born that way” notion that homosexuality and heterosexuality are biologically innate or the product of very early developmental factors—has led many non-specialists to think that homosexuality or heterosexuality is in any given person unchangeable and determined entirely apart from choices, behaviors, life experiences, and social contexts. However, as the following discussion of the relevant scientific literature shows, this is not a view that is well-supported by research.

Studies of Twins

One powerful research design for assessing whether biological or psychological traits have a genetic basis is the study of identical twins. If the probability is high that both members in a pair of identical twins, who share the same genome, exhibit a trait when one of them does—this is known as the concordance rate—then one can infer that genetic factors are likely to be involved in the trait. If, however, the concordance rate for identical twins is no higher than the concordance rate of the same trait in fraternal twins, who share (on average) only half their genes, this indicates that the shared environment may be a more important factor than shared genes.

One of the pioneers of behavioral genetics and one of the first researchers to use twins to study the effect of genes on traits, including sexual orientation, was psychiatrist Franz Josef Kallmann. In a landmark paper published in 1952, he reported that for all the pairs of identical twins he studied, if one of the twins was gay then both were gay, yielding an astonishing 100% concordance rate for homosexuality in identical twins.³¹ Were this result replicated and the study designed better, it would have given early support to the “born that way” hypothesis. But the study was heavily criticized. For example, philosopher and law professor Edward Stein notes that Kallmann did not present any evidence that the twins in his study were in fact genetically identical, and his sample was drawn from psychiatric patients, prisoners, and others through what Kallmann described as “direct contacts with the clandestine homosexual world,” leading Stein to argue that Kallmann’s sample “in no way constituted a reasonable cross-section of the homosexual population.”³²

(Samples such as Kallmann's are known as convenience samples, which involve selecting subjects from populations that are conveniently accessible to the researcher.)

Nevertheless, well-designed twin studies examining the genetics of homosexuality indicate that genetic factors likely play some role in determining sexual orientation. For example, in 2000, psychologist J. Michael Bailey and colleagues conducted a major study of sexual orientation using twins in the Australian National Health and Medical Research Council Twin Registry, a large probability sample, which was therefore more likely to be representative of the general population than Kallmann's.³³ The study employed the Kinsey scale to operationalize sexual orientation and estimated concordance rates for being homosexual of 20% for men and 24% for women in identical (maternal, monozygotic) twins, compared to 0% for men and 10% for women in non-identical (fraternal, dizygotic) twins.³⁴ The difference in the estimated concordance rates was statistically significant for men but not for women. On the basis of these findings, the researchers estimated that the heritability of homosexuality for men was 0.45 with a wide 95% confidence interval of 0.00–0.71; for women, it was 0.08 with a similarly wide confidence interval of 0.00–0.67. These estimates suggest that for males 45% of the differences between certain sexual orientations (homosexual versus heterosexuals as measured by the Kinsey scale) could be attributed to differences in genes.

The large confidence intervals in the study by Bailey and colleagues mean that we must be careful in assessing the substantive significance of these findings. The authors interpret their findings to suggest that “any major gene for strictly defined homosexuality has either low penetrance or low frequency,”³⁵ but their data did show (marginal) statistical significance. While the concordance estimates seem somewhat high in the models used, the confidence intervals are so wide that it is difficult to judge the reliability, including the replicability, of these estimates.

It is worth clarifying here what “heritability” means in these studies, since the technical meaning in population genetics is narrower and more precise than the everyday meaning of the word. Heritability is a measure of how much variation in a particular trait within a population can be attributed to variation in genes in that population. It is not, however, a measure of how much a trait is genetically determined.

Traits that are almost entirely genetically determined can have very low heritability values, while traits that have almost no genetic basis can be found to be highly heritable. For instance, the number of fingers human beings have is almost completely genetically determined. But there is little

variation in the number of fingers humans have, and most of the variation we do see is due to non-genetic factors such as accidents, which would lead to low heritability estimates for the trait. Conversely, cultural traits can sometimes be found to be highly heritable. For instance, whether a given individual in mid-twentieth century America wore earrings would have been found to be highly heritable, because it was highly associated with being male or female, which is in turn associated with possessing XX or XY sex chromosomes, making variability in earring-wearing behavior highly associated with genetic differences, despite the fact that wearing earrings is a cultural rather than biological phenomenon. Today, heritability estimates for earring-wearing behavior would be lower than they were in mid-twentieth century America, not because of any changes in the American gene pool, but because of the increased acceptance of men wearing earrings.³⁶

So, a heritability estimate of 0.45 does not mean that 45% of sexuality is determined by genes. Rather, it means that 45% of the variation between individuals in the population studied can be attributed in some way to genetic factors, as opposed to environmental factors.

In 2010, psychiatric epidemiologist Niklas Långström and colleagues conducted a large, sophisticated twin study of sexual orientation, analyzing data from 3,826 identical and fraternal same-sex twin pairs (2,320 identical and 1,506 fraternal pairs).³⁷ The researchers operationalized homosexuality in terms of lifetime same-sex sexual partners. The sample's concordance rates were somewhat lower than those found in the study by Bailey and colleagues. For having had at least one same-sex partner, the concordance for men was 18% in identical twins and 11% in fraternal twins; for women, 22% and 17%, respectively. For total number of sexual partners, concordance rates for men were 5% in identical twins and 0% in fraternal twins; for women, 11% and 7%, respectively.

For men, these rates suggest an estimated heritability rate of 0.39 for having had at least one lifetime same-sex partner (with a 95% confidence interval of 0.00–0.59), and 0.34 for total number of same-sex partners (with a 95% confidence interval of 0.00–0.53). Environmental factors experienced by one twin but not the other explained 61% and 66% of the variance, respectively, while environmental factors shared by the twins failed to explain any of the variance. For women, the heritability rate for having had at least one lifetime same-sex partner was 0.19 (95% confidence interval of 0.00–0.49); for total number of same-sex partners, it was 0.18 (95% confidence interval of 0.11–0.45). Unique environmental factors accounted for 64% and 66% of the variance, respectively, while

shared environmental factors accounted for 17% and 16%, respectively. These values indicate that, while the genetic component of homosexual behavior is far from negligible, non-shared environmental factors play a critical, perhaps preponderant, role. The authors conclude that sexual orientation arises from both heritable and environmental influences unique to the individual, stating that “the present results support the notion that the individual-specific environment does indeed influence sexual preference.”³⁸

Another large and nationally representative study of twins published by sociologists Peter S. Bearman and Hannah Brückner in 2002 used data from the National Longitudinal Study of Adolescent to Adult Health (commonly abbreviated as “Add Health”) of adolescents in grades 7–12.³⁹ They attempted to estimate the relative influence of social factors, genetic factors, and prenatal hormonal factors on the development of same-sex attractions. Overall, 8.7% of the 18,841 adolescents in their study reported same-sex attractions, 3.1% reported a same-sex romantic relationship, and 1.5% reported same-sex sexual behavior. The authors first analyzed the “social influence hypothesis,” according to which opposite-sex twins receive less gendered socialization from their families than same-sex twins or opposite-sex siblings, and found that this hypothesis was well-supported in the case of males. While female opposite-sex twins in the study were the least likely of all the groups to report same-sex attractions (5.3%), male opposite-sex twins were the likeliest to report same-sex attractions (16.8%)—more than twice as likely as males with a full, non-twin sister (16.8% vs. 7.3%). The authors concluded there was “substantial indirect evidence in support of a socialization model at the individual level.”⁴⁰

The authors also examined the “intrauterine hormone transfer hypothesis,” according to which prenatal hormone transfers between opposite-sex twin fetuses influences the sexual orientation of the twins. (Note that this is different from the more general hypothesis that prenatal hormones influence the development of sexual orientation.) In the study, the proportion of male opposite-sex twins reporting same-sex attraction was about twice as high for those without older brothers (18.7%) as for those with older brothers (8.8%). The authors argued that this finding was strong evidence against the hormone-transfer hypothesis, since the presence of older brothers should not decrease the likelihood of same-sex attraction if that attraction has a basis in prenatal hormonal transfers. However, that conclusion seems premature: the observations are consistent with the possibility of *both* hormonal factors *and* the presence of an older brother having an effect (especially if the latter influences the former). This study

also found no correlation between experiencing same-sex attraction and having multiple older brothers, which had been reported in some earlier studies.⁴¹

Finally, Bearman and Brückner did not find evidence of significant genetic influence on sexual attraction. Significant influence would require that identical twins have significantly higher concordance rates for same-sex attraction than fraternal twins or non-twin siblings. But in the study, the rates were statistically similar: identical twins were 6.7% concordant, dizygotic pairs 7.2% concordant, and full siblings 5.5% concordant. The authors concluded that “it is more likely that any genetic influence, if present, can only be expressed in specific and circumscribed social structures.”⁴² Based on their data, they suggested the one observed social structure that might enable this genetic expression is the more limited “gender socialization associated with firstborn OS [opposite-sex] twin pairs.”⁴³ Thus, they inferred that their results “support the hypothesis that less gendered socialization in early childhood and preadolescence shapes subsequent same-sex romantic preferences.”⁴⁴ While the findings here are suggestive, further research is needed to confirm this hypothesis. The authors also argued that the higher concordance rates for same-sex attraction reported in previous studies may be unreliable due to methodological problems such as non-representative samples and small sample sizes. (It should be noted, however, that these remarks were published prior to the study by Långström and colleagues discussed above, which uses a study design that does not appear to have these limitations.)

To reconcile the somewhat mixed data on heritability, we could hypothesize that attraction to the same sex may have a stronger heritable component as people age—that is, when researchers attempt to measure sexual orientation later in life (as in the 2010 study by Långström and colleagues) than when measured earlier in life. Heritability estimates can change depending on the age at which a trait is measured because changes in the environmental factors that might influence variation in the trait may vary for individuals at different ages, and because genetically influenced traits may become more fixed at a later stage in an individual’s development (height, for instance, becomes fixed in early adulthood). This hypothesis is also suggested by findings, discussed below, that same-sex attraction may be more fluid in adolescence than in later stages of adulthood.

In contrast to the studies just summarized, psychiatrist Kenneth S. Kendler and colleagues conducted a large twin study using a probability sample of 794 twin pairs and 1,380 non-twin siblings.⁴⁵ Based on concordance rates for sexual orientation (defined in this study as self-iden-

tification based on attraction), the authors state that their results “suggest that genetic factors may provide an important influence on sexual orientation.”⁴⁶ The study does not, however, appear to be sufficiently powerful to draw strong conclusions about the degree of genetic influence on sexuality: only 19 of 324 identical twin pairs had any non-heterosexual member, with 6 of the 19 pairs concordant; 15 of 240 same-sex fraternal twin pairs had any non-heterosexual member, with 2 of the 15 pairs concordant. Because only 8 twin pairs were concordant for non-heterosexuality, the study’s ability to draw substantively significant comparisons between identical and fraternal twins (or between twins and non-twin siblings) is limited.

Overall, these studies suggest that (depending on how homosexuality is defined) in anywhere from 6% to 32% of cases, both members of an identical twin pair would be homosexual if at least one member is. Since some twin studies found higher concordance rates in identical twins than in fraternal twins or non-twin siblings, there may be genetic influences on sexual desire and behavioral preferences. One needs to bear in mind that identical twins typically have even more similar environments—early attachment experiences, peer relationships, and the like—than fraternal twins or non-twin siblings. Because of their similar appearances and temperaments, for example, identical twins may be more likely than fraternal twins or other siblings to be treated similarly. So some of the higher concordance rates may be attributable to environmental factors rather than genetic factors. In any case, if genes do play a role in predisposing people toward certain sexual desires or behaviors, these studies make clear that genetic influences cannot be the whole story.

Summarizing the studies of twins, we can say that there is no reliable scientific evidence that sexual orientation is determined by a person’s genes. But there is evidence that genes play a role in influencing sexual orientation. So the question “Are gay people born that way?” requires clarification. There is virtually no evidence that anyone, gay or straight, is “born that way” if that means their sexual orientation was genetically determined. But there is some evidence from the twin studies that certain genetic profiles probably increase the likelihood the person later identifies as gay or engages in same-sex sexual behavior.

Future twin studies on the heritability of sexual orientation should include analyses of larger samples or meta-analyses or other systematic reviews to overcome the limited sample size and statistical power of some of the existing studies, and analyses of heritability rates across different dimensions of sexuality (such as attraction, behavior, and identity) to

overcome the imprecisions of the ambiguous concept of sexual orientation and the limits of studies that look at only one of these dimensions of sexuality.

Molecular Genetics

In examining the question whether, and perhaps to what extent, there may be genetic contributions to homosexuality, we have so far looked at studies that employ methods of classical genetics to estimate the heritability of a trait like sexual orientation but that do not identify particular genes that may be associated with the trait.⁴⁷ But genetics can also be studied using what are often called molecular methods that provide estimates of which particular genetic variations are associated with traits, whether physical or behavioral.

One early attempt to identify a more specific genetic basis for homosexuality was a 1993 study by geneticist Dean Hamer and colleagues of 40 pairs of homosexual brothers.⁴⁸ By examining the family history of homosexuality for these individuals, they identified a possible linkage between homosexuality in males and genetic markers on the Xq28 region of the X chromosome. Attempts to replicate this influential study's results have had mixed results: George Rice and colleagues attempted and failed to replicate Hamer's findings,⁴⁹ though in 2015 Alan R. Sanders and colleagues were able to replicate Hamer's original findings using a larger population size of 409 male twin pairs of homosexual brothers, and to find additional genetic linkage sites.⁵⁰ (Since the effect was small, however, the genetic marker would not be a good predictor of sexual orientation.)

Genetic linkage studies like the ones discussed above are able to identify particular regions of chromosomes that may be associated with a trait by looking at patterns of inheritance. Today, one of the chief methods for inferring which genetic variants are associated with a trait is the genome-wide association study, which uses DNA sequencing technologies to identify particular differences in DNA that may be associated with a trait. Scientists examine millions of genetic variants in large numbers of individuals who have a particular trait, as well as individuals who do not have the trait, and compare the frequency of genetic variants among those who do and do not have the trait. Specific genetic variants that occur more frequently among those who have than those who do not have the trait are inferred to have some association with that trait. Genome-wide association studies have become popular in recent years, yet few such scientific studies have found significant associations of genetic variants with sexual

orientation. The largest attempt to identify genetic variants associated with homosexuality, a study of over 23,000 individuals from the 23andMe database presented at the American Society of Human Genetics annual meeting in 2012, found no linkages reaching genome-wide significance for same-sex sexual identity for males or females.⁵¹

So, again, the evidence for a genetic basis for homosexuality is inconsistent and inconclusive, which suggests that, though genetic factors explain some of the variation in sexual orientation, the genetic contribution to this trait is not likely to be strong and even less likely to be decisive.

As is often true of human behavioral tendencies, there may be genetic contributions to the tendency toward homosexual inclinations or behaviors. Phenotypic expression of genes is usually influenced by environmental factors—different environments may lead to different phenotypes even for the same genes. So even if there are genetic factors that contribute to homosexuality, an individual's sexual attractions or preferences may also be influenced by a number of environmental factors, such as social stressors, including emotional, physical, or sexual abuse. Looking to developmental, environmental, experiential, social, or volitional factors will be necessary to arrive at a fuller picture of how sexual interests, attractions, and desires develop.

The Limited Role of Genetics

Lay readers might note at this point that even at the purely biological level of genetics, the shopworn “nature vs. nurture” debates regarding human psychology have been abandoned by scientists, who recognize that no credible hypothesis can be offered for any particular traits that would be determined either purely by genetics or the environment. The growing field of epigenetics, for example, demonstrates that even for relatively simple traits, gene expression itself can be influenced by innumerable other external factors that can shape the functioning of genes.⁵² This is even more relevant when it comes to the relationship between genes and complex traits like sexual attraction, drives, and behaviors.

These gene-environment relationships are complex and multidimensional. Non-genetic developmental factors and environmental experiences may be sculpted, in part, by genetic factors working in subtle ways. For example, social geneticists have documented the indirect role of genes in peer-aligned behaviors, such that an individual's physical appearance could influence whether a particular social group will include or exclude that individual.⁵³

Contemporary geneticists know that genes can influence a person's range of interests and motivations, therefore indirectly affecting behavior. While genes may in this way incline a person to certain behaviors, compelling behavior directly, independently of a wide range of other factors, seems less plausible. They may influence behavior in more subtle ways, depending on external environmental stimuli (for instance, peer pressure, suggestion, and behavioral rewards) in conjunction with psychological factors and physical makeup. Dean Hamer, whose work on the possible role of genetics in homosexuality was examined above, explained some of the limitations of behavioral genetics in a 2002 article in *Science*: "The real culprit [of lack of progress in behavioral genetics] is the assumption that the rich complexity of human thought and emotion can be reduced to a simple, linear relation between individual genes and behaviors.... This oversimplified model, which underlies most current research in behavior genetics, ignores the critical importance of the brain, the environment, and gene expression networks."⁵⁴

The genetic influences affecting any complex human behavior—whether sexual behaviors, or interpersonal interactions—depend in part on individuals' life experiences as they mature. Genes constitute only one of the many key influences on behavior in addition to environmental influences, personal choices, and interpersonal experiences. The weight of evidence to date strongly suggests that the contribution of genetic factors is modest. We can say with confidence that genes are not the sole, essential cause of sexual orientation; there is evidence that genes play a modest role in contributing to the development of sexual attractions and behaviors but little evidence to support a simplistic "born that way" narrative concerning the nature of sexual orientation.

The Influence of Hormones

Another area of research relevant to the hypothesis that people are born with dispositions toward different sexual orientations involves prenatal hormonal influences on physical development and subsequent male- or female-typical behaviors in early childhood. For ethical and practical reasons, the experimental work in this field is carried out in non-human mammals, which limits how this research can be generalized to human cases. However, children who are born with disorders of sexual development (DSD) serve as a population in which to examine the influence of genetic and hormonal abnormalities on the subsequent development of non-typical sexual identity and sexual orientation.

Hormones responsible for sexual differentiation are generally thought to exert on the developing fetus either *organizational* effects—which produce permanent changes in the wiring and sensitivity of the brain, and thus are considered largely irreversible—or *activating* effects, which occur later in an individual’s life (at puberty, and into adulthood).⁵⁵ Organizational hormones may prime the fetal systems (including the brain) structurally, and set the stage for sensitivity to hormones presenting at puberty and beyond, when the hormone will then “activate” systems which were “organized” prenatally.

Periods of peak response to the hormonal environment are thought to occur during gestation. For example, testosterone is thought to influence the male fetus maximally between weeks 8 and 24, and then again at birth, until about three months of age.⁵⁶ Estrogens are provided throughout gestation by the placenta and the mother’s blood system.⁵⁷ Studies in animals reveal there may even be multiple periods of sensitivity for a variety of hormones, that the presence of one hormone may influence the action of another hormone, and the sensitivity of the receptors for these hormones can influence their actions.⁵⁸ Sexual differentiation, alone, is a highly complex system.

Specific hormones of interest in this area of research are testosterone, dihydrotestosterone (a metabolite of testosterone, and more potent than testosterone), estradiol (which can be metabolized into testosterone), progesterone, and cortisol. The generally accepted pathways of normal hormonal influence of development in utero are as follows. The typical pattern of sex differentiation in human fetuses begins with the differentiation of the sex organs into testes or ovaries, a process that is largely genetically controlled. Once these organs have differentiated, they produce specific hormones that determine development of external genitalia. This window of time in gestation is when hormones exert their phenotypic and neurological effects. Testosterone secreted by the testes contributes to the development of male external genitalia and affects neurological development in males;⁵⁹ it is the absence of testosterone in females which allows for the female pattern of external genitalia to develop.⁶⁰ Imbalances of testosterone or estrogen, as well as their presence or absence at specific critical periods of gestation, may cause disorders of sexual development. (Genetic or environmental effects can also lead to disorders of sexual development.)

Stress may also play some role in influencing the way hormones shape gonadal development, neurodevelopment, and subsequent sex-typical behaviors in early childhood.⁶¹ Cortisol is the main hormone associated

with stress responses. It may originate from the mother, if she experiences severe stressors during her pregnancy, or from the fetus under stress.⁶² Elevated levels of cortisol may also occur from genetic defects.⁶³ One of the most extensively studied disorders of sexual development is congenital adrenal hyperplasia (CAH), which in females can result in genital virilization.⁶⁴ Over 90% of cases of CAH result from a mutation in a gene that codes for an enzyme that helps synthesize cortisol.⁶⁵ This results in an overproduction of cortisol precursors, some of which are converted into androgens (hormones associated with male sex development).⁶⁶ As a result, girls are born with some degree of virilization of their genitalia, depending on the severity of the genetic defect.⁶⁷ For severe cases of genital virilization, surgical intervention is sometimes performed to normalize the genitalia. Hormone therapies are also often administered to mitigate the effects of excess androgen production.⁶⁸ Females with CAH, who as fetuses were exposed to above-average levels of androgens, are less likely to be exclusively heterosexual than females without CAH, and females with more severe forms of CAH are more likely to be non-heterosexual than females with milder forms of the condition.⁶⁹

Likewise, there are disorders of sexual development in genetic males affected by androgen insensitivity. In males with androgen insensitivity syndrome, the testes produce testosterone normally, but the receptors to testosterone are not functional.⁷⁰ The genitalia, at birth, appear to be female, and the child is usually raised as a female. The individual's endogenous testosterone is broken down into estrogen, such that the individual begins to develop female secondary sex characteristics.⁷¹ It does not become apparent that there is a problem until puberty, when the individual does not start menses appropriately.⁷² These patients generally prefer to continue life as females, and their sexual orientation does not differ from females having an XX genotype.⁷³ Studies have suggested that they are just as likely if not more likely to be exclusively interested in male partners than XX females.⁷⁴

There are other disorders of sexual development affecting some genetic males (i.e., with an XY genotype) in whom androgen deficiencies are a direct result of the lack of enzymes either to synthesize dihydrotestosterone from testosterone or to produce testosterone from its precursor hormone.⁷⁵ Individuals with these deficiencies are born with varied degrees of ambiguous genitalia, and are sometimes raised as girls. During puberty, however, these individuals often experience physical virilization, and must then decide whether to live as men or women. Peggy T. Cohen-Kettenis, a professor of gender development and psychopathology, found that 39 to

64% of individuals with these deficiencies who are raised as girls change to live as men in adolescence and early adulthood, and she also reported that “the degree of external genital masculinization at birth does not seem to be related to gender role changes in a systematic way.”⁷⁶

The twin studies reviewed earlier may shed light on the role of maternal hormonal influences, since both identical and fraternal twins are exposed to similar maternal hormonal influences in utero. The relatively weak concordance rates in the twin studies suggest that prenatal hormones, like genetic factors, do not play a strongly determinative role in sexual orientation. Other attempts at finding significant hormonal influences on sexual development have likewise been mixed, and the salience of the findings is not yet clear. Since direct studies of prenatal hormonal influences on sexual development are methodologically difficult, some studies have tried to develop models whereby differences in prenatal hormonal exposure can be inferred indirectly—by measuring subtle morphological changes or by examining hormonal disorders that are present later during development.

For example, one rough proxy of prenatal testosterone levels used by researchers is the ratio between the length of the second finger (index finger) and the fourth finger (ring finger), which is commonly called the “2D:4D ratio.” Some evidence suggests that the ratio may be influenced by prenatal exposure to testosterone, such that in males higher levels of exposure to testosterone cause shorter index fingers relative to the ring finger (or having a low 2D:4D ratio), and vice versa.⁷⁷ According to one hypothesis, homosexual men may have a higher 2D:4D ratio (closer to the ratio found in females than in heterosexual males), while another hypothesis suggests the opposite, that homosexual men may be hypermasculinized by prenatal testosterone, resulting in a lower ratio than in heterosexual men. For women, the hypothesis for homosexuality that they have been hypermasculinized (lower ratio, higher testosterone) has also been proposed. Several studies comparing this trait in homosexually versus heterosexually identified men and women have shown mixed results.

A study published in *Nature* in 2000 found that in a sample of 720 California adults, the right-hand 2D:4D ratio of homosexual women was significantly more masculine (that is, the ratio was smaller) than that of heterosexual women and did not differ significantly from that of heterosexual men.⁷⁸ This study also found no significant difference in mean 2D:4D ratio between heterosexual and homosexual men. Another study that year, which used a relatively small sample of homosexual and heterosexual men from the United Kingdom, reported a lower 2D:4D (that

is, more masculine) ratio in homosexual men.⁷⁹ A 2003 study using a London-based sample also found that homosexual men had a lower 2D:4D ratio than heterosexuals,⁸⁰ while two other studies with samples from California and Texas showed *higher* 2D:4D ratios for homosexual men.⁸¹

A 2003 twin study compared seven female monozygotic twin pairs discordant for homosexuality (one twin was lesbian) and five female monozygotic twin pairs concordant for homosexuality (both twins were lesbian).⁸² In the twin pairs discordant for sexual orientation, the individuals identifying as homosexual had significantly lower 2D:4D ratios than their twins, whereas the concordant twins showed no difference. The authors interpreted this result as suggesting that “low 2D:4D ratio is a result of differences in prenatal environment.”⁸³ Finally, a 2005 study of 2D:4D ratios in an Austrian sample of 95 homosexual and 79 heterosexual men found that the 2D:4D ratios of heterosexual men were not significantly different from those of homosexual men.⁸⁴ After reviewing the several studies on this trait, the authors conclude that “more data are essential before we can be sure whether there is a 2D:4D effect for sexual orientation in men when ethnic variation is controlled for.”⁸⁵

Much research has examined the effects of prenatal hormones on behavior and brain structure. Again, these results come primarily from studies of non-human primates, but the study of disorders of sexual development has provided helpful insights into the effects of hormones on sexual development in humans. Since hormonal influences typically occur during time-sensitive periods of development, when their effects manifest physically, it is reasonable to assume that organizational effects of these early, time-linked hormonal patterns are likely to direct aspects of neural development. Neuroanatomical connectivity and neurochemical sensitivities may be among such influences.

In 1983, Günter Dörner and colleagues performed a study investigating whether there is any relationship between maternal stress during pregnancy and later sexual identity of their children, interviewing two hundred men about stressful events that may have occurred to their mothers during their prenatal lives.⁸⁶ Many of these events occurred as a consequence of World War II. Of men who reported that their mothers had experienced moderately to severely stressful events during pregnancy, 65% were homosexual, 25% were bisexual, and 10% were heterosexual. (Sexual orientation was assessed using the Kinsey scale.) However, more recent studies have shown much smaller or no significant correlations.⁸⁷ In a 2002 prospective study on the relationship between sexual orientation and prenatal stress during the second and third trimesters, Hines

and colleagues found that stress reported by mothers during pregnancy showed “only a small relationship” to male-typical behaviors in their daughters at the age of 42 months, “and no relationship at all” to female-typical behaviors in their sons.⁸⁸

In summary, some forms of prenatal hormone exposure, particularly CAH in females, are associated with differences in sexual orientation, while other factors are often important in determining the physical and psychological effects of those exposures. Hormonal conditions that contribute to disorders of sex development may contribute to the development of non-heterosexual orientations in some individuals, but this does not demonstrate that such factors explain the development of sexual attractions, desires, and behaviors in the majority of cases.

Sexual Orientation and the Brain

There have been several studies examining neurobiological differences between individuals who identify as heterosexual and those who identify as homosexual. This work began with neuroscientist Simon LeVay’s 1991 study that reported biological differences in the brains of gay men as compared to straight men—specifically, a difference in volume in a particular cell group of the interstitial nuclei of the anterior hypothalamus (INAH3).⁸⁹ Later work by psychiatrist William Byne and colleagues showed more nuanced findings: “In agreement with two prior studies... we found INAH3 to be sexually dimorphic, occupying a significantly greater volume in males than females. In addition, we determined that the sex difference in volume was attributable to a sex difference in neuronal number and not in neuronal size or density.”⁹⁰ The authors noted that, “Although there was a trend for INAH3 to occupy a smaller volume in homosexual men than in heterosexual men, there was no difference in the number of neurons within the nucleus based on sexual orientation.” They speculated that “postnatal experience” may account for the differences in volume in this region between homosexual and heterosexual men, though this would require further research to confirm.⁹¹ They also noted that the functional significance of sexual dimorphism in INAH3 is unknown. The authors conclude: “Based on the results of the present study as well as those of LeVay (1991), sexual orientation cannot be reliably predicted on the basis of INAH3 volume alone.”⁹² In 2002, psychologist Mitchell S. Lasco and colleagues published a study examining a different part of the brain—the anterior commissure—and found that there were no significant differences in that area based either on sex or sexual orientation.⁹³

Other studies have since been conducted to ascertain structural or functional differences between the brains of heterosexual and homosexual individuals (using a variety of criteria to define these categories). Findings from several of these studies are summarized in a 2008 commentary published in the *Proceedings of the National Academy of Sciences*.⁹⁴ Research of this kind, however, does not seem to reveal much of relevance regarding the etiology or biological origins of sexual orientation. Due to inherent limitations, this research literature is fairly unremarkable. For example, in one study functional MRI was used to measure activity changes in the brain when pictures of men and women were shown to subjects, finding that viewing a female face produced stronger activity in the thalamus and orbitofrontal cortex of heterosexual men and homosexual women, whereas in homosexual men and heterosexual women these structures reacted more strongly to the face of a man.⁹⁵ That the brains of heterosexual women and homosexual men reacted distinctively to the faces of men, whereas the brains of heterosexual men and homosexual women reacted distinctively to the faces of women, is a finding that seems rather trivial with respect to understanding the etiology of homosexual attractions. In a similar vein, one study reported different responses to pheromones between homosexual and heterosexual men,⁹⁶ and a follow-up study showed a similar finding in homosexual compared to heterosexual women.⁹⁷ Another study showed differences in cerebral asymmetry and functional connectivity between homosexual and heterosexual subjects.⁹⁸

While findings of this kind may suggest avenues for future investigation, they do not move us much closer to an understanding of the biological or environmental determinants of sexual attractions, interests, preferences, or behaviors. We will say more about this below. For now, we will briefly illustrate a few of the inherent limitations in this area of research with the following hypothetical example. Suppose we were to study the brains of yoga teachers and compare them to the brains of bodybuilders. If we search long enough, we will eventually find statistically significant differences in some area of brain morphology or brain function between these two groups. But this would not imply that such differences determined the different life trajectories of the yoga teacher and the bodybuilder. The brain differences could have been the result, rather than the cause, of distinctive patterns of behavior or interests.⁹⁹ Consider another example. Suppose that gay men tend to have less body fat than straight men (as indicated by lower average scores on body mass indices). Even though body mass is, in part, determined by genetics, we could not claim based on this finding that there is some innate, genetic cause of both body

mass and homosexuality at work. It could be the case, for instance, that being gay is associated with a diet that lowers body mass. These examples illustrate one of the common problems encountered in the popular interpretation of such research: the suggestion that the neurobiological pattern determines a particular behavioral expression.

With this overview of studies on biological factors that might influence sexual attraction, preferences, or desires, we can understand the rather strong conclusion by social psychologist Letitia Anne Peplau and colleagues in a 1999 review article: “To recap, more than 50 years of research has failed to demonstrate that biological factors are a major influence in the development of women’s sexual orientation.... Contrary to popular belief, scientists have not convincingly demonstrated that biology determines women’s sexual orientation.”¹⁰⁰ In light of the studies we have summarized here, this statement could also be made for research on male sexual orientation, however this concept is defined.

Misreading the Research

There are some significant built-in limitations to what the kind of empirical research summarized in the preceding sections can show. Ignoring these limitations is one of the main reasons the research is routinely misinterpreted in the public sphere. It may be tempting to assume, as we just saw with the example of brain structure, that if a particular biological profile is associated with some behavioral or psychological trait, then that biological profile *causes* that trait. This reasoning relies on a fallacy, and in this section we explain why, using concepts from the field of epidemiology. While some of these issues are rather technical in detail, we will try to explain them in a general way that is accessible to the non-specialist reader.

Suppose for the sake of illustration that one or more differences in a biological trait are found between homosexual and heterosexual men. That difference could be a discrete measure (call this D) such as presence of a genetic marker, or it could be a continuous measure (call this C) such as the average volume of a particular part of the brain.

Showing that a risk factor significantly increases the chances of a particular health outcome or a behavior might give us a clue to development of that health outcome or that behavior, but it does not provide evidence of causation. Indeed, it may not provide evidence of anything but the weakest of correlations. The inference is sometimes made that if it can be shown that gay men and straight men differ significantly in the

probability that D is present (whether a gene, a hormonal factor, or something else), no matter how low that probability, then this finding suggests that being gay has a biological basis. But this inference is unwarranted. Doubling (or even tripling or quadrupling) the probability of a relatively rare trait can have little value in terms of predicting who will or will not identify as gay.

The same would be true for any continuous variable (C). Showing a significant difference at the mean or average for a given trait (such as the volume of a particular brain region) between men who identify as heterosexual and men who identify as homosexual does not suffice to show that this average difference contributes to the probability of identifying as heterosexual or homosexual. In addition to the reasons explained above, a significant difference at the means of two distributions can be consistent with a great deal of overlap between the distributions. That is, there may be virtually no separation in terms of distinguishing between some individual members of each group, and thus the measure would not provide much predictability for sexual orientation or preference.

Some of these issues could, in part, be addressed by additional methodological approaches, such as the use of a training sample or cross-validation procedures. A training sample is a small sample used to develop a model (or hypothesis); this model is then tested on a larger independent sample. This method avoids testing a hypothesis on the same data used to develop the hypothesis. Cross-validation includes procedures used to examine whether a statistically significant effect is really there or just due to chance. If one wants to show the result did not occur by chance (and if the sample is large), one can run the same tests on a random split of the relevant sample. After finding a difference in the prevalence of trait D or C between a gay sample and a straight sample, researchers could randomly split the gay sample into two groups and then show that these two groups do not differ regarding D or C. Suppose one finds five differences out of 100 comparing gay to straight men in the overall samples, then finds five differences out of 100 when comparing the split gay samples. This would cast additional doubt on the initial finding of a difference between the means of gay and straight individuals.

Sexual Abuse Victimization

Whereas the preceding discussion considered the part that biological factors might play in the development of sexual orientation, this section will summarize evidence that a particular environmental factor—childhood

sexual abuse—is reported significantly more often among those who later identify as homosexual. The results presented below raise the question whether there is an association between sexual abuse, particularly in childhood, and later expressions of sexual attraction, behavior, or identity. If so, might child abuse increase the probability of having a non-heterosexual orientation?

Correlations, at least, have been found, as we will summarize below. But we should note first that they might be accounted for by one or more of the following conjectures:

1. Abuse might contribute to the development of non-heterosexual orientation.
2. Children with (signs of future) non-heterosexual tendencies might attract abusers, placing them at elevated risk.
3. Certain factors might contribute to *both* childhood sexual abuse and non-heterosexual tendencies (for instance, a dysfunctional family or an alcoholic parent).

It should be kept in mind that these three hypotheses are not mutually exclusive; all three, and perhaps others, might be operative. As we summarize the studies on this issue, we will try to evaluate each of these hypotheses in light of current scientific research.

Behavioral and community health professor Mark S. Friedman and colleagues conducted a 2011 meta-analysis of 37 studies from the United States and Canada examining sexual abuse, physical abuse, and peer victimization in heterosexuals as compared to non-heterosexuals.¹⁰¹ Their results showed that non-heterosexuals were on average 2.9 times more likely to report having been abused as children (under 18 years of age). In particular, non-heterosexual males were 4.9 times likelier—and non-heterosexual females, 1.5 times likelier—than their heterosexual counterparts to report sexual abuse. Non-heterosexual adolescents as a whole were 1.3 times likelier to indicate physical abuse by parents than their heterosexual peers, but gay and lesbian adolescents were only 0.9 times as likely (bisexuals were 1.4 times as likely). As for peer victimization, non-heterosexuals were 1.7 times likelier to report being injured or threatened with a weapon or being attacked.

The authors note that although they hypothesized that the rates of abuse would decrease as social acceptance of homosexuality rose, “disparities in prevalence rates of sexual abuse, parental physical abuse, and peer

victimization between sexual minority and sexual nonminority youths did not change from the 1990s to the first decade of the 2000s.”¹⁰² While these authors cite authorities who claim that sexual abuse does not “cause individuals to become gay, lesbian, or bisexual,”¹⁰³ their data do not give evidence against the hypothesis that childhood sexual abuse might affect sexual orientation. On the other hand, the causal path could be in the opposite direction or bi-directional. The evidence does not refute or support this conjecture; the study’s design is not capable of shedding much light on the question of directionality.

The authors invoke a widely-cited hypothesis to explain the higher rates of sexual abuse among non-heterosexuals, the hypothesis that “sexual minority individuals are...more likely to be targeted for sexual abuse, as youths who are perceived to be gay, lesbian, or bisexual are more likely to be bullied by their peers.”¹⁰⁴ The two conjectures—that abuse is a cause and that it is a result of non-heterosexual tendencies—are not mutually exclusive: abuse may be a causal factor in the development of non-heterosexual attractions and desires, and at the same time non-heterosexual attractions, desires, and behaviors may increase the risk of being targeted for abuse.

Community health sciences professor Emily Faith Rothman and colleagues conducted a 2011 systematic review of the research investigating the prevalence of sexual assault against people who identify as gay, lesbian, or bisexual in the United States.¹⁰⁵ They examined 75 studies (25 of which used probability sampling) involving a total of 139,635 gay or bisexual (GB) men and lesbian or bisexual (LB) women, which measured the prevalence of victimization due to lifetime sexual assault (LSA), childhood sexual assault (CSA), adult sexual assault (ASA), intimate partner sexual assault (IPSA), and hate-crime-related sexual assault (HC). Although the study was limited by not having a heterosexual control group, it showed alarmingly high rates of sexual assault, including childhood sexual assault, for this population, as summarized in Table 1.

Using a multi-state probability-based sample in a 2013 study, psychologist Judith Anderson and colleagues compared differences in adverse childhood experiences—including dysfunctional households; physical, sexual, or emotional abuse; and parental discord—among self-identified homosexual, heterosexual, and bisexual adults.¹⁰⁶ They found that bisexuals had significantly higher proportions than heterosexuals of all adverse childhood experience factors, and that gays and lesbians had significantly higher proportions than heterosexuals of all these measures except parental separation or divorce. Overall, gays and lesbians had nearly 1.7 times,

Table 1. Sexual Assault among Gay/Bisexual Men and Lesbian/Bisexual Women

GB Men (%)	LB Women (%)
CSA: 4.1–59.2 (median 22.7)	CSA: 14.9–76.0 (median 34.5)
ASA: 10.8–44.7 (median 14.7)	ASA: 11.3–53.2 (median 23.2)
LSA: 11.8–54.0 (median 30.4)	LSA: 15.6–85.0 (median 43.4)
IPSA: 9.5–57.0 (median 12.1)	IPSA: 3.0–45.0 (median 13.3)
HC: 3.0–19.8 (median 14.0)	HC: 1.0–12.3 (median 5.0)

and bisexuals 1.6 times, the heterosexual rate of adverse childhood experiences. The data for abuse are summarized in Table 2.

While this study, like some others we have discussed, may be limited by recall bias—that is, inaccuracies introduced by errors of memory—it has the merit of having a control group of self-identified heterosexuals to compare with self-identified gay/lesbian and bisexual cohorts. In their discussion of findings, the authors critique the hypothesis that childhood trauma has a causal relationship to homosexual preferences. Among their reasons for skepticism, they note that the vast majority of individuals who suffer childhood trauma do not become gay or bisexual, and that gender-nonconforming behavior may help explain the elevated rates of abuse. However, it is plausible from these and related results to hypothesize

Table 2. Adverse Childhood Experiences among Gays/Lesbians, Bisexuals, and Heterosexuals

Sexual Abuse (%)

GLs	Bisexuals	Heterosexuals
29.7	34.9	14.8

Emotional Abuse (%)

GLs	Bisexuals	Heterosexuals
47.9	48.4	29.6

Physical Abuse (%)

GLs	Bisexuals	Heterosexuals
29.3	30.3	16.7

that adverse childhood experiences may be a significant—but not a determinative—factor in developing homosexual preferences. Further studies are needed to see whether either or both hypotheses have merit.

A 2010 study by professor of social and behavioral sciences Andrea Roberts and colleagues examined sexual orientation and risk of post-traumatic stress disorder (PTSD) using data from a national epidemiological face-to-face survey of nearly 35,000 adults.¹⁰⁷ Individuals were placed into several categories: heterosexual with no same-sex attraction or partners (reference group); heterosexual with same-sex attraction but no same-sex partners; heterosexual with same-sex partners; self-identified gay/lesbian; and self-identified bisexual. Among those reporting exposure to traumatic events, gay and lesbian individuals as well as bisexuals had about twice the lifetime risk of PTSD compared to the heterosexual reference group. Differences were found in rates of childhood maltreatment and interpersonal violence: gays, lesbians, bisexuals, and heterosexuals with same-sex partners reported experiencing worse traumas during childhood and adolescence than the reference group. The findings are summarized in Table 3.

Similar patterns emerged in a 2012 study by psychologist Brendan Zietsch and colleagues that primarily focused on the distinct question of whether common causal factors could explain the association between sexual orientation—in this study defined as sexual preference—and depression.¹⁰⁸ In a community sample of 9,884 adult twins, the authors found that non-heterosexuals had significantly elevated prevalence of lifetime depression (odds ratio for males 2.8; odds ratio for females 2.7). As the authors point out, the data raised questions about whether higher rates of depression for non-heterosexuals could be explained, in their entirety, by the social stress hypothesis (the idea, discussed in depth in Part Two of this report, that social stress

Table 3. Childhood Exposure to Maltreatment or Interpersonal Violence (before Age 18)

Women	Men
49.2% of lesbians	31.5% of gays
51.2% of bisexuals	Approximately 32% of bisexuals ¹⁰⁹
40.9% of heterosexuals with same-sex partners	27.9% of heterosexuals with same-sex partners
21.2% of heterosexuals	19.8% of heterosexuals

experienced by sexual minorities accounts for their elevated risks of poor mental health outcomes). Heterosexuals with a non-heterosexual twin had higher rates of depression (39%) than heterosexual twin pairs (31%), suggesting that genetic, familial, or other factors may play a role.

The authors note that “in both males and females, significantly higher rates of non-heterosexuality were found in participants who experienced childhood sexual abuse and in those with a risky childhood family environment.”¹¹⁰ Indeed, 41% of non-heterosexual males and 42% of non-heterosexual females reported childhood family dysfunction, compared to 24% and 30% of heterosexual males and females, respectively. And 12% of non-heterosexual males and 24% of non-heterosexual females reported sexual abuse before the age of 14, compared with 4% and 11% of heterosexual males and females, respectively. The authors are careful to emphasize that their findings should not be interpreted as disproving the social stress hypothesis, but suggest that there may be other factors at work. Their findings do, however, suggest there could be common etiological factors for depression and non-heterosexual preferences, as they found that genetic factors account for 60% of the correlation between sexual orientation and depression.¹¹¹

In a 2001 study, psychologist Marie E. Tomeo and colleagues noted that the previous literature had consistently found increased rates of reported childhood molestation in the homosexual population, with somewhere between 10% and 46% reporting that they had experienced childhood sexual abuse.¹¹² The authors found that 46% of homosexual men and 22% of homosexual women reported that they had been molested by a person of the same gender, as compared with 7% of heterosexual men and 1% of heterosexual women. Moreover, 38% of homosexual women interviewed did not identify as homosexual until after the abuse, while the authors report conflicting figures—68% in one part of the paper and (by inference) 32% in another—for the number of homosexual men who did not identify as homosexual until after the abuse. The sample for this study was relatively small, only 267 individuals; also, the “sexual contact” measure of abuse in the survey was somewhat vague, and the subjects were recruited from participants in gay pride events in California. But the authors state that “it is most unlikely that all the present findings apply only to homosexual persons who go to homosexual fairs and volunteer to participate in questionnaire research.”¹¹³

In 2010, psychologists Helen Wilson and Cathy S. Widom published a prospective 30-year follow-up study—one that looked at children who had experienced abuse or neglect between 1961 and 1971, and then followed up with those children after 30 years—to ascertain whether physical abuse, sexual abuse, or neglect in childhood increased the likelihood of same-sex

sexual relationships later in life.¹¹⁴ An original sample of 908 abused and/or neglected children was matched with a non-maltreated control group of 667 individuals (matched for age, sex, race or ethnicity, and approximate socioeconomic status). Homosexuality was operationalized as anyone who had cohabited with a same-sex romantic partner or had a same-sex sexual partner, which made up 8% of the sample. Among these 8%, most individuals also reported having had opposite-sex partners, suggesting high rates of bisexuality or fluidity in sexual attractions or behaviors. The study found that those who reported histories of childhood sexual abuse were 2.8 times more likely to report having had same-sex sexual relationships, though the “relationship between childhood sexual abuse and same-sex sexual orientation was significant only for men.”¹¹⁵ This finding suggested that boys who are sexually abused may be more likely to establish both heterosexual and homosexual relationships.

The authors advised caution in interpreting this result, because the sample size of sexually abused men was small, but the association remained statistically significant when they controlled for total lifetime number of sexual partners and for engaging in prostitution. The study was also limited by a definition of sexual orientation that was not sensitive to how participants identified themselves. It may have failed to capture people with same-sex attractions but no same-sex romantic relationship history. The study had two notable methodological strengths. The prospective design is better suited for evaluating causal relationships than the typical retrospective design. Also, the childhood abuse recorded was documented when it occurred, thus mitigating recall bias.

Having examined the statistical association between childhood sexual abuse and later homosexuality, we turn to the question of whether the association suggests causation.

A 2013 analysis by health researcher Andrea Roberts and colleagues attempted to provide an answer to this question.¹¹⁶ The authors noted that while studies show 1.6 to 4 times more reported childhood sexual and physical abuse among gay and lesbian individuals than among heterosexuals, conventional statistical methods cannot demonstrate a strong enough statistical relationship to support the argument of causation. They argued that a sophisticated statistical method called “instrumental variables,” imported from econometrics and economic analysis, could increase the level of association.¹¹⁷ (The method is somewhat similar to the method of “propensity scores,” which is more sophisticated and more familiar to public health researchers.) The authors applied the method of instrumental variables to data collected from a nationally representative sample.

They used three dichotomous measures of sexual orientation: any vs. no same-sex attraction; any vs. no lifetime same-sex sexual partners; and lesbian, gay, or bisexual vs. heterosexual self-identification. As in other studies, the data showed associations between childhood sexual abuse or maltreatment and all three dimensions of non-heterosexuality (attraction, partners, identity), with associations between sexual abuse and sexual identity being the strongest.

The authors' instrumental variable models suggested that early sexual abuse increased the predicted rate of same-sex attraction by 2.0 percentage points, same-sex partnering by 1.4 percentage points, and same-sex identity by 0.7 percentage points. The authors estimated the rate of homosexuality that might be attributable to sexual abuse "using effect estimates from conventional models" and found that on conventional effect estimates, "9% of same-sex attraction, 21% of any lifetime same-sex sexual partnering, and 23% of homosexual or bisexual identity was due to childhood sexual abuse."¹¹⁸ We should note that these correlations are cross-sectional: they compare groups of people to groups of people, rather than model the course of individuals over time. (A study design with a time-series analysis would give the strongest statistical support to the claim of causality.) Additionally, these results have been strongly criticized on methodological grounds for having made unjustified assumptions in the instrumental variables regression; a commentary by Drew H. Bailey and J. Michael Bailey claims, "Not only do Roberts et al.'s results fail to provide support for the idea that childhood maltreatment causes adult homosexuality, the pattern of differences between males and females is opposite what should be expected based on better evidence."¹¹⁹

Roberts and colleagues conclude their study with several conjectures to explain the epidemiological associations. They echo suggestions made elsewhere that sexual abuse perpetrated by men might cause boys to think they are gay or make girls averse to sexual contact with men. They also conjecture that sexual abuse might leave victims feeling stigmatized, which in turn might make them more likely to act in ways that are socially stigmatized (as by engaging in same-sex sexual relationships). The authors also point to the biological effects of maltreatment, citing studies that show that "quality of parenting" can affect chemical and hormonal receptors in children, and hypothesizing that this might influence sexuality "through epigenetic changes, particularly in the stria terminalis and the medial amygdala, brain regions that regulate social behavior."¹²⁰ They also mention the possibilities that emotional numbing caused by maltreatment may drive victims to seek out risky behaviors associated

with same-sex sexuality, or that same-sex attractions and partnering may result from “the drive for intimacy and sex to repair depressed, stressed, or angry moods,” or from borderline personality disorder, which is a risk factor in individuals who have been maltreated.¹²¹

In short, while this study suggests that sexual abuse may sometimes be a causal contributor to having a non-heterosexual orientation, more research is needed to elucidate the biological or psychological mechanisms. Without such research, the idea that sexual abuse may be a causal factor in sexual orientation remains speculative.

Distribution of Sexual Desires and Changes Over Time

However sexual desires and interests develop, there is a related issue that scientists debate: whether sexual desires and attractions tend to remain fixed and unalterable across the lifespan of a person—or are fluid and subject to change over time but tend to become fixed after a certain age or developmental period. Advocates of the “born that way” hypothesis, as mentioned earlier, sometimes argue that a person is not only born with a sexual orientation but that that orientation is immutable; it is fixed for life.

There is now considerable scientific evidence that sexual desires, attractions, behaviors, and even identities can, and sometimes do, change over time. For findings in this area we can turn to the most comprehensive study of sexuality to date, the 1992 National Health and Social Life Survey conducted by the National Opinion Research Center at the University of Chicago (NORC).¹²² Two important publications have appeared using data from NORC’s comprehensive survey: *The Social Organization of Sexuality: Sexual Practices in the United States*, a large tome of data intended for the research community, and *Sex in America: A Definitive Survey*, a smaller and more accessible book summarizing the findings for the general public.¹²³ These books present data from a reliable probability sample of the American population between ages 18 and 59.

According to data from the NORC survey, the estimated prevalence of non-heterosexuality, depending on how it was operationalized, and on whether the subjects were male or female, ranged between roughly 1% and 9%.¹²⁴ The NORC studies added scientific respectability to sexual surveys, and these findings have been largely replicated in the United States and abroad. For example, the British National Survey of Sexual Attitudes and Lifestyles (Natsal) is probably the most reliable source of information on sexual behavior in that country—a study conducted every ten years since 1990.¹²⁵

The NORC study also suggested ways in which sexual behaviors and identities can vary significantly under different social and environmental circumstances. The findings revealed, for example, a sizable difference in rates of male homosexual behavior among individuals who spent their adolescence in rural as compared to large metropolitan cities in America, suggesting the influence of social and cultural environments. Whereas only 1.2% of males who had spent their adolescence in a rural environment responded that they had had a male sexual partner in the year of the survey, those who had spent adolescence living in metropolitan areas were close to four times (4.4%) more likely to report that they had had such an encounter.¹²⁶ From these data one cannot infer differences between these environments in the prevalence of sexual interests or attractions, but the data do suggest differences in sexual behaviors. Also of note is that women who attended college were nine times more likely to identify as lesbians than women who did not.¹²⁷

Moreover, other population-based surveys suggest that sexual desire may be fluid for a considerable number of individuals, especially among adolescents as they mature through the early stages of adult development. In this regard, opposite-sex attraction and identity seem to be more stable than same-sex or bisexual attraction and identity. This is suggested by data from the National Longitudinal Study of Adolescent to Adult Health (the “Add Health” study discussed earlier). This prospective longitudinal study of a nationally representative sample of U.S. adolescents starting in grades 7–12 began during the 1994–1995 school year, and followed the cohort into young adulthood, with four follow-up interviews (referred to as Waves I, II, III, IV in the literature).¹²⁸ The most recent was in 2007–2008, when the sample was aged 24–32.

Same-sex or both-sex romantic attractions were quite prevalent in the study’s first wave, with rates of approximately 7% for the males and 5% for the females.¹²⁹ However, 80% of the adolescent males who had reported same-sex attractions at Wave I later identified themselves as exclusively heterosexual as young adults at Wave IV.¹³⁰ Similarly, for adolescent males who, at Wave I, reported romantic attraction to both sexes, over 80% of them reported no same-sex romantic attraction at Wave III.¹³¹ The data for the females surveyed were similar but less striking: for adolescent females who had both-sex attractions at Wave I, more than half reported exclusive attraction to males at Wave III.¹³²

J. Richard Udry, the director of Add Health for Waves I, II, and III,¹³³ was among the first to point out the fluidity and instability of romantic attraction between the first two waves. He reported that among boys who

reported romantic attraction *only* to boys and *never* to girls at Wave I, 48% did so during Wave II; 35% reported no attraction to either sex; 11% reported exclusively same-sex attraction; and 6% reported attraction to both sexes.¹³⁴

Ritch Savin-Williams and Geoffrey Ream published a 2007 analysis of the data from Waves I–III of Add Health.¹³⁵ Measures used included whether individuals ever had a romantic attraction for a given sex, sexual behavior, and sexual identity. (The categories for sexual identity were 100% heterosexual, mostly heterosexual but somewhat same-sex attracted, bisexual, mostly homosexual but somewhat attracted to opposite sex, and 100% homosexual.) While the authors noted the “stability of opposite-sex attraction and behavior” between Waves I and III, they found a “high proportion of participants with same- and both-sex attraction and behavior that migrated into opposite-sex categories between waves.”¹³⁶ A much smaller proportion of those in the heterosexual categories, and a similar proportion of those without attraction, moved to non-heterosexual categories. The authors summarize: “All attraction categories other than opposite-sex were associated with a lower likelihood of stability over time. That is, individuals reporting any same-sex attractions were more likely to report subsequent shifts in their attractions than were individuals without any same-sex attractions.”¹³⁷

The authors also note the difficulties these data present for trying to define sexual orientation and to classify individuals according to such categories: “the critical consideration is whether having ‘any’ same-sex sexuality qualifies as nonheterosexuality. How much of a dimension must be present to tip the scales from one sexual orientation to another was not resolved with the present data, only that such decisions matter in terms of prevalence rates.”¹³⁸ The authors suggested that researchers could “forsake the general notion of sexual orientation altogether and assess only those components relevant for the research question.”¹³⁹

Another prospective study by biostatistician Miles Ott and colleagues of 10,515 youth (3,980 males; 6,535 females) in 2013 showed findings on sexual orientation change in adolescents consistent with the findings of the Add Health data, again suggesting fluidity and plasticity of same-sex attractions among many adolescents.¹⁴⁰

A few years after the Add Health data were originally published, the *Archives of Sexual Behavior* published an article by Savin-Williams and Joyner that critiqued the Add Health data on sexual attraction change.¹⁴¹ Before outlining their critique, Savin-Williams and Joyner summarize the key Add Health findings: “in the approximately 13 years between Waves

I and IV, regardless of whether the measure was identical across waves (romantic attraction) or discrepant in words but not in theory (romantic attraction and sexual orientation identity), approximately 80% of adolescent boys and half of adolescent girls who expressed either partial or exclusive same-sex romantic attraction at Wave I ‘turned’ heterosexual (opposite-sex attraction or exclusively heterosexual identity) as young adults.”¹⁴² The authors propose three hypotheses to explain these discrepancies:

- (1) gay adolescents going into the closet during their young adult years;
- (2) confusion regarding the use and meaning of romantic attraction as a proxy for sexual orientation; and (3) the existence of mischievous adolescents who played a ‘jokester’ role by reporting same-sex attraction when none was present.¹⁴³

Savin-Williams and Joyner reject the first hypothesis but find support for the second and the third. With respect to the second hypothesis, they question the use of romantic attraction to operationalize sexual identity:

To help us assess whether the construct/measurement issue (romantic attraction versus sexual orientation identity) was driving results, we compared the two constructs at Wave IV... Whereas over 99% of young adults with opposite-sex romantic attraction identified as heterosexual or mostly heterosexual and 94% of those with same-sex romantic attraction identified as homosexual or mostly homosexual, 33% of both-sex attracted men identified as heterosexual (just 6% of both-sex attracted women identified as heterosexual). These data indicated that young adult men and women generally understood the meaning of romantic attraction to the opposite- or same-sex to imply a particular (and consistent) sexual orientation identity, with one glaring exception—a substantial subset of young adult men who, despite their stated both-sex romantic attraction, identified as heterosexual.

Regarding the third hypothesis for explaining the Add Health data, Savin-Williams and Joyner note that surveys of adolescents sometimes yield unusual or distorted results due to adolescents who do not respond truthfully. The Add Health survey, they observe, had a significant number of unusual responders. For example, several hundred adolescents reported in the Wave I questionnaire that they had an artificial limb, whereas in later at-home interviews, only two of those adolescents reported having an artificial limb.¹⁴⁴ Adolescent boys who went from nonheterosexual in Wave I to heterosexual in Wave IV were significantly less likely to report

having filled out the Wave I questionnaire honestly; these boys also displayed other significant differences, such as lower grade point averages. Additionally, like consistently heterosexual boys, boys who were inconsistent between Waves I and IV were more popular in their school with boys than girls, whereas consistently nonheterosexual boys were more popular with girls. These and other data¹⁴⁵ led the authors to conclude that “boys who emerged from a gay or bisexual adolescence to become a heterosexual young adulthood were, by-and-large, heterosexual adolescents who were either confused and did not understand the measure of romantic attraction or jokesters who decided, for reasons we were not able to detect, to dishonestly report their sexuality.”¹⁴⁶ However, the authors were not able to estimate the proportion of inaccurate responders, which would have helped evaluate the explanatory power of the hypotheses.

Later in 2014, the *Archives of Sexual Behavior* published a critique of the Savin-Williams and Joyner explanation of Add Health data by psychologist Gu Li and colleagues.¹⁴⁷ Along with criticizing the methodology of Savin-Williams and Joyner, these authors argued that the data were consistent with a scenario in which some nonheterosexual adolescents went “back into the closet” in later years as a possible reaction to social stress. (We will examine the effects of social stress on mental health in LGBT populations in Part Two of this report.) They also claimed that “it makes little sense to use responses to Wave IV sexual identity to validate or invalidate responses to Waves I or IV romantic attractions when these aspects of sexual orientation may not align in the first place.”¹⁴⁸ Regarding the jokester hypothesis, these authors pose this difficulty: “Although some participants might be ‘jokesters,’ and we as researchers should be cautious of problems associated with self-report surveys whenever analyzing and interpreting data, it is unclear why the ‘jokesters’ would answer questions about delinquency honestly, but not questions about their sexual orientation.”¹⁴⁹

Savin-Williams and Joyner published a response to the critique in the same issue of the journal.¹⁵⁰ Responding to the criticism that their comparison of Wave IV self-reported sexual identity to Wave I self-reported romantic attractions was unsound, Savin-Williams and Joyner claimed that the results were quite similar if one used attraction as the Wave IV measure. They also deemed it highly unlikely that a large proportion of the respondents who were classified as nonheterosexuals in Wave I and heterosexuals in Wave IV went “back into the closet,” because the proportion of individuals in adolescence and young adulthood who are “out of the closet” usually increases over time.¹⁵¹

The following year, the *Archives of Sexual Behavior* published another response to Savin-Williams and Joyner by psychologist Sabra Katz-Wise and colleagues, which argued that Savin-Williams and Joyner's "approach to identifying 'dubious' sexual minority youth is inherently flawed."¹⁵² They wrote that "romantic attraction and sexual orientation identity are two distinct dimensions of sexual orientation that may not be concordant, even at a single time point."¹⁵³ They also claimed that "even if Add Health had assessed the same facets of sexual orientation at all waves, it would still be incorrect to infer 'dubious' sexual minorities from changes on the same dimension of sexual orientation, because these changes may reflect sexual fluidity."¹⁵⁴

Unfortunately, the Add Health study does not appear to contain the data that would allow an assessment to determine which, if any, of these interpretations is likely to be correct. It may well be the case that a combination of factors contributed to the differences between the Wave I and Wave IV data. For example, there may have been some adolescents who responded to the Wave I sexual attraction questions inaccurately, some openly nonheterosexual adolescents who later went "back into the closet," and some adolescents who experienced nonheterosexual attractions before Wave I that largely disappeared by Wave IV. Other prospective study designs that track specific individuals across adolescent and adult development may shed further light on these issues.

While ambiguities in defining and characterizing sexual desire and orientation make changes in sexual desire difficult to study, data from these large, population-based national studies of randomly sampled individuals do suggest that all three dimensions of sexuality— affect, behavior, and identity— may change over time for some people. It is unclear, and current research does not address, whether and to what extent factors subject to volitional control— choice of sexual partners or sexual behaviors, for example— may influence such changes through conditioning and other mechanisms that are characterized in the behavioral sciences.

Several researchers have suggested that sexual orientation and attractions may be especially plastic for women.¹⁵⁵ For example, Lisa Diamond argued in her 2008 book *Sexual Fluidity* that "women's sexuality is fundamentally more fluid than men's, permitting greater variability in its development and expression over the life course," based on research by her and many others.¹⁵⁶

Diamond's longitudinal five-year interviews of women in sexual relationships with other women also shed light on the problems with the concept of sexual orientation. In many cases, the women in her study

reported not so much setting out to form a lesbian sexual relationship but rather experiencing a gradual growth of affective intimacy with a woman that eventually led to sexual involvement. Some of these women rejected the labels of “lesbian,” “straight,” or “bisexual” as being inconsistent with their lived experience.¹⁵⁷ In another study, Diamond calls into question the utility of the concept of sexual orientation, especially as it applies to females.¹⁵⁸ She points out that if the neural basis of parent-child attachment—including attachment to one’s mother—forms at least part of the basis for romantic attachments in adulthood, then it would not be surprising for a woman to experience romantic feelings for another woman without necessarily wanting to be sexually intimate with her. Diamond’s research indicates that these kinds of relationships form more often than we typically recognize, especially among women.

Some researchers have also suggested that men’s sexuality is more fluid than it was previously thought. For example, Diamond presented a 2014 conference paper, based on initial results from a survey of 394 people, entitled “I Was Wrong! Men Are Pretty Darn Sexually Fluid, Too!”¹⁵⁹ Diamond based this conclusion on a survey of men and women between the ages of 18 and 35, which asked about their sexual attractions and self-described identities at different stages of their lives. The survey found that 35% of self-identified gay men reported experiencing opposite-sex attractions in the past year, and 10% of self-identified gay men reported opposite-sex sexual behavior during the same period. Additionally, nearly as many men transitioned at some time in their life from gay to bisexual, queer, or unlabeled identity as did men from bisexual to gay identity.

In a 2012 review article entitled “Can We Change Sexual Orientation?” published in the *Archives of Sexual Behavior*, psychologist Lee Beckstead wrote, “Although their sexual behavior, identity, and attractions may change throughout their lives, this may not indicate a change in sexual orientation... but a change in awareness and an expansion of sexuality.”¹⁶⁰ It is difficult to know how to interpret this claim—that sexual behavior, identity, and attractions may change but that this does not necessarily indicate a change in sexual orientation. We have already analyzed the inherent difficulties of defining sexual orientation, but however one chooses to define this construct, it seems that the definition would somehow be tied to sexual behavior, identity, or attraction. Perhaps we can take Beckstead’s claim here as one more reason to consider dispensing with the construct of sexual orientation in the context of social science research, as it seems that whatever it might represent, it is only loosely or inconsistently tied to empirically measurable phenomena.

Given the possibility of changes in sexual desire and attraction, which research suggests is not uncommon, any attempt to infer a stable, innate, and fixed identity from a complex and often shifting *mélange* of inner fantasies, desires, and attractions—sexual, romantic, aesthetic, or otherwise—is fraught with difficulties. We can imagine, for example, a sixteen-year-old boy who becomes infatuated with a young man in his twenties, developing fantasies centered around the other’s body and build, or perhaps on some of his character traits or strengths. Perhaps one night at a party the two engage in physical intimacy, catalyzed by alcohol and by the general mood of the party. This young man then begins an anguished process of introspection and self-exploration aimed at finding the answer to the enigmatic question, “Does this mean I’m gay?”

Current research from the biological, psychological, and social sciences suggests that this question, at least as it is framed, makes little sense. As far as science can tell us, there is nothing “there” for this young man to discover—no fact of nature to uncover or to find buried within himself. What his fantasies, or his one-time liaison, “really mean” is subject to any number of interpretations: that he finds the male figure beautiful, that he was lonely and feeling rejected the night of the party and responded to his peer’s attentions and affections, that he was intoxicated and influenced by the loud music and strobe lights, that he does have a deep-seated sexual or romantic attraction to other men, and so on. Indeed, psychodynamic interpretations of such behaviors citing unconscious motivational factors and inner conflicts, many of them interesting, most impossible to prove, can be spun endlessly.

What we can say with more confidence is that this young man had an experience encompassing complex feelings, or that he engaged in a sexual act conditioned by multiple complex factors, and that such fantasies, feelings, or associated behaviors may (or may not) be subject to change as he grows and develops. Such behaviors could become more habitual with repetition and thus more stable, or they may extinguish and recur rarely or never. The research on sexual behaviors, sexual desire, and sexual identity suggests that both trajectories are real possibilities.

Conclusion

The concept of sexual orientation is unusually ambiguous compared to other psychological traits. Typically, it refers to at least one of three things: attractions, behaviors, or identity. Additionally, we have seen that sexual orientation often refers to several other things as well: belonging

to a certain community, fantasies (as distinct in some respects from attractions), longings, strivings, felt needs for certain forms of companionship, and so on. It is important, then, that researchers are clear about which of these domains are being studied, and that we keep in mind the researchers' specified definitions when we interpret their findings.

Furthermore, not only can the term "sexual orientation" be understood in several different senses, most of the senses are themselves complex concepts. Attraction, for example, could refer to arousal patterns, or to romantic feelings, or to desires for company, or other things; and each of these things can be present either sporadically and temporarily or pervasively and long-term, either exclusively or not, either in a deep or shallow way, and so forth. For this reason, even specifying one of the basic senses of orientation (attraction, behavior, or identity) is insufficient for doing justice to the richly varied phenomenon of human sexuality.

In this part we have criticized the common assumption that sexual *desires*, *attractions*, or *longings* reveal some innate and fixed feature of our biological or psychological constitution, a fixed sexual *identity* or *orientation*. Furthermore, we may have some reasons to doubt the common assumption that in order to live happy and flourishing lives, we must somehow discover this innate fact about ourselves that we call *sexuality* or *sexual orientation*, and invariably express it through particular patterns of sexual behavior or a particular life trajectory. Perhaps we ought instead to consider what sorts of behaviors—whether in the sexual realm or elsewhere—tend to be conducive to health and flourishing, and what kinds of behaviors tend to undermine a healthy and flourishing life.

Part Two

Sexuality, Mental Health Outcomes, and Social Stress

Compared to the general population, non-heterosexual and transgender subpopulations have higher rates of mental health problems such as anxiety, depression, and suicide, as well as behavioral and social problems such as substance abuse and intimate partner violence. The prevailing explanation in the scientific literature is the social stress model, which posits that social stressors—such as stigmatization and discrimination—faced by members of these subpopulations account for the disparity in mental health outcomes. Studies show that while social stressors do contribute to the increased risk of poor mental health outcomes for these populations, they likely do not account for the entire disparity.

Many of the issues surrounding sexual orientation and gender identity remain controversial among researchers, but there is general agreement on the observation at the heart of Part Two: lesbian, gay, bisexual, and transgender (LGBT) subpopulations are at higher risk, compared to the general population, of numerous mental health problems. Less certain are the causes of that increased risk and thus the social and clinical approaches that may help to ameliorate it. In this part we review some of the research documenting the increased risk, focusing on papers that are data-based with sound methodology, and that are widely cited in the scientific literature.

A robust and growing body of research examines the relationships between sexuality or sexual behaviors and mental health status. The first half of this part discusses the associations of sexual identities or behaviors with psychiatric disorders (such as mood disorders, anxiety disorders, and adjustment disorders), suicide, and intimate partner violence. The second half explores the reasons for the elevated risks of these outcomes among non-heterosexual and transgender populations, and considers what social science research can tell us about one of the most prevalent ways of explaining these risks, the social stress model. As we will see, social stressors such as harassment and stigma likely explain some but not all of the elevated mental health risks for these populations. More research

is needed to understand the causes of and potential solutions for these important clinical and public health issues.

Some Preliminaries

We turn first to the evidence for the statistical links between sexual identities or behaviors and mental health outcomes. Before summarizing the relevant research, we should mention the criteria used in selecting the studies reviewed. In an attempt to distill overall findings of a large body of research, each section begins by summarizing the most extensive and reliable meta-analyses—papers that compile and analyze the statistical data from the published research literature. For some areas of research, no comprehensive meta-analyses have been conducted, and in these areas we rely on review articles that summarize the research literature without going into quantitative analyses of published data. In addition to reporting these summaries, we also discuss a few select studies that are of particular value because of their methodology, sample size, controls for confounding factors, or ways in which concepts such as heterosexuality or homosexuality are operationalized; and we discuss key studies published after the meta-analyses or review articles were published.

As we showed in Part One, explaining the exact biological and psychological origins of sexual desires and behaviors is a difficult scientific task, one that has not yet been and may never be satisfactorily completed. However, researchers can study the correlations between sexual behavior, attraction, or identity and mental health outcomes, though there may be—and often are found to be—differences between how sexual behavior, attraction, and identity relate to particular mental health outcomes. Understanding the scope of the health challenges faced by individuals who engage in particular sexual behaviors or experience certain sexual attractions is a necessary step in providing these individuals with the care they need.

Sexuality and Mental Health

In a 2008 meta-analysis of research on mental health outcomes for non-heterosexuals, University College London professor of psychiatry Michael King and colleagues concluded that gays, lesbians, and bisexuals face “higher risk of suicidal behaviour, mental disorder and substance misuse and dependence than heterosexual people.”¹ This survey of the literature examined papers published between January 1966 and April 2005 with data from 214,344 heterosexual and 11,971 non-heterosexual individuals.

The large sample size allowed the authors to generate estimates that are highly reliable, as indicated by the relatively small confidence intervals.²

Compiling the risk ratios found in these papers, the authors estimated that lesbian, gay, and bisexual individuals had a 2.47 times higher lifetime risk than heterosexuals for suicide attempts,³ that they were about twice as likely to experience depression over a twelve-month period,⁴ and approximately 1.5 times as likely to experience anxiety disorders.⁵ Both non-heterosexual men and women were found to be at an elevated risk for substance abuse problems (1.51 times as likely),⁶ with the risk for non-heterosexual women especially high—3.42 times higher than for heterosexual women.⁷ Non-heterosexual men, on the other hand, were at a particularly high risk for suicide attempts: while non-heterosexual men and women together were at a 2.47 times greater risk of suicide attempts over their lifetimes, non-heterosexual men were found to be at a 4.28 times greater risk.⁸

These findings have been replicated in other studies, both in the United States and internationally, confirming a consistent and alarming pattern. However, there is considerable variation in the estimates of the increased risks of various mental health problems, depending on how researchers define terms such as “homosexual” or “non-heterosexual.” The findings from a 2010 study by Northern Illinois University professor of nursing and health studies Wendy Bostwick and colleagues examined associations of sexual orientation with mood and anxiety disorders among men and women who either identified as gay, lesbian, or bisexual, or who reported engaging in same-sex sexual behavior, or who reported feeling same-sex attractions. The study employed a large, U.S.-based random population sample, using data collected from the 2004–2005 wave of the National Epidemiologic Survey on Alcohol and Related Conditions, which was based on 34,653 interviews.⁹ In its sample, 1.4% of respondents identified as lesbian, gay, or bisexual; 3.4% reported some lifetime same-sex sexual behavior; and 5.8% reported non-heterosexual attractions.¹⁰

Women who identified as lesbian, bisexual, or “not sure” reported higher rates of lifetime mood disorders than women who identified as heterosexual: the prevalence was 44.4% in lesbians, 58.7% in bisexuals, and 36.5% in women unsure of their sexual identity, as compared to 30.5% in heterosexuals. A similar pattern was found for anxiety disorders, with bisexual women experiencing the highest prevalence, followed by lesbians and those unsure, and heterosexual women experiencing the lowest prevalence. Examining the data for women with different sexual *behavior* or sexual *attraction* (rather than identity), those reporting sexual behavior

with or attractions to both men and women had a higher rate of lifetime disorders than women who reported exclusively heterosexual or homosexual behaviors or attractions, and women reporting exclusive same-sex sexual behavior or exclusive same-sex attraction in fact had the *lowest* rates of lifetime mood and anxiety disorders.¹¹

Men who identified as gay had more than double the prevalence of lifetime mood disorders compared to men who identified as heterosexual (42.3% vs. 19.8%), and more than double the rate of any lifetime anxiety disorder (41.2% vs. 18.6%), while those who identified as bisexual had a slightly lower prevalence of mood disorders (36.9%) and anxiety disorders (38.7%) than gay men. When looking at sexual attraction or behavior for men, those who reported sexual attraction to “mostly males” or sexual behavior with “both females and males” had the highest prevalence of lifetime mood disorders and anxiety disorders compared to other groups, while those reporting exclusively heterosexual attraction or behavior had the lowest prevalence of any group.

Other studies have found that non-heterosexual populations are at a higher risk of physical health problems in addition to mental health problems. A 2007 study by UCLA professor of epidemiology Susan Cochran and colleagues examined data from the California Quality of Life Survey of 2,272 adults to assess links between sexual orientation and self-reported physical health status, health conditions, and disability, as well as psychological distress among lesbians, gay men, bisexuals, and those they classified as “homosexually experienced heterosexual individuals.”¹² While the study, like most, was limited by the use of self-reporting of health conditions, it had several strengths: it studied a population-based sample; it separately measured identity and behavioral dimensions of sexual orientation; and it controlled for race (ethnicity), education, relationship status, and family income, among other factors.

While the authors of this study found a number of health conditions that appeared to have elevated prevalence among non-heterosexuals, after adjusting for demographic factors that are potential confounders the only group with significantly greater prevalence of non-HIV physical health conditions was bisexual women, who were more likely to have health problems than heterosexual women. Consistent with the 2010 study by Bostwick and colleagues, higher rates of psychological stress were reported by lesbians, bisexual women, gay men, and homosexually experienced heterosexual men, both before and after adjusting for demographic confounding. Among men, self-identified gay and homosexually experienced heterosexual respondents reported the highest rates of several health problems.

Using the same California Quality of Life Survey, a 2009 study by UCLA professor of psychiatry and biobehavioral sciences Christine Grella and colleagues (including Cochran) examined the relationship between sexual orientation and receiving treatment for substance use or mental disorders.¹³ They used a population-based sample, with sexual minorities oversampled to provide more statistical power to detect group differences. The usage of treatment was classified according to whether or not respondents reported receiving treatment in the preceding twelve months for “emotional, mental health, alcohol or other drug problems.” Sexual orientation was operationalized by a combination of behavioral history and self-identification. For example, they grouped together as “gay/bisexual” or “lesbian/bisexual” both those who identified as gay, lesbian, or bisexual, and those who had reported same-sex sexual behaviors. They found that women who were lesbian or bisexual were most likely to have received treatment, followed by men who were gay or bisexual, then heterosexual women, with heterosexual men being the least likely group to have reported receiving treatment. Overall, more than twice as many LGB individuals, compared to heterosexuals, had reported receiving treatment in the past twelve months (48.5% compared to 22.5%). The pattern was similar for men and women; 42.5% of homosexual men, compared to 17.1% of heterosexual men, had reported receiving treatment, while 55.3% of lesbian and bisexual women and 27.1% of heterosexual women reported receiving treatment. (Bostwick and colleagues had found that women with exclusively same-sex attractions and behaviors had a lower prevalence of mood and anxiety disorders compared to heterosexual women. The difference in results could be due to the fact that Grella and colleagues grouped those who identified as lesbians together with those who identified as bisexuals or who reported same-sex sexual behavior.)

A 2006 study by Columbia University psychiatry professor Theodorus Sandfort and colleagues examined a representative, population-based sample from the second Dutch National Survey of General Practice, carried out in 2001, to assess links between self-reported sexual orientation and health status among 9,511 participants, of whom 0.9% were classified as bisexual and 1.5% as gay or lesbian.¹⁴ To operationalize sexual orientation, the researchers asked respondents about their sexual preference on a 5-point scale: exclusively women, predominantly women, equally men and women, predominantly men, and exclusively men. Only those who reported an equal preference for men and women were classified as bisexual, while men reporting predominant preferences for women, or women reporting a predominant preference for men were classified as heterosexual. They

found that gay, lesbian, and bisexual respondents reported experiencing higher numbers of acute mental health problems and reported worse general mental health than heterosexuals. The results for physical health were mixed, however: lesbian and gay respondents reported experiencing more acute physical symptoms (such as headaches, back pain, or sore throats) over the past fourteen days, though they did not report experiencing two or more such symptoms any more than heterosexuals.

Lesbian and gay respondents were more likely to report chronic health problems, though bisexual men (that is, men who reported an equal sexual preference for men and women) were less likely to report chronic health problems and bisexual women were no more likely than heterosexual women to do so. The researchers did not find a statistically significant relationship between sexual orientation and overall physical health. After controlling for the possible confounding effects of mental health problems on the reporting of physical health problems, the researchers also found that the statistical effect of reporting a gay or lesbian sexual preference on chronic and acute physical conditions disappeared, though the effect of bisexual preference remained.

The Sandfort study defined sexual orientation in terms of preference or attraction without reference to behavior or self-identification, which makes it a challenge to compare its results to the results of studies that operationalize sexual orientation differently. For example, it is difficult to compare the findings of this study regarding bisexuals (defined as men or women who report an equal sexual preference for men and women) with the findings of other studies regarding “homosexually experienced heterosexual individuals” or those who are “unsure” of their sexual identity. As in most of these types of studies, the health assessments were self-reported, which may make the results somewhat unreliable. But this study also has several strengths: it used a large and representative sample of a country’s population, as opposed to the convenience samples that are sometimes used for these kinds of studies, and this sample included a sufficient number of gays and lesbians for their data to be treated in separate groups in the study’s statistical analyses. Only three people in the sample reported HIV infection, so this did not appear to be a potential confounding factor, though HIV could have been underreported.

In an effort to summarize findings in this area, we can cite the 2011 report from the Institute of Medicine (IOM), *The Health of Lesbian, Gay, Bisexual, and Transgender People*.¹⁵ This report is an extensive review of scientific literature citing hundreds of studies that examine the health status of LGBT populations. The authors are scientists who are well versed

in these issues (although we wish there had been more involvement of experts in psychiatry). The report reviews findings on physical and mental health in childhood, adolescence, early and middle adulthood, and late adulthood. Consistent with the studies cited above, this report reviews evidence showing that, compared with heterosexual youth, LGB youth are at a higher risk of depression, as well as suicide attempts and suicidal ideation. They are also more likely to experience violence and harassment and to be homeless. LGB individuals in early or middle adulthood are more prone to mood and anxiety disorders, depression, suicidal ideation, and suicide attempts.

The IOM report shows that, like LGB youth, LGB adults—and women in particular—appear to be likelier than heterosexuals to smoke, use or abuse alcohol, and abuse other drugs. The report cites a study¹⁶ that found that self-identified non-heterosexuals used mental health services more often than heterosexuals, and another¹⁷ that found that lesbians used mental health services at higher rates than heterosexuals.

The IOM report notes that “more research has focused on gay men and lesbians than on bisexual and transgender people.”¹⁸ The relatively few studies focusing on transgender populations show high rates of mental disorders, but the use of nonprobability samples and the lack of non-transgender controls call into question the validity of the studies.¹⁹ Although some studies have suggested that the use of hormone treatments may be associated with negative physical health outcomes among transgender populations, the report notes that the relevant research has been “limited” and that “no clinical trials on the subject have been conducted.”²⁰ (Health outcomes for transgender individuals will be further discussed below in this part and also in Part Three.)

The IOM report claims that the evidence that LGBT populations have worse mental and physical health outcomes is not fully conclusive. To support this claim, the IOM report cites a 2001 study²¹ of mental health in 184 sister pairs in which one sister was lesbian and the other heterosexual. The study found no significant differences in rates of mental health problems, and found significantly higher self-esteem in the lesbian sisters. The IOM report also cites a 2003 study²² that found no significant differences between heterosexual and gay or bisexual men in general happiness, perceived health, and job satisfaction. Acknowledging these caveats and the studies that do not support the general trend, the vast majority of studies cited in the report point to a generally higher risk of poor mental health status in LGBT populations compared to heterosexual populations.

Sexuality and Suicide

The association between sexual orientation and suicide has strong scientific support. This association merits particular attention, since among all the mental health risks, the increased risk of suicide is the most concerning, owing in part to the fact that the evidence is robust and consistent, and in part to the fact that suicide is so devastating and tragic for the person, family, and community. A better understanding of the risk factors for suicide could allow us, quite literally, to save lives.²³

Sociologist and suicide researcher Ann Haas and colleagues published an extensive review article in 2011 based on the results of a 2007 conference sponsored by the Gay and Lesbian Medical Association, the American Foundation for Suicide Prevention, and the Suicide Prevention Resource Center.²⁴ They also examined studies reported since the 2007 conference. For the purposes of their report, the authors defined sexual orientation as “sexual self-identification, sexual behavior, and sexual attraction or fantasy.”²⁵

Haas and colleagues found the association between homosexual or bisexual orientation and suicide attempts to be well supported by data. They noted that population-based surveys of U.S. adolescents since the 1990s indicate that suicide attempts are two to seven times more likely in high school students who identify as LGB, with sexual orientation being a stronger predictor in males than females. They reviewed data from New Zealand that suggested that LGB individuals were six times more likely to have attempted suicide. They cited health-related surveys of U.S. men and Dutch men and women showing same-sex behavior linked to higher risk of suicide attempts. Studies cited in the report show that lesbian or bisexual women are likelier, on average, to experience suicidal ideation, that gay or bisexual men are more likely, on average, to attempt suicide, and that lifetime suicide attempts among non-heterosexuals are greater in men than in women.

Examining studies that looked at rates of mental disorders in relation to suicidal behavior, Haas and colleagues discussed a New Zealand study²⁶ showing that gay people reporting suicide attempts had higher rates of depression, anxiety, and conduct disorder. Large-scale health surveys suggested that rates of substance abuse are up to one third higher for the LGB subpopulation. Combined worldwide studies showed up to 50% higher rates of mental disorders and substance abuse among persons self-identifying in surveys as lesbian, gay, or bisexual. Lesbian or bisexual women showed higher levels of substance abuse, while gay or bisexual men had higher rates of depression and panic disorder.

Haas and colleagues also examined transgender populations, noting that scant information is available about transgender suicides but that the existing studies indicate a dramatic increased risk of completed suicide. (These findings are noted here but examined in more detail in Part Three.) A 1997 clinical study²⁷ estimated elevated risks of suicide for Dutch male-to-female transsexual individuals on hormone therapy, but found no significant differences in overall mortality. A 1998 international review of 2,000 persons receiving sex-reassignment surgery identified 16 possible suicides, an “alarmingly high rate of 800 suicides for every 100,000 post-surgery transsexuals.”²⁸ In a 1984 study, a clinical sample of transgender individuals requesting sex-reassignment surgery showed suicide attempt rates between 19% and 25%.²⁹ And a large sample of 40,000 mostly U.S. volunteers completing an Internet survey in 2000 found transgender persons to report higher rates of suicide attempts than any group except lesbians.³⁰

Finally, the review by Haas and colleagues suggests that it is not clear which aspects of sexuality (identity, attraction, behavior) are most closely linked with the risk of suicidal behavior. The authors cite a 2010 study³¹ showing that adolescents identifying as heterosexual while reporting same-sex attraction or behavior did not have significantly higher suicide rates than other self-identified heterosexuals. They also cite the large national survey of U.S. adults conducted by Wendy Bostwick and colleagues (discussed earlier),³² which showed mood and anxiety disorders—key risk factors for suicidal behavior—more closely related to sexual self-identity than to behavior or attraction, especially for women.

A more recent critical review of existing studies of suicide risk and sexual orientation was presented by Austrian clinical psychologist Martin Plöderl and colleagues.³³ This review rejects several hypotheses developed to account for the increased suicide risk among non-heterosexuals, including biases in self-reporting and failures to measure suicide attempts accurately. The review argues that methodological improvements in studies since 1997 have provided control groups, better representativeness of study samples, and more clarity in defining both suicide attempts and sexual orientation.

The review mentions a 2001 study³⁴ by Ritch Savin-Williams, a Cornell University professor of developmental psychology, that reported no statistically significant difference between heterosexual and LGB youths after eliminating false-positive reports of suicide attempts and blaming a “‘suffering suicidal’ script” for leading to an over-reporting of suicidal behavior among gay youths. Plöderl and colleagues argue, however, that

the Savin-Williams study's finding that there was no statistically significant difference between the suicide rates of LGB and heterosexual youths might be attributable to the small sample size, which yielded low statistical power.³⁵ The later work has not replicated this finding. Subsequent questionnaire or interview-based studies with stricter definitions of suicide attempts have found significantly increased rates of suicide attempts among non-heterosexuals. Several large-scale surveys of young people have found that the elevated risk of reported suicidal behavior increased with the severity of the attempts.³⁶ Finally, according to Plöderl and colleagues, comparing results of questionnaires with clinical interviews indicates that homosexual youth are less likely to over-report suicide attempts in surveys than heterosexual youth.

Plöderl and colleagues concluded that among psychiatric patients, homosexual or bisexual populations are over-represented in "serious suicide attempts," and that sexual orientation is one of the strongest predictors of suicide. Similarly, in nonclinical population-based studies, non-heterosexual status is found to be one of the strongest predictors of suicide attempts. The authors note:

The most exhaustive collation of published and unpublished international studies on the association of suicide attempts and sexual orientation with different methodologies has produced a very consistent picture: nearly all studies found increased incidences of self-reported suicide attempts among sexual minorities.³⁷

In acknowledging the challenges of all such research, the authors suggest that "the major problem remains as to where one draws the line between a heterosexual or non-heterosexual orientation."³⁸

A 1999 study by Richard Herrell and colleagues analyzed 103 middle-aged male twin pairs from the Vietnam Era Twin Registry in Hines, Illinois, in which one twin, but not the other, reported having a male sex partner after the age of 18.³⁹ The study adopted several measures of suicidality and controlled for potential confounding factors such as substance abuse or depression. It found a "substantially increased lifetime prevalence of suicidal symptoms" in male twins who had sex with men compared with co-twins who did not, independent of the potential confounding effects of drug and alcohol abuse.⁴⁰ Though it is a relatively small study and relied on self-reporting for both same-sex behaviors and suicidal thoughts or behaviors, it is notable for using a probability sample (which eliminates selection bias), and for using the co-twin control method (which reduces the effects of genetics, age, race, and the like).

The study looked at middle-aged men; what the implications might be for adolescents is not clear.

In a 2011 study, Robin Mathy and colleagues analyzed the impact of sexual orientation on suicide rates in Denmark during the first twelve years after the legalization of same-sex registered domestic partnerships (RDPs) in that country, using data from death certificates issued between 1990 and 2001 as well as Danish census population estimates.⁴¹ The researchers found that the age-adjusted suicide rate for same-sex RDP men was nearly eight times the rate for men in heterosexual marriages, and nearly twice the rate for men who had never married. For women, RDP status had a small, statistically insignificant effect on suicide mortality risk, and the authors conjectured that the impact of HIV status on the health of gay men might have contributed to this difference between the results for men and women. The study is limited by the fact that RDP status is an indirect measure of sexual orientation or behavior, and does not include those gays and lesbians who are not in a registered domestic partnership; the study also excluded individuals under the age of 18. Finally, the absolute number of individuals with current or past RDP status was relatively small, which may limit the study's conclusions.

Professor of pediatrics Gary Remafedi and colleagues published a 1991 study that looked at 137 males age 14–21 who self-identified as gay (88%) or bisexual (12%). Remafedi and colleagues attempted, with a case-controlled approach, to examine which factors for this population were most predictive of suicide.⁴² Compared to those who did not attempt suicide, those who did were significantly more likely to label themselves and identify publicly as bisexual or homosexual at younger ages, report sexual abuse, and report illicit drug use. The authors noted that the likelihood of a suicide attempt “diminished with advancing age at the time of bisexual or homosexual self-labeling.” Specifically, “with each year’s delay in self-identification, the odds of a suicide attempt declined by more than 80%.”⁴³ This study is limited by using a relatively small nonprobability sample, though the authors note that its result comports with their previous finding⁴⁴ of an inverse relationship between psychosocial problems and the age at which one identifies as homosexual.

In a 2010 study, Plöderl and colleagues solicited self-reported suicide attempts among 1,382 Austrian adults to confirm existing evidence that homosexual and bisexual individuals are at higher risk.⁴⁵ To sharpen the results, the authors developed more rigorous definitions of “suicide attempts” and assessed multiple dimensions of sexual orientation, distinguishing among sexual fantasies, preferred partners, self-identification,

recent sexual behavior, and lifetime sexual behavior. This study found an increased risk for suicide attempts for sexual minorities along all dimensions of sexual orientation. For women, the risk increases were largest for those with homosexual behaviors; for men, they were largest for homosexual or bisexual behavior in the previous twelve months and self-identification as homosexual or bisexual. Those reporting being unsure of their identity reported the highest percentage of suicide attempts (44%), although this group was small, comprising less than 1% of participants.

A 2016 meta-analysis by University of Toronto graduate student Travis Salway Hottes and colleagues aggregated data from thirty cross-sectional studies on suicide attempts that together included 21,201 sexual minority adults.⁴⁶ These studies used either population-based sampling or community-based sampling. Since each sampling method has its own strengths and potential biases,⁴⁷ the researchers wanted to examine any differences in the rates of attempted suicide between the two sampling types. Of the LGB respondents to population-based surveys, 11% reported having attempted suicide at least once, compared to 4% of heterosexual respondents to these surveys.⁴⁸ Of the LGB respondents to community-based surveys, 20% reported having attempted suicide.⁴⁹ Statistical analysis showed that the difference in the sampling methods accounted for 33% of the variation in the suicide figures reported by the studies.

The research on sexuality and the risk of suicide suggests that those who identify as gay, lesbian, bisexual, or transgender, or those who experience same-sex attraction or engage in same-sex sexual behavior are at substantially increased risk of suicidal ideation, suicide attempts, and completed suicide. In the section later in Part Two on the social stress model, we will examine—and raise questions about—one set of arguments put forward to explain these findings. Given the tragic consequences of inadequate or incomplete information in these matters and its effect on public policy and clinical care, more research into the reasons for elevated suicide risk among sexual minorities is desperately needed.

Sexuality and Intimate Partner Violence

Several studies have examined the differences between rates of intimate partner violence (IPV) in same-sex couples and opposite-sex couples. The research literature examines rates of IPV *victimization* (being subjected to violence by a partner) and rates of IPV *perpetration* (committing violence against a partner). In addition to physical and sexual violence, some studies also examine psychological violence, which comprises verbal attacks,

threats, and similar forms of abuse. The weight of evidence indicates that the rate of intimate partner violence is significantly higher among same-sex couples.

In 2014, London School of Hygiene and Tropical Medicine researcher Ana Buller and colleagues conducted a systematic review of 19 studies (with a meta-analysis of 17 of these studies) examining associations between intimate partner violence and health among men who have sex with men.⁵⁰ Combining the available data, they found that the pooled lifetime prevalence of any IPV was 48% (estimates from the studies were quite heterogeneous, ranging from 32% to 82%). For IPV within the previous five years, pooled prevalence was 32% (estimates ranging from 16% to 51%). IPV victimization was associated with increased rates of substance use (pooled odds ratio of 1.9), positive HIV status (pooled odds ratio of 1.5), and increased rates of depressive symptoms (pooled odds ratio of 1.5). IPV perpetration was also associated with increased rates of substance use (pooled odds ratio of 2.0). An important limitation of this meta-analysis was that the number of studies it included was relatively small. Also, the heterogeneity of the studies' results may undermine the precision of the meta-analysis. Further, most of the reviewed studies used convenience samples rather than probabilistic samples, and they used the word "partner" without distinguishing long-term relationships from casual encounters.

English psychologists Sabrina Nowinski and Erica Bowen conducted a 2012 review of 54 studies on the prevalence and correlates of intimate partner violence victimization among heterosexual and gay men.⁵¹ The studies showed rates of IPV victimization for gay men ranging from 15% to 51%. Compared to heterosexual men, the review reports, "it appears that gay men experienced more total and sexual IPV, slightly less physical IPV, and similar levels of psychological IPV."⁵² The authors also report that according to estimates of IPV prevalence over the most recent twelve months, gay men "experienced less physical, psychological and sexual IPV" than heterosexual men, though the relative lack of twelve-month estimates may make this result unreliable. The authors note that "one of the most worrying findings is the prevalence of severe sexual coercion and abuse in male same-gender relationships,"⁵³ citing a 2005 study⁵⁴ on IPV in HIV-positive gay men. Nowinski and Bowen found positive HIV status to be associated with IPV in both gay and heterosexual relationships. An important limitation of their review is the fact that many of the same-sex IPV studies they examined were based on small convenience samples.

Catherine Finneran and Rob Stephenson of Emory University in 2012 conducted a systematic review of 28 studies examining IPV among men

who have sex with men.⁵⁵ Every study in the review estimated rates of IPV for gay men that were similar to or higher than those for all women regardless of sexual orientation. The authors conclude that “the emergent evidence reviewed here demonstrates that IPV—psychological, physical, and sexual—occurs in male-male partnerships at alarming rates.”⁵⁶ Physical IPV victimization was reported most frequently, with rates ranging from 12% to 45%.⁵⁷ The rate of sexual IPV victimization ranged from 5% to 31%, with 9 out of 19 studies reporting rates over 20%. Psychological IPV victimization was recorded in six studies, with rates ranging from 5% to 73%.⁵⁸ Perpetration of physical IPV was reported in eight studies, with rates ranging from 4% to 39%. Rates of perpetration of sexual IPV ranged from 0.7% to 28%; four of the five studies reviewed reported rates of 9% or more. Only one study measured perpetration of psychological violence, and the estimated prevalence was 78%. Lack of consistent research design among the studies examined (for example, some differences regarding the exact definition of IPV, the correlates of IPV examined, and the recall periods used to measure violence) makes it impossible to calculate a pooled prevalence estimate, which would be useful given the lack of a national probability-based sample.

A 2013 study by UCLA’s Naomi Goldberg and Ilan Meyer used a large probability sample of almost 32,000 individuals from the California Health Interview Survey to assess differences in intimate partner violence between various cohorts: heterosexual; self-identified gay, lesbian, and bisexual individuals; and men who have sex with men but did not identify as gay or bisexual, and women who have sex with women but did not identify as lesbian or bisexual.⁵⁹ All three LGB groups had greater lifetime and one-year prevalence of intimate partner violence than the heterosexual group, but this difference was only statistically significant for bisexual women and gay men. Bisexual women were more likely to have experienced lifetime IPV (52% of bisexual women vs. 22% of heterosexual women and 32% of lesbians) and to have experienced IPV in the preceding year (27% of bisexuals vs. 5% of heterosexuals and 10% of lesbians). For men, all three non-heterosexual groups had higher rates of lifetime and one-year IPV, but this was only statistically significant for gay men, who were more likely to have experienced IPV over a lifetime (27% of gay men vs. 11% of heterosexual men and 19.6% of bisexual men) and over the preceding year (12% of gay men vs. 5% of heterosexual men and 9% of bisexual men). The authors also tested whether binge drinking and psychological distress could explain the higher prevalence of IPV victimization in gay men and bisexual women; controlling for these

variables revealed that they did not. This study is limited by the fact that other potentially confounding psychological variables (besides drinking and distress) were not controlled for, statistically or otherwise, and may have accounted for the findings.

To estimate the prevalence of battering victimization among gay partners, AIDS-prevention researcher Gregory Greenwood and colleagues published a 2002 study based on telephone interviews with a probability-based sample of 2,881 men who have sex with men (MSM) in four cities from 1996 to 1998.⁶⁰ Of those interviewed, 34% reported experiencing psychological or symbolic abuse, 22% reported physical abuse, and 5% reported sexual abuse. Overall, 39% reported some type of battering victimization, and 18% reported more than one type of battering in the previous five years. Men younger than 40 were significantly more likely than men over 60 to report battering violence. The authors conclude that “the prevalence of battering within the context of intimate partner relationships was very high” among their sample of men who have sex with men, and that since lifetime rates are usually higher than those for a five-year recall, “it is likely that a substantially greater number of MSM than of heterosexual men have experienced lifetime victimization.”⁶¹ The five-year prevalence of physical battering among this sample of urban MSM was also “significantly higher” than the annual rate of severe violence (3%) or total violence (12%) experienced in a representative sample of heterosexual women living with men, suggesting that the estimates of battering victimization for MSM in this study “are higher than or comparable to those reported for heterosexual women.”⁶² This study was limited by its use of a sample from four cities, so it is not clear how well the results generalize to non-urban settings.

Transgender Health Outcomes

The research literature for mental health outcomes in transgender individuals is more limited than the research on mental health outcomes in LGB populations. Because people identifying as transgender make up a very small proportion of the population, large population-based surveys and studies of such individuals are difficult if not impossible to conduct. Nevertheless, the limited available research strongly suggests that transgender people have increased risks of poor mental health outcomes. It appears that the rates of co-occurring substance use disorders, anxiety disorders, depression, and suicide tend to be higher for transgender people than for LGB individuals.

In 2015, Harvard pediatrics professor and epidemiologist Sari Reisner and colleagues conducted a retrospective matched-pair cohort study of mental health outcomes for 180 transgender subjects aged 12–29 years (106 female-to-male and 74 male-to-female), matched to non-transgender controls based on gender identity.⁶³ Transgender youth had an elevated risk of depression (50.6% vs. 20.6%)⁶⁴ and anxiety (26.7% vs. 10.0%).⁶⁵ Transgender youth also had higher risk of suicidal ideation (31.1% vs. 11.1%),⁶⁶ suicide attempts (17.2% vs. 6.1%),⁶⁷ and self-harm without lethal intent (16.7% vs. 4.4%)⁶⁸ relative to the matched controls. A significantly greater proportion of transgender youth accessed inpatient mental health care (22.8% vs. 11.1%)⁶⁹ and outpatient mental health care (45.6% vs. 16.1%)⁷⁰ services. No statistically significant differences in mental health status were observed when comparing female-to-male transgender individuals to the male-to-female transgender individuals after adjusting for age, race/ethnicity, and hormone use.

This study had the merit of including individuals who presented to a community-based health clinic, and who thus were not identified solely as meeting the diagnostic criteria for gender identity disorder in the fourth edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*, and were not selected from a population of patients presenting to a clinic for treatment of gender identity issues. However, Reisner and colleagues note that their study has the limitations typically found in the retrospective chart review study design, such as incomplete documentation and variation in the quality of information recorded by medical professionals.

A report from the American Foundation for Suicide Prevention and the Williams Institute, a think tank for LGBT issues at the UCLA School of Law, summarized findings on suicide attempts among transgender and gender-nonconforming adults from a large national sample of over 6,000 individuals.⁷¹ This constitutes the largest study of transgender and gender-nonconforming adults to date, though it used a convenience sample rather than a population-based sample. (Large population-based samples are nearly impossible given the low overall prevalence in the general population of transgendered individuals.) Summarizing the major findings of this study, the authors write:

The prevalence of suicide attempts among respondents to the National Transgender Discrimination Survey (NTDS), conducted by the National Gay and Lesbian Task Force and National Center for Transgender Equality, is 41 percent, which vastly exceeds the 4.6

percent of the overall U.S. population who report a lifetime suicide attempt, and is also higher than the 10–20 percent of lesbian, gay and bisexual adults who report ever attempting suicide.⁷²

The authors note that “respondents who said they had received transition-related health care or wanted to have it someday were more likely to report having attempted suicide than those who said they did not want it,” however, “the survey did not provide information about the timing of reported suicide attempts in relation to receiving transition-related health care, which precluded investigation of transition-related explanations for these patterns.”⁷³ The survey data suggested associations between suicide attempts, co-occurring mental health disorders, and experiences of discrimination or mistreatment, although the authors note some limitations of these outcomes: “The survey data did not allow us to determine a direct causal relationship between experiencing rejection, discrimination, victimization, or violence, and lifetime suicide attempts,” although they did find evidence that stressors interacted with mental health factors “to produce a marked vulnerability to suicidal behavior in transgender and gender non-conforming individuals.”⁷⁴

A 2001 study by Kristen Clements-Nolle and colleagues of 392 male-to-female and 123 female-to-male transgender persons found that 62% of the male-to-female and 55% of the female-to-male transgender persons were depressed at the time of the study, and 32% of each population had attempted suicide.⁷⁵ The authors note: “The prevalence of suicide attempts among male-to-female and female-to-male transgender persons in our study was much higher than that found in US household probability samples and a population-based sample of adult men reporting same-sex partners.”⁷⁶

Explanations for the Poor Health Outcomes: The Social Stress Model

The greater prevalence of mental health problems in LGBT subpopulations is a cause for concern, and policymakers and clinicians should strive to reduce these risks. But to know what kinds of measures will help ameliorate them we must better understand their causes. At this time, the medical and social strategies for helping non-heterosexual populations in the United States are quite limited, and this may be due in part to the relatively limited explanations for the poor mental health outcomes offered by social scientists and psychologists.

Despite the limits of the scientific understanding of why non-heterosexual subpopulations are more likely to have such poor mental

health outcomes, much of the public effort to ameliorate these problems is motivated by a particular hypothesis called the *social stress model*. This model posits that discrimination, stigmatization, and other similar stresses contribute to poor mental health outcomes among sexual minorities. An implication of the social stress model is that reducing these stresses would ameliorate the mental health problems experienced by sexual minorities.

Sexual minorities face distinct social challenges such as stigma, overt discrimination and harassment, and, often, struggle with reconciling their sexual behaviors and identities with the norms of their families and communities. In addition, they tend to be subject to challenges similar to those of some other minority populations, arising from marginalization by or conflict with the larger part of society in ways that may adversely impact their health.⁷⁷ Many researchers classify these various challenges under the concept of *social stress* and believe that social stress contributes to the generally higher rates of mental health problems among LGBT subpopulations.⁷⁸

In attempting to account for the mental health disparities between heterosexuals and non-heterosexuals, researchers occasionally refer to a social or minority stress *hypothesis*.⁷⁹ However, it is more accurate to refer to a social or minority stress *model*, because the postulated connection between social stress and mental health is more complex and less precise than anything that could be stated as a single hypothesis.⁸⁰ The term *stress* can have a number of meanings, ranging from a description of a physiological condition to a mental or emotional state of anger or anxiety to a difficult social, economic, or interpersonal situation. More questions arise when one thinks about various kinds of *stressors* that may disproportionately affect mental health in minority populations. We will discuss some of these aspects of the social stress model after a concise overview of the model as it has been presented in recent literature on LGBT mental health.

The social stress model attempts to explain why non-heterosexual people have, on average, higher incidences of poor mental health outcomes than the rest of the population. It does not put forth a complete explanation for the disparities between non-heterosexuals and heterosexuals, and it does not explain the mental health problems of a particular patient. Rather, it describes social factors that might directly or indirectly influence the health risks for LGBT people, which may only become apparent at a population level. Some of these factors may also influence heterosexuals, but LGBT people are probably disproportionately exposed to them.

In an influential 2003 article on the social stress model, psychiatric epidemiologist and sexual orientation law expert Ilan Meyer distinguished between *distal* and *proximate* minority stressors. Distal stressors do not

depend on the individual's "perceptions or appraisals," and thus "can be seen as independent of personal identification with the assigned minority status."⁸¹ For instance, if a man who was perceived to be gay by an employer was fired on that basis, this would be a distal stressor, since the stressful event of discrimination would have had nothing to do with whether the man actually identified as gay, but only with someone else's attitude and perception. Distal stressors tend to reflect social circumstances rather than the individual's reaction to those circumstances. Proximate stressors, in contrast, are more subjective and are closely related to the individual's self-identity as lesbian, gay, bisexual, or transgender. An example of a proximate stressor would be when a young woman personally identifies as being a lesbian, and chooses to hide that identity from her family members out of fear of disapproval, or because of an internal sense of shame. The effects of proximate stressors such as this one are highly dependent on the individual's self-understanding and unique social circumstances. In this section we describe the types of stressors postulated in the social stress model, starting at the distal and proceeding to the most proximate stressors, and examine some of the empirical evidence that has been offered on the links between the stressors and mental health outcomes.

Discrimination and prejudice events. Overt acts of mistreatment, ranging from violence to harassment and discrimination, are categorized together by researchers as "prejudice events." These are thought to be significant stressors for non-heterosexual populations.⁸² Surveys of LGBT subpopulations have found that they tend to experience these kinds of prejudice events more frequently than the general population.⁸³

The available evidence indicates that prejudice events likely contribute to mental health problems. A 1999 study by UC Davis professor of psychology Gregory Herek and colleagues using survey data from 2,259 LGB individuals in Sacramento found that self-identified lesbians and gays who experienced a bias crime in the preceding five years—a crime, such as assault, theft, or vandalism, motivated by the actual or perceived sexual identity of the victim—reported significantly higher levels of depressive symptoms, traumatic stress symptoms, and anxiety than lesbians and gays who had not experienced a bias crime over that same period.⁸⁴ Additionally, lesbians and gays who reported being the victims of bias crimes in the last five years showed significantly higher levels of depressive and traumatic stress symptoms than individuals who experienced non-bias crimes in the same period (though the two groups did not display significant differences in anxiety). Comparable significant correlations were not found for

self-identified bisexuals, who constituted a much smaller portion of the survey respondents. The study also found that lesbians and gays subject to bias crimes were significantly more likely than other respondents to report feelings of vulnerability and a decreased sense of personal mastery or agency. Corroborating these findings on the harmful impact of bias crimes was a 2001 study by Northeastern University social scientist Jack McDevitt and colleagues that examined aggravated assaults using data from the Boston Police Department.⁸⁵ They found that bias crime victims tended to experience the effects of victimization more intensely and for a longer period of time than non-bias crime victims. (The study looked at bias-motivated assaults in general, rather than restricting its analysis to assaults motivated by LGBT bias, though a substantial portion of the subjects did experience assaults motivated by their non-heterosexual status.)

Similar patterns also appear among non-heterosexual adolescents, for whom maltreatment is particularly high.⁸⁶ In a 2011 study, University of Arizona social and behavioral scientist Stephen T. Russell and colleagues analyzed a survey of 245 young LGBT adults that retrospectively assessed school victimization due to actual or perceived LGBT status between the ages of 13 and 19. They found strong correlations between school victimization and poor mental health as young adults.⁸⁷ Victimization was assessed by asking yes-or-no questions, such as, “During my middle or high school years, while at school, I was pushed, shoved, slapped, hit, or kicked by someone who wasn’t just kidding around,” followed by a question of how often these events were related to the respondent’s sexual identity. Respondents who reported high levels of school victimization due to their sexual identity were 2.6 times more likely to report depression as young adults and 5.6 times more likely to report that they had attempted suicide, compared to those who reported low levels of victimization. These differences were highly statistically significant, though the study is potentially limited by its use of retrospective surveys to measure incidents of victimization. A study by professor of social work Joanna Almeida and colleagues, which relied on the 2006 Boston Youth Survey (a biennial survey of high school students in Boston public schools), found that perceptions of having been victimized due to LGBT status accounted for increased symptoms of depression among LGBT students. For male LGBT students, but not females, the study also found a positive correlation between victimization and suicidal thoughts and self-harm.⁸⁸

Differences in compensation suggest discrimination in the workplace, which can have both direct and indirect effects on mental health. M. V. Lee Badgett, a professor of economics at the University of Massachusetts,

Amherst, analyzed data collected between 1989 and 1991 in the General Social Survey and found that non-heterosexual male employees received significantly lower compensation (11% to 27%) than heterosexuals, even after controlling for experience, education, occupation, and other factors.⁸⁹ According to a 2009 review by Badgett,⁹⁰ nine studies from the 1990s and early 2000s “consistently show that gay and bisexual men earned 10% to 32% less than heterosexual men,” and that differences in occupation cannot account for much of the wage disparity. Researchers have also found that non-heterosexual women earn more than heterosexual women,⁹¹ which may suggest either that patterns of discrimination differ for men and women, or that there are other factors associated with non-heterosexual behavior and self-identification in men and women influencing their respective earnings, such as a lower rate of child-rearing or being the family primary wage earner.

There is evidence that suggests that wage disparities can help explain some population-level disparities in mental health outcomes,⁹² though it is difficult to tell if differences in mental health help explain the differences in wages. A 1999 study⁹³ by Craig Waldo on the relationship between workplace heterosexism—defined as negative social attitudes toward non-heterosexuals—and stress-related outcomes in 287 LGB individuals found that LGB individuals who experienced heterosexism in the workplace “exhibited higher levels of psychological distress and health-related problems, as well as decreased satisfaction with several aspects of their jobs.” The cross-sectional data used by many of these studies make it impossible to infer causality, though both prospective studies and qualitative analyses of the impact of unemployment on mental health suggest that at least some of the correlations are likely accounted for by the psychological and material effects of unemployment.⁹⁴

Stigma. Sociologists have for many years documented a range of adverse effects of stigma on individuals, ranging from issues with self-esteem to academic achievement.⁹⁵ Stigma is typically regarded as an attribute attaching to a person that reduces that person’s worth to others in a particular social context.⁹⁶ These negative evaluations are in many cases widely shared among a cultural group and become the basis for excluding or differentially treating stigmatized individuals. For example, mental illness can become stigmatized when it is regarded as a character flaw in mentally ill people. One reason why stigma serves an important role in the social stress model is that it can be invoked as an explanation even in the absence of particular events of discrimination or maltreatment. For

example, stigmatization of depression may take place when a depressed person conceals the depression on the expectation that friends and family members will regard it as a character flaw. Even when this concealment is successful, and there is therefore no actual discrimination or mistreatment by the individual's friends or family, anxiety over the attitudes others may have can affect the depressed person's emotional and mental well-being.

Researchers have found associations between the risk of poor mental health and stigma toward certain populations, though there has been little empirical research on the mental health effects of stigma on LGBT people in particular. Stigma is not easy to define or operationalize, making it a difficult and vague concept for empirical social scientists to study. Nevertheless, researchers have attempted to work with the concept using surveys of self-perceived devaluation by others and have found correlations between experiences of stigma and the risk of poor mental health status. One highly cited 1997 study by sociologist and epidemiologist Bruce Link and colleagues on the connection between stigma and mental health found a "strong and enduring" negative effect of stigma on the mental well-being of men who were suffering from a mental disorder and substance abuse.⁹⁷ In this study, the effects of stigma appeared to persist even after the men had received largely successful treatment for their original mental and substance abuse problems. The study found significant correlations between certain stigma variables—self-reported experiences of devaluation and rejection—and depressive symptoms before and after treatment, suggesting that the effects of stigma are relatively long-lasting. This might simply indicate that people with depressive symptoms tend to report more stigma, but if that were the case, one would have expected reports of stigma to decline over the course of the treatment program, as depression did. However, since stigma reports stayed constant, the authors concluded that stigma must have had a causal role in shaping depressive symptoms. It is worth noting that this study found stigma variables to account uniquely for around 10% or slightly more of the variance in depressive symptoms—in other words, stigma had a minor effect on depressive symptoms, though such an effect might manifest itself in significant ways on a population level. Some other researchers have suggested that the effects of stigma are usually minor and transitory; for example, Vanderbilt sociologist Walter Gove argued that for the "vast majority of cases the stigma [experienced by mental patients] appears to be transitory and does not appear to pose a severe problem."⁹⁸

Researchers have relatively recently begun pursuing both empirical and theoretical work⁹⁹ on how stigma affects the mental health of LGBT

people, though there has been some controversy over the magnitude and duration of effects due to stigma. Some of the controversy may stem from the difficulty of defining and quantifying stigma as well as the variations in stigma across different social contexts. A 2013 study by Columbia University medical psychologist Walter Bockting and colleagues on mental health in 1,093 transgender people found a positive correlation between psychological distress and both enacted and felt stigma, which were measured using survey questions.¹⁰⁰ A 2003 study¹⁰¹ by clinical psychologist Robin Lewis and colleagues of predictors of depressive symptoms in 201 LGB individuals found that stigma consciousness was significantly associated with depressive symptoms, where stigma consciousness was assessed using a ten-item questionnaire that assessed “the degree to which one expects to be judged on the basis of a stereotype.”¹⁰² However, depressive symptoms are often associated with negative cognition about the self, the world, and the future, and this may contribute to the subjective perception of stigmatization among individuals suffering from depression.¹⁰³ A 2011 study¹⁰⁴ by Bostwick that also used measures of stigma consciousness and depressive symptoms found a modest positive correlation between stigma scores and depressive symptoms in bisexual women, although the study was limited by having a relatively small sample size. However, a 2003 longitudinal study¹⁰⁵ of Norwegian adolescents by psychologist Lars Wichstrøm and colleague found that sexual orientation was associated with poor mental health status after accounting for a variety of psychological risk factors, including self-worth. While this study did not directly consider stigma as a risk factor, it suggests that psychological factors such as stigma consciousness alone likely cannot fully account for the disparities in mental health between heterosexuals and non-heterosexuals. Additionally, it is important to note that due to the cross-sectional design of these studies, causal inferences cannot be supported by the data—different kinds of data and more evidence would be needed to support conclusions about causal relationships. In particular, it is impossible to prove through these studies that stigma leads to poor mental health, as opposed to, for example, poor mental health leading people to report higher levels of stigma, or a third factor being responsible for both poor mental health and higher levels of stigma.

Concealment. Stigma may affect non-heterosexual individuals’ decisions about whether to disclose or conceal their sexual orientation. LGBT people may decide to conceal their sexual orientation to protect themselves against possible bias or discrimination, to avoid a sense of shame, or to

avoid a potential conflict between their social role and sexual desires or behaviors.¹⁰⁶ Particular contexts in which LGBT people may be more likely to conceal their sexual orientation include school, work, and other places in which they feel that disclosure could negatively affect the way that people regard them.

There is a large amount of evidence from psychological research indicating that concealment of an important aspect of one's identity may have adverse mental health consequences. In general, expressing one's emotions and sharing important aspects of one's life with others play large roles in maintaining mental health.¹⁰⁷ Recent decades have seen a growing body of research on the relationships between concealment and disclosure and mental health in LGBT subpopulations.¹⁰⁸ For example, a 2007 study¹⁰⁹ by Belle Rose Ragins and colleagues of workplace concealment and disclosure in 534 LGB individuals found that fear of disclosing was associated with psychological strain and other outcomes such as job satisfaction. However, the study also challenged the notion that disclosure leads to positive psychological and social outcomes, since employees' disclosure was not significantly associated with most of the outcome variables. The authors interpret this result by saying that "this study suggests that concealment may be a necessary and adaptive decision in an unsupportive or hostile environment, thus underscoring the importance of social context."¹¹⁰ Due to the relatively rapid changes in social acceptance of same-sex marriage and of same-sex relationships more broadly in recent decades,¹¹¹ it is possible that some of the research on the psychological effects of concealment and disclosure is outdated, because in general there may now be less pressure for those identifying as LGB to conceal their identities.

Testing the model. One of the implications of the social stress model is that reducing the amount of discrimination, prejudice, and stigmatization of sexual minorities would help reduce the rates of mental health problems for these populations. Some jurisdictions have sought to reduce these social stressors by passing anti-discrimination and hate-crime laws. If such policies are in fact successful at reducing these stressors then they could be expected to reduce the rates of mental health problems in LGB populations to the extent that the social stress model accurately accounts for the causes of these problems. So far, studies have not been designed in such a way that could allow them to test conclusively the hypothesis that social stress accounts for the high rates of poor mental health outcomes in non-heterosexual populations, but there is research that provides some data on a testable implication of the social stress model.

A 2009 study by sociomedical scientist Mark Hatzenbuehler and colleagues investigated the association between psychiatric morbidity in LGB populations and two state-level policies that pertained to these populations: hate-crime laws that did not include sexual orientation as a protected category, and laws prohibiting employment discrimination based on sexual orientation.¹¹² The study used data on mental health outcomes from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative sample of 34,653 civilian, non-institutionalized adults, and measuring psychiatric disorders according to *DSM-IV* criteria.¹¹³ Wave 2 of NESARC took place in 2004–2005. Of the sample, 577 respondents identified as lesbian, gay, or bisexual. The analysis of the data showed that LGB individuals living in states with no hate-crime laws and no non-discrimination laws tended to have higher odds of psychiatric morbidity (compared to LGB individuals in states with one or two protective laws), but the analysis found statistically significant correlations only for dysthymia (a less severe but more persistent form of depression), generalized anxiety disorder, and post-traumatic stress disorder, while the correlations between seven other psychiatric conditions investigated were not found to be statistically significant. No epidemiological inferences can be made due to the nature of the data, suggesting the need for more studies on this and similar topics.

Hatzenbuehler and colleagues attempted to improve on this cross-sectional study by doing a prospective study, published in 2010, this time examining changes in psychiatric morbidity over the period in which certain states passed constitutional amendments defining marriage as a union between one man and one woman—amendments that were described by the study’s authors as “bans on gay marriage.”¹¹⁴ The authors examined differences in psychiatric morbidity between Wave 1 of NESARC, which took place in 2001–2002, and Wave 2, which coincided with the 2004 and 2005 state-constitutional amendments. They observed that the prevalence in mood disorders in LGB respondents living in states that passed marriage amendments increased by 36.6% between Waves 1 and 2. Mood disorders for LGB respondents living in states that did not pass marriage amendments decreased by 23.6%, though this change was not statistically significant. The prevalence of certain disorders increased both in states that passed such amendments and in states that did not. Generalized anxiety disorder, for example, increased in both, but by a much larger and statistically significant magnitude in states that passed marriage amendments. Hatzenbuehler and colleagues found that drug-use disorders increased more in states that did *not* pass marriage amendments,

and the increase was statistically significant only for those states. (Total substance abuse disorders increased in both cases, by a roughly similar amount.) As with the earlier cross-sectional study, for the majority of the psychiatric conditions investigated there were no significant correlations between the conditions and the social policies that were hypothesized to have an influence on mental health outcomes.

Some of the limitations of the study's findings noted by the authors include the following: healthier LGB respondents may have moved out of the states that would eventually pass marriage amendments into the states that would not; sexual orientation was only assessed during Wave 2 of NESARC, and there is some fluidity to sexual identity that may have led to misclassification of some LGB respondents; and the sample size of LGB respondents living in states that passed marriage amendments was relatively small, limiting the statistical power of the study.

One hypothesized causal mechanism for the change in mental health variables associated with the marriage amendments is that the public debate surrounding the amendments may have elevated the stress experienced by non-heterosexuals—a hypothesis that was put forward by psychologist Sharon Scales Rostosky and colleagues in a study of the attitudes of LGB adults in states that passed marriage amendments in 2006.¹¹⁵ The survey data collected during this study showed that LGB respondents living in states that passed marriage amendments in 2006 had higher levels of various kinds of psychological distress, including stress and depressive symptoms. The study also found that participation in LGBT activism during the election season was associated with increased psychological distress. It may be that part of the psychological distress recorded by this survey, which included perceived stress, depressive symptoms (but not diagnoses of depressive disorders), and what the researchers called “amendment-related affect,” may have simply reflected the typical feelings of advocates when they experience political defeat on an issue that they care passionately about. Other key limitations of the study were its cross-sectional design and its reliance on volunteers for the survey (in contrast to the previous study by Hatzenbuehler and colleagues). The survey methodology may also have biased the results—the researchers advertised on websites and through listserv e-mail announcements that they were looking for survey respondents for a study on “attitudes and experiences of LGB...individuals regarding the debate” over gay marriage. As with many forms of convenience sampling, individuals with strong attitudes regarding the issues under investigation in the survey may have been more likely to respond.

As for the effects of particular policies, the evidence is equivocal at best. The 2009 study by Hatzenbuehler and colleagues demonstrated significant correlations between the risk of some (though not all) mental health problems in the LGB subpopulation and state policies on hate crime and employment protections. Even for the aspects of mental health that this study found to be correlated with hate-crime or employment-protection policies, the study was unable to show an epidemiological relationship between policies and health outcomes.

Conclusion

The social stress model probably accounts for some of the poor mental health outcomes experienced by sexual minorities, though the evidence supporting the model is limited, inconsistent and incomplete. Some of the central concepts of the model, such as stigmatization, are not easily operationalized. There is evidence linking some forms of mistreatment, stigmatization, and discrimination to some of the poor mental health outcomes experienced by non-heterosexuals, but it is far from clear that these factors account for all of the disparities between the heterosexual and non-heterosexual populations. Those poor mental health outcomes may be mitigated to some extent by reducing social stressors, but this strategy is unlikely to eliminate all of the disparities in mental health status between sexual minorities and the wider population. Other factors, such as the elevated rates of sexual abuse victimization among the LGBT population discussed in Part One, may also account for some of these mental health disparities, as research has consistently shown that “survivors of childhood sexual abuse are significantly at risk of a wide range of medical, psychological, behavioral, and sexual disorders.”¹¹⁶

Just as it does a disservice to non-heterosexual subpopulations to ignore or downplay the statistically higher risks of negative mental health outcomes they face, so it does them a disservice to misattribute the causes of these elevated risks, or to ignore other potential factors that may be at work. Assuming that a single model can explain all of the mental health risks faced by non-heterosexuals can mislead clinicians and therapists charged with helping this vulnerable subpopulation. The social stress model deserves further research, but should not be assumed to offer a complete explanation of the causes of mental health disparities if clinicians and policymakers want to adequately address the mental health challenges faced by the LGBT community. More research is needed to explore the causes of, and solutions to, these important public health challenges.

Part Three

Gender Identity

The concept of biological sex is well defined, based on the binary roles that males and females play in reproduction. By contrast, the concept of gender is not well defined. It is generally taken to refer to behaviors and psychological attributes that tend to be typical of a given sex. Some individuals identify as a gender that does not correspond to their biological sex. The causes of such cross-gender identification remain poorly understood. Research investigating whether these transgender individuals have certain physiological features or experiences in common with the opposite sex, such as brain structures or atypical prenatal hormone exposures, has so far been inconclusive. Gender dysphoria—a sense of incongruence between one’s biological sex and one’s gender, accompanied by clinically significant distress or impairment—is sometimes treated in adults by hormones or surgery, but there is little scientific evidence that these therapeutic interventions have psychological benefits. Science has shown that gender identity issues in children usually do not persist into adolescence or adulthood, and there is little scientific evidence for the therapeutic value of puberty-delaying treatments. We are concerned by the increasing tendency toward encouraging children with gender identity issues to transition to their preferred gender through medical and then surgical procedures. There is a clear need for more research in these areas.

As described in Part One, there is a widely held belief that *sexual orientation* is a well-defined concept, and that it is innate and fixed in each person—as it is often put, gay people are “born that way.” Another emerging and related view is that *gender identity*—the subjective, internal sense of being a man or a woman (or some other gender category)—is also fixed at birth or at a very early age and can diverge from a person’s biological sex. In the case of children, this is sometimes articulated by saying that a little boy may be trapped in a little girl’s body, or vice versa.

In Part One we argued that scientific research does not give much support to the hypothesis that sexual orientation is innate and fixed. We will argue here, similarly, that there is little scientific evidence that gender identity is fixed at birth or at an early age. Though biological sex is innate, and gender identity and biological sex are related in complex ways, they

are not identical; gender is sometimes defined or expressed in ways that have little or no biological basis.

Key Concepts and Their Origins

To clarify what is meant by “gender” and “sex,” we begin with a widely used definition, here quoted from a pamphlet published by the American Psychological Association (APA):

Sex is assigned at birth, refers to one’s biological status as either male or female, and is associated primarily with physical attributes such as chromosomes, hormone prevalence, and external and internal anatomy. *Gender* refers to the socially constructed roles, behaviors, activities, and attributes that a given society considers appropriate for boys and men or girls and women. These influence the ways that people act, interact, and feel about themselves. While aspects of biological sex are similar across different cultures, aspects of gender may differ.¹

This definition points to the obvious fact that there are social norms for men and women, norms that vary across different cultures and that are not simply determined by biology. But it goes further in holding that gender is wholly “socially constructed”—that it is detached from biological sex. This idea has been an important part of a feminist movement to reform or eliminate traditional gender roles. In the classic feminist book *The Second Sex* (1949), Simone de Beauvoir wrote that “one is not born, but becomes a woman.”² This notion is an early version of the now familiar distinction between sex as a biological designation and gender as a cultural construct: though one is born, as the APA explains, with the “chromosomes, hormone prevalence, and external and internal anatomy” of a female, one is socially conditioned to take on the “roles, behaviors, activities, and attributes” of a woman.

Developments in feminist theory in the second half of the twentieth century further solidified the position that gender is socially constructed. One of the first to use the term “gender” as distinct from sex in the social-science literature was Ann Oakley in her 1972 book, *Sex, Gender and Society*.³ In the 1978 book *Gender: An Ethnomethodological Approach*, psychology professors Suzanne Kessler and Wendy McKenna argued that “gender is a social construction, that a world of two ‘sexes’ is a result of the socially shared, taken for granted methods which members use to construct reality.”⁴

Anthropologist Gayle Rubin expresses a similar view, writing in 1975 that “Gender is a socially imposed division of the sexes. It is a product of

the social relations of sexuality.”⁵ According to her argument, if it were not for this social imposition, we would still have males and females but not “men” and “women.” Furthermore, Rubin argues, if traditional gender roles are socially constructed, then they can also be *deconstructed*, and we can eliminate “obligatory sexualities and sex roles” and create “an androgynous and genderless (though not sexless) society, in which one’s sexual anatomy is irrelevant to who one is, what one does, and with whom one makes love.”⁶

The relationship between gender theory and the deconstruction or overthrowing of traditional gender roles is made even clearer in the works of the influential feminist theorist Judith Butler. In works such as *Gender Trouble: Feminism and the Subversion of Identity* (1990)⁷ and *Undoing Gender* (2004)⁸ Butler advances what she describes as “performativity theory,” according to which being a woman or man is not something that one *is* but something that one *does*. “Gender is neither the causal result of sex nor as seemingly fixed as sex,” as she put it.⁹ Rather, gender is a constructed status radically independent from biology or bodily traits, “a free floating artifice, with the consequence that *man* and *masculine* might just as easily signify a female body as a male one, and *woman* and *feminine* a male body as easily as a female one.”¹⁰

This view, that gender and thus gender identity are fluid and plastic, and not necessarily binary, has recently become more prominent in popular culture. An example is Facebook’s move in 2014 to include 56 new ways for users to describe their gender, in addition to the options of male and female. As Facebook explains, the new options allow the user to “feel comfortable being your true, authentic self,” an important part of which is “the expression of gender.”¹¹ Options include *agender*, several *cis-* and *trans-* variants, *gender fluid*, *gender questioning*, *neither*, *other*, *pangender*, and *two-spirit*.¹²

Whether or not Judith Butler was correct in describing traditional gender roles of men and women as “performative,” her theory of gender as a “free-floating artifice” does seem to describe this new taxonomy of gender. As these terms multiply and their meanings become more individualized, we lose any common set of criteria for defining what gender distinctions mean. If gender is entirely detached from the binary of biological sex, gender could come to refer to any distinctions in behavior, biological attributes, or psychological traits, and each person could have a gender defined by the unique combination of characteristics the person possesses. This *reductio ad absurdum* is offered to present the possibility that defining gender too broadly could lead to a definition that has little meaning.

Alternatively, gender identity could be defined in terms of sex-typical traits and behaviors, so that being a boy means behaving in the ways boys typically behave—such as engaging in rough-and-tumble play and expressing an interest in sports and liking toy guns more than dolls. But this would imply that a boy who plays with dolls, hates guns, and refrains from sports or rough-and-tumble play might be considered to be a girl, rather than simply a boy who represents an exception to the typical patterns of male behavior. The ability to recognize exceptions to sex-typical behavior relies on an understanding of maleness and femaleness that is independent of these stereotypical sex-appropriate behaviors. The underlying basis of maleness and femaleness is the distinction between the reproductive roles of the sexes; in mammals such as humans, the female gestates offspring and the male impregnates the female. More universally, the male of the species fertilizes the egg cells provided by the female of the species. This conceptual basis for sex roles is binary and stable, and allows us to distinguish males from females on the grounds of their reproductive systems, even when these individuals exhibit behaviors that are not typical of males or females.

To illustrate how reproductive roles define the differences between the sexes even when behavior appears to be atypical for the particular sex, consider two examples, one from the diversity of the animal kingdom, and one from the diversity of human behavior. First, we look at the emperor penguin. Male emperor penguins provide more care for eggs than do females, and in this sense, the male emperor penguin could be described as more maternal than the female.¹³ However, we recognize that the male emperor penguin is not in fact female but rather that the species represents an exception to the general, but not universal, tendency among animals for females to provide more care than males for offspring. We recognize this because sex-typical behaviors like parental care do not define the sexes; the individual's role in sexual reproduction does.

Even other sex-typical biological traits, such as chromosomes, are not necessarily helpful for defining sex in a universal way, as the penguin example further illustrates. As with other birds, the genetics of sex determination in the emperor penguin is different than the genetics of sex determination in mammals and many other animals. In humans, males have XY chromosomes and females have XX chromosomes; that is, males have a unique sex-determining chromosome that they do not share with females, while females have two copies of a chromosome that they share with males. But in birds, it is females, not males, that have and pass on the sex-specific chromosome.¹⁴ Just as the observation that

male emperor penguins nurture their offspring more than their partners did not lead zoologists to conclude that the egg-laying member of the emperor penguin species was in fact the male, the discovery of the ZW sex-determination system in birds did not lead geneticists to challenge the age-old recognition that hens are females and roosters are males. The only variable that serves as the fundamental and reliable basis for biologists to distinguish the sexes of animals is their role in reproduction, not some other behavioral or biological trait.

Another example that, in this case, only appears to be non-sex-typical behavior is that of Thomas Beatie, who made headlines as a man who gave birth to three children between 2008 and 2010.¹⁵ Thomas Beatie was born a woman, Tracy Lehanani LaGondino, and underwent a surgical and legal transition to living as a man before deciding to have children. Because the medical procedures he underwent did not involve the removal of his ovaries or uterus, Beatie was capable of bearing children. The state of Arizona recognizes Thomas Beatie as the father of his three children, even though, biologically, he is their mother. Unlike the case of the male emperor penguin's ostensibly maternal, "feminine" parenting behavior, Beatie's ability to have children does not represent an exception to the normal inability of males to bear children. The labeling of Beatie as a man despite his being biologically female is a personal, social, and legal decision that was made without any basis in biology; nothing whatsoever in biology suggests Thomas Beatie is a male.

In biology, an organism is male or female if it is structured to perform one of the respective roles in reproduction. This definition does not require any arbitrary measurable or quantifiable physical characteristics or behaviors; it requires understanding the reproductive system and the reproduction process. Different animals have different reproductive systems, but sexual reproduction occurs when the sex cells from the male and female of the species come together to form newly fertilized embryos. It is these reproductive roles that provide the conceptual basis for the differentiation of animals into the biological categories of male and female. There is no other widely accepted biological classification for the sexes.

But this definition of the biological category of sex is not universally accepted. For example, philosopher and legal scholar Edward Stein maintains that infertility poses a crucial problem for defining sex in terms of reproductive roles, writing that defining sex in terms of these roles would define "infertile males as females."¹⁶ Since an infertile male cannot play the reproductive role for which males are structured, and an infertile

female cannot play the reproductive role for which females are structured, according to this line of thinking, defining sex in terms of reproductive roles would not be appropriate, as infertile males would be classified as females, and infertile females as males. Nevertheless, while a reproductive system structured to serve a particular reproductive role may be impaired in such a way that it cannot perform its function, the system is still recognizably structured for that role, so that biological sex can still be defined strictly in terms of the structure of reproductive systems. A similar point can be made about heterosexual couples who choose not to reproduce for any of a variety of reasons. The male and female reproductive systems are generally clearly recognizable, regardless of whether or not they are being used for purposes of reproduction.

The following analogy illustrates how a system can be recognized as having a particular purpose, even when that system is dysfunctional in a way that renders it incapable of carrying out its purpose: Eyes are complex organs that function as processors of vision. However, there are numerous conditions affecting the eye that can impair vision, resulting in blindness. The eyes of the blind are still recognizably organs structured for the function of sight. Any impairments that result in blindness do not affect the purpose of the eye—any more than wearing a blindfold—but only its function. The same is true for the reproductive system. Infertility can be caused by many problems. However, the reproductive system continues to exist for the purpose of begetting children.

There are individuals, however, who are biologically “intersex,” meaning that their sexual anatomy is ambiguous, usually for reasons of genetic abnormalities. For example, the clitoris and penis are derived from the same embryonic structures. A baby may display an abnormally large clitoris or an abnormally small penis, causing its biological sex to be difficult to determine long after birth.

The first academic article to use the term “gender” appears to be the 1955 paper by the psychiatry professor John Money of Johns Hopkins on the treatment of “intersex” children (the term then used was “hermaphrodites”).¹⁷ Money posited that gender identity, at least for these children, was fluid and that it could be constructed. In his mind, making a child identify with a gender only required constructing sex-typical genitalia and creating a gender-appropriate environment for the child. The chosen gender for these children was often female—a decision that was not based on genetics or biology, nor on the belief that these children were “really” girls, but, in part, on the fact that at the time it was easier surgically to construct a vagina than it was to construct a penis.

The most widely known patient of Dr. Money was David Reimer, a boy who was not born with an intersex condition but whose penis was damaged during circumcision as an infant.¹⁸ David was raised by his parents as a girl named Brenda, and provided with both surgical and hormonal interventions to ensure that he would develop female-typical sex characteristics. However, the attempt to conceal from the child what had happened to him was not successful—he self-identified as a boy, and eventually, at the age of 14, his psychiatrist recommended to his parents that they tell him the truth. David then began the difficult process of reversing the hormonal and surgical interventions that had been performed to feminize his body. But he continued to be tormented by his childhood ordeal, and took his own life in 2004, at the age of 38.

David Reimer is just one example of the harm wrought by theories that gender identity can socially and medically be reassigned in children. In a 2004 paper, William G. Reiner, a pediatric urologist and child and adolescent psychiatrist, and John P. Gearhart, a professor of pediatric urology, followed up on the sexual identities of 16 genetic males affected by cloacal exstrophy—a condition involving a badly deformed bladder and genitals. Of the 16 subjects, 14 were assigned female sex at birth, receiving surgical interventions to construct female genitalia, and were raised as girls by their parents; 6 of these 14 later chose to identify as males, while 5 continued to identify as females and 2 declared themselves males at a young age but continued to be raised as females because their parents rejected the children's declarations. The remaining subject, who had been told at age 12 that he was born male, refused to discuss sexual identity.¹⁹ So the assignment of female sex persisted in only 5 of the 13 cases with known results.

This lack of persistence is some evidence that the assignment of sex through genital construction at birth with immersion into a “gender-appropriate” environment is not likely to be a successful option for managing the rare problem of genital ambiguity from birth defects. It is important to note that the ages of these individuals at last follow-up ranged from 9 to 19, so it is possible that some of them may have subsequently changed their gender identities.

Reiner and Gearhart's research indicates that gender is not arbitrary; it suggests that a biological male (or female) will probably not come to identify as the opposite gender after having been altered physically and immersed into the corresponding gender-typical environment. The plasticity of gender appears to have a limit.

What is clear is that biological sex is not a concept that can be reduced to, or artificially assigned on the basis of, the type of external genitalia

alone. Surgeons are becoming more capable of constructing artificial genitalia, but these “add-ons” do not change the biological sex of the recipients, who are no more capable of playing the reproductive roles of the opposite biological sex than they were without the surgery. Nor does biological sex change as a function of the environment provided for the child. No degree of supporting a little boy in converting to be considered, by himself and others, to be a little girl makes him biologically a little girl. The scientific definition of biological sex is, for almost all human beings, clear, binary, and stable, reflecting an underlying biological reality that is not contradicted by exceptions to sex-typical behavior, and cannot be altered by surgery or social conditioning.

In a 2004 article summarizing the results of research related to intersex conditions, Paul McHugh, the former chief of psychiatry at Johns Hopkins Hospital (and the coauthor of this report), suggested:

We in the Johns Hopkins Psychiatry Department eventually concluded that human sexual identity is mostly built into our constitution by the genes we inherit and the embryogenesis we undergo. Male hormones sexualize the brain and the mind. Sexual dysphoria—a sense of disquiet in one’s sexual role—naturally occurs amongst those rare males who are raised as females in an effort to correct an infantile genital structural problem.²⁰

We now turn our attention to transgender individuals—children and adults—who choose to identify as a gender different from their biological sex, and explore the meaning of gender identity in this context and what the scientific literature tells us about its development.

Gender Dysphoria

While biological sex is, with very few exceptions, a well-defined, binary trait (male versus female) corresponding to how the body is organized for reproduction, *gender identity* is a more subjective attribute. For most people, their own gender identity is probably not a significant concern; most biological males identify as boys or men, and most biological females identify as girls or women. But some individuals experience an incongruence between their biological sex and their gender identity. If this struggle causes them to seek professional help, then the problem is classified as “gender dysphoria.”

Some male children raised as females, as described in Reiner and colleagues’ 2004 study, came to experience problems with their gender

identity when their subjective sense of being boys conflicted with being identified and treated as girls by their parents and doctors. The biological sex of the boys was not in question (they had an XY genotype), and the cause of gender dysphoria lay in the fact that they were genetically male, came to identify as male, but had been assigned female gender identities. This suggests that gender identity can be a complex and burdensome issue for those who choose (or have others choose for them) a gender identity opposite their biological sex.

But the cases of gender dysphoria that are the subject of much public debate are those in which individuals come to identify as genders different from those based on their biological sex. These people are usually identified, and describe themselves, as “transgender.”*

According to the fifth edition of the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, gender dysphoria is marked by “incongruence between one’s experienced/expressed gender and assigned gender,” as well as “clinically significant distress or impairment in social, occupational, or other important areas of functioning.”²¹

It is important to clarify that gender dysphoria is not the same as gender nonconformity or gender identity disorder. Gender nonconformity describes an individual who behaves in a manner contrary to the gender-specific norms of his or her biological sex. As the *DSM-5* notes, most transvestites, for instance, are not transgender—men who dress as women typically do not identify themselves as women.²² (However, certain forms of transvestitism can be associated with late-onset gender dysphoria.²³)

Gender identity disorder, an obsolete term from an earlier version of the *DSM* that was removed in its fifth edition, was used as a psychiatric diagnosis. If we compare the diagnostic criteria for gender dysphoria (the current term) and gender identity disorder (the former term), we see that both require the patient to display “a marked incongruence between one’s

* A note on terminology: In this report, we generally use the term *transgender* to refer to persons for whom there is an incongruity between the gender identity they understand themselves to possess and their biological sex. We use the term *transsexual* to refer to individuals who have undergone medical interventions to transform their appearance to better correspond with that of their preferred gender. The most familiar colloquial term used to describe the medical interventions that transform the appearance of transgender individuals may be “sex change” (or, in the case of surgery, “sex-change operation”), but this is not commonly used in the scientific and medical literature today. While no simple terms for these procedures are completely satisfactory, in this report we employ the commonly used terms *sex reassignment* and *sex-reassignment surgery*, except when quoting a source that uses “gender reassignment” or some other term.

experienced/expressed gender and assigned gender.”²⁴ The key difference is that a diagnosis of gender dysphoria requires the patient additionally to experience a “clinically significant distress or impairment in social, occupational, or other important areas of functioning” associated with these incongruent feelings.²⁵ Thus the major set of diagnostic criteria used in contemporary psychiatry does not designate all transgender individuals as having a psychiatric disorder. For example, a biological male who identifies himself as a female is not considered to have a psychiatric disorder unless the individual is experiencing significant psychosocial distress at the incongruence. A diagnosis of gender dysphoria may be part of the criteria used to justify sex-reassignment surgery or other clinical interventions. Furthermore, a patient who has had medical or surgical modifications to express his or her gender identity may still suffer from gender dysphoria. It is the nature of the struggle that defines the disorder, not the fact that the expressed gender differs from the biological sex.

There is no scientific evidence that all transgender people have gender dysphoria, or that they are all struggling with their gender identities. Some individuals who are not transgender—that is, who do not identify as a gender that does not correspond with their biological sex—might nonetheless struggle with their gender identity; for example, girls who behave in some male-typical ways might experience various forms of distress without ever coming to identify as boys. Conversely, individuals who do identify as a gender that does not correspond with their biological sex may not experience clinically significant distress related to their gender identity. Even if only, say, 40% of individuals who identify as a gender that does not correspond with their biological sex experience significant distress related to their gender identity, this would constitute a public health issue requiring clinicians and others to act to support those with gender dysphoria, and hopefully, to reduce the rate of gender dysphoria in the population. There is no evidence to suggest that the other 60% in this hypothetical—that is, the individuals who identify as a gender that does not correspond with their biological sex but who do not experience significant distress—would require clinical treatment.

The *DSM*’s concept of subjectively “experiencing” one’s gender as incongruent from one’s biological sex may require more critical scrutiny and possibly modification. The exact definition of gender dysphoria, however well-intentioned, is somewhat vague and confusing. It does not account for individuals who self-identify as transgender but do not experience dysphoria associated with their gender identity and who seek psychiatric care for functional impairment for problems unrelated to their

gender identity, such as anxiety or depression. They may then be mislabeled as having gender dysphoria simply because they have a desire to be identified as a member of the opposite gender, when they have come to a satisfactory resolution, subjectively, with this incongruence and may be depressed for reasons having nothing to do with their gender identity.

The *DSM-5* criteria for a diagnosis of gender dysphoria in children are defined in a “more concrete, behavioral manner than those for adolescents and adults.”²⁶ This is to say that some of the diagnostic criteria for gender dysphoria in children refer to behaviors that are stereotypically associated with the opposite gender. Clinically significant distress is still necessary for a diagnosis of gender dysphoria in children, but some of the other diagnostic criteria include, for instance, a “strong preference for the toys, games, or activities stereotypically used or engaged in by the other gender.”²⁷ What of girls who are “tomboys” or boys who are not oriented toward violence and guns, who prefer quieter play? Should parents worry that their tomboy daughter is really a boy stuck in a girl’s body? There is no scientific basis for believing that playing with toys typical of boys defines a child as a boy, or that playing with toys typical of girls defines a child as a girl. The *DSM-5* criterion for diagnosing gender dysphoria by reference to gender-typical toys is unsound; it appears to ignore the fact that a child could display an *expressed* gender—manifested by social or behavioral traits—incongruent with the child’s biological sex but without *identifying* as the opposite gender. Furthermore, even for children who do identify as a gender opposite their biological sex, diagnoses of gender dysphoria are simply unreliable. The reality is that they may have psychological difficulties in accepting their biological sex as their gender. Children can have difficulty with the expectations associated with those gender roles. Traumatic experiences can also cause a child to express distress with the gender associated with his or her biological sex.

Gender identity problems can also arise with intersex conditions (the presence of ambiguous genitalia due to genetic abnormalities), which we discussed earlier. These disorders of sex development, while rare, can contribute to gender dysphoria in some cases.²⁸ Some of these conditions include complete androgen insensitivity syndrome, where individuals with XY (male) chromosomes lack receptors for male sex hormones, leading them to develop the secondary sex characteristics of females, rather than males (though they lack ovaries, do not menstruate, and are consequently sterile).²⁹ Another hormonal disorder of sex development that can lead to individuals developing in ways that are not typical of their genetic sex include congenital adrenal hyperplasia, a condition that can

masculinize XX (female) fetuses.³⁰ Other rare phenomena such as genetic mosaicism³¹ or chimerism,³² where some cells in the individual's bodies contain XX chromosomes and others contain XY chromosomes, can lead to considerable ambiguity in sex characteristics, including individuals who possess both male and female gonads and sex organs.

While there are many cases of gender dysphoria that are not associated with these identifiable intersex conditions, gender dysphoria may still represent a different type of intersex condition in which the primary sex characteristics such as genitalia develop normally while secondary sex characteristics associated with the brain develop along the lines of the opposite sex. Controversy exists over influences determining the nature of neurological, psychological, and behavioral sex differences. The emerging consensus is that there may be some differences in patterns of neurological development in- and ex-utero for men and women.³³ Therefore, in theory, transgender individuals could be subject to conditions allowing a more female-type brain to develop within a genetic male (having the XY chromosomal patterns), and vice versa. However, as we will show in the next section, the research supporting this idea is quite minimal.

As a way of surveying the biological and social science research on gender dysphoria, we can list some of the important questions. Are there biological factors that influence the development of a gender identity that does not correspond with one's biological sex? Are some individuals born with a gender identity different from their biological sex? Is gender identity shaped by environmental or nurturing conditions? How stable are choices of gender identity? How common is gender dysphoria? Is it persistent across the lifespan? Can a little boy who thinks he is a little girl change over the course of his life to regard himself as male? If so, how often can such people change their gender identities? How would someone's gender identity be measured scientifically? Does self-understanding suffice? Does a biological girl become a gender boy by believing, or at least stating, she is a little boy? Do people's struggles with a sense of incongruity between their gender identity and biological sex persist over the life course? Does gender dysphoria respond to psychiatric interventions? Should those interventions focus on affirming the gender identity of the patient or take a more neutral stance? Do efforts to hormonally or surgically modify an individual's primary or secondary sex characteristics help resolve gender dysphoria? Does modification create further psychiatric problems for some of those diagnosed with gender dysphoria, or does it typically resolve existing psychiatric problems? We broach a few of these critical questions in the following sections.

Gender and Physiology

Robert Sapolsky, a Stanford professor of biology who has done extensive neuroimaging research, suggested a possible neurobiological explanation for cross-gender identification in a 2013 *Wall Street Journal* article, “Caught Between Male and Female.” He asserted that recent neuroimaging studies of the brains of transgender adults suggest that they may have brain structures more similar to their gender identity than to their biological sex.³⁴ Sapolsky bases this assertion on the fact that there are differences between male and female brains, and while the differences are “small and variable,” they “probably contribute to the sex differences in learning, emotion and socialization.”³⁵ He concludes: “The issue isn’t that sometimes people believe they are of a different gender than they actually are. Remarkably, instead, it’s that sometimes people are born with bodies whose gender is different from what they actually are.”³⁶ In other words, he claims that some people can have a female-type brain in a male body, or vice versa.

While this kind of neurobiological theory of cross-gender identification remains outside of the scientific mainstream, it has recently received scientific and popular attention. It provides a potentially attractive explanation for cross-gender identification, especially for individuals who are not affected by any known genetic, hormonal, or psychosocial abnormalities.³⁷ However, while Sapolsky may be right, there is fairly little support in the scientific literature for his contention. His neurological explanation for differences between male and female brains and those differences’ possible relevance to cross-gender identification warrant further scientific consideration.

There are many small studies that attempt to define causal factors of the experience of incongruence between one’s biological sex and felt gender. These studies are described in the following pages, each pointing to an influence that may contribute to the explanation for cross-gender identification.

Nancy Segal, a psychologist and geneticist, researched two case studies of identical twins discordant for female-to-male (FtM) transsexualism.³⁸ Segal notes that, according to another, earlier study that conducted nonclinical interviews with 45 FtM transsexuals, 60% suffered some form of childhood abuse, with 31% experiencing sexual abuse, 29% experiencing emotional abuse, and 38% physical abuse.³⁹ However, this earlier study did not include a control group and was limited by its small sample size, making it difficult to extract significant interactions, or generalizations, from the data.

Segal's own first case study was of a 34-year-old FtM twin, whose identical twin sister was married and the mother of seven children.⁴⁰ Several stressful events had occurred during the twins' mother's pregnancy, and they were born five weeks prematurely. When they were eight years old, their parents divorced. The FtM twin exhibited gender-nonconforming behavior early and it persisted throughout childhood. She became attracted to other girls in junior high school and as a teenager attempted suicide several times. She reported physical abuse and emotional abuse at the hand of her mother. The twins were raised in a Mormon household, in which transsexuality was not tolerated.⁴¹ The twin sister had never questioned her gender identity but did experience some depression. For Segal, the FtM twin's gender nonconformity and abuse in childhood were factors that contributed to gender dysphoria; the other twin was not subject to the same stressors in childhood, and did not develop issues around her gender identity. Segal's second case study also concerned identical twins with one twin transitioning from female to male.⁴² This FtM twin had early-onset nonconforming behaviors and attempted suicide as a young adult. At age 29 she underwent reassignment surgery, was well supported by family, met a woman, and married. As in the first case, the other twin was reportedly always secure in her female gender identity.

Segal speculates that each set of twins may have had uneven prenatal androgen exposures (though her study did not offer evidence to support this)⁴³ and concludes that "Transsexualism is unlikely to be associated with a major gene, but is likely to be associated with multiple genetic, epigenetic, developmental and experiential influences."⁴⁴ Segal is critical of the notion that the maternal abuse experienced by the FtM twin in her first case study may have played a causal role in the twin's "atypical gender identification" since the abuse "apparently *followed*" the twin's gender-atypical behaviors—though Segal acknowledges "it is possible that this abuse reinforced his already atypical gender identification."⁴⁵ These case studies, while informative, are not scientifically strong, and do not provide direct evidence for any causal hypotheses about the origins of atypical gender identification.

A source of more information—but also inadequate to make direct causal inferences—is a case analysis by Mayo Clinic psychiatrists J. Michael Bostwick and Kari A. Martin of an intersex individual born with ambiguous genitalia who was operated on and raised as a female.⁴⁶ By way of offering some background, the authors draw a distinction between gender identity disorder (an "inconsistency between perceived gender identity and phenotypic sex" that generally involves "no discernible neuroendocri-

nological abnormality”⁴⁷), and intersexuality (a condition in which biological features of both sexes are present). They also provide a summary and classification scheme of the various types of intersex disorders. After a thorough discussion of the various intersex developmental issues that can lead to a disjunction between the brain and body, the authors acknowledge that “Some adult patients with severe dysphoria—transsexuals—have neither history nor objective findings supporting a known biological cause of brain-body disjunction.”⁴⁸ These patients require thorough medical and psychiatric attention to avoid gender dysphoria.

After this helpful summary, the authors state that “Absent psychosis or severe character pathology, patients’ subjective assertions are presently the most reliable standards for delineating core gender identity.”⁴⁹ But it is not clear how we could consider subjective assertions more reliable in establishing gender identity, unless gender identity is defined as a completely subjective phenomenon. The bulk of the article is devoted to describing the various objectively discernible and identifiable ways in which one’s identity as a male or female is imprinted on the nervous and endocrine system. Even when something goes wrong with the development of external genitalia, individuals are more likely to act in accordance with their chromosomal and hormonal makeup.⁵⁰

In 2011, Giuseppina Rametti and colleagues from various research centers in Spain used MRI to study the brain structures of 18 FtM transsexuals who exhibited gender nonconformity early in life and experienced sexual attraction to females prior to hormone treatment.⁵¹ The goal was to learn whether their brain features corresponded more to their biological sex or to their sense of gender identity. The control group consisted of 24 male and 19 female heterosexuals with gender identities conforming to their biological sex. Differences were noted in the white matter microstructure of specific brain areas. In untreated FtM transsexuals, that structure was more similar to that of heterosexual males than to that of heterosexual females in three of four brain areas.⁵² In a complementary study, Rametti and colleagues compared 18 MtF transsexuals to 19 female and 19 male heterosexual controls.⁵³ These MtF transsexuals had white matter tract averages in several brain areas that fell between the averages of the control males and the control females. The values, however, were typically closer to the males (that is, to those that shared their biological sex) than to the females in most areas.⁵⁴ In controls the authors found that, as expected, the males had greater amounts of gray and white matter and higher volumes of cerebrospinal fluid than control females. The MtF transsexual brain volumes

were all similar to those of male controls and significantly different from those of females.⁵⁵

Overall, the findings of these studies by Rametti and colleagues do not sufficiently support the notion that transgender individuals have brains more similar to their preferred gender than to the gender corresponding with their biological sex. Both studies are limited by small sample sizes and lack of a prospective hypothesis—both analyzed the MRI data to find the gender differences and then looked to see where the data from transgender subjects fit.

Whereas both of these MRI studies looked at brain *structure*, a functional MRI study by Emiliano Santarnecchi and colleagues from the University of Siena and the University of Florence looked at brain *function*, examining gender-related differences in spontaneous brain activity during the resting state.⁵⁶ The researchers compared a single FtM individual (declared cross-gender since childhood), and control groups of 25 males and 25 females, with regard to spontaneous brain activity. The FtM individual demonstrated a “brain activity profile more close to his biological sex than to his desired one,” and based in part on this result the authors concluded that “untreated FtM transsexuals show a functional connectivity profile comparable to female control subjects.”⁵⁷ With a sample size of one, this study’s statistical power is virtually zero.

In 2013, Hsaio-Lun Ku and colleagues from various medical centers and research institutes in Taiwan also conducted functional brain imaging studies. They compared the brain activity of 41 transsexuals (21 FtMs, 20 MtFs) and 38 matched heterosexual controls (19 males and 19 females).⁵⁸ Arousal response of each cohort while viewing neutral as compared to erotic films was compared between groups. All of the transsexuals in the study reported sexual attractions to members of their natal, biological sex, and exhibited more sexual arousal than heterosexual controls when viewing erotic films that depicted sexual activity between subjects sharing their biological sex. A “selfness” score was also incorporated into the study, in which the researchers asked participants to “rate the degree to which you identify yourself as the male or female in the film.”⁵⁹ The transsexuals in the study identified with those of their preferred gender more than the controls identified with those of their biological gender, in both erotic films and neutral films. The heterosexual controls did not identify themselves with either males or females in either of the film types. Ku and colleagues claim to have demonstrated characteristic brain patterns for sexual attraction as related to biological sex but did not make meaningful neurobiological gender-identity comparisons among the three cohorts. In

addition, they reported findings that transsexuals demonstrated psychosocial maladaptive defensive styles.

A 2008 study by Hans Berglund and colleagues from Sweden's Karolinska Institute and Stockholm Brain Institute used PET and fMRI scans to compare brain-area activation patterns in 12 MtF transgendered individuals who were sexually attracted to women with those of 12 heterosexual women and 12 heterosexual men.⁶⁰ The first set of subjects took no hormones and had not undergone sex-reassignment surgery. The experiment involved smelling odorous steroids thought to be female pheromones, and other sexually neutral odors such as lavender oil, cedar oil, eugenol, butanol, and odorless air. The results were varied and mixed between the groups for the various odors, which should not be surprising, since *post hoc* analyses usually lead to contradictory findings.

In summary, the studies presented above show inconclusive evidence and mixed findings regarding the brains of transgender adults. Brain-activation patterns in these studies do not offer sufficient evidence for drawing sound conclusions about possible associations between brain activation and sexual identity or arousal. The results are conflicting and confusing. Since the data by Ku and colleagues on brain-activation patterns are not universally associated with a particular sex, it remains unclear whether and to what extent neurobiological findings say anything meaningful about gender identity. It is important to note that regardless of their findings, studies of this kind cannot support any conclusion that individuals come to identify as a gender that does not correspond to their biological sex because of an innate, biological condition of the brain.

The question is not simply whether there are differences between the brains of transgender individuals and people identifying with the gender corresponding to their biological sex, but whether gender identity is a fixed, innate, and biological trait, even when it does not correspond to biological sex, or whether environmental or psychological causes contribute to the development of a sense of gender identity in such cases. Neurological differences in transgender adults might be the consequence of biological factors such as genes or prenatal hormone exposure, or of psychological and environmental factors such as childhood abuse, or they could result from some combination of the two. There are no serial, longitudinal, or prospective studies looking at the brains of cross-gender identifying children who develop to later identify as transgender adults. Lack of this research severely limits our ability to understand causal relationships between brain morphology, or functional activity, and the later development of gender identity different from biological sex.

More generally, it is now widely recognized among psychiatrists and neuroscientists who engage in brain imaging research that there are inherent and ineradicable methodological limitations of *any* neuroimaging study that simply associates a particular trait, such as a certain behavior, with a particular brain morphology.⁶¹ (And when the trait in question is not a concrete behavior but something as elusive and vague as “gender identity,” these methodological problems are even more serious.) These studies cannot provide statistical evidence nor show a plausible biological mechanism strong enough to support *causal connections* between a brain feature and the trait, behavior, or symptom in question. To support a conclusion of causality, even epidemiological causality, we need to conduct prospective longitudinal panel studies of a fixed set of individuals across the course of sexual development if not their lifespan.

Studies like these would use serial brain images at birth, in childhood, and at other points along the developmental continuum, to see whether brain morphology findings were there from the beginning. Otherwise, we cannot establish whether certain brain features caused a trait, or whether the trait is innate and perhaps fixed. Studies like those discussed above of individuals who already exhibit the trait are incapable of distinguishing between *causes* and *consequences* of the trait. In most cases transgender individuals have been acting and thinking for years in ways that, through learned behavior and associated neuroplasticity, may have produced brain changes that could differentiate them from other members of their biological or natal sex. The only definitive way to establish epidemiological causality between a brain feature and a trait (especially one as complex as gender identity) is to conduct prospective, longitudinal, preferably randomly sampled and population-based studies.

In the absence of such prospective longitudinal studies, large representative population-based samples with adequate statistical controls for confounding factors may help narrow the possible causes of a behavioral trait and thereby increase the probability of identifying a neurological cause.⁶² However, because the studies conducted thus far use small convenience samples, none of them is especially helpful for narrowing down the options for causality. To obtain a better study sample, we would need to include neuroimaging in large-scale epidemiological studies. In fact, given the small number of transgender individuals in the general population,⁶³ the studies would need to be prohibitively large to attain findings that would reach statistical significance.

Moreover, if a study found significant differences between these groups—that is, a number of differences higher than what would be

expected by chance alone—these differences would refer to the average in a population of each group. Even if these two *groups* differed significantly for all 100 measurements, it would not necessarily indicate a biological difference among *individuals* at the extremes of the distribution. Thus, a randomly selected transgender individual and a randomly selected non-transgender individual might not differ on any of these 100 measurements. Additionally, since the probability that a randomly selected person from the general population will be transgender is quite small, statistically significant differences in the sample means are not sufficient evidence to conclude that a particular measurement is predictive of whether the person is transgender or not. If we measured the brain of an infant, toddler, or adolescent and found this individual to be closer to one cohort than another on these measures, it would not imply that this individual would grow up to identify as a member of that cohort. It may be helpful to keep this caveat in mind when interpreting research on transgender individuals.

In this context, it is important to note that there are no studies that demonstrate that any of the biological differences being examined have predictive power, and so all interpretations, usually in popular outlets, claiming or suggesting that a statistically significant difference between the brains of people who are transgender and those who are not is the cause of being transgendered or not—that is to say, that the biological differences determine the differences in gender identity—are unwarranted.

In short, the current studies on associations between brain structure and transgender identity are small, methodologically limited, inconclusive, and sometimes contradictory. Even if they were more methodologically reliable, they would be insufficient to demonstrate that brain structure is a cause, rather than an effect, of the gender-identity behavior. They would likewise lack predictive power, the real challenge for any theory in science.

For a simple example to illustrate this point, suppose we had a room with 100 people in it. Two of them are transgender and all others are not. I pick someone at random and ask you to guess the person's gender identity. If you know that 98 out of 100 of the individuals are not transgender, the safest bet would be to guess that the individual is not transgender, since that answer will be correct 98% of the time. Suppose, then, that you have the opportunity to ask questions about the neurobiology and about the natal sex of the person. Knowing the biology only helps in predicting whether the individual is transgender if it can improve on the original guess that the person is not transgender. So if knowing a characteristic of the individual's brain does not improve the ability to predict what group the patient belongs to, then the fact that the two groups differ at the mean is almost irrelevant.

Improving on the original prediction is very difficult for a rare trait such as being transgender, because the probability of that prediction being correct is already very high. If there really were a clear difference between the brains of transgender and non-transgender individuals, akin to the biological differences between the sexes, then improving on the original guess would be relatively easy. Unlike the differences between the sexes, however, there are no biological features that can reliably identify transgender individuals as different from others.

The consensus of scientific evidence overwhelmingly supports the proposition that a physically and developmentally normal boy or girl is indeed what he or she appears to be at birth. The available evidence from brain imaging and genetics does not demonstrate that the development of gender identity as different from biological sex is innate. Because scientists have not established a solid framework for understanding the causes of cross-gender identification, ongoing research should be open to psychological and social causes, as well as biological ones.

Transgender Identity in Children

In 2012, the *Washington Post* featured a story by Petula Dvorak, “Transgender at five,”⁶⁴ about a girl who at the age of 2 years began insisting that she was a boy. The story recounts her mother’s interpretation of this behavior: “Her little girl’s brain was different. Jean [her mother] could tell. She had heard about transgender people, those who are one gender physically but the other gender mentally.” The story recounts this mother’s distressed experiences as she began researching gender identity problems in children and came to understand other parents’ experiences:

Many talked about their painful decision to allow their children to publicly transition to the opposite gender—a much tougher process for boys who wanted to be girls. Some of what Jean heard was reassuring: Parents who took the plunge said their children’s behavior problems largely disappeared, schoolwork improved, happy kid smiles returned. But some of what she heard was scary: children taking puberty blockers in elementary school and teens embarking on hormone therapy before they’d even finished high school.⁶⁵

The story goes on to describe how the sister, Moyin, of the transgender child Tyler (formerly Kathryn) made sense of her sibling’s identity:

Tyler’s sister, who’s 8, was much more casual about describing her transgender sibling. “It’s just a boy mind in a girl body,” Moyin

explained matter-of-factly to her second-grade classmates at her private school, which will allow Tyler to start kindergarten as a boy, with no mention of Kathryn.⁶⁶

The remarks from the child's sister encapsulate the popular notion regarding gender identity: transgender individuals, or children who meet the diagnostic criteria for gender dysphoria, are simply "a boy mind in a girl body," or vice versa. This view implies that gender identity is a persistent and innate feature of human psychology, and it has inspired a gender-affirming approach to children who experience gender identity issues at an early age.

As we have seen above in the overview of the neurobiological and genetic research on the origins of gender identity, there is little evidence that the phenomenon of transgender identity has a biological basis. There is also little evidence that gender identity issues have a high rate of persistence in children. According to the *DSM-5*, "In natal [biological] males, persistence [of gender dysphoria] has ranged from 2.2% to 30%. In natal females, persistence has ranged from 12% to 50%."⁶⁷ Scientific data on persistence of gender dysphoria remains sparse due to the very low prevalence of the disorder in the general population, but the wide range of findings in the literature suggests that there is still much that we do not know about why gender dysphoria persists or desists in children. As the *DSM-5* entry goes on to note, "It is unclear if children 'encouraged' or supported to live socially in the desired gender will show higher rates of persistence, since such children have not yet been followed longitudinally in a systematic manner."⁶⁸ There is a clear need for more research in these areas, and for parents and therapists to acknowledge the great uncertainty regarding how to interpret the behavior of these children.

Therapeutic Interventions in Children

With the uncertainty surrounding the diagnosis of and prognosis for gender dysphoria in children, therapeutic decisions are particularly complex and difficult. Therapeutic interventions for children must take into account the probability that the children may outgrow cross-gender identification. University of Toronto researcher and therapist Kenneth Zucker believes that family and peer dynamics can play a significant role in the development and persistence of gender-nonconforming behavior, writing that

it is important to consider both predisposing and perpetuating factors that might inform a clinical formulation and the development of

a therapeutic plan: the role of temperament, parental reinforcement of cross-gender behavior during the sensitive period of gender identity formation, family dynamics, parental psychopathology, peer relationships and the multiple meanings that might underlie the child's fantasy of becoming a member of the opposite sex.⁶⁹

Zucker worked for years with children experiencing feelings of gender incongruence, offering psychosocial treatments to help them embrace the gender corresponding with their biological sex—for instance, talk therapy, parent-arranged play dates with same-sex peers, therapy for co-occurring psychopathological issues such as autism spectrum disorder, and parent counseling.⁷⁰

In a follow-up study by Zucker and colleagues of children treated by them over the course of thirty years at the Center for Mental Health and Addiction in Toronto, they found that gender identity disorder persisted in only 3 of the 25 girls they had treated.⁷¹ (Zucker's clinic was closed by the Canadian government in 2015.⁷²)

An alternative to Zucker's approach that emphasizes affirming the child's preferred gender identity has become more common among therapists.⁷³ This approach involves helping the children to self-identify even more with the gender label they prefer at the time. One component of the gender-affirming approach has been the use of hormone treatments for adolescents in order to delay the onset of sex-typical characteristics during puberty and alleviate the feelings of dysphoria the adolescents will experience as their bodies develop sex-typical characteristics that are at odds with the gender with which they identify. There is relatively little evidence for the therapeutic value of these kinds of puberty-delaying treatments, but they are currently the subject of a large clinical study sponsored by the National Institutes of Health.⁷⁴

While epidemiological data on the outcomes of medically delayed puberty is quite limited, referrals for sex-reassignment hormones and surgical procedures appear to be on the rise, and there is a push among many advocates to proceed with sex reassignment at younger ages. According to a 2013 article in *The Times* of London, the United Kingdom saw a 50% increase in the number of children referred to gender dysphoria clinics from 2011 to 2012, and a nearly 50% increase in referrals among adults from 2010 to 2012.⁷⁵ Whether this increase can be attributed to rising rates of gender confusion, rising sensitivity to gender issues, growing acceptance of therapy as an option, or other factors, the increase itself is concerning, and merits further scientific inquiry into the family dynamics

and other potential problems, such as social rejection or developmental issues, that may be taken as signs of childhood gender dysphoria.

A study of psychological outcomes following puberty suppression and sex-reassignment surgery, published in the journal *Pediatrics* in 2014 by child and adolescent psychiatrist Annelou L. C. de Vries and colleagues, suggested improved outcomes for individuals after receiving these interventions, with well-being improving to a level similar to that of young adults from the general population.⁷⁶ This study looked at 55 transgender adolescents and young adults (22 MtF and 33 FtM) from a Dutch clinic who were assessed three times: before the start of puberty suppression (mean age: 13.6 years), when cross-sex hormones were introduced (mean age: 16.7 years), and at least one year after sex-reassignment surgery (mean age: 20.7 years). The study did not provide a matched group for comparison—that is, a group of transgender adolescents who did not receive puberty-blocking hormones, cross-sex hormones, and/or sex-reassignment surgery—which makes comparisons of outcomes more difficult.

In the study cohort, gender dysphoria improved over time, body image improved on some measures, and overall functioning improved modestly. Due to the lack of a matched control group it is unclear whether these changes are attributable to the procedures or would have occurred in this cohort without the medical and surgical interventions. Measures of anxiety, depression, and anger showed some improvements over time, but these findings did not reach statistical significance. While this study suggested some improvements over time in this cohort, particularly the reported subjective satisfaction with the procedures, detecting significant differences would require the study to be replicated with a matched control group and a larger sample size. The interventions also included care from a multidisciplinary team of medical professionals, which could have had a beneficial effect. Future studies of this kind would ideally include long-term follow-ups that assess outcomes and functioning beyond the late teens or early twenties.

Therapeutic Interventions in Adults

The potential that patients undergoing medical and surgical sex reassignment may want to return to a gender identity consistent with their biological sex suggests that reassignment carries considerable psychological and physical risk, especially when performed in childhood, but also in adulthood. It suggests that the patients' pre-treatment beliefs about an ideal post-treatment life may sometimes go unrealized.

In 2004, Birmingham University's Aggressive Research Intelligence Facility (Arif) assessed the findings of more than one hundred follow-up studies of post-operative transsexuals.⁷⁷ An article in *The Guardian* summarized the findings:

Arif...concludes that none of the studies provides conclusive evidence that gender reassignment is beneficial for patients. It found that most research was poorly designed, which skewed the results in favour of physically changing sex. There was no evaluation of whether other treatments, such as long-term counselling, might help transsexuals, or whether their gender confusion might lessen over time. Arif says the findings of the few studies that have tracked significant numbers of patients over several years were flawed because the researchers lost track of at least half of the participants. The potential complications of hormones and genital surgery, which include deep vein thrombosis and incontinence respectively, have not been thoroughly investigated, either. "There is huge uncertainty over whether changing someone's sex is a good or a bad thing," says Dr Chris Hyde, director of Arif. "While no doubt great care is taken to ensure that appropriate patients undergo gender reassignment, there's still a large number of people who have the surgery but remain traumatized—often to the point of committing suicide."⁷⁸

The high level of uncertainty regarding various outcomes after sex-reassignment surgery makes it difficult to find clear answers about the effects on patients of reassignment surgery. Since 2004, there have been other studies on the efficacy of sex-reassignment surgery, using larger sample sizes and better methodologies. We will now examine some of the more informative and reliable studies on outcomes for individuals receiving sex-reassignment surgery.

As far back as 1979, Jon K. Meyer and Donna J. Reter published a longitudinal follow-up study on the overall well-being of adults who underwent sex-reassignment surgery.⁷⁹ The study compared the outcomes of 15 people who received surgery with those of 35 people who requested but did not receive surgery (14 of these individuals eventually received surgery later, resulting in three cohorts of comparison: operated, not-operated, and operated later). Well-being was quantified using a scoring system that assessed psychiatric, economic, legal, and relationship outcome variables. Scores were determined by the researchers after performing interviews with the subjects. Average follow-up time was approximately five years for subjects who had sex change surgery, and about two years for those subjects who did not.

Compared to their condition before surgery, the individuals who had undergone surgery appeared to show some improvement in well-being, though the results had a fairly low level of statistical significance. Individuals who had no surgical intervention did display a statistically significant improvement at follow-up. However, there was no statistically significant difference between the two groups' scores of well-being at follow-up. The authors concluded that "sex reassignment surgery confers no objective advantage in terms of social rehabilitation, although it remains subjectively satisfying to those who have rigorously pursued a trial period and who have undergone it."⁸⁰ This study led the psychiatry department at Johns Hopkins Medical Center (JHMC) to discontinue surgical interventions for sex changes for adults.⁸¹

However, the study has important limitations. Selection bias was introduced in the study population, because the subjects were drawn from those individuals who sought sex-reassignment surgery at JHMC. In addition, the sample size was small. Also, the individuals who did not undergo sex-reassignment surgery but presented to JHMC for it did not represent a true control group. Random assignment of the surgical procedure was not possible. Large differences in the average follow-up time between those who underwent surgery and those who did not further reduces any capacity to draw valid comparisons between the two groups. Additionally, the study's methodology was also criticized for the somewhat arbitrary and idiosyncratic way it measured the well-being of its subjects. Cohabitation or any form of contact with psychiatric services were scored as equally negative factors as having been arrested.⁸²

In 2011, Cecilia Dhejne and colleagues from the Karolinska Institute and Gothenburg University in Sweden published one of the more robust and well-designed studies to examine outcomes for persons who underwent sex-reassignment surgery. Focusing on mortality, morbidity, and criminality rates, the matched cohort study compared a total of 324 transsexual persons (191 MtFs, 133 FtMs) who underwent sex reassignment between 1973 and 2003 to two age-matched controls: people of the same sex as the transsexual person at birth, and people of the sex to which the individual had been reassigned.⁸³

Given the relatively low number of transsexual persons in the general population, the size of this study is impressive. Unlike Meyer and Reter, Dhejne and colleagues did not seek to evaluate the patient satisfaction after sex-reassignment surgery, which would have required a control group of transgender persons who desired to have sex-reassignment surgery but did not receive it. Also, the study did not compare outcome

variables before and after sex-reassignment surgery; only outcomes after surgery were evaluated. We need to keep these caveats in mind as we look at what this study found.

Dhejne and colleagues found statistically significant differences between the two cohorts on several of the studied rates. For example, the postoperative transsexual individuals had an approximately three times higher risk for psychiatric hospitalization than the control groups, even after adjusting for prior psychiatric treatment.⁸⁴ (However, the risk of being hospitalized for substance abuse was not significantly higher after adjusting for prior psychiatric treatment, as well as other covariates.) Sex-reassigned individuals had nearly a three times higher risk of all-cause mortality after adjusting for covariates, although the elevated risk was significant only for the time period of 1973–1988.⁸⁵ Those undergoing surgery during this period were also at increased risk of being convicted of a crime.⁸⁶ Most alarmingly, sex-reassigned individuals were 4.9 times more likely to attempt suicide and 19.1 times more likely to die by suicide compared to controls.⁸⁷ “Mortality from suicide was strikingly high among sex-reassigned persons, including after adjustment for prior psychiatric morbidity.”⁸⁸

The study design precludes drawing inferences “as to the effectiveness of sex reassignment as a treatment for transsexualism,” although Dhejne and colleagues state that it is possible that “things might have been even worse without sex reassignment.”⁸⁹ Overall, post-surgical mental health was quite poor, as indicated especially by the high rate of suicide attempts and all-cause mortality in the 1973–1988 group. (It is worth noting that for the transsexuals in the study who underwent sex reassignment from 1989 to 2003, there were of course fewer years of data available at the time the study was conducted than for those transsexuals from the earlier period. The rates of mortality, morbidity, and criminality in the later group may in time come to resemble the elevated risks of the earlier group.) In summary, this study suggests that sex-reassignment surgery may not rectify the comparatively poor health outcomes associated with transgender populations in general. Still, because of the limitations of this study mentioned above, the results also cannot establish that sex-reassignment surgery causes poor health outcomes.

In 2009, Annette Kuhn and colleagues from the University Hospital and University of Bern in Switzerland examined post-surgery quality of life in 52 MtF and 3 FtM transsexuals fifteen years after sex-reassignment surgery.⁹⁰ This study found considerably lower general life satisfaction in post-surgical transsexuals as compared with females who had at least one

pelvic surgery in the past. The postoperative transsexuals reported lower satisfaction with their general quality of health and with some of the personal, physical, and social limitations they experienced with incontinence that resulted as a side effect of the surgery. Again, inferences cannot be drawn from this study regarding the efficacy of sex-reassignment surgery due to the lack of a control group of transgender individuals who did not receive sex-reassignment surgery.

In 2010, Mohammad Hassan Murad and colleagues from the Mayo Clinic published a systematic review of studies on the outcomes of hormonal therapies used in sex-reassignment procedures, finding that there was “very low quality evidence” that sex reassignment via hormonal interventions “likely improves gender dysphoria, psychological functioning and comorbidities, sexual function and overall quality of life.”⁹¹ The authors identified 28 studies that together examined 1,833 patients who underwent sex-reassignment procedures that included hormonal interventions (1,093 male-to-female, 801 female-to-male).⁹² Pooling data across studies showed that, after receiving sex-reassignment procedures, 80% of patients reported improvement in gender dysphoria, 78% reported improvement in psychological symptoms, and 80% reported improvement in quality of life.⁹³ None of the studies included the bias-limiting measure of randomization (that is, in none of the studies were sex-reassignment procedures assigned randomly to some patients but not to others), and only three of the studies included control groups (that is, patients who were not provided the treatment to serve as comparison cases for those who did).⁹⁴ Most of the studies examined in Murad and colleagues’ review reported improvements in psychiatric comorbidities and quality of life, though notably suicide rates remained higher for individuals who had received hormone treatments than for the general population, despite reductions in suicide rates following the treatments.⁹⁵ The authors also found that there were some exceptions to reports of improvements in mental health and satisfaction with sex-reassignment procedures; in one study, 3 of 17 individuals regretted the procedure with 2 of these 3 seeking reversal procedures,⁹⁶ and four of the studies reviewed reported worsening quality of life, including continuing social isolation, lack of improvement in social relationships, and dependence on government welfare programs.⁹⁷

The scientific evidence summarized suggests we take a skeptical view toward the claim that sex-reassignment procedures provide the hoped-for benefits or resolve the underlying issues that contribute to elevated mental health risks among the transgender population. While we work to stop maltreatment and misunderstanding, we should also work to study

and understand whatever factors may contribute to the high rates of suicide and other psychological and behavioral health problems among the transgender population, and to think more clearly about the treatment options that are available.

Conclusion

Accurate, replicable scientific research results can and do influence our personal decisions and self-understanding, and can contribute to the public discourse, including cultural and political debates. When the research touches on controversial themes, it is particularly important to be clear about precisely what science has and has not shown. For complex, complicated questions concerning the nature of human sexuality, there exists at best provisional scientific consensus; much remains unknown, as sexuality is an immensely complex part of human life that defies our attempts at defining all its aspects and studying them with precision.

For questions that are easier to study empirically, however, such as those concerning the rates of mental health outcomes for identifiable subpopulations of sexual minorities, the research does offer some clear answers: these subpopulations show higher rates of depression, anxiety, substance abuse, and suicide compared to the general population. One hypothesis, the social stress model—which posits that stigma, prejudice, and discrimination are the primary causes of higher rates of poor mental health outcomes for these subpopulations—is frequently cited as a way to explain this disparity. While non-heterosexual and transgender individuals are often subject to social stressors and discrimination, science has not shown that these factors alone account for the entirety, or even a majority, of the health disparity between non-heterosexual and transgender subpopulations and the general population. There is a need for extensive research in this area to test the social stress hypothesis and other potential explanations for the health disparities, and to help identify ways of addressing the health concerns present in these subpopulations.

Some of the most widely held views about sexual orientation, such as the “born that way” hypothesis, simply are not supported by science. The literature in this area does describe a small ensemble of biological differences between non-heterosexuals and heterosexuals, but those biological differences are not sufficient to predict sexual orientation, the ultimate test of any scientific finding. The strongest statement that science offers to explain sexual orientation is that some biological factors appear, to an unknown extent, to predispose some individuals to a non-heterosexual orientation.

The suggestion that we are “born that way” is more complex in the case of gender identity. In one sense, the evidence that we are born with

a given gender seems well supported by direct observation: males overwhelmingly identify as men and females as women. The fact that children are (with a few exceptions of intersex individuals) born either biologically male or female is beyond debate. The biological sexes play complementary roles in reproduction, and there are a number of population-level average physiological and psychological differences between the sexes. However, while biological sex is an innate feature of human beings, gender identity is a more elusive concept.

In reviewing the scientific literature, we find that almost nothing is well understood when we seek biological explanations for what causes some individuals to state that their gender does not match their biological sex. The findings that do exist often have sample-selection problems, and they lack longitudinal perspective and explanatory power. Better research is needed, both to identify ways by which we can help to lower the rates of poor mental health outcomes and to make possible more informed discussion about some of the nuances present in this field.

Yet despite the scientific uncertainty, drastic interventions are prescribed and delivered to patients identifying, or identified, as transgender. This is especially troubling when the patients receiving these interventions are children. We read popular reports about plans for medical and surgical interventions for many prepubescent children, some as young as six, and other therapeutic approaches undertaken for children as young as two. We suggest that no one can determine the gender identity of a two-year-old. We have reservations about how well scientists understand what it even means for a child to have a developed sense of his or her gender, but notwithstanding that issue, we are deeply alarmed that these therapies, treatments, and surgeries seem disproportionate to the severity of the distress being experienced by these young people, and are at any rate premature since the majority of children who identify as the gender opposite their biological sex will not continue to do so as adults. Moreover, there is a lack of reliable studies on the long-term effects of these interventions. We strongly urge caution in this regard.

We have sought in this report to present a complex body of research in a way that will be intelligible to a wide audience of both experts and lay readers alike. Everyone—scientists and physicians, parents and teachers, lawmakers and activists—deserves access to accurate information about sexual orientation and gender identity. While there is much controversy surrounding how our society treats its LGBT members, no political

or cultural views should discourage us from understanding the related clinical and public health issues and helping people suffering from mental health problems that may be connected to their sexuality.

Our work suggests some avenues for future research in the biological, psychological, and social sciences. More research is needed to uncover the causes of the increased rates of mental health problems in the LGBT subpopulations. The social stress model that dominates research on this issue requires improvement, and most likely needs to be supplemented by other hypotheses. Additionally, the ways in which sexual desires develop and change across one's lifespan remain, for the most part, inadequately understood. Empirical research may help us to better understand relationships, sexual health, and mental health.

Critiquing and challenging both parts of the “born that way” paradigm—both the notion that sexual orientation is biologically determined and fixed, and the related notion that there is a fixed gender independent of biological sex—enables us to ask important questions about sexuality, sexual behaviors, gender, and individual and social goods in a different light. Some of these questions lie outside the scope of this work, but those that we have examined suggest that there is a great chasm between much of the public discourse and what science has shown.

Thoughtful scientific research and careful, circumspect interpretation of its results can advance our understanding of sexual orientation and gender identity. There is still much work to be done and many unanswered questions. We have attempted to synthesize and describe a complex body of scientific research related to some of these themes. We hope that this report contributes to the ongoing public conversation regarding human sexuality and identity. We anticipate that this report may elicit spirited responses, and we welcome them.

Notes

Part One: Sexual Orientation

1. Alex Witchel, "Life After 'Sex,'" *The New York Times Magazine*, January 19, 2012, <http://www.nytimes.com/2012/01/22/magazine/cynthia-nixon-wit.html>.
2. Brandon Ambrosino, "I Wasn't Born This Way. I Choose to Be Gay," *The New Republic*, January 28, 2014, <https://newrepublic.com/article/116378/macklemores-same-love-sends-wrong-message-about-being-gay>.
3. J. Michael Bailey *et al.*, "A Family History Study of Male Sexual Orientation Using Three Independent Samples," *Behavior Genetics* 29, no. 2 (1999): 79–86, <http://dx.doi.org/10.1023/A:1021652204405>; Andrea Camperio-Ciani, Francesca Corna, Claudio Capiluppi, "Evidence for maternally inherited factors favouring male homosexuality and promoting female fecundity," *Proceedings of the Royal Society B* 271, no. 1554 (2004): 2217–2221, <http://dx.doi.org/10.1098/rspb.2004.2872>; Dean H. Hamer *et al.*, "A linkage between DNA markers on the X chromosome and male sexual orientation," *Science* 261, no. 5119 (1993): 321–327, <http://dx.doi.org/10.1126/science.8332896>.
4. Elizabeth Norton, "Homosexuality May Start in the Womb," *Science*, December 11, 2012, <http://www.sciencemag.org/news/2012/12/homosexuality-may-start-womb>.
5. Mark Joseph Stern, "No, Being Gay Is Not a Choice," *Slate*, February 4, 2014, http://www.slate.com/blogs/outward/2014/02/04/choose_to_be_gay_no_you_don_t.html.
6. David Nimmons, "Sex and the Brain," *Discover*, March 1, 1994, <http://discovermagazine.com/1994/mar/sexandthebrain346/>.
7. Leonard Sax, *Why Gender Matters: What Parents and Teachers Need to Know about the Emerging Science of Sex Differences* (New York: Doubleday, 2005), 206.
8. Benoit Denizet-Lewis, "The Scientific Quest to Prove Bisexuality Exists," *The New York Times Magazine*, March 20, 2014, <http://www.nytimes.com/2014/03/23/magazine/the-scientific-quest-to-prove-bisexuality-exists.html>.
9. *Ibid.*
10. *Ibid.*
11. Stephen B. Levine, "Reexploring the Concept of Sexual Desire," *Journal of Sex & Marital Therapy*, 28, no. 1 (2002), 39, <http://dx.doi.org/10.1080/009262302317251007>.
12. *Ibid.*
13. See Lori A. Brotto *et al.*, "Sexual Desire and Pleasure," in *APA Handbook of Sexuality and Psychology*, Volume 1: Person-based Approaches, APA (2014): 205–244; Stephen B. Levine, "Reexploring the Concept of Sexual Desire," *Journal of Sex & Marital Therapy* 28, no. 1 (2002): 39–51, <http://dx.doi.org/10.1080/009262302317251007>; Lisa M. Diamond, "What Does Sexual Orientation Orient? A Biobehavioral Model Distinguishing Romantic Love and Sexual Desire," *Psychological Review* 110, no. 1 (2003): 173–192,

<http://dx.doi.org/10.1037/0033-295X.110.1.173>; Gian C. Gonzaga *et al.*, “Romantic Love and Sexual Desire in Close Relationships,” *Emotion* 6, no. 2 (2006): 163–179, <http://dx.doi.org/10.1037/1528-3542.6.2.163>.

14. Alexander R. Pruss, *One Body: An Essay in Christian Sexual Ethics* (Notre Dame, Ind.: University of Notre Dame Press, 2012), 360.

15. Neil A. Campbell and Jane B. Reece, *Biology*, Seventh Edition (San Francisco: Pearson Education, 2005), 973.

16. See, for instance, Nancy Burley, “The Evolution of Concealed Ovulation,” *American Naturalist* 114, no. 6 (1979): 835–858, <http://dx.doi.org/10.1086/283532>.

17. David Woodruff Smith, “Phenomenology,” *Stanford Encyclopedia of Philosophy* (2013), <http://plato.stanford.edu/entries/phenomenology/>.

18. See, for instance, Abraham Maslow, *Motivation and Personality*, Third Edition (New York: Addison-Wesley Educational Publishers, 1987).

19. Marc-André Raffalovich, *Uranisme et unisexualité: étude sur différentes manifestations de l'instinct sexuel* (Lyon, France: Storck, 1896).

20. See, generally, Brocard Sewell, *In the Dorian Mode: Life of John Gray 1866–1934* (Padstow, Cornwall, U.K.: Tabb House, 1983).

21. For more on the Kinsey scale, see “Kinsey’s Heterosexual-Homosexual Rating Scale,” Kinsey Institute at Indiana University, <http://www.kinseyinstitute.org/research/publications/kinsey-scale.php>.

22. Brief as *Amicus Curiae* of Daniel N. Robinson in Support of Petitioners and Supporting Reversal, *Hollingsworth v. Perry*, 133 S. Ct. 2652 (2013).

23. See, for example, John Bowlby, “The Nature of the Child’s Tie to His Mother,” *The International Journal of Psycho-Analysis* 39 (1958): 350–373.

24. Edward O. Laumann *et al.*, *The Social Organization of Sexuality: Sexual Practices in the United States* (Chicago: University of Chicago Press, 1994).

25. American Psychological Association, “Answers to Your Questions for a Better Understanding of Sexual Orientation & Homosexuality,” 2008, <http://www.apa.org/topics/lgbt/orientation.pdf>.

26. Laumann *et al.*, *The Social Organization of Sexuality*, 300–301.

27. Lisa M. Diamond and Ritch C. Savin-Williams, “Gender and Sexual Identity,” in *Handbook of Applied Development Science*, eds. Richard M. Lerner, Francine Jacobs, and Donald Wertlieb (Thousand Oaks, Calif.: SAGE Publications, 2002), 101. See also A. Elfin Moses and Robert O. Hawkins, *Counseling Lesbian Women and Gay Men: A Life-Issues Approach* (Saint Louis, Mo.: Mosby, 1982).

28. John C. Gonsiorek and James D. Weinrich, “The Definition and Scope of Sexual Orientation,” in *Homosexuality: Research Implications for Public Policy*, eds. John C. Gonsiorek and James D. Weinrich (Newberry Park, Calif.: SAGE Publications, 1991), 8.

29. Letitia Anne Peplau *et al.*, “The Development of Sexual Orientation in Women,”

- Annual Review of Sex Research* 10, no. 1 (1999): 83, <http://dx.doi.org/10.1080/10532528.1999.10559775>.
30. Lisa M. Diamond, “New Paradigms for Research on Heterosexual and Sexual-Minority Development,” *Journal of Clinical Child & Adolescent Psychology* 32, no. 4 (2003): 492.
31. Franz J. Kallmann, “Comparative Twin Study on the Genetic Aspects of Male Homosexuality,” *Journal of Nervous and Mental Disease* 115, no. 4 (1952): 283–298, <http://dx.doi.org/10.1097/00005053-195201000-00025>.
32. Edward Stein, *The Mismeasure of Desire: The Science, Theory, and Ethics of Sexual Orientation* (New York: Oxford University Press, 1999), 145.
33. J. Michael Bailey, Michael P. Dunne, and Nicholas G. Martin, “Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample,” *Journal of Personality and Social Psychology* 78, no. 3 (2000): 524–536, <http://dx.doi.org/10.1037/0022-3514.78.3.524>.
34. Bailey and colleagues calculated these concordance rates using a “strict” criterion for determining non-heterosexuality, which was a Kinsey score of 2 or greater. They also calculated concordance rates using a “lenient” criterion, a Kinsey score of 1 or greater. The concordance rates for this lenient criterion were 38% for men and 30% for women in identical twins, compared to 6% for men and 30% for women in fraternal twins. The differences between the identical and fraternal concordance rates using the lenient criterion were statistically significant for men but not for women.
35. Bailey, Dunne, and Martin, “Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample,” 534.
36. These examples are drawn from Ned Block, “How heritability misleads about race,” *Cognition* 56, no. 2 (1995): 103–104, [http://dx.doi.org/10.1016/0010-0277\(95\)00678-R](http://dx.doi.org/10.1016/0010-0277(95)00678-R).
37. Niklas Långström *et al.*, “Genetic and Environmental Effects on Same-sex Sexual Behavior: A Population Study of Twins in Sweden,” *Archives of Sexual Behavior* 39, no. 1 (2010): 75–80, <http://dx.doi.org/10.1007/s10508-008-9386-1>.
38. *Ibid.*, 79.
39. Peter S. Bearman and Hannah Brückner, “Opposite-Sex Twins and Adolescent Same-Sex Attraction,” *American Journal of Sociology* 107, no. 5 (2002): 1179–1205, <http://dx.doi.org/10.1086/341906>.
40. *Ibid.*, 1199.
41. See, for example, Ray Blanchard and Anthony F. Bogaert, “Homosexuality in men and number of older brothers,” *American Journal of Psychiatry* 153, no. 1 (1996): 27–31, <http://dx.doi.org/10.1176/ajp.153.1.27>.
42. Peter S. Bearman and Hannah Brückner, 1198.
43. *Ibid.*, 1198.
44. *Ibid.*, 1179.
-

45. Kenneth S. Kendler *et al.*, “Sexual Orientation in a U.S. National Sample of Twin and Nontwin Sibling Pairs,” *American Journal of Psychiatry* 157, no. 11 (2000): 1843–1846, <http://dx.doi.org/10.1176/appi.ajp.157.11.1843>.

46. *Ibid.*, 1845.

47. Quantitative genetic studies, including twin studies, rely on an abstract model based on many assumptions, rather than on the measurement of correlations between genes and phenotypes. This abstract model is used to infer the presence of a genetic contribution to a trait by means of correlation among relatives. Environmental effects can be controlled in experiments with laboratory animals, but in humans this is not possible, so it is likely that the best that can be done is to study identical twins raised apart. But it should be noted that even these studies can be somewhat misinterpreted because identical twins adopted separately tend to be adopted into similar socioeconomic environments. The twin studies on homosexuality do not include any separated twin studies, and the study designs report few effective controls for environmental effects (for instance, identical twins likely share a common rearing environment to a greater extent than ordinary siblings or even fraternal twins).

48. Dean H. Hamer *et al.*, “A linkage between DNA markers on the X chromosome and male sexual orientation,” *Science* 261, no. 5119 (1993): 321–327, <http://dx.doi.org/10.1126/science.8332896>.

49. George Rice *et al.*, “Male Homosexuality: Absence of Linkage to Microsatellite Markers at Xq28,” *Science* 284, no. 5414 (1999): 665–667, <http://dx.doi.org/10.1126/science.284.5414.665>.

50. Alan R. Sanders *et al.*, “Genome-wide scan demonstrates significant linkage for male sexual orientation,” *Psychological Medicine* 45, no. 07 (2015): 1379–1388, <http://dx.doi.org/10.1017/S0033291714002451>.

51. E. M. Drabant *et al.*, “Genome-Wide Association Study of Sexual Orientation in a Large, Web-based Cohort,” 23andMe, Inc., Mountain View, Calif. (2012), <http://blog.23andme.com/wp-content/uploads/2012/11/Drabant-Poster-v7.pdf>.

52. Richard C. Francis, *Epigenetics: How Environment Shapes Our Genes* (New York: W. W. Norton & Company, 2012).

53. See, for example, Richard P. Ebstein *et al.*, “Genetics of Human Social Behavior,” *Neuron* 65, no. 6 (2010): 831–844, <http://dx.doi.org/10.1016/j.neuron.2010.02.020>.

54. Dean Hamer, “Rethinking Behavior Genetics,” *Science* 298, no. 5591 (2002): 71, <http://dx.doi.org/10.1126/science.1077582>.

55. For an overview of the distinction between the organizational and activating effects of hormones and its importance in the field of endocrinology, see 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 (2009): 570–578, <http://dx.doi.org/10.1016/j.yhbeh.2009.03.011>.

56. Melissa Hines, “Prenatal endocrine influences on sexual orientation and on sexually differentiated childhood behavior,” *Frontiers in Neuroendocrinology* 32, no. 2 (2011):

170–182, <http://dx.doi.org/10.1016/j.yfrne.2011.02.006>.

57. Eugene D. Albrecht and Gerald J. Pepe, “Estrogen regulation of placental angiogenesis and fetal ovarian development during primate pregnancy,” *The International Journal of Developmental Biology* 54, no. 2–3 (2010): 397–408, <http://dx.doi.org/10.1387/ijdb.082758ea>.

58. Sheri A. Berenbaum, “How Hormones Affect Behavioral and Neural Development: Introduction to the Special Issue on ‘Gonadal Hormones and Sex Differences in Behavior,’” *Developmental Neuropsychology* 14 (1998): 175–196, <http://dx.doi.org/10.1080/087565649809540708>.

59. Jean D. Wilson, Fredrick W. George, and James E. Griffin, “The Hormonal Control of Sexual Development,” *Science* 211 (1981): 1278–1284, <http://dx.doi.org/10.1126/science.7010602>.

60. *Ibid.*

61. See, for example, Celina C. C. Cohen-Bendahan, Cornelië van de Beek, and Sheri A. Berenbaum, “Prenatal sex hormone effects on child and adult sex-typed behavior: methods and findings,” *Neuroscience & Biobehavioral Reviews* 29, no. 2 (2005): 353–384, <http://dx.doi.org/10.1016/j.neubiorev.2004.11.004>; Marta Weinstock, “The potential influence of maternal stress hormones on development and mental health of the offspring,” *Brain, Behavior, and Immunity* 19, no. 4 (2005): 296–308, <http://dx.doi.org/10.1016/j.bbi.2004.09.006>; Marta Weinstock, “Gender Differences in the Effects of Prenatal Stress on Brain Development and Behaviour,” *Neurochemical Research* 32, no. 10 (2007): 1730–1740, <http://dx.doi.org/10.1007/s11064-007-9339-4>.

62. Vivette Glover, T. G. O’Connor, and Kieran O’Donnell, “Prenatal stress and the programming of the HPA axis,” *Neuroscience & Biobehavioral Reviews* 35, no. 1 (2010): 17–22, <http://dx.doi.org/10.1016/j.neubiorev.2009.11.008>.

63. See, for example, Felix Beuschlein *et al.*, “Constitutive Activation of PKA Catalytic Subunit in Adrenal Cushing’s Syndrome,” *New England Journal of Medicine* 370, no. 11 (2014): 1019–1028, <http://dx.doi.org/10.1056/NEJMoa1310359>.

64. Phyllis W. Speiser, and Perrin C. White, “Congenital Adrenal Hyperplasia,” *New England Journal of Medicine* 349, no. 8 (2003): 776–788, <http://dx.doi.org/10.1056/NEJMra021561>.

65. *Ibid.*, 776.

66. *Ibid.*

67. *Ibid.*, 778.

68. Phyllis W. Speiser *et al.*, “Congenital Adrenal Hyperplasia Due to Steroid 21-Hydroxylase Deficiency: An Endocrine Society Clinical Practice Guideline,” *The Journal of Clinical Endocrinology and Metabolism* 95, no. 9 (2009): 4133–4160, <http://dx.doi.org/10.1210/jc.2009-2631>.

69. Melissa Hines, “Prenatal endocrine influences on sexual orientation and on sexually differentiated childhood behavior,” 173–174.

70. Ieuan A. Hughes *et al.*, “Androgen insensitivity syndrome,” *The Lancet* 380, no. 9851 (2012): 1419–1428, <http://dx.doi.org/10.1016/S0140-6736%2812%2960071-3>.
71. *Ibid.*, 1420.
72. *Ibid.*, 1419.
73. Melissa S. Hines, Faisal Ahmed, and Ieuan A. Hughes, “Psychological Outcomes and Gender-Related Development in Complete Androgen Insensitivity Syndrome,” *Archives of Sexual Behavior* 32, no. 2 (2003): 93–101, <http://dx.doi.org/10.1023/A:1022492106974>.
74. See, for example, Claude J. Migeon Wisniewski *et al.*, “Complete Androgen Insensitivity Syndrome: Long-Term Medical, Surgical, and Psychosexual Outcome,” *The Journal of Clinical Endocrinology & Metabolism* 85, no. 8 (2000): 2664–2669, <http://dx.doi.org/10.1210/jcem.85.8.6742>.
75. Peggy T. Cohen-Kettenis, “Gender Change in 46,XY Persons with 5 α -Reductase-2 Deficiency and 17 β -Hydroxysteroid Dehydrogenase-3 Deficiency,” *Archives of Sexual Behavior* 34, no. 4 (2005): 399–410, <http://dx.doi.org/10.1007/s10508-005-4339-4>.
76. *Ibid.*, 399.
77. See, for example, Johannes Hönekopp *et al.*, “Second to fourth digit length ratio (2D:4D) and adult sex hormone levels: New data and a meta-analytic review,” *Psychoneuroendocrinology* 32, no. 4 (2007): 313–321, <http://dx.doi.org/10.1016/j.psychneu.2007.01.007>.
78. Terrance J. Williams *et al.*, “Finger-length ratios and sexual orientation,” *Nature* 404, no. 6777 (2000): 455–456, <http://dx.doi.org/10.1038/35006555>.
79. S. J. Robinson and John T. Manning, “The ratio of 2nd to 4th digit length and male homosexuality,” *Evolution and Human Behavior* 21, no. 5 (2000): 333–345, [http://dx.doi.org/10.1016/S1090-5138\(00\)00052-0](http://dx.doi.org/10.1016/S1090-5138(00)00052-0).
80. Qazi Rahman and Glenn D. Wilson, “Sexual orientation and the 2nd to 4th finger length ratio: evidence for organising effects of sex hormones or developmental instability?,” *Psychoneuroendocrinology* 28, no. 3 (2003): 288–303, [http://dx.doi.org/10.1016/S0306-4530\(02\)00022-7](http://dx.doi.org/10.1016/S0306-4530(02)00022-7).
81. Richard A. Lippa, “Are 2D:4D Finger-Length Ratios Related to Sexual Orientation? Yes for Men, No for Women,” *Journal of Personality and Social Psychology* 85, no. 1 (2003): 179–188, <http://dx.doi.org/10.1037/0022-3514.85.1.179>; Dennis McFadden and Erin Shubel, “Relative Lengths of Fingers and Toes in Human Males and Females,” *Hormones and Behavior* 42, no. 4 (2002): 492–500, <http://dx.doi.org/10.1006/hbeh.2002.1833>.
82. Lynn S. Hall and Craig T. Love, “Finger-Length Ratios in Female Monozygotic Twins Discordant for Sexual Orientation,” *Archives of Sexual Behavior* 32, no. 1 (2003): 23–28, <http://dx.doi.org/10.1023/A:1021837211630>.
83. *Ibid.*, 23.
84. Martin Voracek, John T. Manning, and Ivo Ponocny, “Digit ratio (2D:4D) in homosexual and heterosexual men from Austria,” *Archives of Sexual Behavior* 34, no. 3 (2005): 335–340, <http://dx.doi.org/10.1007/s10508-005-3122-x>.
-

85. *Ibid.*, 339.

86. Günter Dörner *et al.*, “Stressful Events in Prenatal Life of Bi- and Homosexual Men,” *Experimental and Clinical Endocrinology* 81, no. 1 (1983): 83–87, <http://dx.doi.org/10.1055/s-0029-1210210>.

87. See, for example, Lee Ellis *et al.*, “Sexual orientation of human offspring may be altered by severe maternal stress during pregnancy,” *Journal of Sex Research* 25, no. 2 (1988): 152–157, <http://dx.doi.org/10.1080/00224498809551449>; J. Michael Bailey, Lee Willerman, and Carlton Parks, “A Test of the Maternal Stress Theory of Human Male Homosexuality,” *Archives of Sexual Behavior* 20, no. 3 (1991): 277–293, <http://dx.doi.org/10.1007/BF01541847>; Lee Ellis and Shirley Cole-Harding, “The effects of prenatal stress, and of prenatal alcohol and nicotine exposure, on human sexual orientation,” *Physiology & Behavior* 74, no. 1 (2001): 213–226, [http://dx.doi.org/10.1016/S0031-9384\(01\)00564-9](http://dx.doi.org/10.1016/S0031-9384(01)00564-9).

88. Melissa Hines *et al.*, “Prenatal Stress and Gender Role Behavior in Girls and Boys: A Longitudinal, Population Study,” *Hormones and Behavior* 42, no. 2 (2002): 126–134, <http://dx.doi.org/10.1006/hbeh.2002.1814>.

89. Simon LeVay, “A Difference in Hypothalamic Structure between Heterosexual and Homosexual Men,” *Science* 253, no. 5023 (1991): 1034–1037, <http://dx.doi.org/10.1126/science.1887219>.

90. William Byne *et al.*, “The Interstitial Nuclei of the Human Anterior Hypothalamus: An Investigation of Variation with Sex, Sexual Orientation, and HIV Status,” *Hormones and Behavior* 40, no. 2 (2001): 87, <http://dx.doi.org/10.1006/hbeh.2001.1680>.

91. *Ibid.*, 91.

92. *Ibid.*

93. Mitchell S. Lasco, *et al.*, “A lack of dimorphism of sex or sexual orientation in the human anterior commissure,” *Brain Research* 936, no. 1 (2002): 95–98, [http://dx.doi.org/10.1016/S0006-8993\(02\)02590-8](http://dx.doi.org/10.1016/S0006-8993(02)02590-8).

94. Dick F. Swaab, “Sexual orientation and its basis in brain structure and function,” *Proceedings of the National Academy of Sciences* 105, no. 30 (2008): 10273–10274, <http://dx.doi.org/10.1073/pnas.0805542105>.

95. Felicitas Kranz and Alomit Ishai, “Face Perception Is Modulated by Sexual Preference,” *Current Biology* 16, no. 1 (2006): 63–68, <http://dx.doi.org/10.1016/j.cub.2005.10.070>.

96. Ivanka Savic, Hans Berglund, and Per Lindström, “Brain response to putative pheromones in homosexual men,” *Proceedings of the National Academy of Sciences* 102, no. 20 (2005): 7356–7361, <http://dx.doi.org/10.1073/pnas.0407998102>.

97. Hans Berglund, Per Lindström, and Ivanka Savic, “Brain response to putative pheromones in lesbian women,” *Proceedings of the National Academy of Sciences* 103, no. 21 (2006): 8269–8274, <http://dx.doi.org/10.1073/pnas.0600331103>.

98. Ivanka Savic and Per Lindström, “PET and MRI show differences in cerebral asymmetry and functional connectivity between homo- and heterosexual subjects,”

Proceedings of the National Academy of Sciences 105, no. 27 (2008): 9403–9408, <http://dx.doi.org/10.1073/pnas.0801566105>.

99. Research on neuroplasticity shows that while there are critical periods of development in which the brain changes more rapidly and profoundly (for instance, during development of language in toddlers), the brain continues to change across the lifespan in response to behaviors (like practicing juggling or playing a musical instrument), life experiences, psychotherapy, medications, psychological trauma, and relationships. For a helpful and generally accessible overview of the research related to neuroplasticity, see Norman Doidge, *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science* (New York: Penguin, 2007).

100. Letitia Anne Peplau *et al.*, “The Development of Sexual Orientation in Women,” *Annual Review of Sex Research* 10, no. 1 (1999): 81, <http://dx.doi.org/10.1080/10532528.1999.10559775>. Also see J. Michael Bailey, “What is Sexual Orientation and Do Women Have One?” in *Contemporary Perspectives on Lesbian, Gay, and Bisexual Identities*, ed. Debra A. Hope (New York: Springer, 2009), 43–63, http://dx.doi.org/10.1007/978-0-387-09556-1_3.

101. Mark S. Friedman *et al.*, “A Meta-Analysis of Disparities in Childhood Sexual Abuse, Parental Physical Abuse, and Peer Victimization Among Sexual Minority and Sexual Nonminority Individuals,” *American Journal of Public Health* 101, no. 8 (2011): 1481–1494, <http://dx.doi.org/10.2105/AJPH.2009.190009>.

102. *Ibid.*, 1490.

103. *Ibid.*, 1492.

104. *Ibid.*

105. Emily F. Rothman, Deineria Exner, and Allyson L. Baughman, “The Prevalence of Sexual Assault Against People Who Identify as Gay, Lesbian, or Bisexual in the United States: A Systematic Review,” *Trauma, Violence, & Abuse* 12, no. 2 (2011): 55–66, <http://dx.doi.org/10.1177/1524838010390707>.

106. Judith P. Andersen and John Blosnich, “Disparities in Adverse Childhood Experiences among Sexual Minority and Heterosexual Adults: Results from a Multi-State Probability-Based Sample,” *PLOS ONE* 8, no. 1 (2013): e54691, <http://dx.doi.org/10.1371/journal.pone.0054691>.

107. Andrea L. Roberts *et al.*, “Pervasive Trauma Exposure Among US Sexual Orientation Minority Adults and Risk of Posttraumatic Stress Disorder,” *American Journal of Public Health* 100, no. 12 (2010): 2433–2441, <http://dx.doi.org/10.2105/AJPH.2009.168971>.

108. Brendan P. Zietsch *et al.*, “Do shared etiological factors contribute to the relationship between sexual orientation and depression?,” *Psychological Medicine* 42, no. 3 (2012): 521–532, <http://dx.doi.org/10.1017/S0033291711001577>.

109. The exact figure is not reported in the text for reasons the authors do not specify.

110. *Ibid.*, 526.

111. *Ibid.*, 527.

112. Marie E. Tomeo *et al.*, “Comparative Data of Childhood and Adolescence Molestation in Heterosexual and Homosexual Persons,” *Archives of Sexual Behavior* 30, no. 5 (2001): 535–541, <http://dx.doi.org/10.1023/A:1010243318426>.

113. *Ibid.*, 541.

114. Helen W. Wilson and Cathy Spatz Widom, “Does Physical Abuse, Sexual Abuse, or Neglect in Childhood Increase the Likelihood of Same-sex Sexual Relationships and Cohabitation? A Prospective 30-year Follow-up,” *Archives of Sexual Behavior* 39, no. 1 (2010): 63–74, <http://dx.doi.org/10.1007/s10508-008-9449-3>.

115. *Ibid.*, 70.

116. Andrea L. Roberts, M. Maria Glymour, and Karestan C. Koenen, “Does Maltreatment in Childhood Affect Sexual Orientation in Adulthood?,” *Archives of Sexual Behavior* 42, no. 2 (2013): 161–171, <http://dx.doi.org/10.1007/s10508-012-0021-9>.

117. For those interested in the methodological details: this statistical method uses a two-step process where “instruments”—in this case, family characteristics that are known to be related to maltreatment (presence of a stepparent, parental alcohol abuse, or parental mental illness)—are used as the “instrumental variables” to predict the risk of maltreatment. In the second step, the predicted risk of maltreatment is employed as the independent variable and adult sexual orientation as the dependent variable; coefficients from this are the instrumental variable estimates. It should also be noted here that these instrumental variable estimation techniques rely on some important (and questionable) assumptions, in this case the assumption that the instruments (the stepparent, the alcohol abuse, the mental illness) do not affect the child’s sexual orientation measures except through child abuse. But this assumption is not demonstrated, and therefore may constitute a foundational limitation of the method. Causation is difficult to support statistically and continues to beguile research in the social sciences in spite of efforts to design studies capable of generating stronger associations that give stronger support to claims of causation.

118. Roberts, Glymour, and Koenen, “Does Maltreatment in Childhood Affect Sexual Orientation in Adulthood?,” 167.

119. Drew H. Bailey and J. Michael Bailey, “Poor Instruments Lead to Poor Inferences: Comment on Roberts, Glymour, and Koenen (2013),” *Archives of Sexual Behavior* 42, no. 8 (2013): 1649–1652, <http://dx.doi.org/10.1007/s10508-013-0101-5>.

120. Roberts, Glymour, and Koenen, “Does Maltreatment in Childhood Affect Sexual Orientation in Adulthood?,” 169.

121. *Ibid.*, 169.

122. For information on the study, see “National Health and Social Life Survey,” Population Research Center of the University of Chicago, <http://popcenter.uchicago.edu/data/nhsls.shtml>.

123. Edward O. Laumann *et al.*, *The Social Organization of Sexuality: Sexual Practices in the United States* (Chicago: University of Chicago Press, 1994); Robert T. Michael *et al.*, *Sex in America: A Definitive Survey* (New York: Warner Books, 1994).

124. Laumann *et al.*, *The Social Organization of Sexuality*, 295.

125. The third iteration of Natsal from 2010 found, over an age range from 16 to 74, that 1.0% of women and 1.5% of men consider themselves gay/lesbian, and 1.4% of women and 1.0% of men think of themselves as bisexual. See Catherine H. Mercer *et al.*, “Changes in sexual attitudes and lifestyles in Britain through the life course and over time: findings from the National Surveys of Sexual Attitudes and Lifestyles (Natsal),” *The Lancet* 382, no. 9907 (2013): 1781–1794, [http://dx.doi.org/10.1016/S0140-6736\(13\)62035-8](http://dx.doi.org/10.1016/S0140-6736(13)62035-8). Full results of this survey are reported in several articles in the same issue of *The Lancet*.

126. See Table 8.1 in Laumann *et al.*, *The Social Organization of Sexuality*, 304.

127. This figure is calculated from Table 8.2 in Laumann *et al.*, *The Social Organization of Sexuality*, 305.

128. For more information on the study design of Add Health, see Kathleen Mullan Harris *et al.*, “Study Design,” The National Longitudinal Study of Adolescent to Adult Health, <http://www.cpc.unc.edu/projects/addhealth/design>. Some studies based on Add Health data use Arabic numerals rather than Roman numerals to label the waves; when describing or quoting from those studies, we stick with the Roman numerals.

129. See Table 1 in Ritch C. Savin-Williams and Kara Joyner, “The Dubious Assessment of Gay, Lesbian, and Bisexual Adolescents of Add Health,” *Archives of Sexual Behavior* 43, no. 3 (2014): 413–422, <http://dx.doi.org/10.1007/s10508-013-0219-5>.

130. *Ibid.*, 415.

131. *Ibid.*

132. *Ibid.*

133. “Research Collaborators,” The National Longitudinal Study of Adolescent to Adult Health, <http://www.cpc.unc.edu/projects/addhealth/people>.

134. J. Richard Udry and Kim Chantala, “Risk Factors Differ According to Same-Sex and Opposite-Sex Interest,” *Journal of Biosocial Science* 37, no. 04 (2005): 481–497, <http://dx.doi.org/10.1017/S0021932004006765>.

135. Ritch C. Savin-Williams and Geoffrey L. Ream, “Prevalence and Stability of Sexual Orientation Components During Adolescence and Young Adulthood,” *Archives of Sexual Behavior* 36, no. 3 (2007): 385–394, <http://dx.doi.org/10.1007/s10508-006-9088-5>.

136. *Ibid.*, 388.

137. *Ibid.*, 389.

138. *Ibid.*, 392–393.

139. *Ibid.*, 393.

140. Miles Q. Ott *et al.*, “Repeated Changes in Reported Sexual Orientation Identity Linked to Substance Use Behaviors in Youth,” *Journal of Adolescent Health* 52, no. 4 (2013): 465–472, <http://dx.doi.org/10.1016/j.jadohealth.2012.08.004>.

141. Savin-Williams and Joyner, “The Dubious Assessment of Gay, Lesbian, and Bisexual

Adolescents of Add Health.”

142. *Ibid.*, 416.

143. *Ibid.*, 414.

144. For more analysis of inaccurate responders in the Add Health surveys, see Xitao Fan *et al.*, “An Exploratory Study about Inaccuracy and Invalidity in Adolescent Self-Report Surveys,” *Field Methods* 18, no. 3 (2006): 223–244, <http://dx.doi.org/10.1177/152822X06289161>.

145. Savin-Williams and Joyner were also skeptical of the Add Health survey data because the high proportion of youth reporting same-sex or both-sex attractions (7.3% of boys and 5.0% of girls) in Wave I was very unusual when compared to similar studies, and because of the dramatic reduction in reported same-sex attraction a little over a year later, in Wave II.

146. Savin-Williams and Joyner, “The Dubious Assessment of Gay, Lesbian, and Bisexual Adolescents of Add Health,” 420.

147. Gu Li, Sabra L. Katz-Wise, and Jerel P. Calzo, “The Unjustified Doubt of Add Health Studies on the Health Disparities of Non-Heterosexual Adolescents: Comment on Savin-Williams and Joyner (2014),” *Archives of Sexual Behavior*, 43 no. 6 (2014): 1023–1026, <http://dx.doi.org/10.1007/s10508-014-0313-3>.

148. *Ibid.*, 1024.

149. *Ibid.*, 1025.

150. Ritch C. Savin-Williams and Kara Joyner, “The Politicization of Gay Youth Health: Response to Li, Katz-Wise, and Calzo (2014),” *Archives of Sexual Behavior* 43, no. 6 (2014): 1027–1030, <http://dx.doi.org/10.1007/s10508-014-0359-2>.

151. See, for example, Stephen T. Russell *et al.*, “Being Out at School: The Implications for School Victimization and Young Adult Adjustment,” *American Journal of Orthopsychiatry* 84, no. 6 (2014): 635–643, <http://dx.doi.org/10.1037/ort0000037>.

152. Sabra L. Katz-Wise *et al.*, “Same Data, Different Perspectives: What Is at Stake? Response to Savin-Williams and Joyner (2014a),” *Archives of Sexual Behavior* 44, no. 1 (2015): 15, <http://dx.doi.org/10.1007/s10508-014-0434-8>.

153. *Ibid.*, 15.

154. *Ibid.*, 15–16.

155. For example, see Bailey, “What is Sexual Orientation and Do Women Have One?,” 43–63; Peplau *et al.*, “The Development of Sexual Orientation in Women,” 70–99.

156. Lisa M. Diamond, *Sexual Fluidity* (Cambridge, Mass.: Harvard University Press, 2008), 52.

157. Lisa M. Diamond, “Was It a Phase? Young Women’s Relinquishment of Lesbian/Bisexual Identities Over a 5-Year Period,” *Journal of Personality and Social Psychology* 84, no. 2 (2003): 352–364, <http://dx.doi.org/10.1037/0022-3514.84.2.352>.

158. Diamond, “What Does Sexual Orientation Orient?,” 173–192.

159. This conference paper was summarized in Denizet-Lewis, “The Scientific Quest to Prove Bisexuality Exists.”

160. A. Lee Beckstead, “Can We Change Sexual Orientation?,” *Archives of Sexual Behavior* 41, no. 1 (2012): 128, <http://dx.doi.org/10.1007/s10508-012-9922-x>.

Part Two: Sexuality, Mental Health Outcomes, and Social Stress

1. Michael King *et al.*, “A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people,” *BMC Psychiatry* 8 (2008): 70, <http://dx.doi.org/10.1186/1471-244X-8-70>.

2. The researchers who performed this meta-analysis initially found 13,706 papers by searching academic and medical research databases, but after excluding duplicates and other spurious search results examined 476 papers. After further excluding uncontrolled studies, qualitative papers, reviews, and commentaries, the authors found 111 data-based papers, of which they excluded 87 that were not population-based studies, or that failed to employ psychiatric diagnoses, or that used poor sampling. The 28 remaining papers relied on 25 studies (some of the papers examined data from the same studies), which King and colleagues evaluated using four quality criteria: (1) whether or not random sampling was used; (2) the representativeness of the study (measured by survey response rates); (3) whether the sample was drawn from the general population or from some more limited subset, such as university students; and (4) sample size. However, only one study met all four criteria. Acknowledging the inherent limitations and inconsistencies of sexual orientation concepts, the authors included information on how those concepts were operationalized in the studies analyzed—whether in terms of same-sex attraction (four studies), same-sex behavior (thirteen studies), self-identification (fifteen studies), score above zero on the Kinsey scale (three studies), two different definitions of sexual orientation (nine studies), three different definitions (one study). Eighteen of the studies used a specific time frame for defining the sexuality of their subjects. The studies were also grouped into whether or not they focused on lifetime or twelve-month prevalence, and whether the authors analyzed outcomes for LGB populations separately or collectively.

3. 95% confidence interval: 1.87–3.28.

4. 95% confidence interval: 1.69–2.48.

5. 95% confidence interval: 1.23–1.92.

6. 95% confidence interval: 1.23–1.86.

7. 95% confidence interval: 1.97–5.92.

8. 95% confidence interval: 2.32–7.88.

9. Wendy B. Bostwick *et al.*, “Dimensions of Sexual Orientation and the Prevalence of Mood and Anxiety Disorders in the United States,” *American Journal of Public Health* 100, no. 3 (2010): 468–475, <http://dx.doi.org/10.2105/AJPH.2008.152942>.

10. *Ibid.*, 470.

11. The difference in health outcomes between women who identify as lesbians and women who report exclusive same-sex sexual behaviors or attractions is a good illustration of how the differences between sexual identity, behavior, and attraction matter.
 12. Susan D. Cochran and Vickie M. Mays, “Physical Health Complaints Among Lesbians, Gay Men, and Bisexual and Homosexually Experienced Heterosexual Individuals: Results From the California Quality of Life Survey,” *American Journal of Public Health* 97, no. 11 (2007): 2048–2055, <http://dx.doi.org/10.2105/AJPH.2006.087254>.
 13. Christine E. Grella *et al.*, “Influence of gender, sexual orientation, and need on treatment utilization for substance use and mental disorders: Findings from the California Quality of Life Survey,” *BMC Psychiatry* 9, no. 1 (2009): 52, <http://dx.doi.org/10.1186/1471-244X-9-52>.
 14. Theo G. M. Sandfort *et al.*, “Sexual Orientation and Mental and Physical Health Status: Findings from a Dutch Population Survey,” *American Journal of Public Health* 96, (2006): 1119–1125, <http://dx.doi.org/10.2105/AJPH.2004.058891>.
 15. Robert Graham *et al.*, Committee on Lesbian, Gay, Bisexual, and Transgender Health Issues and Research Gaps and Opportunities, Institute of Medicine, *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding* (Washington, D.C.: The National Academies Press, 2011), <http://dx.doi.org/10.17226/13128>.
 16. Susan D. Cochran, J. Greer Sullivan, and Vickie M. Mays, “Prevalence of Mental Disorders, Psychological Distress, and Mental Health Services Use Among Lesbian, Gay, and Bisexual Adults in the United States,” *Journal of Consulting and Clinical Psychology* 71, no. 1 (2007): 53–61, <http://dx.doi.org/10.1037/0022-006X.71.1.53>.
 17. Lisa A. Razzano, Alicia Matthews, and Tonda L. Hughes, “Utilization of Mental Health Services: A Comparison of Lesbian and Heterosexual Women,” *Journal of Gay & Lesbian Social Services* 14, no. 1 (2002): 51–66, http://dx.doi.org/10.1300/J041v14n01_03.
 18. Robert Graham *et al.*, *The Health of Lesbian, Gay, Bisexual, and Transgender People*, 4.
 19. *Ibid.*, 190, see also 258–259.
 20. *Ibid.*, 211.
 21. Esther D. Rothblum and Rhonda Factor, “Lesbians and Their Sisters as a Control Group: Demographic and Mental Health Factors,” *Psychological Science* 12, no. 1 (2001): 63–69, <http://dx.doi.org/10.1111/1467-9280.00311>.
 22. Stephen M. Horowitz, David L. Weis, and Molly T. Laflin, “Bisexuality, Quality of Life, Lifestyle, and Health Indicators,” *Journal of Bisexuality* 3, no. 2 (2003): 5–28, http://dx.doi.org/10.1300/J159v03n02_02.
 23. By way of context, it may be worth noting that in the United States, the overall suicide rate has risen in recent years: “From 1999 through 2014, the age-adjusted suicide rate in the United States increased 24%, from 10.5 to 13.0 per 100,000 population, with the pace of increase greater after 2006.” Sally C. Curtin, Margaret Warner, and Holly Hedegaard, “Increase in suicide in the United States, 1999–2014,” National Center for
-

Health Statistics, NCHS data brief no. 241 (April 22, 2016), <http://www.cdc.gov/nchs/products/databriefs/db241.htm>.

24. Ann P. Haas *et al.*, “Suicide and Suicide Risk in Lesbian, Gay, Bisexual, and Transgender Populations: Review and Recommendations,” *Journal of Homosexuality* 58, no. 1 (2010): 10–51, <http://dx.doi.org/10.1080/00918369.2011.534038>.

25. *Ibid.*, 13.

26. David M. Fergusson, L. John Horwood, and Annette L. Beautrais, “Is Sexual Orientation Related to Mental Health Problems and Suicidality in Young People?,” *Archives of General Psychiatry* 56, no. 10 (1999): 876–880, <http://dx.doi.org/10.1001/archpsyc.56.10.876>.

27. Paul J.M. Van Kesteren *et al.*, “Mortality and morbidity in transsexual subjects treated with cross-sex hormones,” *Clinical Endocrinology* 47, no. 3 (1997): 337–343, <http://dx.doi.org/10.1046/j.1365-2265.1997.2601068.x>.

28. Friedemann Pfäfflin and Astrid Junge, *Sex Reassignment: Thirty Years of International Follow-Up Studies After Sex Reassignment Surgery: A Comprehensive Review, 1961–1991*, Roberta B. Jacobson and Alf B. Meier, trans. (Düsseldorf: Symposion Publishing, 1998), <https://web.archive.org/web/20070503090247/http://www.symposion.com/ijt/pfaefflin/1000.htm>.

29. Jean M. Dixen *et al.*, “Psychosocial characteristics of applicants evaluated for surgical gender reassignment,” *Archives of Sexual Behavior* 13, no. 3 (1984): 269–276, <http://dx.doi.org/10.1007/BF01541653>.

30. Robin M. Mathy, “Transgender Identity and Suicidality in a Nonclinical Sample: Sexual Orientation, Psychiatric History, and Compulsive Behaviors,” *Journal of Psychology & Human Sexuality* 14, no. 4 (2003): 47–65, http://dx.doi.org/10.1300/J056v14n04_03.

31. Yue Zhao *et al.*, “Suicidal Ideation and Attempt Among Adolescents Reporting ‘Unsure’ Sexual Identity or Heterosexual Identity Plus Same-Sex Attraction or Behavior: Forgotten Groups?,” *Journal of the American Academy of Child & Adolescent Psychiatry* 49, no. 2 (2010): 104–113, <http://dx.doi.org/10.1016/j.jaac.2009.11.003>.

32. Wendy B. Bostwick *et al.*, “Dimensions of Sexual Orientation and the Prevalence of Mood and Anxiety Disorders in the United States.”

33. Martin Plöderl *et al.*, “Suicide Risk and Sexual Orientation: A Critical Review,” *Archives of Sexual Behavior* 42, no. 5 (2013): 715–727, <http://dx.doi.org/10.1007/s10508-012-0056-y>.

34. Ritch C. Savin-Williams, “Suicide Attempts Among Sexual-Minority Youths: Population and Measurement Issues,” *Journal of Consulting and Clinical Psychology* 69, no. 6 (2001): 983–991, <http://dx.doi.org/10.1037/0022-006X.69.6.983>.

35. For females in this study, eliminating false positive attempts substantially decreased the difference between orientations. For males, the “true suicide attempts” difference approached statistical significance: 2% of heterosexual males (1 of 61) and 9% of homosexual males (5 of 53) attempted suicide, resulting in an odds ratio of 6.2.

36. Martin Plöderl *et al.*, “Suicide Risk and Sexual Orientation,” 716–717.
37. *Ibid.*, 723.
38. *Ibid.*
39. Richard Herrell *et al.*, “Sexual Orientation and Suicidality: A Co-twin Control Study in Adult Men,” *Archives of General Psychiatry* 56, no. 10 (1999): 867–874, <http://dx.doi.org/10.1001/archpsyc.56.10.867>.
40. *Ibid.*, 872.
41. Robin M. Mathy *et al.*, “The association between relationship markers of sexual orientation and suicide: Denmark, 1990–2001,” *Social Psychiatry and Psychiatric Epidemiology* 46, no. 2 (2011): 111–117, <http://dx.doi.org/10.1007/s00127-009-0177-3>.
42. Gary Remafedi, James A. Farrow, and Robert W. Deisher, “Risk Factors for Attempted Suicide in Gay and Bisexual Youth,” *Pediatrics* 87, no. 6 (1991): 869–875, <http://pediatrics.aappublications.org/content/87/6/869>.
43. *Ibid.*, 873.
44. Gary Remafedi, “Adolescent Homosexuality: Psychosocial and Medical Implications,” *Pediatrics* 79, no. 3 (1987): 331–337, <http://pediatrics.aappublications.org/content/79/3/331>.
45. Martin Plöderl, Karl Kralovec, and Reinhold Fartacek, “The Relation Between Sexual Orientation and Suicide Attempts in Austria,” *Archives of Sexual Behavior* 39, no. 6 (2010): 1403–1414, <http://dx.doi.org/10.1007/s10508-009-9597-0>.
46. Travis Salway Hottes *et al.*, “Lifetime Prevalence of Suicide Attempts Among Sexual Minority Adults by Study Sampling Strategies: A Systematic Review and Meta-Analysis,” *American Journal of Public Health* 106, no. 5 (2016): e1–e12, <http://dx.doi.org/10.2105/AJPH.2016.303088>.
47. For a brief explanation of the strengths and limitations of population- and community-based sampling, see Hottes *et al.*, e2.
48. 95% confidence intervals: 8–15% and 3–5%, respectively.
49. 95% confidence interval: 18–22%.
50. Ana Maria Buller *et al.*, “Associations between Intimate Partner Violence and Health among Men Who Have Sex with Men: A Systematic Review and Meta-Analysis,” *PLOS Medicine* 11, no. 3 (2014): e1001609, <http://dx.doi.org/10.1371/journal.pmed.1001609>.
51. Sabrina N. Nowinski and Erica Bowen, “Partner violence against heterosexual and gay men: Prevalence and correlates,” *Aggression and Violent Behavior* 17, no. 1 (2012): 36–52, <http://dx.doi.org/10.1016/j.avb.2011.09.005>. It is worth noting that the 54 studies that Nowinski and Bowen consider operationalize heterosexuality and homosexuality in various ways.
52. *Ibid.*, 39.
53. *Ibid.*, 50.
-

54. Shonda M. Craft and Julianne M. Serovich, “Family-of-Origin Factors and Partner Violence in the Intimate Relationships of Gay Men Who Are HIV Positive,” *Journal of Interpersonal Violence* 20, no. 7 (2005): 777–791, <http://dx.doi.org/10.1177/0886260505277101>.

55. Catherine Finneran and Rob Stephenson, “Intimate Partner Violence Among Men Who Have Sex With Men: A Systematic Review,” *Trauma, Violence, & Abuse* 14, no. 2 (2013): 168–185, <http://dx.doi.org/10.1177/1524838012470034>.

56. *Ibid.*, 180.

57. Although one study reported just 12%, the majority of studies (17 out of 24) showed that physical IPV was at least 22%, with nine studies recording rates of 31% or more.

58. Although Finneran and Stephenson say this measure was recorded in only six studies, the table they provide lists eight studies as measuring psychological violence, with seven of these showing rates 33% or higher, including five reporting rates of 45% or higher.

59. Naomi G. Goldberg and Ilan H. Meyer, “Sexual Orientation Disparities in History of Intimate Partner Violence: Results From the California Health Interview Survey,” *Journal of Interpersonal Violence* 28, no. 5 (2013): 1109–1118, <http://dx.doi.org/10.1177/0886260512459384>.

60. Gregory L. Greenwood *et al.*, “Battering Victimization Among a Probability-Based Sample of Men Who Have Sex With Men,” *American Journal of Public Health* 92, no. 12 (2002): 1964–1969, <http://dx.doi.org/10.2105/AJPH.92.12.1964>.

61. *Ibid.*, 1967.

62. *Ibid.*

63. Sari L. Reisner *et al.*, “Mental Health of Transgender Youth in Care at an Adolescent Urban Community Health Center: A Matched Retrospective Cohort Study,” *Journal of Adolescent Health* 56, no. 3 (2015): 274–279, <http://dx.doi.org/10.1016/j.jadohealth.2014.10.264>.

64. Relative risk: 3.95.

65. Relative risk: 3.27.

66. Relative risk: 3.61.

67. Relative risk: 3.20.

68. Relative risk: 4.30.

69. Relative risk: 2.36.

70. Relative risk: 4.36.

71. Anne P. Haas, Philip L. Rodgers, and Jody Herman, “Suicide Attempts Among Transgender and Gender Non-Conforming Adults: Findings of the National Transgender Discrimination Survey,” Williams Institute, UCLA School of Law, January 2014, <http://williamsinstitute.law.ucla.edu/wp-content/uploads/AFSP-Williams-Suicide-Report->

Final.pdf.

72. *Ibid.*, 2.

73. *Ibid.*, 8.

74. *Ibid.*, 13.

75. Kristen Clements-Nolle *et al.*, “HIV Prevalence, Risk Behaviors, Health Care Use, and Mental Health Status of Transgender Persons: Implications for Public Health Intervention,” *American Journal of Public Health* 91, no. 6 (2001): 915–921, <http://dx.doi.org/10.2105/AJPH.91.6.915>.

76. *Ibid.*, 919.

77. See, for example, Ilan H. Meyer, “Minority Stress and Mental Health in Gay Men,” *Journal of Health and Social Behavior* 36 (1995): 38–56, <http://dx.doi.org/10.2307/2137286>; Bruce P. Dohrenwend, “Social Status and Psychological Disorder: An Issue of Substance and an Issue of Method,” *American Sociological Review* 31, no. 1 (1966): 14–34, <http://www.jstor.org/stable/2091276>.

78. For overviews of the social stress model and mental health patterns among LGBT populations, see Ilan H. Meyer, “Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence,” *Psychological Bulletin* 129, no. 5 (2003): 674–697, <http://dx.doi.org/10.1037/0033-2909.129.5.674>; Robert Graham *et al.*, *The Health of Lesbian, Gay, Bisexual, and Transgender People, op. cit.*; Gregory M. Herek and Linda D. Garnets, “Sexual Orientation and Mental Health,” *Annual Review of Clinical Psychology* 3 (2007): 353–375, <http://dx.doi.org/10.1146/annurev.clinpsy.3.022806.091510>; Mark L. Hatzenbuehler, “How Does Sexual Minority Stigma ‘Get Under the Skin’? A Psychological Mediation Framework,” *Psychological Bulletin* 135, no. 5 (2009): 707–730, <http://dx.doi.org/10.1037/a0016441>.

79. See, for instance, Ilan H. Meyer, “The Right Comparisons in Testing the Minority Stress Hypothesis: Comment on Savin-Williams, Cohen, Joyner, and Rieger (2010),” *Archives of Sexual Behavior* 39, no. 6 (2010): 1217–1219.

80. This should not be taken to suggest that social stress is too vague a concept for empirical social science; the social stress model may certainly produce quantitative empirical hypotheses, such as hypotheses about correlations between stressors and specific mental health outcomes. In this context, the term “model” does not refer to a statistical model of the kind often used in social science research—the social stress model is a “model” in a metaphorical sense.

81. Meyer, “Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations,” 676.

82. Meyer, “Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations,” 680; Gregory M. Herek, J. Roy Gillis, and Jeanine C. Cogan, “Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults,” *Journal of Consulting and Clinical Psychology* 67, no. 6 (1999): 945–951, <http://dx.doi.org/10.1037/0022-006X.67.6.945>; Allegra R. Gordon and Ilan H. Meyer, “Gender Nonconformity as a Target of Prejudice, Discrimination, and Violence Against LGB

Individuals,” *Journal of LGBT Health Research* 3, no. 3 (2008): 55–71, <http://dx.doi.org/10.1080/15574090802093562>; David M. Huebner, Gregory M. Rebchook, and Susan M. Kegeles, “Experiences of Harassment, Discrimination, and Physical Violence Among Young Gay and Bisexual Men,” *American Journal of Public Health* 94, no. 7 (2004): 1200–1203, <http://dx.doi.org/10.2105/AJPH.94.7.1200>; Rebecca L Stotzer, “Violence against transgender people: A review of United States data,” *Aggression and Violent Behavior* 14, no. 3 (2009): 170–179, <http://dx.doi.org/10.1016/j.avb.2009.01.006>; Rebecca L. Stotzer, “Gender identity and hate crimes: Violence against transgender people in Los Angeles County,” *Sexuality Research and Social Policy* 5, no. 1 (2008): 43–52, <http://dx.doi.org/10.1525/srsp.2008.5.1.43>.

83. Stotzer, “Gender identity and hate crimes,” 43–52; Emilia L. Lombardi *et al.*, “Gender Violence: Transgender Experiences with Violence and Discrimination,” *Journal of Homosexuality* 42, no. 1 (2002): 89–101, http://dx.doi.org/10.1300/J082v42n01_05; Herek, Gillis, and Cogan, “Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults,” 945–951; Huebner, Rebchook, and Kegeles, “Experiences of Harassment, Discrimination, and Physical Violence Among Young Gay and Bisexual Men,” 1200–1203; Anne H. Faulkner and Kevin Cranston, “Correlates of same-sex sexual behavior in a random sample of Massachusetts high school students,” *American Journal of Public Health* 88, no. 2 (1998): 262–266, <http://dx.doi.org/10.2105/AJPH.88.2.262>.

84. Herek, Gillis, and Cogan, “Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults,” 945–951.

85. Jack McDevitt *et al.*, “Consequences for Victims: A Comparison of Bias- and Non-Bias-Motivated Assaults,” *American Behavioral Scientist* 45, no. 4 (2001): 697–713, <http://dx.doi.org/10.1177/0002764201045004010>.

86. Caitlin Ryan and Ian Rivers, “Lesbian, gay, bisexual and transgender youth: Victimization and its correlates in the USA and UK,” *Culture, Health & Sexuality* 5, no. 2 (2003): 103–119, <http://dx.doi.org/10.1080/1369105011000012883>; Elise D. Berlan *et al.*, “Sexual Orientation and Bullying Among Adolescents in the Growing Up Today Study,” *Journal of Adolescent Health* 46, no. 4 (2010): 366–371, <http://dx.doi.org/10.1016/j.jadohealth.2009.10.015>; Ritch C. Savin-Williams, “Verbal and Physical Abuse as Stressors in the Lives of Lesbian, Gay Male, and Bisexual Youths: Associations With School Problems, Running Away, Substance Abuse, Prostitution, and Suicide,” *Journal of Consulting and Clinical Psychology* 62, no. 2 (1994): 261–269, <http://dx.doi.org/10.1037/0022-006X.62.2.261>.

87. Stephen T. Russell *et al.*, “Lesbian, Gay, Bisexual, and Transgender Adolescent School Victimization: Implications for Young Adult Health and Adjustment,” *Journal of School Health* 81, no. 5 (2011): 223–230, <http://dx.doi.org/10.1111/j.1746-1561.2011.00583.x>.

88. Joanna Almeida *et al.*, “Emotional Distress Among LGBT Youth: The Influence of Perceived Discrimination Based on Sexual Orientation,” *Journal of Youth and Adolescence* 38, no. 7 (2009): 1001–1014, <http://dx.doi.org/10.1007/s10964-009-9397-9>.

89. M. V. Lee Badgett, “The Wage Effects of Sexual Orientation Discrimination,” *Industrial and Labor Relations Review* 48, no. 4 (1995): 726–739, <http://dx.doi.org/10.1177/>

001979399504800408.

90. M. V. Lee Badgett, "Bias in the Workplace: Consistent Evidence of Sexual Orientation and Gender Identity Discrimination 1998–2008," *Chicago-Kent Law Review* 84, no. 2 (2009): 559–595, <http://scholarship.kentlaw.iit.edu/cklawreview/vol84/iss2/7>.

91. Marieka Klawitter, "Meta-Analysis of the Effects of Sexual Orientation on Earning," *Industrial Relations* 54, no. 1 (2015): 4–32, <http://dx.doi.org/10.1111/irel.12075>.

92. Jonathan Platt *et al.*, "Unequal depression for equal work? How the wage gap explains gendered disparities in mood disorders," *Social Science & Medicine* 149 (2016): 1–8, <http://dx.doi.org/10.1016/j.socscimed.2015.11.056>.

93. Craig R. Waldo, "Working in a majority context: A structural model of heterosexism as minority stress in the workplace," *Journal of Counseling Psychology* 46, no. 2 (1999): 218–232, <http://dx.doi.org/10.1037/0022-0167.46.2.218>.

94. M. W. Linn, Richard Sandifer, and Shayna Stein, "Effects of unemployment on mental and physical health," *American Journal of Public Health* 75, no. 5 (1985): 502–506, <http://dx.doi.org/10.2105/AJPH.75.5.502>; Jennie E. Brand, "The far-reaching impact of job loss and unemployment," *Annual Review of Sociology* 41 (2015): 359–375, <http://dx.doi.org/10.1146/annurev-soc-071913-043237>; Marie Conroy, "A Qualitative Study of the Psychological Impact of Unemployment on individuals," (master's dissertation, Dublin Institute of Technology, September 2010), <http://arrow.dit.ie/aaschssldis/50/>.

95. Irving Goffman, *Stigma: Notes on the Management of Spoiled Identity* (New York: Simon & Schuster, 1963); Brenda Major and Laurie T. O'Brien, "The Social Psychology of Stigma," *Annual Review of Psychology*, 56 (2005): 393–421, <http://dx.doi.org/10.1146/annurev.psych.56.091103.070137>.

96. Major and O'Brien, "The Social Psychology of Stigma," 395.

97. Bruce G. Link *et al.*, "On Stigma and Its Consequences: Evidence from a Longitudinal Study of Men with Dual Diagnoses of Mental Illness and Substance Abuse," *Journal of Health and Social Behavior* 38, no. (1997): 177–190, <http://dx.doi.org/10.2307/2955424>.

98. Walter R. Gove, "The Current Status of the Labeling Theory of Mental Illness," in *Deviance and Mental Illness*, ed. Walter R. Gove (Beverly Hills, Calif.: Sage, 1982), 290.

99. A highly cited piece of theoretical research on stigma processes is Hatzenbuehler, "How Does Sexual Minority Stigma 'Get Under the Skin?', " *op. cit.*, <http://dx.doi.org/10.1037/a0016441>.

100. Walter O. Bockting *et al.*, "Stigma, Mental Health, and Resilience in an Online Sample of the US Transgender Population," *American Journal of Public Health* 103, no. 5 (2013): 943–951, <http://dx.doi.org/10.2105/AJPH.2013.301241>.

101. Robin J. Lewis *et al.*, "Stressors for Gay Men and Lesbians: Life Stress, Gay-Related Stress, Stigma Consciousness, and Depressive Symptoms," *Journal of Social and Clinical Psychology* 22, no. 6 (2003): 716–729, <http://dx.doi.org/10.1521/jscp.22.6.716.22932>.

102. *Ibid.*, 721.

103. Aaron T. Beck *et al.*, *Cognitive Therapy of Depression* (New York: Guilford Press,

1979).

104. Wendy Bostwick, "Assessing Bisexual Stigma and Mental Health Status: A Brief Report," *Journal of Bisexuality* 12, no. 2 (2012): 214–222, <http://dx.doi.org/10.1080/15299716.2012.674860>.

105. Lars Wichstrøm and Kristinn Hegna, "Sexual Orientation and Suicide Attempt: A Longitudinal Study of the General Norwegian Adolescent Population," *Journal of Abnormal Psychology* 112, no. 1 (2003): 144–151, <http://dx.doi.org/10.1037/0021-843X.112.1.144>.

106. Anthony R. D'Augelli and Arnold H. Grossman, "Disclosure of Sexual Orientation, Victimization, and Mental Health Among Lesbian, Gay, and Bisexual Older Adults," *Journal of Interpersonal Violence* 16, no. 10 (2001): 1008–1027, <http://dx.doi.org/10.1177/088626001016010003>; Eric R. Wright and Brea L. Perry, "Sexual Identity Distress, Social Support, and the Health of Gay, Lesbian, and Bisexual Youth," *Journal of Homosexuality* 51, no. 1 (2006): 81–110, http://dx.doi.org/10.1300/J082v51n01_05; Judith A. Clair, Joy E. Beatty, and Tammy L. MacLean, "Out of Sight But Not Out of Mind: Managing Invisible Social Identities in the Workplace," *Academy of Management Review* 30, no. 1 (2005): 78–95, <http://dx.doi.org/10.5465/AMR.2005.15281431>.

107. For example, see *Emotion, Disclosure, and Health* (Washington, D.C.: American Psychological Association, 2002), ed. James W. Pennebaker; Joanne Frattaroli, "Experimental Disclosure and Its Moderators: A Meta-Analysis," *Psychological Bulletin* 132, no. 6 (2006): 823–865, <http://dx.doi.org/10.1037/0033-2909.132.6.823>.

108. See, for example, James M. Croteau, "Research on the Work Experiences of Lesbian, Gay, and Bisexual People: An Integrative Review of Methodology and Findings," *Journal of Vocational Behavior* 48, no. 2 (1996): 195–209, <http://dx.doi.org/10.1006/jvbe.1996.0018>; Anthony R. D'Augelli, Scott L. Hershberger, and Neil W. Pilkington, "Lesbian, Gay, and Bisexual Youth and Their Families: Disclosure of Sexual Orientation and Its Consequences," *American Journal of Orthopsychiatry* 68, no. 3 (1998): 361–371, <http://dx.doi.org/10.1037/h0080345>; Margaret Rosario, Eric W. Schrimshaw, and Joyce Hunter, "Disclosure of Sexual Orientation and Subsequent Substance Use and Abuse Among Lesbian, Gay, and Bisexual Youths: Critical Role of Disclosure Reactions," *Psychology of Addictive Behaviors* 23, no. 1 (2009): 175–184, <http://dx.doi.org/10.1037/a0014284>; D'Augelli and Grossman, "Disclosure of Sexual Orientation, Victimization, and Mental Health Among Lesbian, Gay, and Bisexual Older Adults," 1008–1027; Belle Rose Ragins, "Disclosure Disconnects: Antecedents and Consequences of Disclosing Invisible Stigmas across Life Domains," *Academy of Management Review* 33, no. 1 (2008): 194–215, <http://dx.doi.org/10.5465/AMR.2008.27752724>; Nicole Legate, Richard M. Ryan, and Netta Weinstein, "Is Coming Out Always a 'Good Thing'? Exploring the Relations of Autonomy Support, Outness, and Wellness for Lesbian, Gay, and Bisexual Individuals," *Social Psychological and Personality Science* 3, no. 2 (2012): 145–152, <http://dx.doi.org/10.1177/1948550611411929>.

109. Belle Rose Ragins, Romila Singh, and John M. Cornwell, "Making the Invisible Visible: Fear and Disclosure of Sexual Orientation at Work," *Journal of Applied Psychology* 92, no. 4 (2007): 1103–1118, <http://dx.doi.org/10.1037/0021-9010.92.4.1103>.

110. *Ibid.*, 1114.

111. Dawn Michelle Baunach, “Changing Same-Sex Marriage Attitudes in America from 1988 Through 2010,” *Public Opinion Quarterly* 76, no. 2 (2012): 364–378, <http://dx.doi.org/10.1093/poq/nfs022>; Pew Research Center, “Changing Attitudes on Gay Marriage” (online publication), July 29, 2015, <http://www.pewforum.org/2015/07/29/graphics-slideshow-changing-attitudes-on-gay-marriage/>; Bruce Drake, Pew Research Center, “How LGBT adults see society and how the public sees them” (online publication), June 25, 2013, <http://www.pewresearch.org/fact-tank/2013/06/25/how-lgbt-adults-see-society-and-how-the-public-sees-them/>.

112. Mark L. Hatzenbuehler, Katherine M. Keyes, and Deborah S. Hasin, “State-Level Policies and Psychiatric Morbidity In Lesbian, Gay, and Bisexual Populations,” *American Journal of Public Health* 99, no. 12 (2009): 2275–2281, <http://dx.doi.org/10.2105/AJPH.2008.153510>.

113. Deborah S. Hasin and Bridget F. Grant, “The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Waves 1 and 2: review and summary of findings,” *Social Psychiatry and Psychiatric Epidemiology* 50, no. 11 (2015): 1609–1640, <http://dx.doi.org/10.1007/s00127-015-1088-0>.

114. Mark L. Hatzenbuehler *et al.*, “The Impact of Institutional Discrimination on Psychiatric Disorders in Lesbian, Gay, and Bisexual Populations: A Prospective Study,” *American Journal of Public Health* 100, no. 3 (2010): 452–459, <http://dx.doi.org/10.2105/AJPH.2009.168815>.

115. Sharon Scales Rostosky *et al.*, “Marriage Amendments and Psychological Distress in Lesbian, Gay, and Bisexual (LGB) Adults,” *Journal of Counseling Psychology* 56, no. 1 (2009): 56–66, <http://dx.doi.org/10.1037/a0013609>.

116. Roberto Maniglio, “The impact of child sexual abuse on health: A systematic review of reviews,” *Clinical Psychology Review* 29 (2009): 647, <http://dx.doi.org/10.1016/j.cpr.2009.08.003>.

Part Three: Gender Identity

1. American Psychological Association, “Answers to Your Questions About Transgender People, Gender Identity and Gender Expression” (pamphlet), <http://www.apa.org/topics/lgbt/transgender.pdf>.

2. Simone de Beauvoir, *The Second Sex* (New York: Vintage, 2011 [orig. 1949]), 283.

3. Ann Oakley, *Sex, Gender and Society* (London: Maurice Temple Smith, 1972).

4. Suzanne J. Kessler and Wendy McKenna, *Gender: An Ethnomethodological Approach* (New York: John Wiley & Sons, 1978), vii.

5. Gayle Rubin, “The Traffic in Women: Notes on the ‘Political Economy’ of Sex,” in *Toward an Anthropology of Women*, ed. Rayna R. Reiter (New York and London: Monthly Review Press, 1975), 179.

6. *Ibid.*, 204.

7. Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (London: Routledge, 1990).
 8. Judith Butler, *Undoing Gender* (New York: Routledge, 2004).
 9. Butler, *Gender Trouble*, 7.
 10. *Ibid.*, 6.
 11. “Facebook Diversity” (web page), <https://www.facebook.com/facebookdiversity/photos/a.196865713743272.42938.105225179573993/567587973337709/>.
 12. Will Oremus, “Here Are All the Different Genders You Can Be on Facebook,” *Slate*, February 13, 2014, http://www.slate.com/blogs/future_tense/2014/02/13/facebook_custom_gender_options_here_are_all_56_custom_options.html.
 13. André Ancel, Michaël Beaulieu, and Caroline Gilbert, “The different breeding strategies of penguins: a review,” *Comptes Rendus Biologies* 336, no. 1 (2013): 6–7, <http://dx.doi.org/10.1016/j.crv.2013.02.002>. Generally, male emperor penguins do the work of incubating the eggs and then caring for the chicks for several days after hatching. After that point, males and females take turns caring for the chicks.
 14. Jennifer A. Marshall Graves and Swathi Shetty, “Sex from W to Z: Evolution of Vertebrate Sex Chromosomes and Sex Determining Genes,” *Journal of Experimental Zoology* 290 (2001): 449–462, <http://dx.doi.org/10.1002/jez.1088>.
 15. For an overview of Thomas Beatie’s story, see his book, *Labor of Love: The Story of One Man’s Extraordinary Pregnancy* (Berkeley: Seal Press, 2008).
 16. Edward Stein, *The Mismeasure of Desire: The Science, Theory, and Ethics of Sexual Orientation* (New York: Oxford University Press, 1999), 31.
 17. John Money, “Hermaphroditism, gender and precocity in hyperadrenocorticism: psychologic findings,” *Bulletin of the John Hopkins Hospital* 95, no. 6 (1955): 253–264, <http://www.ncbi.nlm.nih.gov/pubmed/14378807>.
 18. An account of the David Reimer story can be found in John Colapinto, *As Nature Made Him: The Boy Who Was Raised as a Girl* (New York: Harper Collins, 2000).
 19. William G. Reiner and John P. Gearhart, “Discordant Sexual Identity in Some Genetic Males with Cloacal Exstrophy Assigned to Female Sex at Birth,” *New England Journal of Medicine*, 350 (January 2004): 333–341, <http://dx.doi.org/10.1056/NEJMoa022236>.
 20. Paul R. McHugh, “Surgical Sex: Why We Stopped Doing Sex Change Operations,” *First Things* (November 2004), <http://www.firstthings.com/article/2004/11/surgical-sex>.
 21. American Psychiatric Association, “Gender Dysphoria,” *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* [hereafter *DSM-5*] (Arlington, Va.: American Psychiatric Publishing, 2013), 452, <http://dx.doi.org/10.1176/appi.books.9780890425596.dsm14>.
 22. *Ibid.*, 458.
 23. *Ibid.*
-

-
24. *Ibid.*, 452.
25. *Ibid.*
26. *Ibid.*, 454–455.
27. *Ibid.*, 452.
28. *Ibid.*, 457.
29. Angeliki Galani *et al.*, “Androgen insensitivity syndrome: clinical features and molecular defects,” *Hormones* 7, no. 3 (2008): 217–229, <https://dx.doi.org/10.14310%2Fhorm.2002.1201>.
30. Perrin C. White and Phyllis W. Speiser, “Congenital Adrenal Hyperplasia due to 21-Hydroxylase Deficiency,” *Endocrine Reviews* 21, no. 3 (2000): 245–219, <http://dx.doi.org/10.1210/edrv.21.3.0398>.
31. Alexandre Serra *et al.*, “Uniparental Disomy in Somatic Mosaicism 45,X/46,XY/46,XX Associated with Ambiguous Genitalia,” *Sexual Development* 9 (2015): 136–143, <http://dx.doi.org/10.1159/000430897>.
32. Marion S. Verp *et al.*, “Chimerism as the etiology of a 46,XX/46,XY fertile true hermaphrodite,” *Fertility and Sterility* 57, no 2 (1992): 346–349, [http://dx.doi.org/10.1016/S0015-0282\(16\)54843-2](http://dx.doi.org/10.1016/S0015-0282(16)54843-2).
33. For one recent review of the science of neurological sex differences, see Amber N. V. Ruigrok *et al.*, “A meta-analysis of sex differences in human brain structure,” *Neuroscience Biobehavioral Review* 39 (2014): 34–50, <http://dx.doi.org/10.1016%2Fj.neurobiorev.2013.12.004>.
34. Robert Sapolsky, “Caught Between Male and Female,” *Wall Street Journal*, December 6, 2013, <http://www.wsj.com/articles/SB10001424052702304854804579234030532617704>.
35. *Ibid.*
36. *Ibid.*
37. For some examples of popular interest in this view, see Francine Russo, “Transgender Kids,” *Scientific American Mind* 27, no. 1 (2016): 26–35, <http://dx.doi.org/10.1038/scientificamericanmind0116-26>; Jessica Hamzelou, “Transsexual differences caught on brain scan,” *New Scientist* 209, no. 2796 (2011): 1, <https://www.newscientist.com/article/dn20032-transsexual-differences-caught-on-brain-scan/>; Brynn Tannehill, “Do Your Homework, Dr. Ablow,” *The Huffington Post*, January 17, 2014, http://www.huffingtonpost.com/brynn-tannehill/how-much-evidence-does-it_b_4616722.html.
38. Nancy Segal, “Two Monozygotic Twin Pairs Discordant for Female-to-Male Transsexualism,” *Archives of Sexual Behavior* 35, no. 3 (2006): 347–358, <http://dx.doi.org/10.1007/s10508-006-9037-3>.
39. Holly Devor, “Transsexualism, Dissociation, and Child Abuse: An Initial Discussion Based on Nonclinical Data,” *Journal of Psychology and Human Sexuality*, 6 no. 3 (1994): 49–72, http://dx.doi.org/10.1300/J056v06n03_04.
-

40. Segal, “Two Monozygotic Twin Pairs Discordant for Female-to-Male Transsexualism,” 350.
41. *Ibid.*, 351.
42. *Ibid.*, 353–354.
43. *Ibid.*, 354.
44. *Ibid.*, 356.
45. *Ibid.*, 355. Emphasis in original.
46. J. Michael Bostwick and Kari A. Martin, “A Man’s Brain in an Ambiguous Body: A Case of Mistaken Gender Identity,” *American Journal of Psychiatry*, 164 no. 10 (2007): 1499–1505, <http://dx.doi.org/10.1176/appi.ajp.2007.07040587>.
47. *Ibid.*, 1500.
48. *Ibid.*, 1504.
49. *Ibid.*
50. *Ibid.*, 1503–1504.
51. Giuseppina Rametti *et al.*, “White matter microstructure in female to male transsexuals before cross-sex hormonal treatment. A diffusion tensor imaging study,” *Journal of Psychiatric Research* 45, no. 2 (2011): 199–204, <http://dx.doi.org/10.1016/j.jpsychires.2010.05.006>.
52. *Ibid.*, 202.
53. Giuseppina Rametti *et al.*, “The microstructure of white matter in male to female transsexuals before cross-sex hormonal treatment. A DTI study,” *Journal of Psychiatric Research* 45, no. 7 (2011): 949–954, <http://dx.doi.org/10.1016/j.jpsychires.2010.11.007>.
54. *Ibid.*, 952.
55. *Ibid.*, 951.
56. Emiliano Santarnecchi *et al.*, “Intrinsic Cerebral Connectivity Analysis in an Untreated Female-to-Male Transsexual Subject: A First Attempt Using Resting-State fMRI,” *Neuroendocrinology* 96, no. 3 (2012): 188–193, <http://dx.doi.org/10.1159/000342001>.
57. *Ibid.*, 188.
58. Hsiao-Lun Ku *et al.*, “Brain Signature Characterizing the Body-Brain-Mind Axis of Transsexuals,” *PLOS ONE* 8, no. 7 (2013): e70808, <http://dx.doi.org/10.1371/journal.pone.0070808>.
59. *Ibid.*, 2.
60. Hans Berglund *et al.*, “Male-to-Female Transsexuals Show Sex-Atypical Hypothalamus Activation When Smelling Odorous Steroids,” *Cerebral Cortex* 18, no. 8 (2008): 1900–1908, <http://dx.doi.org/10.1093/cercor/bhm216>.
61. See, for example, Sally Satel and Scott D. Lilienfeld, *Brainwashed: The Seductive Appeal*
-

of *Mindless Neuroscience*, (New York: Basic Books, 2013).

62. An additional clarification may be helpful with regard to research studies of this kind. Significant differences in the means of sample populations do not entail predictive power of any consequence. Suppose that we made 100 different types of brain measurements in cohorts of transgender and non-transgender individuals, and then calculated the means of each of those 100 variables for both cohorts. Statistical theory tells us that, due to mere chance, we can (on average) expect the two cohorts to differ significantly in the means of 5 of those 100 variables. This implies that if the significant differences are about 5 or fewer out of 100, these differences could easily be by chance and therefore we should not ignore the fact that 95 other measurements failed to find significant differences.

63. One recent paper estimates that 0.6% of the adult U.S. population is transgender. See Andrew R. Flores *et al.*, “How Many Adults Identify as Transgender in the United States?” (white paper), Williams Institute, UCLA School of Law, June 30, 2016, <http://williamsinstitute.law.ucla.edu/wp-content/uploads/How-Many-Adults-Identify-as-Transgender-in-the-United-States.pdf>.

64. Petula Dvorak, “Transgender at five,” *Washington Post*, May 19, 2012, https://www.washingtonpost.com/local/transgender-at-five/2012/05/19/gIQABfFkbU_story.html.

65. *Ibid.*

66. *Ibid.*

67. American Psychiatric Association, “Gender Dysphoria,” *DSM-5*, 455. Note: Although the quotation comes from the *DSM-5* entry for “gender dysphoria” and implies that the listed persistence rates apply to that precise diagnosis, the diagnosis of gender dysphoria was formalized by the *DSM-5*, so some of the studies from which the persistence rates were drawn may have employed earlier diagnostic criteria.

68. *Ibid.*, 455.

69. Kenneth J. Zucker, “Children with gender identity disorder: Is there a best practice?,” *Neuropsychiatrie de l’Enfance et de l’Adolescence* 56, no. 6 (2008): 363, <http://dx.doi.org/10.1016/j.neurenf.2008.06.003>.

70. Kenneth J. Zucker *et al.*, “A Developmental, Biopsychosocial Model for the Treatment of Children with Gender Identity Disorder,” *Journal of Homosexuality* 59, no. 2 (2012), <http://dx.doi.org/10.1080/00918369.2012.653309>. For an accessible summary of Zucker’s approach to treating gender dysphoria in children, see J. Michael Bailey, *The Man Who Would Be Queen: The Science of Gender-Bending and Transsexualism* (Washington, D.C.: Joseph Henry Press, 2003), 31–32.

71. Kelley D. Drummond *et al.*, “A follow-up study of girls with gender identity disorder,” *Developmental Psychology* 44, no. 1 (2008): 34–45, <http://dx.doi.org/10.1037/0012-1649.44.1.34>.

72. Jesse Singal, “How the Fight Over Transgender Kids Got a Leading Sex Researcher Fired,” *New York Magazine*, February 7, 2016, <http://nymag.com/scienceofus/2016/02/fight-over-trans-kids-got-a-researcher-fired.html>.

73. See, for example, American Psychological Association, “Guidelines for Psychological Practice with Transgender and Gender Nonconforming People,” *American Psychologist* 70 no. 9, (2015): 832–864, <http://dx.doi.org/10.1037/a0039906>; and Marco A. Hidalgo *et al.*, “The Gender Affirmative Model: What We Know and What We Aim to Learn,” *Human Development* 56 (2013): 285–290, <http://dx.doi.org/10.1159/000355235>.

74. Sara Reardon, “Largest ever study of transgender teenagers set to kick off,” *Nature* 531, no. 7596 (2016): 560, <http://dx.doi.org/10.1038/531560a>.

75. Chris Smyth, “Better help urged for children with signs of gender dysphoria,” *The Times* (London), October 25, 2013, <http://www.thetimes.co.uk/tto/health/news/article3903783.ece>. According to the article, in 2012 “1,296 adults were referred to specialist gender dysphoria clinics, up from 879 in 2010. There are now [in 2013] 18,000 people in treatment, compared with 4,000 15 years ago. [In 2012] 208 children were referred, up from 139 the year before and 64 in 2008.”

76. Annelou L. C. de Vries *et al.*, “Young Adult Psychological Outcome After Puberty Suppression and Gender Reassignment,” *Pediatrics* 134, no. 4 (2014): 696–704, <http://dx.doi.org/10.1542/peds.2013-2958d>.

77. David Batty, “Mistaken identity,” *The Guardian*, July 30, 2004, <http://www.theguardian.com/society/2004/jul/31/health.socialcare>.

78. *Ibid.*

79. Jon K. Meyer and Donna J. Reter, “Sex Reassignment: Follow-up,” *Archives of General Psychiatry* 36, no. 9 (1979): 1010–1015, <http://dx.doi.org/10.1001/archpsyc.1979.01780090096010>.

80. *Ibid.*, 1015.

81. See, for instance, Paul R. McHugh, “Surgical Sex,” *First Things* (November 2004), <http://www.firstthings.com/article/2004/11/surgical-sex>.

82. Michael Fleming, Carol Steinman, and Gene Bocknek, “Methodological Problems in Assessing Sex-Reassignment Surgery: A Reply to Meyer and Reter,” *Archives of Sexual Behavior* 9, no. 5 (1980): 451–456, <http://dx.doi.org/10.1007/BF02115944>.

83. Cecilia Dhejne *et al.*, “Long-term follow-up of transsexual persons undergoing sex reassignment surgery: cohort study in Sweden,” *PLOS ONE* 6, no. 2 (2011): e16885, <http://dx.doi.org/10.1371/journal.pone.0016885>.

84. 95% confidence interval: 2.0–3.9.

85. 95% confidence interval: 1.8–4.3.

86. MtF transsexuals in the study’s 1973–1988 period showed a higher risk of crime compared to the female controls, suggesting that they maintain a male pattern for criminality. That study period’s FtM transsexuals, however, did show a higher risk of crime compared to the female controls, perhaps related to the effects of exogenous testosterone administration.

87. 95% confidence intervals: 2.9–8.5 and 5.8–62.9, respectively.

88. *Ibid.*, 6.

89. *Ibid.*, 7.

90. Annette Kuhn *et al.*, “Quality of life 15 years after sex reassignment surgery for transsexualism,” *Fertility and Sterility* 92, no. 5 (2009): 1685–1689, <http://dx.doi.org/10.1016/j.fertnstert.2008.08.126>.

91. Mohammad Hassan Murad *et al.*, “Hormonal therapy and sex reassignment: a systematic review and meta-analysis of quality of life and psychosocial outcomes,” *Clinical Endocrinology* 72 (2010): 214–231, <http://dx.doi.org/10.1111/j.1365-2265.2009.03625.x>.

92. *Ibid.*, 215.

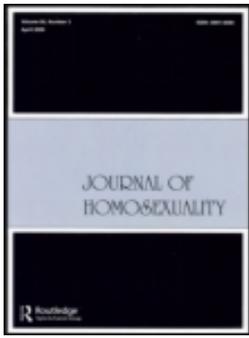
93. 95% confidence intervals: 68–89%, 56–94%, and 72–88%, respectively.

94. *Ibid.*

95. *Ibid.*, 216.

96. *Ibid.*

97. *Ibid.*, 228.



A Developmental, Biopsychosocial Model for the Treatment of Children with Gender Identity Disorder

Kenneth J. Zucker PhD , Hayley Wood PhD , Devita Singh MA & Susan J. Bradley MD

To cite this article: Kenneth J. Zucker PhD , Hayley Wood PhD , Devita Singh MA & Susan J. Bradley MD (2012) A Developmental, Biopsychosocial Model for the Treatment of Children with Gender Identity Disorder, Journal of Homosexuality, 59:3, 369-397, DOI: [10.1080/00918369.2012.653309](https://doi.org/10.1080/00918369.2012.653309)

To link to this article: <https://doi.org/10.1080/00918369.2012.653309>



Published online: 28 Mar 2012.



Submit your article to this journal [↗](#)



Article views: 6347



View related articles [↗](#)



Citing articles: 46 View citing articles [↗](#)

A Developmental, Biopsychosocial Model for the Treatment of Children with Gender Identity Disorder

KENNETH J. ZUCKER, PhD, HAYLEY WOOD, PhD,
DEVITA SINGH, MA, and SUSAN J. BRADLEY, MD
Centre for Addiction and Mental Health, Toronto, Ontario, Canada

This article provides a summary of the therapeutic model and approach used in the Gender Identity Service at the Centre for Addiction and Mental Health in Toronto. The authors describe their assessment protocol, describe their current multifactorial case formulation model, including a strong emphasis on developmental factors, and provide clinical examples of how the model is used in the treatment.

KEYWORDS gender, gender identity, gender identity disorder, gender identity disorder of childhood, gender identity disorder of adolescence, gender variance, transgender, transsexual, treatment

In this article, we will outline the therapeutic approach for children that has evolved in the Gender Identity Service, Child, Youth, and Family Program at the Centre for Addiction and Mental Health in Toronto. Since our clinic was established in the mid-1970s, we have evaluated a total of 590 children (age range, 2–12 years) who were referred to our service. In organizing this article, we will attempt to address the majority of questions provided to the contributors by the guest editors.

WHAT CONSTITUTES AN ASSESSMENT?

Tables 1–2 show the assessment protocol that we currently use in our clinic. As is the case for most children referred for a psychiatric and psychological

Address correspondence to Kenneth J. Zucker, Gender Identity Service, Child, Youth, and Family Program, Centre for Addiction and Mental Health, 250 College St., Toronto, ON M5T 1R8, Canada. E-mail: Ken_Zucker@camh.net

TABLE 1 Clinical assessment protocol

Interview schedule	Approximate duration
Telephone intake interview	.5–1.5 hours
Family interview	3 hours
Individual interviews with parents	2–5 hours/parent
Psychological testing of the child	4 hours
Individual interview with child	1 hour
Feedback session	1–2 hours

Note. In Canada, there is universal health care coverage. When a child is seen in a hospital setting, the Canadian health care plan covers the entire cost. A psychiatrist bills directly the health care system for all face-to-face contact. Psychologists who work in a hospital setting are paid an hourly rate, but do not bill the health care plan. For child psychiatrists in private practice, they also bill the health care plan for all face-to-face contact. Psychologists in private practice operate on a fee-for-service basis. Clients pay the psychologist directly. If they have private health insurance, at least some of the costs are covered by the individual health care plan.

TABLE 2 Psychological testing protocol and parent-completed questionnaires

Test/task/questionnaire	Comment/reference
Child measures	
IQ test	WPPSI-III or WISC-IV
Quality of attachment (mother-child observation)	Used with children 3–6 years of age. Cassidy and Marvin (1992)
Feelings, Attitudes, and Behaviors Scale for Children	Used with children 6–10 years of age. Beitchman (1996)
Youth Self-Report Form	Used with children 11–12 years of age. Achenbach and Edelbrock (1986a)
Rorschach	Zucker, Lozinski, Bradley, and Doering (1992)
Draw-a-Person test	Zucker, Finegan, Doering, and Bradley (1983)
Free play task	Zucker, Doering, Bradley, and Finegan (1982)
Playmate and Play Style Preferences Structured Interview	Fridell, Owen-Anderson, Johnson, Bradley, and Zucker (2006)
Color preference task	Chiu et al. (2006)
Gender Identity Interview for Children	Wallien et al. (2009) and Zucker et al. (1993)
Parent/teacher measures	
Separation Anxiety Interview schedule	Used for boys only. Zucker, Bradley, and Lowry Sullivan (1996)
Child Behavior Checklist	Achenbach and Edelbrock (1983)
Teacher's Report Form	Achenbach and Edelbrock (1986b)
Temperament questionnaire	Zucker and Bradley (1995)
Games Inventory	Bates and Bentler (1973)
Gender Identity Questionnaire for Children	Johnson et al. (2004)
Symptom Checklist-90	Derogatis (1983)
Dyadic Adjustment Scale	Spanier (1976)
Recalled Childhood Gender Identity/Gender Role Questionnaire	Zucker et al. (2006)

Note. We no longer use the two gender constancy assessment measures reported on by Zucker et al. (1999). The Children's Depression Inventory is used on an ad hoc basis.

assessment, a referral is invariably initiated on the part of parents or a health professional (e.g., the pediatrician, a family physician, a teacher or a mental health professional currently involved in the care of the child and the family). Upon receipt of the referral, the first phase in our assessment protocol is to conduct an intake telephone interview with a parent or another primary caregiver (e.g., a child protection worker). In this intake telephone interview, which varies between 30 and 90 minutes, parents provide information about why they have contacted us, their concerns, and their goals. We collect information about their child's gender development (asking questions about behaviors that correspond to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR, American Psychiatric Association, 2000) diagnosis of Gender Identity Disorder), whether there are other concerns about the child's socioemotional development (including other *DSM* diagnoses), previous mental health contacts, the child's physical health, and whether or not there is a family history of psychologic problems/psychiatric disorders. If a child has had previous mental health contacts, this information is requested for review prior to our own assessment. An intake interview is as follows:¹

An intake telephone interview was conducted with Zack's mother, lasting approximately 45 minutes. Ms. Aziz appeared to be quite distracted during the phone call, often excusing herself to attend to her children, who were heard screaming in the background. Zack, age 3, lives with his parents and 6-month-old sister. Both parents are employed full-time as managers of business firms.

Ms. Aziz explained why the referral to our clinic was initiated. She described Zack as exhibiting an array of behaviors that she believes to be female-typical. For example, he will color his fingernails to mimic nail polish, will wear her shoes, wrap a blanket around himself to make a skirt, and appears to be very fascinated by jewelry. She said that she first noticed these behaviors just over a year ago and that they have increased since then. Ms. Aziz said that she initiated contact with our clinic to learn how to deal with these behaviors.

Ms. Aziz stated that she believes that Zack knows that he is a boy and has a penis. She thinks that he notices the anatomical differences between himself and his sister. She said that she saw him "pushing his penis in" about 3 months ago. In terms of gender identity statements, Zack has said that he is a girl and that he wants to be a girl. Ms. Aziz said that she has responded to these statements by asking Zack, "Why?" Ms. Aziz explained that Zack is not able to express himself very well through speech, so has not been able to answer this question with clarity.

Ms. Aziz said that Zack displays a range of behaviors, acting in a gender-typical fashion at times. He enjoys playing with other children and has both male and female friends. It was reported that Zack's best friend is a boy and, together, they will play in a rough-and-tumble manner. However, Ms. Aziz believes that Zack likes being around same-aged

girls more. With girls, Zack is said to be less active, sitting back and watching them with a look of fascination. He has made comments about liking the clothing of the girls in his class.

In terms of the feedback Zack has received regarding his cross-gender behaviors, Ms. Aziz said that she believes they have been inconsistent. Starting at the age of 1.5 years, Zack attended a daycare run by a woman, who Ms. Aziz thinks encouraged and taught some of his female-typical behavior because she found it “entertaining.” For example, at this daycare, Zack was taught how to belly dance. Ms. Aziz sees the movements involved in belly dancing as being quite feminine and said that Zack enjoys showing them off. Zack’s teachers have noticed some cross-gender behaviors but do not discourage them unless they are potentially harmful. For example, they will only intervene if they see him painting on his own skin.

Ms. Aziz said that her family identifies as Muslim. She explained that cross-gender behaviors are unacceptable in the Muslim faith, but said that their family is not very observant. Ms. Aziz has seen her husband get quite agitated by Zack’s female-typical behavior and said that he “hates the idea” of Zack being girly. Mr. Aziz has made disapproving comments to Zack, like “you look silly” when he dresses up like a girl.

Ms. Aziz believes that she has contributed to Zack’s gender confusion herself somewhat. Until recently, she has read him fairy tales like Cinderella, with female characters that Zack has seemed to really connect with. At first, she tried to ignore his cross-gender tendencies and not make any comments. However, she said that since reading online about Dr. Zucker’s approach, she has tried to replace the feminine things that Zack is interested in with more masculine things. For example, she has taken away fairy tales and replaced them with stories about male characters, like Diego. Zack reportedly pays some attention to the newly introduced items, but appears to miss the female-typical things. Ms. Aziz said that he will throw a tantrum when something he likes is removed. For example, when his makeshift skirt was taken away, he cried and expressed that he wanted it back. She said that she still tries to remain neutral on the subject because she does not want to “cause harm,” but has told him many times that he is a boy and has a penis.

Within the family, Zack is said to be closest with his mother, who has been his “primary caregiver.” Ms. Aziz said that she has always been responsible for Zack’s daily routine and she described Zack as being very attached to her. She has noticed separations from her, like when he goes to daycare, as being difficult for him. Zack is also said to be quite close with his grandmother, who is said to be very female typical. He often appears to be fascinated by her jewelry and makeup. She said that he just appears to like having someone around, even if he is playing by himself. He is also said to have a good relationship with his father. Together, they will read stories, build blocks, and ride bikes in the summer. Ms. Aziz said that Zack seemed to hate the idea of having a younger sister when she was pregnant. For example, he made a comment about sending the baby on a train to go to his aunt’s house. Zack appears to have gotten used

to the idea of having a younger sister. Ms. Aziz stated that Zack loves his sister and will sometimes appear to be frightened that something bad might happen to her.

Ms. Aziz said that her relationship with her husband has been contentious at times. When Zack was 1.5 years old, Ms. Aziz and her husband had their biggest fight. Ms. Aziz described this fight as “traumatic,” as Zack witnessed his father hold a gun to his mother’s chest. As a result, the police were involved. Ms. Aziz said that she is not sure if Zack remembers this incident because he has not said anything about it, but she believes it might have affected him. This fight was an isolated episode in terms of magnitude, but there have been other instances of argumentativeness. Zack is said to always take his mother’s side in these arguments, asking his father why he is being “bad to mommy.”

Ms. Aziz’s pregnancy with Zack was the result of in vitro fertilization. He has been exposed to three languages all at once, so she believes that his speech has been slow to progress as a result. When asked why she thought Zack displayed these cross-gender behaviors, Ms. Aziz cited many environmental explanations. She said that she thinks it is likely related to his attachment to her. She noted that he sees her all the time and that she has always been the one to take care of his routine. She said that, although she does not see herself as being very “girly,” she thinks that she has encouraged his identification with females by reading him fairy tales. Ms. Aziz also believes that his daycare provider is somewhat responsible for teaching and encouraging female-typical behaviors. Finally, she thinks that he is more likely to behave in this way if he is “lacking attention” or bored.

Prior to the assessment, parents are provided with information about the temporal course of the assessment (typically 3–4 visits) and what it will involve. Parents are asked what they will inform their child about the assessment, who they are going to see, and why they are coming to see us. In our experience, this is an important phase in the assessment process in terms of establishing appropriate assessment rapport, particularly with anxious parents. For the majority of parents, they do not have a particular difficulty or problem in explaining to their child that they are coming to see some “talking doctors who know a lot about families” (a script that we suggest). They are able to frankly discuss with their child that they are coming to see a talking doctor to understand better why their child wishes to be of the other gender. This is usually because the issue has been on the table within the family environment.

There are, however, a minority of parents who are very uncertain and torn about what to tell their child. A common comment is, “I don’t know what to tell him. I don’t want him to think that there is anything wrong with him.” Our suggestion for these parents is to, first, state that the issue is not a matter of right or wrong. Rather, the issue is to understand better why their child feels the way that he or she does and the purpose of the assessment is to determine how to best help them and their child. For these parents,

we have found this suggestion to usually be helpful and they might be able to say something like, “You know how you have been telling mommy that you want to be a girl, that you like ‘girls’ toys,’ that you like to dress-up in mommy’s clothes? Well, mom and dad want to understand better how you are feeling about yourself and we are going to go and see some talking doctors who know a lot about kids.” In our experience, almost all reluctant parents who contact us are able to provide this information. However, for the very small minority who cannot provide this information due to severe anxiety or ambivalence, we will meet only with the parents. If after meeting us, they are comfortable bringing their child, the usual assessment protocol follows. If not, the assessment is conducted only with the parents. Since 1975, only five assessments were conducted only with parents.

The assessment protocol usually allows us to acquire enough information to decide whether or not the child meets the DSM criteria for Gender Identity Disorder (GID) and any other psychiatric disorder. Multiple sources of information are used, including the open-ended material gleaned from the clinical interviews, a review of the psychological testing of the child, and an examination of the relevant parent-report questionnaires. The assessment also attempts to understand the general functioning of the family matrix (e.g., the parent’s relationship, parent-child relationships, sibling relationships, etc.) and how the child is functioning at school, in the peer group, etc. An effort is made to gain an understanding of how the parents have made sense of their child’s gender development (e.g., its origins), how the parents have responded to their child’s cross-gender behavior prior to the assessment, what goals the parents have with regard to their child’s gender development, and so on.

ON WHAT BASIS IS IT DECIDED THAT TREATMENT IS INDICATED?

Prior to providing parents with feedback, we have a case formulation conference among the team members involved in the assessment. It is obvious that a case formulation requires some type of conceptual model to guide it. Accordingly, we will comment here on some of the parameters that underlie what we would like to characterize as a developmental, biopsychosocial model that we use in case formulations and in generating treatment decisions and recommendations. It is a model informed by a variety of theoretical and empirical advances that have emerged in the clinical and scientific literature over the past several decades.

1. Is gender identity fixed and unalterable in childhood? For the vast majority of children, it is probably safe to say that gender identity is a stable trait. A girl who “has” a female gender identity at age 3 is very much likely to have a female gender identity at age 13, at age 23, and so on

throughout the life course. In this sense, one might argue that the gender identity at age 3 was fixed and unalterable. But, for most children, no one tries to alter their gender identity after it is first expressed, for a host of psychological and social reasons. To formally answer the question of whether or not a young child's gender identity is fixed and unalterable, one would have to conduct a randomized psychosocial trial in which, for half the children, some type of intervention was attempted to alter the child's gender identity. It is unlikely that such an "experiment of nurture" would attract many volunteer parent participants.

For children who present clinically with the diagnosis of GID, long-term follow-up studies suggest that their gender identity is not necessarily fixed. The majority of children followed longitudinally appear to lose the diagnosis of GID when seen in late adolescence or young adulthood, and appear to have differentiated a gender identity that matches their natal sex (Drummond, Bradley, Badali-Peterson, & Zucker, 2008; Green, 1987; Singh, Bradley, & Zucker, 2010; Wallien & Cohen-Kettenis, 2008; Zucker, 2008a).² In this sense, one could argue that their childhood gender identity was alterable—that there was plasticity and malleability—although the mechanisms that underlie this change are far from fully understood. Thus, when we provide feedback to parents about their child's gender identity, we make use of the empirical information that is currently available about "natural history."

2. In our view, gender identity development can be best understood using a multifactorial model that takes into account biological factors, psychosocial factors, social cognition, associated psychopathology, and psychodynamic mechanisms. In the model, biological factors (e.g., possible genetic factors, prenatal sex hormones, temperament) are conceptualized as possible predisposing factors for the expression of a particular gender identity phenotype. They are not conceptualized as fixed factors leading to invariant gender identity differentiation across developmental time. The other parameters can be conceptualized as predisposing, precipitating or perpetuating factors.

Biological Factors

Let us use a dimension of temperament (activity level; AL) as an example of a possible predisposing biological factor. Activity level, the propensity for intense physical energy expenditure and the proclivity for rough-and-tumble play, is a sex-dimorphic trait, with likely genetic and prenatal hormonal influences (Campbell & Eaton, 1999; Eaton & Enns, 1986). Via a parent-report measure, we have shown that AL is inverted in children with GID: Boys with GID have a lower AL than control boys and girls with GID have a higher AL than control girls. Indeed, girls with GID have a significantly higher AL than boys with GID (Zucker & Bradley, 1995). If one construes

AL as a temperamental trait, one could conceptualize, for example, a boy with a low AL to find the behaviors of girls, on average, as more compatible with his own temperamental style than the behaviors of boys and could, conceivably, lead to a greater affiliation with girls regarding sex-of-playmate preference. In turn, this could lead to a greater interest in the toys and activities of girls which could, in theory, have a feedback effect on the child's gender identity, especially during early development when cognitive reasoning is fairly rigid and black and white.

Frank was a 7-year-old boy who met the *DSM* criteria for GID. In contrast to his two brothers, Frank was described by his parents as more sensitive and emotional. He had a long history of an avoidance of rough-and-tumble play, complaining that other boys were both mean and aggressive. Indeed, one of his brothers, who had a history of severe disruptive behavior, had often been mean and aggressive towards him. The problematic relationship with his brother appeared to generalize to Frank's view of all boys, as he complained that all boys were mean. He affiliated primarily with girls and, with them, engaged in a variety of stereotypical feminine activities. By age 5, he began to voice the wish to be a girl, stating that if he were a girl, then all of his problems would be solved.

If one conceptualized Frank's sensitive temperament as a predisposing, presumably biological factor, one could argue for an intervention that, in part, would focus on helping Frank recognize that there are a variety of ways to be a boy and that there are likely some boys in his social environment who are not pervasively mean or aggressive. Exposure of Frank to other boys whose temperament was more a match to his own could, in theory, help him to develop a more nuanced understanding of gender: that there are different ways to be a boy, that one does not have to be a girl as a fantasy solution to cope with his difficulties with his aggressive brother or the more boisterous boys in the school environment, and so on.

Psychosocial Factors

Psychosocial factors constitute a second parameter in case formulation. One example pertains to the parental response to cross-gender behavior as it emerges early in development. In our view, it is common for the initial parental response to cross-gender behavior to be either neutral or encouraging (reinforcement). Early cross-gender behavior is often viewed by parents as either cute or only a phase.³ For some parents, they seek out a clinical assessment only after some kind of threshold is crossed, and they now no longer believe that the behavior is cute or only a phase (Zucker, 2000). The threshold might pertain to emergent social ostracism in the peer group, the child's intense verbalization that he or she either is or wants to be the

other gender, or other factors. In our case formulation, parental neutrality or encouragement of cross-gender behavior is viewed as a perpetuating factor (in relatively rare cases, in which, e.g., the mother overtly cross-dresses her son, acting out her desire for a daughter, such behavior could be viewed as a precipitating factor).

Roy was a 4.5-year-old boy with a two-year history of pervasive cross-gender behavior. At the time of assessment, Roy did not express the wish to be a girl; rather, he insisted that he was a girl. Since he first began to display signs of cross-gender behavior, the parental response was to “go with it.” They bought him stereotypical girls’ toys, allowed him to wear his mother’s clothes on a daily basis, and would often videotape his activities when he dressed up as a girl. Apart from his gender identity development, the parents identified one other major concern about his socioemotional development, namely that he would have intense and extremely disorganized temper tantrums when frustrated. During these episodes, he was experienced as inconsolable. By history, the parents reported that they had never “challenged” Roy when he insisted that he “was” a girl. They came to the assessment wanting to know if this was “really who Roy was” and if they were doing the “right thing” by allowing Roy to consistently enact behaviors that allowed him to, in effect, see himself as a girl.

Social Cognition

In the literature on normative gender development, it has long been noted that young children do not have a full understanding of gender constancy. Gender constancy refers to a child’s cognitive understanding that gender is an invariant part of the self. It has been argued that in the early stages of gender constancy (e.g., the capacity to self-label oneself as a boy or a girl or to understand the constancy of gender over time) that children do not fully understand its invariance. Until children develop the capacity for concrete operational thought, typically between the ages of 5 and 7 years, they often conflate gender identity with surface expressions of gender behaviors (Kohlberg, 1966; Ruble, Martin, & Berenbaum, 2006). Thus, it is not particularly unusual for a 4-year-old girl to express the belief that, if she wore boys’ clothes and engaged in boys’ activities, then this would mean that she was a boy. It has also been reported in the normative gender development literature that younger children tend to have more rigid beliefs than older children about what boys and girls can do or should do (Ruble et al., 2006). In our own research, we have reported that children with GID appear to have a developmental lag in gender constancy acquisition (Zucker et al., 1999). Although it is unclear if this developmental lag can be understood as a predisposing factor, it can certainly be understood as a perpetuating

factor (e.g., pervasive enactments of surface cross-gender behaviors could contribute to the maintenance of cognitive gender confusion).

In some respects, gendered social cognition provides a window into how children with GID construct a subjective sense of self as a boy or as a girl. For example, when asked why he wanted to be a girl, one 7-year-old boy said that it was because he did not like to sweat and only boys sweat. He also commented that he wanted to be a girl because he liked to read and girls read better than boys. An 8-year-old boy commented that “girls are treated better than boys by their parents” and that “the teacher only yells at the boys.” His view was that, if he was a girl, then his parents would be nicer to him and that he would get into less trouble at school. One 5-year-old boy talked about having a “girl’s brain” because he only liked Barbie dolls. In this particular boy’s treatment, he created drawings of his own brain, writing in examples of what made his brain more like a girl’s brain and what made his brain more like a boy’s brain (e.g., when he developed an interest in Lego). Over time, the drawings of the size of his girl’s brain shrunk and the size of his boy’s brain expanded.

It could, of course, be argued that gendered social cognition is merely an epiphenomenon of a more fundamental developmental process pertaining to gender identity, that is, it is simply a way that children attempt to explain to themselves their gender identity. On the other hand, it could be argued that young children’s limited understanding of gendered social cognition calls for caution in assuming how fixed their gender identity is and that, with development, some children will develop a more flexible understanding that there are different ways one can be a boy or a girl.

Co-Occurring Psychopathology

When there is co-occurring psychopathology in children with GID, it can be understood in several ways: a) as a result of social ostracism; b) as related to generic family risk factors for psychopathology; and c) as a possible cause of the GID. Regarding this last possibility, Coates and Person (1985), for example, argued that severe separation anxiety preceded the expression of feminine behavior in GID boys, which emerged in order “to restore a fantasy tie to the physically or emotionally absent mother. In imitating ‘Mommy’ [the boy] confuse[s] ‘being Mommy’ with ‘having Mommy.’ [Cross-gender behavior] appears to allay, in part, the anxiety generated by the loss of the mother” (p. 708).

In recent years, various clinicians working with children with GID have noted that some of these youngsters also appear to show signs of autism spectrum disorder (ASD), particularly at the high-functioning end of the spectrum. This clinical observation, which is now supported by some systematic empirical data (de Vries, Noens, Cohen-Kettenis, van Berckelaer-Onnes, & Doreleijers, 2010), opens up another avenue regarding the role of

associated psychopathology in children with GID. In our experience, children with GID generally show intense, if not obsessional, interests, in cross-gender activities. This propensity for intense interests may be magnified even further in those youngsters with a co-occurring ASD. Thus, a bridge between GID and ASD may be the predisposition for obsessional or focused interests and extreme rigidity in thinking. Moreover, any attempt to interfere with the obsessionalism may evoke intense anxiety. It is common for parents of these youngsters to report a series of obsessions (e.g., with a particular color, with a particular book that must be read over and over in ritualistic fashion, with specific objects, such as washing machines, vacuum cleaners, etc.).

Gender can become a site for obsessionalism, perhaps a magnification of intense interests in typically developing children (DeLoache, Simcock, & Macara, 2007). One 5-year-old boy with co-occurring GID and ASD had many obsessional interests that preceded his gender obsession. Unlike his earlier obsessions, which the parents tried to ignore, they were less certain if they should ignore his gendered obsessions and, thus, bought him an array of girls' toys and allowed him to wear his mother's clothes on a daily basis. At the time of assessment, this youngster had been insisting that he was a girl and, at school, where gendered line-ups were common, would join the girls in their line. In the course of the assessment, the mother reported that he was now developing a new obsession: "He now thinks that he is a computer." She thought that this was preferable to him believing that he was a girl. The child psychiatrist who has followed this youngster reported that, at age 12, the symptoms of GID had remitted. At age 12, this youngster had an "obsession" with male heavy metal rock stars (a particular musical genre) and wore his hair long to emulate them.

David was referred at the age of 5 by a child psychiatrist, following remarks to his parents that he wished to be a girl and to cut off his penis. Apart from a GID, David had a number of socioemotional difficulties, including persistent and pervasive struggles with self-regulation, behavioral rigidity, obsessive behaviors, anxiety, and poor social functioning. In our assessment, we concluded that he met criteria for Asperger's Disorder. Play therapy was initiated to help explore David's gender dysphoria. As appropriate, additional therapeutic strategies were drawn upon in order to support the development of self-regulation (e.g., with regard to sexualized behavior directed towards the therapist, temper tantrums), social skills, and the management of areas of obsessive focus. In the therapeutic context, struggles with the parent-child relationship, self-concept, peer relations, and anger and guilt were consistent themes.

Over the course of four years in therapy, David evidenced a strong tendency towards obsessions/restricted interests (e.g., trains, airports, certain television shows, and book series), with each lasting between 3 to 6 months in duration. The gender-related preoccupation stood out in terms of its relationship to identity. The gender dysphoria began to

wane around age 7. At age 9 years, in the 112th therapy session, David initiated discussion about his history of obsessions/restricted interests. He requested that his therapist write out each of his areas of interest (in chronological order) and he proceeded to summarize the “rationale” behind each. Early in the list placed his preoccupation with cross-gender materials. David paused on this area and reflected it had carried special meaning for him. He went on to say that this may have been more than just an interest in this topic area, and that, in fact, he had wanted to *be* a girl. He reflected on the reinforcing aspects of many of the feminine interests and behaviors (e.g., the feeling of pretend long hair, how “beautiful” things looked, etc.), with a focus on the associated visual and tactile stimulation. When asked about his understanding of his involvement in therapy, starting at age 5 years, David reflected that his parents may have been concerned about his desire to be a girl, as they knew that he was “really a boy.” He recalled his parents’ efforts to curtail his cross-gender behaviors by limiting his time and access. He discussed his belief that this was not the right approach, and that they should have just allowed him to grow out of this interest, as he had all of the previous and subsequent ones.

In reflecting on his development of gender dysphoria, David discussed his experience of bullying from peers for his gender atypical areas of interest. He speculated that, in many ways, his desire to become a girl may have been an effort to avoid the bullying from peers. David again reiterated the very reinforcing aspects of many of his female-typical interests. Finally, he reflected on his negative feelings about himself and his behavior and we considered his gender dysphoria as an effort to cope with these feelings. David continues to demonstrate a tendency towards preoccupations but, at present, has no symptoms characteristic of GID. He continues to benefit from therapeutic support for self-regulation, social skills, and management of his restricted interests/preoccupations.

Psychodynamic Mechanisms

Psychodynamic mechanisms can be understood, in part, as a transfer of unresolved conflict and trauma-related experiences from parent to child. Sometimes these kinds of experiences are consciously recognized by parents (but, nonetheless, acted out), but certainly not always. Children, themselves, may vary in their understanding of what drives their behavior.

Tom was a 4-year-old boy with an approximate one-year history of pervasive cross-gender behavior, including the repeated wish to be a girl. Tom’s mother was an intense, volatile, and extremely anxious woman, with strong narcissistic personality traits. She viewed Tom as a perfect child, until he began to express the desire to be a girl. She then experienced Tom as less than perfect, which, for her, was a severe narcissistic

injury. Tom's father played little role in his day-to-day life, working 18-hour days, 7 days/week.

We understood Tom's GID to develop in the context of the birth of his younger sister when he was just shy of his third birthday. He felt abandoned by his mother, who seemed to transfer much of her psychologic investment to the sister. She adorned the baby sister in pink (in early therapy sessions with Tom, he only used the color pink in his numerous drawings). In part, we conceptualized Tom's GID as the result of feeling an intense psychologic abandonment by his mother and an intense jealous rage towards his sister ("If you could be a girl like Suzie, then mom would pay more attention to you"). In our view, one of the factors in helping Tom work through his gender identity conflict was to make him more conscious of his jealous feelings and how they organized his day-to-day life within the family matrix.

Rose was a 9-year-old girl with a long history of cross-gender behavior, including the strong desire to be a boy. Rose was raised by her biological mother. At the age of 4, Rose discovered her mother's body at the bottom of the staircase. She had been murdered by a boyfriend. For various reasons, there were no biological relatives to care for Rose and so she was adopted at the age of 6.

At the time of assessment, Rose looked like a boy, based on her hairstyle and clothing style. During the assessment, Rose commented that she wanted to be a boy because boys were stronger than girls. She told her adoptive mother that when they walked down the street together that her mother need not be afraid, because "I look like a boy and no one will hurt you." Rose acknowledged that she has had the recurring thought that, had she been a boy, then she would have been able to protect her mother from the boyfriend because "boys are stronger than girls."

We conceptualized Rose's desire to be a boy as an unusual symptom emanating from a Post-Traumatic Stress Disorder. Perhaps due to the rigid normative social cognitions about gender, Rose had constructed, for herself, an unusual fantasy solution: had she been a boy ("because" boys are stronger than girls), she could have saved her mother's life.

In the case of Roy described above, one issue that was discussed in the case formulation conference was why the parents had never attempted to tell Roy that he was, in fact, "a boy." We wondered about why the parents were so "paralyzed" in this regard. One element of the family history that seemed relevant was that his mother had been subject to a long history of psychological and physical abuse by her father. We wondered if any signs of more boy-typical behavior on Roy's part might be conflated with viewing him as an "abuser-in-the-making," like her own father. In addition, Roy's mother had been subject to very severe peer ostracism during her own childhood (e.g., being made fun of because she wore glasses, had dental problems, etc.). These experiences were extremely difficult for her and she cried profusely (30 years

later) as she described them. She worried that, if she said anything to Roy about his insistence that he was a girl, he would experience this in the same traumatic way that she experienced the peer group teasing in her own childhood. Roy's father also had had a lot of difficult experiences in the peer group because of a speech impediment and he was also extremely worried that if he said anything to Roy about his girlish behaviors that Roy would experience this as representing a "defect," just like he experienced his speech problem as a defect.

Jim was the last of four boys born to a middle-class family. When seen at age 4, he had a strong desire to be a girl. Jim's mother acknowledged a very strong wish for a daughter, as she knew that this was her "last chance." Although rare, Jim's mother's reaction to giving birth to a fourth son was consistent with what we have characterized as pathological gender mourning (Zucker, Bradley, & Ipp, 1993). She became deeply depressed after his birth, wanting little to do with the baby for a couple of weeks. She had florid dreams about having given birth to a daughter. When Jim was a year old, her female friends bought her a life-sized female baby doll. As far as we could tell, Jim's mother had little insight into the significance of this gift. She asked plaintively, "Do you think it's because my desire for a daughter was so apparent to my friends?"

In the case formulation conference, we wondered whether or not it would be useful to organize treatment for the mother around helping her to understand the meaning of the wish for a daughter and what it represented for her and to help her mourn the loss of having given birth to a child of the non-preferred gender. We also wondered how the mother's disappointment/despondency might have been transmitted to Jim across his development.

WHEN TREATMENT IS INDICATED, WHAT ARE
THE RATIONALES AND GOALS FOR TREATMENT AND,
AS SPECIFICALLY AS POSSIBLE, HOW DOES
TREATMENT PROCEED?

When treatment is recommended, it might include the following: a) weekly individual play psychotherapy for the child; b) weekly parent counseling or psychotherapy; c) parent-guided interventions in the naturalistic environment; and d) when required for other psychiatric problems in the child, psychotropic medication. The goals for treatment are formulated on a case-by-case basis. In some cases, the focus might be only on the child's GID, as the child shows little in the way of associated psychopathology and the parents are generally functioning well. In other cases, the focus of treatment is much broader: If the child has other significant socioemotional problems

and if the parents have significant psychopathology or marital discord, then these issues also need to be addressed.

If the parents are clear in their desire to have their child feel more comfortable in their own skin, that is, they would like to reduce their child's desire to be of the other gender, the therapeutic approach is organized around this goal. Any co-occurring psychopathology is also treated and the approach depends heavily on the understanding of the sources of the associated psychopathology. If parents are uncertain about how best to address their child's *GID*, we offer to address this further in the course of therapeutic sessions and will suggest to the parents that we hold off on making any specific decisions about intervention options. Table 3 provides a summary of treatment recommendations and disposition for 26 children evaluated in 2008.

When we conduct open-ended play psychotherapy (or simply talk therapy) with children, like any psychotherapeutic intervention for any issue, therapy begins with educating the child about the reason that they are in therapy. This is tailored to the child's developmental level and cognitive sophistication. Some children are simply told that they are going to meet with an individual therapist to understand better their gender-related feelings and, during sessions, they are free to play with whatever they want (boys' toys, girls' toys, dress-up clothing, neutral and educational activities, etc.), to draw, to talk about day-to-day life, to report on their dreams, and so on. Principles of confidentiality are reviewed.

For other children, they have a very sophisticated understanding of why they are in treatment and the educative process is less formal. One 4-year-old girl, for example, had actually asked her parents to take her to see a therapist (she was very intelligent) because she was confused about why she wanted to be a boy. After the assessment, she seamlessly entered into a therapeutic process about her gender feelings. Other children are substantially more guarded and require a much longer period of time before they are comfortable discussing their feelings. One 3-year-old boy, for example, in the course of a two-year treatment, was never able to talk about his day-to-day life with his therapist: It was all enacted literally via play with repetitive family scenarios in which he labeled the characters as himself and his parents. In both of these cases, the *GID* remitted in full.

Individual open-ended psychotherapy enables many children with *GID* to discuss and to play out their gender identity issues, it affords them the opportunity to make sense of their internal representational world, and, in general, to master various developmental tasks with which they may be struggling. There is a reasonably large psychoanalytic case report literature on *GID*, for which the interested reader can glean some good examples of the process of open-ended psychotherapy (see Zucker, 2006a, 2008b; Zucker & Bradley, 1995).

TABLE 3 Treatment recommendations for cases evaluated in 2008 (*N* = 26)

ID	Sex	Age	Individual Therapy	Parent Therapy	Medication	Other	Comment
1	F	10	No	Yes	On Concerta for ADHD prior to assessment	Support provided to child by school psychologist	Diagnosed with ODD and ADHD Outpatient services difficult to access in community
2	F	7	Yes	Yes	Consult recommended for ADHD	Feedback provided to school psychologist	Dropped out of treatment; mother sought advice from a nurse practitioner who specialized in naturopathy; significant discord between parents, who were separated; diagnosed with ODD and ADHD
3	F	5	Yes	Yes	No		Mourning the sudden death of father was one focus of treatment
4	M	6	Yes	Yes	Consult recommended for ADHD	In day treatment for behavioral problems (diagnosed with ODD and ADHD)	Father seen in counseling; mother refused treatment (has bipolar disorder and on long-term disability); parents separated; father has custody
5	M	9	No	No	No		Sibling of ID 2; subthreshold for GID; feminine behaviors of no concern to mother; father "denies" observing any feminine behaviors
6	M	5	No	Yes	No	Feedback provided to school psychologist and to child protection agency	Subthreshold for GID; behavioral problems at school; in foster care

7	M	3	No	No	No	Recommendations to parents for interventions in naturalistic environment	Family lives in a small town, with no mental health resources available
8	M	7	No	No	No	Recommendations to parents for interventions in naturalistic environment	Parents wanted to try interventions on their own prior to considering formal therapy
9	M	6	Yes	Yes	No	Recommendations to parents for interventions in naturalistic environment	When informed that the "odds" of persistent gender dysphoria were quite low for the patient, the mother "sobbed" with relief. She did not feel that formal therapy was, therefore, required, that she could "handle the rest" on her own.
10	M	8	Yes	Yes	No		Referred for immediate surgery for undescended testicles
11	F	12	Yes	Yes	On Celexa, Strattera, and Seroquel prior to assessment		Patient had transitioned to living as a boy prior to assessment; diagnosed with PDD-NOS
12	M	8	Yes	Yes	No		Raised by maternal grandmother; both biological parents were drug addicts; father diagnosed with Schizophrenia

(Continued)

TABLE 3 (Continued)

ID	Sex	Age	Individual Therapy	Parent Therapy	Medication	Other	Comment
13	M	7	Yes	Yes	No	Consult recommended for pharmacologic treatment for anxiety	Diagnosed with ASD prior to our assessment; referred to a child psychiatrist in private practice
14	M	6	No	No	No	Recommendations to parents for interventions in naturalistic environment	Parents wanted to try interventions on their own prior to considering formal therapy
15	M	7	Yes	Yes	No		Parents, who were separated, refused treatment; parent-initiated a social gender change in child after assessment; diagnosed with Separation Anxiety Disorder query ODD
16	M	6	Yes	Yes	No		
17	M	4	Yes	Yes	No		
18	F	10	Yes	Yes	No		
19	M	6	Yes	Yes	No	Recommendations to parents for interventions in naturalistic environment	Parents wanted to try interventions on their own; query ASD; r/o chronic motor tic disorder; local mental health resources not available

20	M	3	Yes	Yes	No	Co-occurring disorder of sex development (46,XX ova-testicular DSD); male gender assignment shortly after birth; speech and language delay; significant behavior problems adopted at 20 months from Russia; language delay; Reactive Attachment Disorder (in remission); query PDD-NOS; significant behavior problems (one brief in-patient hospitalization) Marfan syndrome; significant obsessional behavior; query Separation Anxiety Disorder; significant family stress, including OCD in older sister; discontinued treatment because of distance and family stress; referred to local resources for continued therapeutic support
21	F	10	Yes	Yes	Yes	On Concerta prior to assessment; Risperdal recommended
22	M	6	Yes	Yes	No	
23	M	4	Yes	Yes	No	Parents agreed to therapy, but then did not follow up
24	F	5	Yes	Yes	No	
25	M	4	Yes	Yes	No	
26	F	5	No	Yes	No	Referred mother for local mental health support

Note. F = natal female; M = natal male; ADHD = attention-deficit/hyperactivity disorder; ASD = autism spectrum disorder; ODD = oppositional defiant disorder; OCD = obsessive-compulsive disorder; PDD-NOS = pervasive developmental disorder not otherwise specified.

With parents, the focus of treatment that is specific to GID considers two issues: a) the potential role of parental factors in the genesis and maintenance of the GID, and b) naturalistic interventions. For parents for whom there may be significant psychodynamic and interpersonal factors in the genesis/maintenance of GID, we attempt to work on these issues. For example, we have posited that “identification with the aggressor” may be one factor involved in GID in girls (Zucker & Bradley, 1995). One 7-year-old girl, for example, had a long-standing conflicted relationship with her father. Her father was extremely critical, abrasive, and mean to this her. She had numerous socioemotional problems: extreme oppositional behavior with the parents, intense jealousy directed toward a younger sister, many sensory sensitivities that resulted in ritualistic behaviors, and was, in general, a very challenging child to parent. A large part of the treatment with the father focused on discussing how his rage toward his child was not helpful and likely made matters worse.

When parental psychopathology revolves around a gender-related axis, effort is made to explore the impact of this on their feelings toward the child. One mother of an 8-year-old boy wanted little to do with him. She was extremely depressed and withdrawn from her parenting role. She had been date raped as an adolescent and recalled that she dealt with this by becoming promiscuous (“Better to fuck them than to get fucked”). She acknowledged that she hated men. The only maneuver this boy could use to be close to his mother was to comb her hair (she was a hairdresser). In our view, these kinds of pathological processes require a long time to work on in psychotherapy with parents and are not particularly amenable to brief interventions.

When parents have significant reservations about setting limits on their child’s cross-gender behaviors and to provide alternative activities, this requires considerable discussion. In our work, we emphasize that authoritarian limit setting is not the goal (limit setting per se is not the goal of treatment, but part of a series of interventions); rather, the goal is to help the child feel more comfortable in his or her own skin. Limit setting is discussed in context of the overall case formulation. If, for example, a young boy is driven by the desire to cross-dress, we explore with parents their understanding of what might underlie it.

For example, one 8-year-old boy was cared for by his mother (the father had died in a car accident) who worked two jobs. He was often left in the care of a neighbor while his mother worked the swing shift. In this context, he began to cross-dress and created a transitional mother object that he slept with. Helping the mother understand the possible link between his separation anxiety and his gender identity issues motivated her to spend more time discussing with him why she needed to work long hours, provided him with pictures of her to sleep with while she worked, called him a couple of times prior to his bedtime, and made more of an

effort to be with him on her days off. This resulted in a significant reduction in both the separation anxiety and his desire to be a girl. In general, our approach with parents is to make the point that the surface behaviors of GID are, in effect, “symptoms” and that symptoms can best be helped if the underlying mechanisms are better understood. As an example, we might explain to parents of girls that forcing them to wear dresses or other feminine clothing (which creates severe anxiety in many girls with GID) should not be the focus of treatment and that it would likely be unhelpful. Instead, it would be more helpful to focus on the underlying gender dysphoria.

In the naturalistic environment, we typically target the improvement of same-sex peer relations, since peer relationships are often the site of gender identity consolidation (Maccoby, 1998; Meyer-Bahlburg, 2002). For young children, this can be implemented via parent-arranged play dates with temperamentally compatible same-sex peers; with older children, this can be implemented via enrollment in community activities, such as gymnastics, drama clubs, and team sports. The goal here is to see if children with GID are able to develop a broader range of friendships that include same-sex peers. For parents who are free of major life stressors or significant psychopathology that interferes with their parenting role, this task can be implemented fairly easily; however, when parents are overwhelmed with their own difficulties, they often feel depleted and unable to work on these kinds of interventions.

WHAT IS THE DISPOSITION OF REFERRED CASES FOR WHICH NO CLINICALLY SIGNIFICANT GENDER-VARIANT BEHAVIOR IS OBSERVED?

In our clinic, we almost never receive a referral in which we conclude from the intake interview that the case is a false positive. About 70% of the children we evaluate meet the complete *DSM* criteria for GID; the remainder of referrals are subthreshold (gender variant), some of whom had met the full criteria when younger. Of the 26 cases evaluated in 2008 (Table 3), only one youngster (ID 6) showed no signs of GID although he had voiced to the referring child psychiatrist a strong wish to be a girl. Psychological testing confirmed the absence of clinically significant gender identity issues. In this case, this youngster was dealing with the stressor of having been placed in foster care because of maternal neglect and had significant behavior problems at school and at home. Another youngster (ID 5) was the sibling of ID 2 and was subthreshold for GID. As noted in Table 3, the mother did not have any concerns about his feminine behavior and the father denied observing any. Because his sister had a severe GID, oppositional behavior, and ADHD, and because the parents had significant relational discord

(they were separated), the focus of the recommendations were directed elsewhere.

The question posed by the guest editors of this special issue of the *Journal of Homosexuality* is relevant especially for children who are subthreshold for GID. Do these youngsters still have clinically significant gender identity issues that need to be monitored or even treated? In our view, the answer is sometimes yes and sometimes no. Some children may be subthreshold for GID, yet, the clinical impression is that these children may well be struggling with their gender identity and, for these children, a trial of therapy can certainly be beneficial to explore the issue further. If they have substantial other psychologic or psychiatric issues, these can also be a focus of treatment. One could argue that some children who are subthreshold for GID may be at risk for the later development of a full-blown GID (e.g., see Zucker, 2004, 2006b).

HOW ARE THE RELATIVE RISKS AND BENEFITS OF TREATMENT AS WELL AS THE IMPACT OF TREATMENT ON OUTCOME EXPLAINED TO CAREGIVERS?

In providing feedback to parents, we attempt to articulate our case formulation in a manner that is understandable. We identify the factors that we have found useful in understanding the child and the family. Parents vary in their psychologic sophistication and capacity for reflective functioning, so feedback is done in a way that is client centered. We provide a rationale for our treatment recommendations.

In the era of the Internet, some parents are quite familiar with the controversies about treatment of children with GID; others are not. For parents who are interested in discussing the philosophical differences among care providers, we discuss the varying perspectives. Benefits of treatment that we argue in favor of include the reduction in gender dysphoria, the attendant social ostracism that can ensue from GID persistence, the complexities of sex-reassignment surgery and its biomedical treatment, and the importance of reducing family psychopathology and stress, when it is present. The risks of treatment are discussed: Perhaps the child will not respond to the treatment; perhaps the parents will find it too stressful to attempt naturalistic interventions. As noted earlier, we explain that the goal of treatment is not to prevent the child from developing a future homosexual sexual orientation. For some parents, this is a non-issue; for other parents, it remains their goal. One concern parents have is that their child may go underground with his or her gender dysphoric feelings. We are mindful of this concern (the development of a false self in the Winnicottian sense) and emphasize that this is not a good outcome—the goal is to help the child work through their gender dysphoric feelings.

IS PREVENTION OF ADULT TRANSSEXUALISM
A REASONABLE TREATMENT GOAL, AND GIVEN THE LOW
FREQUENCY WITH WHICH GID PERSISTS INTO ADULTHOOD,
HOW IS IT POSSIBLE TO DETERMINE THE EFFICACY OF
TREATMENT IN ATTAINING THAT GOAL?

... we cannot rule out the possibility that early successful treatment of childhood GID will diminish the role of a continuation of GID into adulthood. If so, successful treatment would also reduce the need for the long and difficult process of sex reassignment which includes hormonal and surgical procedures with substantial medical risks and complications. (Meyer-Bahlburg, 2002, p. 362)

Relatively little dispute exists regarding the prevention of transsexualism, though evidence about the effectiveness of treatment in preventing adult transsexualism is also virtually nonexistent. (Cohen-Kettenis & Pfäfflin, 2003, p. 120)

The guest editors of this special issue have posed a provocative question about the prevention of transsexualism (GID) in adulthood. Here, we can pose an ancillary question to illustrate, in part, the centrality of social values: Is prevention of homosexuality a reasonable treatment goal? On this point, most secular clinicians would answer “no.” In our own clinic, we have never advocated for the prevention of homosexuality as a treatment goal for GID in children. At the same time, we are sensitive to the fact that some parents bring their child to the clinic, in part, because they are worried that their child will grow up to be gay or lesbian (for all the reasons one might imagine—parental homophobia, worries about social ostracism, worries about HIV/AIDS, worries that this will result in a more difficult life, cultural factors, religious factors, etc.).

Over the years, our approach has been a psychoeducational one and also a pragmatic one: a) we explain to parents that there are no empirical studies that suggest that alteration of a child’s gender identity will also alter their eventual sexual orientation; b) that homosexuality per se is not considered a mental disorder; c) that gay men and lesbians can lead productive and satisfying lives (as banal as this sounds) and that, over time, if their child develops a homoerotic sexual orientation, then it will be their job (and ours) to support their child in adapting to whatever stressors may be associated with their sexual identity. In our experience, the majority of parents are satisfied with this psychoeducational approach and, for some, it involves mourning the loss of the expected heterosexual child and whatever fantasies and aspirations are associated with this. Many of the parents that we work with do not have a particular problem if their child were to grow up gay or lesbian. Many of these parents do, however, hold the aspiration

that they would like their child to be comfortable in his or her skin. In other words, they can see that growing up transsexual or transgender may augur a more complicated life.

Although we do not have a particular quarrel with the prevention of transsexualism as a treatment goal for children with GID, we believe that this should be contextualized. If, for example, children with GID who persist in their desire to be of the other gender showed a better psychosocial adjustment and adaptation than children with GID who desist (e.g., become gay or lesbian or heterosexual without gender dysphoria), then one could, quite reasonably, question the prevention of transsexualism as a legitimate treatment goal. If a child grew up comfortable in their own skin, but was generally miserable otherwise, one could hardly argue with unabashed enthusiasm for the prevention of transsexualism.

From a developmental perspective, we take a very different approach when we work with adolescents with GID than when we work with children with GID. This is because we believe that there is much less evidence that GID can remit in adolescents than in children. Whether this is due to different populations of clients seen in adolescence versus childhood or whether this is due to a narrowing of plasticity and malleability in gender identity differentiation by the time of adolescence is open to debate. But, if the clinical consensus is that a particular adolescent is very much likely to persist down a pathway toward hormonal and sex-reassignment surgery, then our therapeutic approach is one that supports this pathway on the grounds that it will lead to a better psychosocial adaptation and quality of life (Zucker, Bradley, Owen-Anderson, et al., 2011).

Because the treatment literature is lacking in terms of rigorous comparative evaluations (e.g., Treatment X vs. Treatment Y or Treatment X vs. no treatment, etc.), one has to rely on a patchwork of empirical evidence about natural history. Thus, for example, natural history data suggest, to date, a much higher rate of desistance of GID in child samples than in adolescent or adult samples (Zucker et al., 2011).

The guest editors have made reference to the low frequency with which GID persists into adulthood and the implications of this fact in the evaluation of treatment efficacy. Persistence rates have varied fairly substantially in long-term follow-up studies. For example, Green (1987) reported that only 1 of 44 previously feminine boys appeared to be gender dysphoric at the time of follow-up. In contrast, Wallien and Cohen-Kettenis (2008) reported that 50% of 18 GID girls were persisters at follow up. In our own follow-up studies, we have found a persistence rate of 12% for GID girls ($n=25$; Drummond et al., 2008) and a persistence rate of 13.3% for GID boys ($n=135$; Singh et al., 2010). Thus, there is a fair bit of variation in persistence rates.

How can this variation be understood? One possibility is sampling differences. Another possibility pertains to the degree of GID in childhood.

Both Wallien and Cohen-Kettenis (2008) and Singh et al. (2010) showed that several metrics of GID severity in childhood predicted persistence at follow-up. Another possibility is to contextualize the natural history data.

Is there really such a thing as natural history for GID or does its developmental course vary as a function of contextual factors? If, as in our clinic, treatment is recommended to reduce the likelihood of GID persistence, perhaps the data can only be interpreted in that context. In any event, we require more comparative data to draw conclusions about the natural history of GID in children and its relation to contextual factors.

WHAT CONSTITUTES A SUCCESSFUL OUTCOME? WHAT CONSTITUTES A TREATMENT FAILURE?

If one goal of treatment is to reduce the gender dysphoria, then, by definition, a successful outcome would be its remission and a failure would be its persistence. If, however, a successful outcome also takes into account a child's more general well-being and adaptation to various developmental tasks, then the definitions of success and failure must be broader. Consider, for example, the vignette described earlier of the 7-year-old girl who had an extremely strained relationship with her father. Six years after therapy commenced (and still continues), the GID has fully remitted and there has been a lessening of the sensory sensitivities and rituals. Although this now young adolescent girl functions reasonably well at school and has friends, parent-child relations remain severely strained and there continues to be substantial parental psychopathology (in each parent and in their marriage). Success? Failure? In between?

For Tom, the 4-year-old boy who experienced his younger sister's birth as an extreme threat to his relationship with his mother, at the age of 13 his GID has remitted fully. In the course of many years of therapy, he has intermittently struggled with various issues (episodic encopresis, peer conflicts, behavioral compliance with parental expectations), but he functions extremely well at school and has many close friends. Although his development has been marked with various stressors and challenges, we would gauge his current outcome as pretty successful.

For children whose gender dysphoria persisted into adolescence or adulthood, some are functioning quite well; others are not. One natal male, originally seen at age 5, was seen for follow up at age 35. At follow up, she was living as a woman, but had elected to neither take exogenous female hormones or to have genital reassignment surgery ("A woman does not need a vagina to be a woman"). Because this individual was quite overweight, idiopathic gynecomastia was sufficient for the appearance of female breasts. She had a boyfriend who was sexually attracted to "she-males." She engaged in sex work, also attracting men interested in she-males. She used,

on a daily basis, oxycontin and heroin. She was on long-term psychiatric disability, with various diagnoses: ADHD, bipolar disorder, and adult baby syndrome (she and her boyfriend planned on getting an apartment and creating a baby's room for her). Apart from the ADHD, the patient had no complaints about her life. Success? Failure?

Another natal female was originally seen for assessment at the age of 12 years and followed up at the age of 26. He had transitioned to the male gender in adolescence, but had not sought out either hormonal suppression or cross-sex hormonal therapy. He was very content living as a man. Ben worked full time, owned his own house, and had had long-term relationships with women. However, he struggled with severe alcohol abuse, abused recreational drugs, had been frequently arrested for getting into fights while intoxicated, and was occasionally suicidal. Success? Failure? In between?

Our long-term follow-up studies of both girls and boys with GID suggest that many of these youngsters, regardless of their later gender identity and sexual orientation, are a psychiatrically vulnerable group (Drummond, 2006; Drummond et al., 2008; Singh et al., 2010). Although some of this vulnerability might be understood in relation to the stressors associated with an atypical gender identity and/or sexual orientation, it is our belief that it is also related to other risk factors, including biological and psychosocial parameters within their families.

NOTES

1. We have used Clift's (1986) guidelines for confidentiality in reporting clinical material.
2. These children are sometimes referred to as *desisters*, while those who do not "lose" the diagnosis are referred to as *persisters*.
3. There are more parents nowadays who interpret the cross-gender identification as a marker of the child's "essential" gender identity (Brill & Pepper, 2008; Dreger, 2009; Kilodavis, 2009).

REFERENCES

- Achenbach, T. M., & Edelbrock, C. (1983). *Manual for the Child Behavior Checklist and Revised Child Behavior Profile*. Burlington, VT: University of Vermont: Department of Psychiatry.
- Achenbach, T. M., & Edelbrock, C. (1986a). *Manual for the Youth Self-Report and Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M., & Edelbrock, C. (1986b). *Manual for the Teacher's Report Form and Teacher Version of the Child Behavior Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Bates, J. E., & Bentler, P. M. (1973). Play activities of normal and effeminate boys. *Developmental Psychology*, 9, 20–27.
- Beitchman, J. H. (1996). *FAB-CTM: Feelings, Attitudes, and Behaviors Scale for Children*. Toronto, ON, Canada: Multi-Health Systems.

- Brill, S., & Pepper, R. (2008). *The transgender child: A handbook for families and professionals*. San Francisco, CA: Cleis Press.
- Campbell, D. W., & Eaton, W. O. (1999). Sex differences in the activity level of infants. *Infant and Child Development*, *8*, 1–17.
- Cassidy, J., & Marvin, R. S., with the Attachment Working Group of the MacArthur Network on the Transition from Infancy to Early Childhood. (1992). *Attachment organization in three- and four-year-olds*. Unpublished manual, University of Virginia at Charlottesville.
- Chiu, S. W., Gervan, S., Fairbrother, C., Johnson, L. L., Owen-Anderson, A. F. H., Bradley, S. J., & Zucker, K. J. (2006). Sex-dimorphic color preference in children with gender identity disorder: A comparison to clinical and community controls. *Sex Roles*, *55*, 385–395.
- Clift, M. A. (1986). Writing about psychiatric patients: Guidelines for disguising case material. *Bulletin of the Menninger Clinic*, *50*, 511–524.
- Coates, S., & Person, E. S. (1985). Extreme boyhood femininity: Isolated behavior or pervasive disorder? *Journal of the American Academy of Child Psychiatry*, *24*, 702–709.
- Cohen-Kettenis, P. T., & Pfäfflin, F. (2003). *Transgenderism and intersexuality in childhood and adolescence: Making choices*. Thousand Oaks, CA: Sage.
- de Vries, A. L. C., Noens, I. L., Cohen-Kettenis, P. T., van Berckelaer-Onnes, I. A., & Doreleijers, T. A. H. (2010). Autism spectrum disorders in gender dysphoric children and adolescents. *Journal of Autism and Developmental Disorders*, *40*, 930–936.
- DeLoache, J. S., Simcock, G., & Macari, S. (2007). Planes, trains, automobiles—and tea sets: Extremely intense interests in very young children. *Developmental Psychology*, *43*, 1579–1586.
- Derogatis, L. (1983). *SCL-90: Administration, scoring and procedures manual for the revised version*. Baltimore, MD: Clinical Psychometric Research.
- Dreger, A. (2009). Gender identity disorder in childhood: Inconclusive advice to parents. *Hastings Center Report*, *39*, 26–29.
- Drummond, K. D. (2006). *A follow-up study of girls with gender identity disorder*. Unpublished master's thesis, Ontario Institute for Studies in Education of the University of Toronto.
- Drummond, K. D., Bradley, S. J., Badali-Peterson, M., & Zucker, K. J. (2008). A follow-up study of girls with gender identity disorder. *Developmental Psychology*, *44*, 34–45.
- Eaton, W. O., & Enns, L. R. (1986). Sex differences in human motor activity level. *Psychological Bulletin*, *100*, 19–28.
- Fridell, S. R., Owen-Anderson, A., Johnson, L. L., Bradley, S. J., & Zucker, K. J. (2006). The Playmate And Play Style Preferences Structured Interview: A comparison of children with gender identity disorder and controls. *Archives of Sexual Behavior*, *35*, 729–737.
- Green, R. (1987). *The “sissy boy syndrome” and the development of homosexuality*. New Haven, CT: Yale University Press.
- Johnson, L. L., Bradley, S. J., Birkenfeld-Adams, A. S., Kuksis, M. A. R., Maing, D. M., Mitchell, J. N., & Zucker, K. J. (2004). A parent-report Gender Identity Questionnaire for Children. *Archives of Sexual Behavior*, *33*, 105–116.

- Kilodavis, C. (2009). *My princess boy: A mom's story about a young boy who loves to dress up*. Seattle, WA: K D Talent LLC.
- Kohlberg, L. (1966). A cognitive-developmental analysis of children's sex-role concepts and attitudes. In E. E. Maccoby (Ed.), *The development of sex differences* (pp. 82–173). Stanford, CA: Stanford University Press.
- Maccoby, E. E. (1998). *The two sexes: Growing up apart, coming together*. Cambridge, MA: Harvard University Press.
- Meyer-Bahlburg, H. F. L. (2002). Gender identity disorder in young boys: A parent- and peer-based treatment protocol. *Clinical Child Psychology and Psychiatry*, 7, 360–377.
- Ruble, D. N., Martin, C. L., & Berenbaum, S. A. (2006). Gender development. In W. Damon & R. M. Lerner (Series eds.) and N. Eisenberg (Vol. ed.), *Handbook of child psychology (6th ed.)*. Vol. 3: *Social, emotional, and personality development* (pp. 858–932). New York, NY: Wiley.
- Singh, D., Bradley, S. J., & Zucker, K. J. (2010, June). *A follow-up study of boys with gender identity disorder*. Poster presented at the University of Lethbridge Workshop, The Puzzle of Sexual Orientation: What Is It and How Does It Work?, Lethbridge, AB, Canada.
- Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, 38, 15–28.
- Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender dysphoric children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 1413–1423.
- Wallien, M. S. C., Quilty, L. C., Steensma, T. D., Singh, D., Lambert, S. L., Leroux, A., . . . Zucker, K. J. (2009). Cross-national replication of the Gender Identity Interview for Children. *Journal of Personality Assessment*, 91, 545–552.
- Zucker, K. J. (2000). Gender identity disorder. In A. J. Sameroff, M. Lewis, & S. M. Miller (Eds.), *Handbook of developmental psychopathology* (2nd ed.; pp. 671–686). New York, NY: Kluwer Academic/Plenum.
- Zucker, K. J. (2004). Gender identity disorder. In I. B. Weiner (Ed.), *Adult psychopathology case studies* (pp. 207–228). New York, NY: Wiley.
- Zucker, K. J. (2006a). I'm half-boy, half-girl": Play psychotherapy and parent counseling for gender identity disorder. In R. L. Spitzer, M. B. First, J. B. W. Williams, & M. Gibbons (Eds.), *DSM-IV-TR casebook, volume 2. Experts tell how they treated their own patients* (pp. 321–334). Washington, DC: American Psychiatric Publishing.
- Zucker, K. J. (2006b). Gender identity disorder. In D. A. Wolfe & E. J. Mash (Eds.), *Behavioral and emotional disorders in adolescents: Nature, assessment, and treatment* (pp. 535–562). New York, NY: Guilford Press.
- Zucker, K. J. (2008a). On the "natural history" of gender identity disorder in children [Editorial]. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 1361–1363.
- Zucker, K. J. (2008b). Enfants avec troubles de l'identité sexuée: y-a-t-il une pratique la meilleure? [Children with gender identity disorder: Is there a best practice?]. *Neuropsychiatrie de l'Enfance et de l'Adolescence*, 56, 358–364.
- Zucker, K. J., & Bradley, S. J. (1995). *Gender identity disorder and psychosexual problems in children and adolescents*. New York, NY: Guilford Press.

- Zucker, K. J., Bradley, S. J., & Ipp, M. (1993). Delayed naming of a newborn boy: Relationship to the mother's wish for a girl and subsequent cross-gender identity in the child by the age of two. *Journal of Psychology and Human Sexuality*, *6*, 57–68.
- Zucker, K. J., Bradley, S. J., Kuksis, M., Pecore, K., Birkenfeld-Adams, A., Doering, R. W., et al. (1999). Gender constancy judgments in children with gender identity disorder: Evidence for a developmental lag. *Archives of Sexual Behavior*, *28*, 475–502.
- Zucker, K. J., Bradley, S. J., & Lowry Sullivan, C. B. (1996). Traits of separation anxiety in boys with gender identity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*, 791–798.
- Zucker, K. J., Bradley, S. J., Lowry Sullivan, C. B., Kuksis, M., Birkenfeld-Adams, A., & Mitchell, J. N. (1993). A gender identity interview for children. *Journal of Personality Assessment*, *61*, 443–456.
- Zucker, K. J., Bradley, S. J., Owen-Anderson, A., Singh, D., Blanchard, R., & Bain, J. (2011). Puberty-blocking hormonal therapy for adolescents with gender identity disorder: A descriptive clinical study. *Journal of Gay & Lesbian Mental Health*, *15*, 58–82.
- Zucker, K. J., Doering, R. W., Bradley, S. J., & Finegan, J. K. (1982). Sex-typed play in gender-disturbed children: A comparison to sibling and psychiatric controls. *Archives of Sexual Behavior*, *11*, 309–321.
- Zucker, K. J., Finegan, J. K., Doering, R. W., & Bradley, S. J. (1983). Human figure drawings of gender-problem children: A comparison to sibling, psychiatric, and normal controls. *Journal of Abnormal Child Psychology*, *11*, 287–298.
- Zucker, K. J., Lozinski, J. A., Bradley, S. J., & Doering, R. W. (1992). Sex-typed responses in the Rorschach protocols of children with gender identity disorder. *Journal of Personality Assessment*, *58*, 295–310.
- Zucker, K. J., Mitchell, J. N., Bradley, S. J., Tkachuk, J., Cantor, J. M., & Allin, S. M. (2006). The Recalled Childhood Gender Identity/Gender Role Questionnaire: Psychometric properties. *Sex Roles*, *54*, 469–483.

DIAGNOSTIC AND STATISTICAL
MANUAL OF
MENTAL DISORDERS

FIFTH EDITION

DSM-5TM

Gender Dysphoria

In this chapter, there is one overarching diagnosis of gender dysphoria, with separate developmentally appropriate criteria sets for children and for adolescents and adults. The area of sex and gender is highly controversial and has led to a proliferation of terms whose meanings vary over time and within and between disciplines. An additional source of confusion is that in English "sex" connotes both male/female and sexuality. This chapter employs constructs and terms as they are widely used by clinicians from various disciplines with specialization in this area. In this chapter, *sex* and *sexual* refer to the biological indicators of male and female (understood in the context of reproductive capacity), such as in sex chromosomes, gonads, sex hormones, and nonambiguous internal and external genitalia. Disorders of sex development denote conditions of inborn somatic deviations of the reproductive tract from the norm and/or discrepancies among the biological indicators of male and female. *Cross-sex* hormone treatment denotes the use of feminizing hormones in an individual assigned male at birth based on traditional biological indicators or the use of masculinizing hormones in an individual assigned female at birth.

The need to introduce the term *gender* arose with the realization that for individuals with conflicting or ambiguous biological indicators of sex (i.e., "intersex"), the lived role in society and/or the identification as male or female could not be uniformly associated with or predicted from the biological indicators and, later, that some individuals develop an identity as female or male at variance with their uniform set of classical biological indicators. Thus, *gender* is used to denote the public (and usually legally recognized) lived role as boy or girl, man or woman, but, in contrast to certain social constructionist theories, biological factors are seen as contributing, in interaction with social and psychological factors, to gender development. *Gender assignment* refers to the initial assignment as male or female. This occurs usually at birth and, thereby, yields the "natal gender." *Gender-atypical* refers to somatic features or behaviors that are not typical (in a statistical sense) of individuals with the same assigned gender in a given society and historical era; for behavior, *gender-nonconforming* is an alternative descriptive term. *Gender reassignment* denotes an official (and usually legal) change of gender. *Gender identity* is a category of social identity and refers to an individual's identification as male, female, or, occasionally, some category other than male or female. *Gender dysphoria* as a general descriptive term refers to an individual's affective/cognitive discontent with the assigned gender but is more specifically defined when used as a diagnostic category. *Transgender* refers to the broad spectrum of individuals who transiently or persistently identify with a gender different from their natal gender. *Transsexual* denotes an individual who seeks, or has undergone, a social transition from male to female or female to male, which in many, but not all, cases also involves a somatic transition by cross-sex hormone treatment and genital surgery (*sex reassignment surgery*).

Gender dysphoria refers to the distress that may accompany the incongruence between one's experienced or expressed gender and one's assigned gender. Although not all individuals will experience distress as a result of such incongruence, many are distressed if the desired physical interventions by means of hormones and/or surgery are not available. The current term is more descriptive than the previous DSM-IV term *gender identity disorder* and focuses on dysphoria as the clinical problem, not identity per se.

Gender Dysphoria

Diagnostic Criteria

Gender Dysphoria in Children

302.6 (F64.2)

- A. A marked incongruence between one's experienced/expressed gender and assigned gender, of at least 6 months' duration, as manifested by at least six of the following (one of which must be Criterion A1):
1. A strong desire to be of the other gender or an insistence that one is the other gender (or some alternative gender different from one's assigned gender).
 2. In boys (assigned gender), a strong preference for cross-dressing or simulating female attire; or in girls (assigned gender), a strong preference for wearing only typical masculine clothing and a strong resistance to the wearing of typical feminine clothing.
 3. A strong preference for cross-gender roles in make-believe play or fantasy play.
 4. A strong preference for the toys, games, or activities stereotypically used or engaged in by the other gender.
 5. A strong preference for playmates of the other gender.
 6. In boys (assigned gender), a strong rejection of typically masculine toys, games, and activities and a strong avoidance of rough-and-tumble play; or in girls (assigned gender), a strong rejection of typically feminine toys, games, and activities.
 7. A strong dislike of one's sexual anatomy.
 8. A strong desire for the primary and/or secondary sex characteristics that match one's experienced gender.
- B. The condition is associated with clinically significant distress or impairment in social, school, or other important areas of functioning.

Specify if:

With a disorder of sex development (e.g., a congenital adrenogenital disorder such as 255.2 [E25.0] congenital adrenal hyperplasia or 259.50 [E34.50] androgen insensitivity syndrome).

Coding note: Code the disorder of sex development as well as gender dysphoria.

Gender Dysphoria in Adolescents and Adults

302.85 (F64.1)

- A. A marked incongruence between one's experienced/expressed gender and assigned gender, of at least 6 months' duration, as manifested by at least two of the following:
1. A marked incongruence between one's experienced/expressed gender and primary and/or secondary sex characteristics (or in young adolescents, the anticipated secondary sex characteristics).
 2. A strong desire to be rid of one's primary and/or secondary sex characteristics because of a marked incongruence with one's experienced/expressed gender (or in young adolescents, a desire to prevent the development of the anticipated secondary sex characteristics).
 3. A strong desire for the primary and/or secondary sex characteristics of the other gender.
 4. A strong desire to be of the other gender (or some alternative gender different from one's assigned gender).
 5. A strong desire to be treated as the other gender (or some alternative gender different from one's assigned gender).
 6. A strong conviction that one has the typical feelings and reactions of the other gender (or some alternative gender different from one's assigned gender).

- B. The condition is associated with clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if:

With a disorder of sex development (e.g., a congenital adrenogenital disorder such as 255.2 [E25.0] congenital adrenal hyperplasia or 259.50 [E34.50] androgen insensitivity syndrome).

Coding note: Code the disorder of sex development as well as gender dysphoria.

Specify if:

Posttransition: The individual has transitioned to full-time living in the desired gender (with or without legalization of gender change) and has undergone (or is preparing to have) at least one cross-sex medical procedure or treatment regimen—namely, regular cross-sex hormone treatment or gender reassignment surgery confirming the desired gender (e.g., penectomy, vaginoplasty in a natal male; mastectomy or phalloplasty in a natal female).

Specifiers

The posttransition specifier may be used in the context of continuing treatment procedures that serve to support the new gender assignment.

Diagnostic Features

Individuals with gender dysphoria have a marked incongruence between the gender they have been assigned to (usually at birth, referred to as *natal gender*) and their experienced/expressed gender. This discrepancy is the core component of the diagnosis. There must also be evidence of distress about this incongruence. Experienced gender may include alternative gender identities beyond binary stereotypes. Consequently, the distress is not limited to a desire to simply be of the other gender, but may include a desire to be of an alternative gender, provided that it differs from the individual's assigned gender.

Gender dysphoria manifests itself differently in different age groups. Prepubertal natal girls with gender dysphoria may express the wish to be a boy, assert they are a boy, or assert they will grow up to be a man. They prefer boys' clothing and hairstyles, are often perceived by strangers as boys, and may ask to be called by a boy's name. Usually, they display intense negative reactions to parental attempts to have them wear dresses or other feminine attire. Some may refuse to attend school or social events where such clothes are required. These girls may demonstrate marked cross-gender identification in role-playing, dreams, and fantasies. Contact sports, rough-and-tumble play, traditional boyhood games, and boys as playmates are most often preferred. They show little interest in stereotypically feminine toys (e.g., dolls) or activities (e.g., feminine dress-up or role-play). Occasionally, they refuse to urinate in a sitting position. Some natal girls may express a desire to have a penis or claim to have a penis or that they will grow one when older. They may also state that they do not want to develop breasts or menstruate.

Prepubertal natal boys with gender dysphoria may express the wish to be a girl or assert they are a girl or that they will grow up to be a woman. They have a preference for dressing in girls' or women's clothes or may improvise clothing from available materials (e.g., using towels, aprons, and scarves for long hair or skirts). These children may role-play female figures (e.g., playing "mother") and often are intensely interested in female fantasy figures. Traditional feminine activities, stereotypical games, and pastimes (e.g., "playing house"; drawing feminine pictures; watching television or videos of favorite female characters) are most often preferred. Stereotypical female-type dolls (e.g., Barbie) are often favorite toys, and girls are their preferred playmates. They avoid rough-and-tumble play and competitive sports and have little interest in stereotypically masculine toys (e.g., cars, trucks). Some may pretend not to have a penis and insist on sitting to urinate. More

rarely, they may state that they find their penis or testes disgusting, that they wish them removed, or that they have, or wish to have, a vagina.

In young adolescents with gender dysphoria, clinical features may resemble those of children or adults with the condition, depending on developmental level. As secondary sex characteristics of young adolescents are not yet fully developed, these individuals may not state dislike of them, but they are concerned about imminent physical changes.

In adults with gender dysphoria, the discrepancy between experienced gender and physical sex characteristics is often, but not always, accompanied by a desire to be rid of primary and/or secondary sex characteristics and/or a strong desire to acquire some primary and/or secondary sex characteristics of the other gender. To varying degrees, adults with gender dysphoria may adopt the behavior, clothing, and mannerisms of the experienced gender. They feel uncomfortable being regarded by others, or functioning in society, as members of their assigned gender. Some adults may have a strong desire to be of a different gender and treated as such, and they may have an inner certainty to feel and respond as the experienced gender without seeking medical treatment to alter body characteristics. They may find other ways to resolve the incongruence between experienced/expressed and assigned gender by partially living in the desired role or by adopting a gender role neither conventionally male nor conventionally female.

Associated Features Supporting Diagnosis

When visible signs of puberty develop, natal boys may shave their legs at the first signs of hair growth. They sometimes bind their genitals to make erections less visible. Girls may bind their breasts, walk with a stoop, or use loose sweaters to make breasts less visible. Increasingly, adolescents request, or may obtain without medical prescription and supervision, hormonal suppressors ("blockers") of gonadal steroids (e.g., gonadotropin-releasing hormone [GnRH] analog, spironolactone). Clinically referred adolescents often want hormone treatment and many also wish for gender reassignment surgery. Adolescents living in an accepting environment may openly express the desire to be and be treated as the experienced gender and dress partly or completely as the experienced gender, have a hairstyle typical of the experienced gender, preferentially seek friendships with peers of the other gender, and/or adopt a new first name consistent with the experienced gender. Older adolescents, when sexually active, usually do not show or allow partners to touch their sexual organs. For adults with an aversion toward their genitals, sexual activity is constrained by the preference that their genitals not be seen or touched by their partners. Some adults may seek hormone treatment (sometimes without medical prescription and supervision) and gender reassignment surgery. Others are satisfied with either hormone treatment or surgery alone.

Adolescents and adults with gender dysphoria before gender reassignment are at increased risk for suicidal ideation, suicide attempts, and suicides. After gender reassignment, adjustment may vary, and suicide risk may persist.

Prevalence

For natal adult males, prevalence ranges from 0.005% to 0.014%, and for natal females, from 0.002% to 0.003%. Since not all adults seeking hormone treatment and surgical reassignment attend specialty clinics, these rates are likely modest underestimates. Sex differences in rate of referrals to specialty clinics vary by age group. In children, sex ratios of natal boys to girls range from 2:1 to 4.5:1. In adolescents, the sex ratio is close to parity; in adults, the sex ratio favors natal males, with ratios ranging from 1:1 to 6.1:1. In two countries, the sex ratio appears to favor natal females (Japan: 2.2:1; Poland: 3.4:1).

Development and Course

Because expression of gender dysphoria varies with age, there are separate criteria sets for children versus adolescents and adults. Criteria for children are defined in a more con-

crete, behavioral manner than those for adolescents and adults. Many of the core criteria draw on well-documented behavioral gender differences between typically developing boys and girls. Young children are less likely than older children, adolescents, and adults to express extreme and persistent anatomic dysphoria. In adolescents and adults, incongruence between experienced gender and somatic sex is a central feature of the diagnosis. Factors related to distress and impairment also vary with age. A very young child may show signs of distress (e.g., intense crying) only when parents tell the child that he or she is “really” not a member of the other gender but only “desires” to be. Distress may not be manifest in social environments supportive of the child’s desire to live in the role of the other gender and may emerge only if the desire is interfered with. In adolescents and adults, distress may manifest because of strong incongruence between experienced gender and somatic sex. Such distress may, however, be mitigated by supportive environments and knowledge that biomedical treatments exist to reduce incongruence. Impairment (e.g., school refusal, development of depression, anxiety, and substance abuse) may be a consequence of gender dysphoria.

Gender dysphoria without a disorder of sex development. For clinic-referred children, onset of cross-gender behaviors is usually between ages 2 and 4 years. This corresponds to the developmental time period in which most typically developing children begin expressing gendered behaviors and interests. For some preschool-age children, both pervasive cross-gender behaviors and the expressed desire to be the other gender may be present, or, more rarely, labeling oneself as a member of the other gender may occur. In some cases, the expressed desire to be the other gender appears later, usually at entry into elementary school. A small minority of children express discomfort with their sexual anatomy or will state the desire to have a sexual anatomy corresponding to the experienced gender (“anatomic dysphoria”). Expressions of anatomic dysphoria become more common as children with gender dysphoria approach and anticipate puberty.

Rates of persistence of gender dysphoria from childhood into adolescence or adulthood vary. In natal males, persistence has ranged from 2.2% to 30%. In natal females, persistence has ranged from 12% to 50%. Persistence of gender dysphoria is modestly correlated with dimensional measures of severity ascertained at the time of a childhood baseline assessment. In one sample of natal males, lower socioeconomic background was also modestly correlated with persistence. It is unclear if particular therapeutic approaches to gender dysphoria in children are related to rates of long-term persistence. Extant follow-up samples consisted of children receiving no formal therapeutic intervention or receiving therapeutic interventions of various types, ranging from active efforts to reduce gender dysphoria to a more neutral, “watchful waiting” approach. It is unclear if children “encouraged” or supported to live socially in the desired gender will show higher rates of persistence, since such children have not yet been followed longitudinally in a systematic manner. For both natal male and female children showing persistence, almost all are sexually attracted to individuals of their natal sex. For natal male children whose gender dysphoria does not persist, the majority are *androphilic* (sexually attracted to males) and often self-identify as gay or homosexual (ranging from 63% to 100%). In natal female children whose gender dysphoria does not persist, the percentage who are *gynephilic* (sexually attracted to females) and self-identify as lesbian is lower (ranging from 32% to 50%).

In both adolescent and adult natal males, there are two broad trajectories for development of gender dysphoria: early onset and late onset. *Early-onset gender dysphoria* starts in childhood and continues into adolescence and adulthood; or, there is an intermittent period in which the gender dysphoria desists and these individuals self-identify as gay or homosexual, followed by recurrence of gender dysphoria. *Late-onset gender dysphoria* occurs around puberty or much later in life. Some of these individuals report having had a desire to be of the other gender in childhood that was not expressed verbally to others. Others do not recall any signs of childhood gender dysphoria. For adolescent males with late-onset gender dysphoria, parents often report surprise because they did not see signs of gender

dysphoria during childhood. Expressions of anatomic dysphoria are more common and salient in adolescents and adults once secondary sex characteristics have developed.

Adolescent and adult natal males with early-onset gender dysphoria are almost always sexually attracted to men (androphilic). Adolescents and adults with late-onset gender dysphoria frequently engage in transvestic behavior with sexual excitement. The majority of these individuals are gynephilic or sexually attracted to other posttransition natal males with late-onset gender dysphoria. A substantial percentage of adult males with late-onset gender dysphoria cohabit with or are married to natal females. After gender transition, many self-identify as lesbian. Among adult natal males with gender dysphoria, the early-onset group seeks out clinical care for hormone treatment and reassignment surgery at an earlier age than does the late-onset group. The late-onset group may have more fluctuations in the degree of gender dysphoria and be more ambivalent about and less likely satisfied after gender reassignment surgery.

In both adolescent and adult natal females, the most common course is the early-onset form of gender dysphoria. The late-onset form is much less common in natal females compared with natal males. As in natal males with gender dysphoria, there may have been a period in which the gender dysphoria desisted and these individuals self-identified as lesbian; however, with recurrence of gender dysphoria, clinical consultation is sought, often with the desire for hormone treatment and reassignment surgery. Parents of natal adolescent females with the late-onset form also report surprise, as no signs of childhood gender dysphoria were evident. Expressions of anatomic dysphoria are much more common and salient in adolescents and adults than in children.

Adolescent and adult natal females with early-onset gender dysphoria are almost always gynephilic. Adolescents and adults with the late-onset form of gender dysphoria are usually androphilic and after gender transition self-identify as gay men. Natal females with the late-onset form do not have co-occurring transvestic behavior with sexual excitement.

Gender dysphoria in association with a disorder of sex development. Most individuals with a disorder of sex development who develop gender dysphoria have already come to medical attention at an early age. For many, starting at birth, issues of gender assignment were raised by physicians and parents. Moreover, as infertility is quite common for this group, physicians are more willing to perform cross-sex hormone treatments and genital surgery before adulthood.

Disorders of sex development in general are frequently associated with gender-atypical behavior starting in early childhood. However, in the majority of cases, this does not lead to gender dysphoria. As individuals with a disorder of sex development become aware of their medical history and condition, many experience uncertainty about their gender, as opposed to developing a firm conviction that they are another gender. However, most do not progress to gender transition. Gender dysphoria and gender transition may vary considerably as a function of a disorder of sex development, its severity, and assigned gender.

Risk and Prognostic Factors

Temperamental. For individuals with gender dysphoria without a disorder of sex development, atypical gender behavior among individuals with early-onset gender dysphoria develops in early preschool age, and it is possible that a high degree of atypicality makes the development of gender dysphoria and its persistence into adolescence and adulthood more likely.

Environmental. Among individuals with gender dysphoria without a disorder of sex development, males with gender dysphoria (in both childhood and adolescence) more commonly have older brothers than do males without the condition. Additional predisposing

factors under consideration, especially in individuals with late-onset gender dysphoria (adolescence, adulthood), include habitual fetishistic transvestism developing into autogynephilia (i.e., sexual arousal associated with the thought or image of oneself as a woman) and other forms of more general social, psychological, or developmental problems.

Genetic and physiological. For individuals with gender dysphoria without a disorder of sex development, some genetic contribution is suggested by evidence for (weak) familiarity of transsexualism among nontwin siblings, increased concordance for transsexualism in monozygotic compared with dizygotic same-sex twins, and some degree of heritability of gender dysphoria. As to endocrine findings, no endogenous systemic abnormalities in sex-hormone levels have been found in 46,XY individuals, whereas there appear to be increased androgen levels (in the range found in hirsute women but far below normal male levels) in 46,XX individuals. Overall, current evidence is insufficient to label gender dysphoria without a disorder of sex development as a form of intersexuality limited to the central nervous system.

In gender dysphoria associated with a disorder of sex development, the likelihood of later gender dysphoria is increased if prenatal production and utilization (via receptor sensitivity) of androgens are grossly atypical relative to what is usually seen in individuals with the same assigned gender. Examples include 46,XY individuals with a history of normal male prenatal hormone milieu but inborn nonhormonal genital defects (as in cloacal bladder exstrophy or penile agenesis) and who have been assigned to the female gender. The likelihood of gender dysphoria is further enhanced by additional, prolonged, highly gender-atypical postnatal androgen exposure with somatic virilization as may occur in female-raised and noncastrated 46,XY individuals with 5-alpha reductase-2 deficiency or 17-beta-hydroxysteroid dehydrogenase-3 deficiency or in female-raised 46,XX individuals with classical congenital adrenal hyperplasia with prolonged periods of non-adherence to glucocorticoid replacement therapy. However, the prenatal androgen milieu is more closely related to gendered behavior than to gender identity. Many individuals with disorders of sex development and markedly gender-atypical behavior do not develop gender dysphoria. Thus, gender-atypical behavior by itself should not be interpreted as an indicator of current or future gender dysphoria. There appears to be a higher rate of gender dysphoria and patient-initiated gender change from assigned female to male than from assigned male to female in 46,XY individuals with a disorder of sex development.

Culture-Related Diagnostic Issues

Individuals with gender dysphoria have been reported across many countries and cultures. The equivalent of gender dysphoria has also been reported in individuals living in cultures with institutionalized gender categories other than male or female. It is unclear whether with these individuals the diagnostic criteria for gender dysphoria would be met.

Diagnostic Markers

Individuals with a somatic disorder of sex development show some correlation of final gender identity outcome with the degree of prenatal androgen production and utilization. However, the correlation is not robust enough for the biological factor, where ascertainable, to replace a detailed and comprehensive diagnostic interview evaluation for gender dysphoria.

Functional Consequences of Gender Dysphoria

Preoccupation with cross-gender wishes may develop at all ages after the first 2–3 years of childhood and often interfere with daily activities. In older children, failure to develop age-typical same-sex peer relationships and skills may lead to isolation from peer groups and to distress. Some children may refuse to attend school because of teasing and harass-

ment or pressure to dress in attire associated with their assigned sex. Also in adolescents and adults, preoccupation with cross-gender wishes often interferes with daily activities. Relationship difficulties, including sexual relationship problems, are common, and functioning at school or at work may be impaired. Gender dysphoria, along with atypical gender expression, is associated with high levels of stigmatization, discrimination, and victimization, leading to negative self-concept, increased rates of mental disorder comorbidity, school dropout, and economic marginalization, including unemployment, with attendant social and mental health risks, especially in individuals from resource-poor family backgrounds. In addition, these individuals' access to health services and mental health services may be impeded by structural barriers, such as institutional discomfort or inexperience in working with this patient population.

Differential Diagnosis

Nonconformity to gender roles. Gender dysphoria should be distinguished from simple nonconformity to stereotypical gender role behavior by the strong desire to be of another gender than the assigned one and by the extent and pervasiveness of gender-variant activities and interests. The diagnosis is not meant to merely describe nonconformity to stereotypical gender role behavior (e.g., "tomboyism" in girls, "girly-boy" behavior in boys, occasional cross-dressing in adult men). Given the increased openness of atypical gender expressions by individuals across the entire range of the transgender spectrum, it is important that the clinical diagnosis be limited to those individuals whose distress and impairment meet the specified criteria.

Transvestic disorder. Transvestic disorder occurs in heterosexual (or bisexual) adolescent and adult males (rarely in females) for whom cross-dressing behavior generates sexual excitement and causes distress and/or impairment without drawing their primary gender into question. It is occasionally accompanied by gender dysphoria. An individual with transvestic disorder who also has clinically significant gender dysphoria can be given both diagnoses. In many cases of late-onset gender dysphoria in gynephilic natal males, transvestic behavior with sexual excitement is a precursor.

Body dysmorphic disorder. An individual with body dysmorphic disorder focuses on the alteration or removal of a specific body part because it is perceived as abnormally formed, not because it represents a repudiated assigned gender. When an individual's presentation meets criteria for both gender dysphoria and body dysmorphic disorder, both diagnoses can be given. Individuals wishing to have a healthy limb amputated (termed by some *body integrity identity disorder*) because it makes them feel more "complete" usually do not wish to change gender, but rather desire to live as an amputee or a disabled person.

Schizophrenia and other psychotic disorders. In schizophrenia, there may rarely be delusions of belonging to some other gender. In the absence of psychotic symptoms, insistence by an individual with gender dysphoria that he or she is of some other gender is not considered a delusion. Schizophrenia (or other psychotic disorders) and gender dysphoria may co-occur.

Other clinical presentations. Some individuals with an emasculation desire who develop an alternative, nonmale/nonfemale gender identity do have a presentation that meets criteria for gender dysphoria. However, some males seek castration and/or penectomy for aesthetic reasons or to remove psychological effects of androgens without changing male identity; in these cases, the criteria for gender dysphoria are not met.

Comorbidity

Clinically referred children with gender dysphoria show elevated levels of emotional and behavioral problems—most commonly, anxiety, disruptive and impulse-control, and de-

pressive disorders. In prepubertal children, increasing age is associated with having more behavioral or emotional problems; this is related to the increasing non-acceptance of gender-variant behavior by others. In older children, gender-variant behavior often leads to peer ostracism, which may lead to more behavioral problems. The prevalence of mental health problems differs among cultures; these differences may also be related to differences in attitudes toward gender variance in children. However, also in some non-Western cultures, anxiety has been found to be relatively common in individuals with gender dysphoria, even in cultures with accepting attitudes toward gender-variant behavior. Autism spectrum disorder is more prevalent in clinically referred children with gender dysphoria than in the general population. Clinically referred adolescents with gender dysphoria appear to have comorbid mental disorders, with anxiety and depressive disorders being the most common. As in children, autism spectrum disorder is more prevalent in clinically referred adolescents with gender dysphoria than in the general population. Clinically referred adults with gender dysphoria may have coexisting mental health problems, most commonly anxiety and depressive disorders.

Other Specified Gender Dysphoria

302.6 (F64.8)

This category applies to presentations in which symptoms characteristic of gender dysphoria that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for gender dysphoria. The other specified gender dysphoria category is used in situations in which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for gender dysphoria. This is done by recording "other specified gender dysphoria" followed by the specific reason (e.g., "brief gender dysphoria").

An example of a presentation that can be specified using the "other specified" designation is the following:

The current disturbance meets symptom criteria for gender dysphoria, but the duration is less than 6 months.

Unspecified Gender Dysphoria

302.6 (F64.9)

This category applies to presentations in which symptoms characteristic of gender dysphoria that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for gender dysphoria. The unspecified gender dysphoria category is used in situations in which the clinician chooses *not* to specify the reason that the criteria are not met for gender dysphoria, and includes presentations in which there is insufficient information to make a more specific diagnosis.



American College of Pediatricians Best for Children

- [Health Professionals »](#)
- [Parents »](#)
- [The College Speaks »](#)
- [About Us »](#)

You are here: [Home](#) > [The College Speaks](#) > [Position Statements of the College](#) > Gender Dysphoria in Children

Gender Dysphoria in Children

American College of Pediatricians – November 2018

ABSTRACT: Gender dysphoria (GD) of childhood describes a psychological condition in which children experience a marked incongruence between their experienced gender and the gender associated with their biological sex. When this occurs in the pre-pubertal child, GD resolves in the vast majority of patients by late adolescence. Currently there is a vigorous, albeit suppressed, debate among physicians, therapists, and academics regarding what is fast becoming the new treatment standard for GD in children. This new paradigm is rooted in the assumption that GD is innate, and involves pubertal suppression with gonadotropin releasing hormone (GnRH) agonists followed by the use of cross-sex hormones—a combination that results in the sterility of minors. A review of the current literature suggests that this protocol is founded upon an unscientific gender ideology, lacks an evidence base, and violates the long-standing ethical principle of “First do no harm.”

Gender Dysphoria in Children: This Debate Concerns More than Science

Gender is a term that refers to the psychological and cultural characteristics associated with biological sex.¹ It is a psychological concept and sociological term, not a biological one. Gender identity refers to an individual’s awareness of being male or female and is sometimes referred to as an individual’s “experienced gender.” Gender dysphoria (GD) in children describes a psychological condition in which they experience marked incongruence between their experienced gender and the gender associated with their biological sex. They often express the belief that they are the opposite sex.² The prevalence rates of GD among children has been estimated to be less than 1%.³ Sex differences in rate of referrals to specialty clinics vary by age. In pre-pubertal children, the ratio of boys to girls ranges from 2:1 to 4.5:1. In adolescents, the sex ratio is close to parity; in adults, the ratio of males to females range from 1:1 to 6.1:1.²

The debate over how to treat children with GD is primarily an ethical dispute, one that concerns physician worldview as much as science. Medicine does not occur in a moral vacuum; every therapeutic action or inaction is the result of a moral judgment of some kind that arises from the physician’s philosophical worldview. Medicine also does not occur in a political vacuum and being on the wrong side of sexual politics can have severe consequences for individuals who hold the politically incorrect view.

As an example, Dr. Kenneth Zucker, long acknowledged as a foremost authority on gender identity issues in children, has also been a lifelong advocate for gay and transgender rights. However, much to the consternation of adult transgender activists, Zucker believes that gender-dysphoric pre-pubertal children are best served by helping them align their gender identity with their anatomic sex. This view ultimately cost him his 30-year directorship of the Child Youth and Family Gender Identity Clinic (GIC) at the Center for Addiction and Mental Health in Toronto.^{4,5}

Many critics of pubertal suppression hold a modernist teleological worldview. They find it self-evident that there is a purposeful design to human nature, and that cooperation with this design leads to human flourishing. Others, however, identify as post-modernists who reject teleology. What unites the two groups is a traditional interpretation of “First do no harm.” For example, there is a growing online community of gay-affirming physicians, mental health professionals, and academics with a webpage entitled “First, do no harm: youth trans critical professionals.” They write:

We are concerned about the current trend to quickly diagnose and affirm young people as transgender, often setting them down a path toward medical transition.... We feel that unnecessary surgeries and/or hormonal treatments which have not been proven safe in the long-term represent significant risks for young people. Policies that encourage—either directly or indirectly—such medical treatment for young people who may not be able to evaluate the risks and benefits are highly suspect, in our opinion.⁶

Advocates of the medical interventionist paradigm, in contrast, are also post-modernists but hold a subjective view of “First do no harm.” Dr. Johanna Olson-Kennedy, an adolescent medicine specialist at Children’s Hospital Los Angeles, and leader in pediatric gender transitioning, has stated that “[First do no harm] is really subjective. [H]istorically we come from a very paternalistic perspective... [in which] doctors are really given the purview of deciding what is going to be harmful and what isn’t. And that, in the world of gender, is really problematic.”⁷ Not only does she claim that “First do no harm” is subjective, but she later also states that it should be left to the child decide what constitutes harm based upon their own subjective thoughts and feelings.⁷ Given the cognitive and experiential immaturity of the child and adolescent, the American College of Pediatricians (ACPed) finds this highly problematic and unethical.

Gender dysphoria as the result of an innate internal sexed identity

Professor of social work, Dr. William Brennan, has written that “[t]he power of language to color one’s view of reality is profound.”⁸ It is for this reason that linguistic engineering always precedes social engineering — even in medicine. Many hold the mistaken belief that gender once meant biological sex. Though the terms are often used interchangeably they were never truly synonymous.^{9,10} Feminists of the late 1960’s and 1970’s used gender to refer to a “social sex” that could differ from one’s “biological sex” in order to overcome unjust discrimination against women rooted in sex stereotypes. These feminists are largely responsible for mainstreaming the use of the word gender in place of sex. More recently, in an attempt to eliminate heteronormativity, queer theorists have expanded gender into an excess of 50 categories by merging the concept of a social sex with sexual attractions.⁹ However, neither usage reflects the original meaning of the term.

Prior to the 1950s, gender meant male or female, but applied only to grammar not persons.^{9,10} Latin based languages categorize nouns and their modifiers as masculine or feminine and for this reason are still referred to as having a gender. This changed during the 1950s and 1960s as sexologists realized that their sex reassignment agenda could not be sufficiently defended using the words sex and transsexual. From a purely scientific standpoint, human beings possess a biologically determined sex and innate sex differences. No sexologist could actually change a person’s genes through hormones and surgery. Sex change is objectively impossible. Their solution was to hijack the word gender and infuse it with a new meaning that applied to persons.

John Money, PhD was among the most prominent of these sexologists who redefined gender to mean “the social performance indicative of an internal sexed identity”.¹⁰ In essence, these sexologists invented the ideological foundation necessary to justify their treatment of transsexualism with sex reassignment surgery and called it gender. It is this man-made ideology of an innate and immutable “internal sexed identity” that now dominates

mainstream medicine, psychiatry and academia. This linguistic history makes it clear that gender is not and never has been a biological or scientific entity. Rather, gender is a socially and politically constructed concept.

In their “Overview of Gender Development and Gender Nonconformity in Children and Adolescents,” Forcier and Olson-Kennedy dismiss the binary model of human sexuality as “ideology” and present an “alternate perspective” of “innate gender identity” that presents along a “gender continuum.” They recommend that pediatricians tell parents that a child’s “real gender” is what he or she feels it to be because “a child’s brain and body may not be on the same page.”¹¹

Forcier and Olson-Kennedy’s claim of an innate discordance between a child’s brain and the rest of the body derives from diffusion-weighted MRI scans that demonstrate the pubertal testosterone surge in boys increases white matter volume, as well as from brain studies of adults who identify as transgender. A study by Rametti and colleagues found that the white matter microstructure of the brains of female-to-male (FtM) transsexual adults, who had not begun testosterone treatment, more closely resembled that of men than that of women.¹² Other diffusion-weighted MRI studies have concluded that the white matter microstructure in both FtM and male-to-female (MtF) transsexuals falls halfway between that of genetic females and males.¹³ These and more recent studies, however, fail to prove causation due to several design flaws. A properly designed brain difference study needs to be prospective and longitudinal; it would require a large randomly selected population based sample of a fixed set of individuals, would follow them with serial brain imaging from infancy through adulthood, and would have to be replicated. Not one brain study to date meets a single one of these requirements to be considered rigorous research design. Even if they did, causation would not be certain due to neuroplasticity.

Neuroplasticity

Neuroplasticity is the well-established phenomenon in which thinking and behavior alters brain microstructure. There is no evidence that people are born with brain microstructures that are forever unalterable, but there is significant evidence that experience changes brain microstructure.¹⁴ Therefore, if scientifically rigorous studies ever do identify transgender brain differences, these differences will still more likely be the result of transgender behavior rather than its cause.

More importantly, however, is the fact that the brains of all male infants are masculinized prenatally by their own endogenous testosterone, which is secreted from their testes beginning at approximately eight weeks’ gestation. Female infants, of course, lack testes, and therefore, do not have their brains masculinized by endogenous testosterone.^{15,16,17} For this reason, barring maternal exposure to androgens or one of the rare disorders of sex development (DSDs), boys are not born with feminized brains, and girls are not born with masculinized brains.

Genetic Determinism

Might gender identity be genetically determined? Behavior geneticists have known for decades that while genes *influence* behavior, they do not hard-wire a person to think, feel, or behave in a particular way. The science of epigenetics has established that genes are not analogous to rigid “blueprints” for behavior. Rather, humans “develop traits through the dynamic process of gene-environment interaction... [genes alone] don’t determine who we are.”¹⁸ Regarding the etiology of transgenderism, twin studies of adult transsexuals prove definitively that genetic influence is far less than that of environmental factors.

Twin studies are instrumental in elucidating whether genes or environmental factors contribute more significantly to a particular trait. Since monozygotic twins are conceived with exactly the same DNA, and spontaneous mutations before birth are rare, traits that are solely determined by genes, will manifest in both identical twins close to if not exactly 100 percent of the time. Skin color is an example of a trait that identical twins share virtually 100 percent of the time because it is solely determined by genes.

The largest transsexual twin study to date examines 110 twin pairs and was published by Dr. Milton Diamond in the May 2013 issue of the *International Journal of Transgenderism*.¹⁹ Table 5 documents that the number of monozygotic twin pairs concordant for transsexualism is greater than that of dizygotic twin pairs. This suggests

a possible biological predisposition for gender dysphoria. The most significant data entry, however, is the low number of concordant monozygotic twin pairs. Only 21 monozygotic twin pairs out of a total of 74 monozygotic pairs, or 28 percent, were concordant for transsexualism; the remaining 72 percent of identical twins were discordant for transsexualism.

This means that environmental factors trump any biological predisposition. Environmental factors account for nearly 75 percent of what causes transsexualism in one twin and not in the other; and since identical twins develop in the same uterus, non-shared post-birth experiences are likely to have a greater influence than the prenatal environment. A high 72 percent discordance rate among identical twins proves that no one is born pre-determined to have gender dysphoria let alone pre-determined to identify as transgender or transsexual.

This is what would be expected given the dramatic rates of resolution of gender dysphoria documented among children when they are not encouraged to impersonate the opposite sex. The low concordance rate also supports the theory that persistent GD is due predominantly to the impact of non-shared environmental influences upon certain biologically vulnerable children. To be clear, twin studies alone establish that the “alternative perspective” of an “innate gender identity” trapped in the wrong body is in fact an ideological belief that has no basis in rigorous science.

A teleological binary view of human sexuality, in contrast, is compatible with biological reality. The norm for human design is to be conceived either male or female. Sex chromosome pairs “XY” and “XX” are genetic determinants of sex, male and female, respectively. They are not genetic markers of a disordered body or birth defect. Human sexuality is binary by design with the purpose being the reproduction of our species. This principle is self-evident. Barring one of the rare disorders of sex development (DSD), no infant is “assigned” a sex or a gender at birth. Sex declares itself anatomically in utero and is clearly evident and acknowledged at birth.

Disorders of sex development (DSDs), including but not limited to androgen insensitivity syndrome and congenital adrenal hyperplasia, affect less than 0.02 percent of the population.²⁰ These disorders are all medically identifiable deviations from the human binary sexual norm. Unlike individuals with a normal genotype and hormonal axis who identify as “transgender,” those with DSDs have an innate biological condition. Sex assignment in individuals with DSDs can be complex and depends on a variety of genetic, hormonal, and physical factors. Nevertheless, the 2006 consensus statement of the Intersex Society of North America did not endorse DSD as a third sex.²¹

Post-natal Factors Predominate in the Development and Persistence of GD

Identical twin studies demonstrate that environmental factors, especially post-natal non-shared events, predominate in the development and persistence of gender dysphoria. This is not surprising since it is well accepted that a child’s emotional and psychological development is impacted by positive and negative experiences from infancy forward. Family and peer relationships, one’s school and neighborhood, the experience of any form of abuse, media exposure, chronic illness, war, and natural disasters are all examples of environmental factors that impact an individual’s emotional, social, and psychological development. *There is no single family dynamic, social situation, adverse event, or combination thereof that has been found to destine any child to develop GD.* This fact, together with twin studies, suggests that there are many paths that may lead to GD in certain predisposed children.

The literature regarding the etiology and psychotherapeutic treatment of childhood GD is heavily based upon clinical case studies. These studies suggest that social reinforcement, parental psychopathology, family dynamics, and social contagion -facilitated by mainstream and social media, all contribute to the development and/or persistence of GD in some vulnerable children. There may be other as yet unrecognized contributing factors as well.

Most parents of children with GD recall their initial reactions to their child’s cross-sex dressing and other cross-sex behaviors to have been tolerance and/or encouragement. Sometimes parental psychopathology is at the root of the social reinforcement. For example, among mothers of boys with GD who had desired daughters, a small

subgroup experienced what has been termed “pathologic gender mourning.” Within this subgroup the mother’s desire for a daughter was acted out by the mother actively cross-dressing her son as a girl. These mothers typically suffered from severe depression that was relieved when their sons dressed and acted in a feminine manner.²²

A large body of clinical literature documents that fathers of feminine boys report spending less time with their sons between the ages of two and five as compared with fathers of control boys. This is consistent with data that shows feminine boys feel closer to their mothers than to their fathers. In his clinical studies of boys with GD, Stoller observed that most had an overly close relationship with their mother and a distant, peripheral relationship with their father. He postulated that GD in boys was a “developmental arrest ... in which an excessively close and gratifying mother-infant symbiosis, undisturbed by father’s presence, prevents a boy from adequately separating himself from his mother’s female body and feminine behavior.”²²

It has also been found that among children with GD, the rate of maternal psychopathology, particularly depression and bipolar disorder is “high by any standard.” Additionally, a majority of the fathers of GD boys are easily threatened, exhibit difficulty with affect regulation, and possess an inner sense of inadequacy. These fathers typically deal with their conflicts by overwork or otherwise distance themselves from their families. Most often, the parents fail to support one another, and have difficulty resolving marital conflicts. This produces an intensified air of conflict and hostility. In this situation, the boy becomes increasingly unsure about his own self-value because of the mother’s withdrawal or anger and the father’s failure to intercede. The boy’s anxiety and insecurity intensify, as does his anger, which may all result in his inability to identify with his biological sex.²³

Systematic studies regarding girls with GD and the parent-child relationship have not been conducted. However, clinical observations suggest that the relationship between mother and daughter is most often distant and marked by conflict, which may lead the daughter to disidentify from the mother. In other cases, masculinity is praised while femininity is devalued by the parents. Furthermore, there have been cases in which girls are afraid of their fathers who may exhibit volatile anger up to and including abuse toward the mother. A girl may perceive being female as unsafe, and psychologically defend against this by feeling that she is really a boy; subconsciously believing that if she were a boy she would be safe from and loved by her father.²²

There is evidence that psychopathology and/or developmental diversity may precipitate GD in adolescents, particularly among young women. Recent research has documented increasing numbers of adolescents who present to adolescent gender identity clinics and request sex reassignment (SR). Kaltiala-Heino and colleagues sought to describe the adolescent applicants for legal and medical sex reassignment during the first two years of an adolescent gender identity clinic in Finland, in terms of sociodemographic, psychiatric, and gender identity related factors and adolescent development. They conducted a structured quantitative retrospective chart review and qualitative analysis of case files of all adolescent SR applicants who entered the assessment by the end of 2013. They found that the number of referrals exceeded expectations in light of epidemiological knowledge. Natal girls were markedly overrepresented among applicants. Severe psychopathology preceding the onset of GD was common. Many youth were on the autism spectrum. These findings do not fit the commonly accepted image of a gender dysphoric child. The researchers conclude that treatment guidelines need to consider GD in minors in the context of severe psychopathology and developmental difficulties.²⁴

A recent study has documented an increasing trend among adolescents to self-diagnose as transgender after binges on social media sites such as Tumblr, Reddit, and YouTube.²⁵ This suggests that social contagion may be at play. In many schools and communities, there are entire peer groups “coming out” as trans at the same time.²⁵ Finally, strong consideration should be given to investigating a causal association between adverse childhood events, including sexual abuse, and transgenderism. The overlap between childhood gender discordance and an adult homosexual orientation has long been acknowledged.²⁶ There is also a large body of literature documenting a significantly greater prevalence of childhood adverse events and sexual abuse among homosexual adults as compared to heterosexual adults. Andrea Roberts and colleagues’ published a study in 2013 that found “half to all of the elevated risk of childhood abuse among persons with same-sex sexuality compared to heterosexuals was due to the effects of abuse on sexuality.”²⁷ It is therefore possible that some

individuals develop GD and later claim a transgender identity as a result of childhood maltreatment and/or sexual abuse. This is an area in need of research.

GD as an Objective Mental Disorder

Psychology has increasingly rejected the concept of norms for mental health, focusing instead on emotional distress. The American Psychiatric Association (APA), for example, explains in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) that GD is listed therein not due to the discrepancy between the individual's thoughts and physical reality, but due to the presence of emotional distress that hampers social functioning. The DSM-5 also notes that a diagnosis is required for insurance companies to pay for cross-sex hormones and sex reassignment surgery (SRS) to alleviate the emotional distress of GD. Once the distress is relieved, GD is no longer considered a disorder.²

There are problems with this reasoning. Consider the following examples: a girl with anorexia nervosa has the persistent mistaken belief that she is obese; a person with body dysmorphic disorder (BDD) harbors the erroneous conviction that she is ugly; a person with body integrity identity disorder (BIID) identifies as a disabled person and feels trapped in a fully functional body. Individuals with BIID are often so distressed by their fully capable bodies that they seek surgical amputation of healthy limbs or the surgical severing of their spinal cord.²⁸ Dr. Anne Lawrence, who is transgender, has argued that BIID has many parallels with GD.²⁹ The aforementioned false beliefs, like GD, are not merely emotionally distressing for the individuals but also life-threatening. In each case, surgery to "affirm" the false assumption (liposuction for anorexia, cosmetic surgery for BDD, amputation or surgically induced paraplegia for BIID, sex reassignment surgery for GD) may very well alleviate the patient's emotional distress, but will do nothing to address the underlying psychological problem, and may result in the patient's death. Completely removed from physical reality, the art of psychotherapy will diminish as the field of psychology increasingly devolves into a medical interventionist specialty, with devastating results for patients.

Alternatively, a minimal standard could be sought. Normality has been defined as "that which functions according to its design."³⁰ One of the chief functions of the brain is to perceive physical reality. Thoughts that are in accordance with physical reality are normal. Thoughts that deviate from physical reality are abnormal—as well as potentially harmful to the individual or to others. This is true whether or not the individual who possesses the abnormal thoughts feels distress. A person's belief that he is something or someone he is not is, at best, a sign of confused thinking; at worst, it is a delusion. Just because a person thinks or feels something does not make it so. This would be true even if abnormal thoughts were biologically "hardwired."

The norm for human development is for an individual's thoughts to align with physical reality; for an individual's gender identity to align with biologic sex. People who identify as "feeling like the opposite sex" or "somewhere in between" or some other category do not comprise a third sex. They remain biological men or biological women. GD is a problem that resides in the mind not in the body. Children with GD do not have a disordered body—even though they feel as if they do. Similarly, a child's distress over developing secondary sex characteristics does not mean that puberty should be treated as a disease to be halted, because puberty is not, in fact, a disease. Likewise, although many men with GD express the belief that they are a "feminine essence" trapped in a male body, this belief has no scientific basis.

Until recently, the prevailing worldview with respect to childhood GD was that it reflected abnormal thinking or confusion on the part of the child that may or may not be transient. Consequently, the standard approach was either watchful waiting or pursuit of family and individual psychotherapy.^{1,2} The goals of therapy were to address familial pathology if it was present, treat any psychosocial morbidities in the child, and aid the child in aligning gender identity with biological sex.^{22,23} Experts on both sides of the pubertal suppression debate agree that within this context, 80 percent to 95 percent of children with GD accepted their biological sex by late adolescence.³¹ This worldview began to shift, however, as adult transgender activists increasingly promoted the "feminine essence" narrative to secure social acceptance.¹⁰ In 2007, the same year that Boston Children's Hospital opened the nation's first pediatric gender clinic, Dr. J. Michael Bailey wrote:

Currently the predominant cultural understanding of male-to-female transsexualism is that all male-to-female (MtF) transsexuals are, essentially, women trapped in men's bodies. This understanding has little scientific basis, however, and is inconsistent with clinical observations. Ray Blanchard has shown that there are two distinct subtypes of MtF transsexuals. Members of one subtype, homosexual transsexuals, are best understood as a type of homosexual male. The other subtype, autogynephilic transsexuals, are (sic) motivated by the erotic desire to become women. The persistence of the predominant cultural understanding, while explicable, is damaging to science and to many transsexuals.³²

As the “feminine essence” view persisted, the suffering of transgender adults was invoked to argue for the urgent rescue of children from the same fate by early identification, affirmation, and pubertal suppression. It is now alleged that discrimination, violence, psychopathology, and suicide are the direct and inevitable consequences of withholding social affirmation and puberty blockers or cross-sex hormones from a gender dysphoric child.³³ Yet, the fact that 80 percent to 95 percent of gender-dysphoric youth emerge physically and psychologically intact after passing through puberty without social affirmation refutes this claim.³¹ Furthermore, over 90 percent of people who die of suicide have a diagnosed mental disorder.³⁴ There is no evidence that gender-dysphoric children who commit suicide are any different. Therefore, the cornerstone for suicide prevention should be the same for them as for all children: early identification and treatment of psychological co-morbidities.

Nevertheless, there are now 40 gender clinics across the United States that promote the use of pubertal suppression and cross-sex hormones in children. The rationale for suppression is to allow the gender-dysphoric child time to explore gender identity free from the emotional distress triggered by the onset of secondary sex characteristics. The standards followed in these clinics are based on “expert opinion.” There is not a single large, randomized, controlled study that documents the alleged benefits and potential harms to gender-dysphoric children from pubertal suppression and decades of cross-sex hormone use. Nor is there a single long-term, large, randomized, controlled study that compares the outcomes of various psychotherapeutic interventions for childhood GD with those of pubertal suppression followed by decades of toxic synthetic steroids. In today’s age of “evidence-based medicine,” this should give everyone pause. Of greater concern is that pubertal suppression at Tanner Stage 2 (usually 11 years of age) followed by the use of cross-sex hormones will leave these children sterile and without gonadal tissue or gametes available for cryo-preservation.^{35,36,37}

Neuroscience clearly documents that the adolescent brain is cognitively immature and lacks the adult capacity needed for risk assessment prior to the early to mid-twenties.³⁸ There is a serious ethical problem with allowing irreversible, life-changing procedures to be performed on minors who are too young to give valid consent themselves. This ethical requirement of informed consent is fundamental to the practice of medicine, as emphasized by the U.S. Department of Health & Human Services website: “The voluntary consent of the human subject is absolutely essential.”³⁹ Moreover, when an individual is sterilized, even as a secondary outcome of therapy, lacking full, free, and informed consent, it is a violation of international law.⁴⁰

Transgender-Affirming Protocol: What Is the Evidence Base?

Over the past two decades, Hayes, Inc. has grown to become an internationally recognized research and consulting firm that evaluates a wide range of medical technologies to determine the impact on patient safety, health outcomes, and resource utilization. This corporation conducted a comprehensive review and evaluation of the scientific literature regarding the treatment of GD in adults and children in 2014. It concluded that although “evidence suggests positive benefits” to the practice of using sex reassignment surgery in gender dysphoric adults, “serious limitations [inherent to the research] permit only weak conclusions.”⁴¹ Similarly, Hayes, Inc. found the practice of using cross-sex hormones for gender dysphoric adults to be based on “very low” quality of evidence:

Statistically significant improvements have not been consistently demonstrated by multiple studies for most outcomes. Evidence regarding quality of life and function in male-to-female (MtF) adults was very sparse. Evidence for less comprehensive measures of well-being in adult recipients of cross-sex hormone therapy was directly applicable to GD patients but was sparse and/or conflicting. The study designs do not permit conclusions of causality and studies generally had weaknesses associated with study execution as well. There

*are potentially long-term safety risks associated with hormone therapy but none have been proven or conclusively ruled out.*⁴²

Regarding treatment of children with GD using gonadotropin releasing hormone (GnRH) agonists and cross-sex hormones, Hayes, Inc. awarded its lowest rating indicating that the literature is “too sparse and the studies [that exist are] too limited to suggest conclusions.”⁴²

Gender Clinics Proliferate Across United States Despite Lack of Medical Evidence

In 2007 Dr. Norman Spack, a pediatric endocrinologist and founder of the nation’s first gender clinic at Boston Children’s Hospital, launched the pubertal suppression paradigm in the United States.⁴³ It consists of first affirming the child’s false self-concept by instituting name and pronoun changes, and facilitating the impersonation of the opposite sex within and outside of the home. Next, puberty is suppressed via GnRH agonists as early as age 11 years, and then finally, patients may graduate to cross-sex hormones at age 16 in preparation for sex-reassignment surgery as an older adolescent or adult.⁴⁴ Endocrine Society guidelines currently prohibit the use of cross-sex hormones before age 16 but this prohibition is being reconsidered.⁴⁵ Some gender specialists are already bypassing pubertal suppression and instead putting children as young as 11 years old directly onto cross-sex hormones.⁴⁶ The rationale is that the child will experience the pubertal development of the desired sex and thereby avoid the iatrogenic emotional distress from maintaining a pre-pubertal appearance as peers progress along their natural pubertal trajectory.

In 2014 there were 24 gender clinics clustered chiefly along the East Coast and in California; one year later there were 40 across the nation. Dr. Ximena Lopez, a pediatric endocrinologist at Children’s Medical Center Dallas, and a member of that program’s GENDER Education and Care, Interdisciplinary Support program (Genecis) stated, “[Use of this protocol is] growing really fast. And the main reason is [that] parents are demanding it and bringing patients to the door of pediatric endocrinologists because they know this is available.”⁴⁷ Notice, the *main* reason for the protocol’s increased use is parent demand; not evidence-based medicine.

Risks of GnRH Agonists

The GnRH agonists used for pubertal suppression in gender dysphoric children include two that are approved for the treatment of precocious puberty: leuprolide by intramuscular injection with monthly or once every three month dosing formulations, and histrelin, a subcutaneous implant with yearly dosing.³⁶ In addition to preventing the development of secondary sex characteristics, GnRH agonists arrest bone growth, decrease bone accretion, prevent the sex-steroid dependent organization and maturation of the adolescent brain, and inhibit fertility by preventing the development of gonadal tissue and mature gametes for the duration of treatment. If the child discontinues the GnRH agonists, puberty will ensue.^{36,44} Consequently, the Endocrine Society maintains that GnRH agonists, as well as living socially as the opposite sex, are fully reversible interventions that carry no risk of permanent harm to children.⁴⁴ However, social learning theory, neuroscience, and the single long-term follow-up study of adolescents who have received pubertal suppression described below challenge this claim.

In a follow-up study of their first 70 pre-pubertal candidates to receive puberty suppression, de Vries and colleagues documented that all subjects eventually embraced a transgender identity and requested cross-sex hormones.⁴⁸ This is cause for concern. Normally, 80 percent to 95 percent of pre-pubertal youth with GD do not persist in their GD. To have 100 percent of pre-pubertal children choose cross-sex hormones suggests that the protocol itself inevitably leads the individual to identify as transgender.

There is an obvious self-fulfilling nature to encouraging a young child with GD to socially impersonate the opposite sex and then institute pubertal suppression. Purely from a social learning point of view, the repeated behavior of impersonating and being treated as the opposite sex will make identity alignment with the child’s biologic sex less likely. This, together with the suppression of puberty that prevents further endogenous masculinization or feminization of the entire body and brain, causes the child to remain either a gender non-conforming pre-pubertal boy disguised as a pre-pubertal girl, or the reverse. Since their peers develop normally into young men or young women, these children are left psychosocially isolated. They will be less able to identify as being the biological male or female they actually are. A protocol of impersonation and pubertal

suppression that sets into motion a single inevitable outcome (transgender identification) that requires lifelong use of toxic synthetic hormones, resulting in infertility, is neither fully reversible nor harmless.

GnRH Agonists, Cross-sex Hormones, and Infertility

Since GnRH agonists prevent the maturation of gonadal tissue and gametes in both sexes, youth who graduate from pubertal suppression at Tanner Stage 2 to cross-sex hormones will be rendered infertile without any possibility of having genetic offspring in the future because they will lack gonadal tissue and gametes for cryo-preservation. The same outcome will occur if pre-pubertal children are placed directly upon cross-sex hormones. Older adolescents who declined pubertal suppression are advised to consider cryo-preservation of gametes prior to beginning cross-sex hormones. This will allow them to conceive genetic offspring in the future via artificial reproductive technology. While there are documented cases of transgendered adults who stopped their cross-sex hormones in order to allow their bodies to produce gametes, conceive, and have a child, there is no absolute guarantee that this is a viable option in the long term. Moreover, transgendered individuals who undergo sex reassignment surgery and have their reproductive organs removed are rendered permanently infertile.^{35,37,38}

Additional Health Risks Associated with Cross-sex Hormones

Potential risks from cross-sex hormones to children with GD are based on the adult literature. Recall that regarding the adult literature, the Hayes report states: “There are potentially long-term safety risks associated with hormone therapy but none have been proven or conclusively ruled out.”⁴² For example, most experts agree that there is an increased risk of coronary artery disease among MtF adults when placed on oral ethinyl estradiol; therefore, alternative estrogen formulations are recommended. However, there is one study of MtF adults using alternative preparations that found a similar increased risk. Therefore, this risk is neither established nor ruled out.^{49,50,51} Children who transition will require these hormones for a significantly greater length of time than their adult counterparts. Consequently, they may be more likely to experience physiologically theoretical though rarely observed morbidities in adults. With these caveats, it is most accurate to say that oral estrogen administration to boys *may* place them at risk for experiencing: thrombosis/thromboembolism; cardiovascular disease; weight gain; hypertriglyceridemia; elevated blood pressure; decreased glucose tolerance; gallbladder disease; prolactinoma; and breast cancer.^{49,50,51} Similarly, girls who receive testosterone *may* experience an elevated risk for: low HDL and elevated triglycerides; increased homocysteine levels; hepatotoxicity; polycythemia; increased risk of sleep apnea; insulin resistance; and unknown effects on breast, endometrial and ovarian tissues.^{49,50,51} In addition, girls may legally obtain a mastectomy as early as 16 years of age after receiving testosterone therapy for at least one year; this surgery carries its own set of irreversible risks.³⁶

The Post-Pubertal Adolescent with GD

As previously noted, 80 percent to 95 percent of pre-pubertal children with GD will experience resolution by late adolescence if not exposed to social affirmation and medical intervention. This means that 5 percent to 20 percent will persist in their GD as young adults. Currently, there is no medical or psychological test to determine which children will persist in their GD as young adults. Pre-pubertal children with GD who persist in their GD beyond puberty are more likely to also persist into adulthood. The Endocrine Society and others, including Dr. Zucker, therefore regard it reasonable to affirm children who persist in their GD beyond puberty, as well as those who present after puberty, and to proceed with cross-sex hormones at age 16 years.⁴⁴

ACPeds disagrees for the following reasons. First, not all adolescents with GD inevitably go on to trans-identification, but cross-sex hormones inevitably result in irreversible changes for all patients. Second, adolescents are not sufficiently mature to make significant irreversible medical decisions. The adolescent brain does not achieve the capacity for full risk assessment until the early to mid-twenties. There is a serious ethical problem with allowing minors to receive life-altering medical interventions including cross-sex hormones and, in the case of natal girls, bilateral mastectomy, when they are incapable of providing informed consent for themselves.

As stated earlier, ACPeds is also concerned about an increasing trend among adolescents to self-diagnose as transgender after binges on social media sites. While many of these adolescents will seek out a therapist after

self-identifying, many states have been forced by non-scientific political pressure to ban therapists from asking why an adolescent believes he or she is transgender. In these states therapists may not explore underlying mental health issues; cannot consider the symbolic nature of the gender dysphoria; and may not look at possible confounding issues such as social media use or social contagion.⁶

Impact of sex reassignment in adults as it relates to risk in children

Surveys suggest that transgender adults initially express a sense of “relief” and “satisfaction” following the use of hormones and sex reassignment surgery (SRS). In the long term, however, SRS does not result in a level of health equivalent to that of the general population.⁵² For example, a 2001 study of 392 male-to-female and 123 female-to-male transgender persons found that 62 percent of the male-to-female (MtF) and 55 percent of the female-to-male (FtM) transgender persons were depressed. Nearly one third (32 percent) of each population had attempted suicide.⁵³ Similarly, in 2009, Kuhn and colleagues found considerably lower general health and general life satisfaction among 52 MtF and 3 FtM transsexuals fifteen years after SRS when compared with controls.⁵⁴ Finally, a thirty-year follow-up study of post-operative transgender patients from Sweden found that thirty years out from surgery, the rate of suicide among post-operative transgender adults was nearly twenty times greater than that of the general population.

To be clear, this does not prove that sex reassignment causes an increased risk of suicide or other psychological morbidities. Rather, it indicates that sex reassignment alone does not provide the individual with a level of mental health on par with the general population. The authors of the Swedish study summarized their findings as follows:

Persons with transsexualism, after sex reassignment, have considerably higher risks for mortality, suicidal behaviour, and psychiatric morbidity than the general population. Our findings suggest that sex reassignment, though alleviating gender dysphoria, may not suffice as treatment for transsexualism, and should inspire improved psychiatric and somatic care after sex reassignment for this patient group.⁵²

It is noteworthy that these mental health disparities are observed in one of the most lesbian, gay, bisexual and transgender (LGBT) affirming nations of the world. It suggests that these health differences are not due primarily to social prejudice, but rather due to underlying trauma that also induced transgender belief, and/or the adult transgender condition or lifestyle. This is also consistent with an American study published in the *Journal of LGBT Health* in 2008 that found discrimination did not account for the mental health discrepancies between LGBT-identified individuals and the heterosexual population.⁵⁵

Absent hormonal and surgical intervention, only 5-20 percent of pre-pubertal children with GD will face a transgender adulthood which seems to predispose them to certain morbidities and an increased risk of early death. In contrast, the single study of pre-pubertal children with GD who received pubertal suppression makes clear that as many as 100 percent of these children will face a transgender adulthood. Therefore, the current transgender affirming interventions at pediatric gender clinics will statistically yield this outcome for the remaining 80 to 95 percent of pre-pubertal children with GD who otherwise would have identified with their biological sex by adulthood.

Recommendations for research

Identical twin studies establish that post-natal environmental factors exert a significant influence over the development of GD and transgenderism. Data also reflects a greater than 80% resolution rate among pre-pubertal children with GD. Consequently, identification of the various environmental factors and pathways that trigger GD in biologically vulnerable children should be one focus of research. Particular attention should be given to the impact of childhood adverse events and social contagion. Another area of much needed research is within psychotherapy. Large long term longitudinal studies in which children with GD and their families are randomized to treatment with various therapeutic modalities and assessed across multiple measures of physical and social emotional health are desperately needed and should have been launched long ago. In addition, long term follow-up studies that assess objective measures of physical and mental health of post-surgical transsexual adults must include a matched control group consisting of transgender individuals who do not undergo SRS.

This is the only way to test the hypothesis that SRS itself may cause more harm to individuals than they otherwise would experience with psychotherapy alone.

Conclusion

Gender dysphoria (GD) in children is a term used to describe a psychological condition in which a child experiences marked incongruence between his or her experienced gender and the gender associated with the child's biological sex. Twin studies demonstrate that GD is not an innate trait. Moreover, barring pre-pubertal affirmation and hormone intervention for GD, 80 percent to 95 percent of children with GD will accept the reality of their biological sex by late adolescence.

The treatment of GD in childhood with hormones effectively amounts to mass experimentation on, and sterilization of, youth who are cognitively incapable of providing informed consent. There is a serious ethical problem with allowing irreversible, life-changing procedures to be performed on minors who are too young to give valid consent themselves; adolescents cannot understand the magnitude of such decisions.

Ethics alone demands an end to the use of pubertal suppression with GnRH agonists, cross-sex hormones, and sex reassignment surgeries in children and adolescents. The American College of Pediatricians recommends an immediate cessation of these interventions, as well as an end to promoting gender ideology via school curricula and legislative policies. Healthcare, school curricula and legislation must remain anchored to physical reality. Scientific research should focus upon better understanding the psychological underpinnings of this disorder, optimal family and individual therapies, as well as delineating the differences among children who resolve with watchful waiting versus those who resolve with therapy and those who persist despite therapy.

Primary author: Michelle Cretella, MD

August 2016

Updated June 2017

Updated September 2017

Updated November 2018

The American College of Pediatricians is a national medical association of licensed physicians and healthcare professionals who specialize in the care of infants, children, and adolescents. The mission of the College is to enable all children to reach their optimal, physical and emotional health and well-being.

A printable Adobe Acrobat (pdf) copy of this position is available by clicking here: [Gender Dysphoria in Children](#)

[Gender Dysphoria in Children](#). Summary points from Position Statement

Spanish version: [Disforia de género en menores: Resumen de puntos importantes](#)

REFERENCES

1. Shechner T. Gender identity disorder: a literature review from a developmental perspective. *Isr J Psychiatry Relat Sci* 2010;47:132-138.
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed; 2013:451-459.
3. Cohen-Kettenis PT, Owen A, Kaijser VG, Bradley SJ, Zucker KJ. Demographic characteristics, social competence, and behavior problems in children with gender identity disorder: a cross-national, cross-clinic comparative analysis. *J Abnorm Child Psychol*. 2003;31:41–53.
4. Singal J. How the fight over transgender kids got a leading sex researcher fired. *New York Magazine*, Feb 7, 2016. Available at: <http://nymag.com/scienceofus/2016/02/fight-over-trans-kids-got-a-researcher-fired.html>. Accessed May 15, 2016.
5. Bancroft J, Blanchard R, Brotto L, et al. Open Letter to the Board of Trustees of CAMH; Jan 11, 2016. Available at: ipetitions.com/petition/boardoftrustees-CAMH. Accessed May 125, 2016.

6. Youth Trans Critical Professionals. Professionals Thinking Critically about the Youth Transgender Narrative. Available at: <https://youthtranscriticalprofessionals.org/about/>. Accessed June 15, 2016.
7. Skipping the puberty blockers: American “transgender children” doctors are going rogue; Nov 4, 2014. Available at: <https://gendertrender.wordpress.com/2014/11/11/skipping-the-puberty-blockers-american-transgender-children-doctors-are-going-rogue/>. Accessed May 15, 2016.
8. Brennan, W. *Dehumanizing the Vulnerable: When word games take lives*. Chicago: Loyola University Press, 1995.
9. Kuby, G. *The Global Sexual Revolution: Destruction of freedom in the name of freedom*. Kettering, OH: Angelico Press, 2015.
10. Jeffeys, S. *Gender Hurts: A feminist analysis of the politics of transgressions*. NY: Routledge, 2014 (p. 27).
11. Forcier M, Olson-Kennedy J. Overview of gender development and gender nonconformity in children and adolescents. UpToDate; 2016. Available at: www.uptodate.com/contents/overview-of-gender-development-and-clinical-presentation-of-gender-nonconformity-in-children-and-adolescents?source=search_result&search=Overview+of+gender+nonconformity+in+children&selectedTitle=2percent7E150. Accessed May 16, 2016.
12. Rametti G, Carrillo B, Gomez-Gil E, et al. White matter microstructure in female to male transsexuals before cross-sex hormonal treatment. A diffusion tensor imaging study. *J Psychiatr Res* 2011;45:199-204.
13. Kranz GS, Hahn A, Kaufmann U, et al. White matter microstructure in transsexuals and controls investigated by diffusion tensor imaging. *J Neurosci* 2014;34(46):15466-15475.
14. Gu J, Kanai R. What contributes to individual differences in brain structure? *Front Hum Neurosci* 2014;8:262.
15. Reyes FI, Winter JS, Faiman C. Studies on human sexual development fetal gonadal and adrenal sex steroids. *J Clin Endocrinol Metab* 1973;37(1):74-78.
16. Lombardo M. Fetal testosterone influences sexually dimorphic gray matter in the human brain. *J Neurosci* 2012;32:674-680.
17. Campano A. [ed]. Geneva Foundation for Medical Education and Research. *Human Sexual Differentiation*; 2016. Available at: www.gfmer.ch/Books/Reproductive_health/Human_sexual_differentiation.html. Accessed May 11, 2016.
18. Shenk, D. *The Genius in All of Us: Why everything you’ve been told about genetics, talent, and IQ is wrong*. (2010) New York, NY: Doubleday; p. 18.
19. Diamond, M. “Transsexuality Among Twins: identity concordance, transition, rearing, and orientation.” *International Journal of Transgenderism*, 14(1), 24–38. (Note: the abstract of this article erroneously states that the concordance rate from MZ twins is 20 percent. Dr. Cretella, the author of this paper, “Gender Dysphoria in Children,” has therefore referenced Dr. Diamond’s data directly to demonstrate that the actual concordance rate is slightly higher at 28 percent.)
20. Sax L. How Common is Intersex. *J Sex Res*. 2002 Aug;39(3):174-8. Available at <http://www.leonardsax.com/how-common-is-intersex-a-response-to-anne-fausto-sterling/> Accessed Nov 1, 2018.
21. Consortium on the Management of Disorders of Sex Development. *Clinical Guidelines for the Management of Disorders of Sex Development in Childhood*. Intersex Society of North America; 2006. Available at: www.dsdguidelines.org/files/clinical.pdf. Accessed Mar 20, 2016.
22. Zucker KJ, Bradley SJ. Gender Identity and Psychosexual Disorders. *FOCUS* 2005;3(4):598-617.
23. Zucker KJ, Bradley SJ, Ben-Dat DN, et al. Psychopathology in the parents of boys with gender identity disorder. *J Am Acad Child Adolesc Psychiatry* 2003;42:2-4.
24. 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* (2015) 9:9.
25. Littman L. Rapid-onset gender dysphoria in adolescents and young adults: A study of parental reports. *PLOS one*. August 2018 Available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0202330> Accessed Nov 1, 2018.
26. Zucker KJ, Spitzer RL. Was the Gender Identity Disorder of Childhood Diagnosis Introduced into DSM-III as a Backdoor Maneuver to Replace Homosexuality? *Journal of Sex and Marital Therapy*. 2005;31:31-42.
27. Roberts A. Considering alternative explanations for the associations among childhood adversity, childhood abuse, and adult sexual orientation: reply to Bailey and Bailey (2013) and Rind (2013). *Arch Sexual Behav* 2014;43:191-196.
28. Blom RM, Hennekam RC, Denys D. Body integrity identity disorder. *PLoS One* 2012;7(4).

29. Lawrence A. Clinical and theoretical parallels between desire for limb amputation and gender identity disorder. *Arch Sexual Behavior* 2006;35:263-278.
30. King CD. The meaning of normal. *Yale J Biol Med* 1945;18:493-501.
31. Cohen-Kettenis PT, Delemarre-van de Waal HA, Gooren LJ. The treatment of adolescent transsexuals: changing insights. *J Sexual Med* 2008;5:1892–1897.
32. Bailey MJ, Triea K. What many transsexual activists don't want you to know and why you should know it anyway. *Perspect Biol Med* 2007;50:521-534. Available at: www.ncbi.nlm.nih.gov/pubmed/17951886. Accessed May 11, 2016.
33. Sadjadi S. The endocrinologist's office—puberty suppression: saving children from a natural disaster? *Med Humanit* 2013;34:255-260.
34. Bertolote JM, Fleischmann A. Suicide and psychiatric diagnosis: a worldwide perspective. *World Psychiatry* 2002;1(3):181–185.
35. Eyler AE, Pang SC, Clark A. LGBT assisted reproduction: current practice and future possibilities. *LGBT Health* 2014;1(3):151-156.
36. Schmidt L, Levine R. Psychological outcomes and reproductive issues among gender dysphoric individuals. *Endocrinol Metab Clin N Am* 2015;44:773-785.
37. Jeffreys, S. The transgenering of children: gender eugenics. *Women's Studies International Forum* 2012;35:384-393.
38. Johnson SB, Blum RW, Giedd JN. Adolescent maturity and the brain: the promise and pitfalls of neuroscience research in adolescent health policy. *J Adolesc Health* 2009;45(3):216-221.
39. US Department of Health and Human Services. Nuremberg Code; 2015. Available at: www.stat.ncsu.edu/people/tsiatis/courses/st520/references/nuremberg-code.pdf. Accessed 5/15/16.
40. World Health Organization. Eliminating forced, coercive and otherwise involuntary sterilization. Interagency Statement; 2014. Available at: www.unaids.org/sites/default/files/media_asset/201405_sterilization_en.pdf. Accessed May 16, 2016.
41. Hayes, Inc. Sex reassignment surgery for the treatment of gender dysphoria. Hayes Medical Technology Directory. Lansdale, Pa.: Winifred Hayes; May 15, 2014.
42. Hayes, Inc. Hormone therapy for the treatment of gender dysphoria. Hayes Medical Technology Directory. Lansdale, Pa.: Winifred Hayes; May 19, 2014.
43. Kennedy P. Q & A with Norman Spack: a doctor helps children change their gender. *Boston Globe*, Mar 30, 2008. Available at http://archive.boston.com/bostonglobe/ideas/articles/2008/03/30/qa_with_norman_spack/. Accessed May 16, 2016.
44. Hembree WC, Cohen-Kettenis PT, Delemarre-van de Wall HA, et al. Endocrine treatment of transsexual persons: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2009;94:3132-3154.
45. Reardon S. Transgender youth study kicks off: scientists will track psychological and medical outcomes of controversial therapies to help transgender teens to transition. *Nature* 2016;531:560. Available at: www.nature.com/news/largest-ever-study-of-transgender-teenagers-set-to-kick-off-1.19637. Accessed May 16, 2016.
46. Keleman M. What do transgender children need? *Houstonian Magazine*, Nov 3, 2014. Available at: www.houstoniamag.com/articles/2014/11/3/what-do-transgender-children-need-november-2014. Accessed May 16, 2016.
47. Farwell S. Free to be themselves: Children's Medical Center Dallas opens clinic for transgender children and teenagers, the only pediatric center of its type in the Southwest. *Dallas Morning News*, Jun 4, 2015. Available at: <http://interactives.dallasnews.com/2015/gender/>. Accessed May 16, 2016.
48. De Vries ALC, Steensma TD, Doreleijers TAH, Cohen-Kettenis, PT. Puberty suppression in adolescents with gender identity disorder: a prospective follow-up study. *J Sex Med* 2011;8:2276-2283.
49. Feldman J, Brown GR, Deutsch MB, et al. Priorities for transgender medical and healthcare research. *Curr Opin Endocrinol Diabetes Obes* 2016;23:180-187.
50. Tangpricha V. Treatment of transsexualism. UpToDate Available at: www.uptodate.com/contents/treatment-of-transsexualism?source=search_result&search=treatment+of+transsexualism&selectedTitle=1percent7E8. Accessed May 14, 2016.
51. Moore E, Wisniewski A, Dobs A. Endocrine treatment of transsexual people: a review of treatment regimens, outcomes, and adverse effects. *J Clin Endocrinol Metab* 2003;88:3467-3473.
52. Dhejne, C, et al. "Long-Term Follow-Up of Transsexual Persons Undergoing Sex Reassignment Surgery:

Cohort Study in Sweden." PLoS ONE, 2011; 6(2). Affiliation: Department of Clinical Neuroscience, Division of Psychiatry, Karolinska Institutet, Stockholm, Sweden. Accessed 7.11.16 from <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0016885>.

53. Clements-Nolle, K., et al. HIV prevalence, risk behaviors, health care use and mental health status of transgender persons: implications for public health intervention. Am J Public Health 2001;91(6):915-21.

54. Kuhn, A., et al. Quality of Life 15 years after sex reassignment surgery for transsexualism. Fertility and Sterility 2009;92(5):1685-89.

55. Burgess D, Lee R, Tran A, van Ryn M. Effects of Perceived Discrimination on Mental Health and Mental Health Services Utilization Among Gay, Lesbian, Bisexual and Transgender Persons. Journal of LGBT Health Research 2008;3(4): 1-14.

Share this:



Like this:

Like



4 bloggers like this.

Navigation

- [Become a Member Today!](#)
- [Renew Your Membership](#)
- [National Meeting](#)
- [Issues in Medical Ethics](#)
- [The College Store](#)
- [Lead Your Child](#)
- [Patient Handouts](#)
- [Resources](#)

Search

Enter search keywords...

Copyright © 2019, American College of Pediatricians ®, All Rights Reserved



Long-Term Follow-Up of Transsexual Persons Undergoing Sex Reassignment Surgery: Cohort Study in Sweden

Cecilia Dhejne¹, Paul Lichtenstein², Marcus Boman², Anna L. V. Johansson², Niklas Långström^{2,3}, Mikael Landén^{1,2,4*}

1 Department of Clinical Neuroscience, Division of Psychiatry, Karolinska Institutet, Stockholm, Sweden, **2** Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden, **3** Centre for Violence Prevention, Karolinska Institutet, Stockholm, Sweden, **4** Institute of Neuroscience and Physiology, The Sahlgrenska Academy at Gothenburg University, Gothenburg, Sweden

Abstract

Context: The treatment for transsexualism is sex reassignment, including hormonal treatment and surgery aimed at making the person's body as congruent with the opposite sex as possible. There is a dearth of long term, follow-up studies after sex reassignment.

Objective: To estimate mortality, morbidity, and criminal rate after surgical sex reassignment of transsexual persons.

Design: A population-based matched cohort study.

Setting: Sweden, 1973–2003.

Participants: All 324 sex-reassigned persons (191 male-to-females, 133 female-to-males) in Sweden, 1973–2003. Random population controls (10:1) were matched by birth year and birth sex or reassigned (final) sex, respectively.

Main Outcome Measures: Hazard ratios (HR) with 95% confidence intervals (CI) for mortality and psychiatric morbidity were obtained with Cox regression models, which were adjusted for immigrant status and psychiatric morbidity prior to sex reassignment (adjusted HR [aHR]).

Results: The overall mortality for sex-reassigned persons was higher during follow-up (aHR 2.8; 95% CI 1.8–4.3) than for controls of the same birth sex, particularly death from suicide (aHR 19.1; 95% CI 5.8–62.9). Sex-reassigned persons also had an increased risk for suicide attempts (aHR 4.9; 95% CI 2.9–8.5) and psychiatric inpatient care (aHR 2.8; 95% CI 2.0–3.9). Comparisons with controls matched on reassigned sex yielded similar results. Female-to-males, but not male-to-females, had a higher risk for criminal convictions than their respective birth sex controls.

Conclusions: Persons with transsexualism, after sex reassignment, have considerably higher risks for mortality, suicidal behaviour, and psychiatric morbidity than the general population. Our findings suggest that sex reassignment, although alleviating gender dysphoria, may not suffice as treatment for transsexualism, and should inspire improved psychiatric and somatic care after sex reassignment for this patient group.

Citation: Dhejne C, Lichtenstein P, Boman M, Johansson ALV, Långström N, et al. (2011) Long Term Follow Up of Transsexual Persons Undergoing Sex Reassignment Surgery: Cohort Study in Sweden. PLoS ONE 6(2): e16885. doi:10.1371/journal.pone.0016885

Editor: James Scott, The University of Queensland, Australia

Received: September 30, 2010; **Accepted:** January 9, 2011; **Published:** February 22, 2011

Copyright: © 2011 Dhejne et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Funding: Financial support was provided through the regional agreement on medical training and clinical research (ALF) between Stockholm County Council and the Karolinska Institutet, and through grants from the Swedish Medical Research Council (K2008 62x 14647 06 3) and the Royal Swedish Academy of Sciences (Torsten Amundson's Foundation). The sponsors of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. All authors had full access to the data in the study and the final responsibility for the decision to submit for publication was made by the corresponding author.

Competing Interests: The authors have declared that no competing interests exist.

* E mail: mikael.landen@neuro.gu.se

Introduction

Transsexualism (ICD 10),[1] or gender identity disorder (DSM IV),[2] is a condition in which a person's gender identity—the sense of being a man or a woman—contradicts his or her bodily sex characteristics. The individual experiences gender dysphoria and desires to live and be accepted as a member of the opposite sex.

The treatment for transsexualism includes removal of body hair, vocal training, and cross sex hormonal treatment aimed at making the person's body as congruent with the opposite sex as possible to alleviate the gender dysphoria. Sex reassignment also involves the surgical removal of body parts to make external sexual characteristics resemble those of the opposite sex, so called sex reassignment/confirmation surgery (SRS). This is a unique

intervention not only in psychiatry but in all of medicine. The present form of sex reassignment has been practised for more than half a century and is the internationally recognized treatment to ease gender dysphoria in transsexual persons.[3,4]

Despite the long history of this treatment, however, outcome data regarding mortality and psychiatric morbidity are scant. With respect to suicide and deaths from other causes after sex reassignment, an early Swedish study followed 24 transsexual persons for an average of six years and reported one suicide.[5] A subsequent Swedish study recorded three suicides after sex reassignment surgery of 175 patients.[6] A recent Swedish follow up study reported no suicides in 60 transsexual patients, but one death due to complications after the sex reassignment surgery.[7] A Danish study reported death by suicide in 3 out of 29 operated male to female transsexual persons followed for an average of six years.[8] By contrast, a Belgian study of 107 transsexual persons followed for 4–6 years found no suicides or deaths from other causes.[9] A large Dutch single centre study (N 1,109), focusing on adverse events following hormonal treatment, compared the outcome after cross sex hormone treatment with national Dutch standardized mortality and morbidity rates and found no increased mortality, with the exception of death from suicide and AIDS in male to females 25–39 years of age.[10] The same research group concluded in a recent report that treatment with cross sex hormones seems acceptably safe, but with the reservation that solid clinical data are missing.[11] A limitation with respect to the Dutch cohort is that the proportion of patients treated with cross sex hormones who also had surgical sex reassignment is not accounted for.[10]

Data is inconsistent with respect to psychiatric morbidity post sex reassignment. Although many studies have reported psychiatric and psychological improvement after hormonal and/or surgical treatment,[7,12,13,14,15,16] other have reported on regrets,[17] psychiatric morbidity, and suicide attempts after SRS.[9,18] A recent systematic review and meta analysis concluded that approximately 80% reported subjective improvement in terms of gender dysphoria, quality of life, and psychological symptoms, but also that there are studies reporting high psychiatric morbidity and suicide rates after sex reassignment.[19] The authors concluded though that the evidence base for sex reassignment “is of very low quality due to the serious methodological limitations of included studies.”

The methodological shortcomings have many reasons. First, the nature of sex reassignment precludes double blind randomized controlled studies of the result. Second, transsexualism is rare [20] and many follow ups are hampered by small numbers of subjects.[5,8,21,22,23,24,25,26,27,28] Third, many sex reassigned persons decline to participate in follow up studies, or relocate after surgery, resulting in high drop out rates and consequent selection bias.[6,9,12,21,24,28,29,30] Fourth, several follow up studies are hampered by limited follow up periods.[7,9,21,22,26,30] Taken together, these limitations preclude solid and generalisable conclusions. A long term population based controlled study is one way to address these methodological shortcomings.

Here, we assessed mortality, psychiatric morbidity, and psychosocial integration expressed in criminal behaviour after sex reassignment in transsexual persons, in a total population cohort study with long term follow up information obtained from Swedish registers. The cohort was compared with randomly selected population controls matched for age and gender. We adjusted for premorbid differences regarding psychiatric morbidity and immigrant status. This study design sheds new light on transsexual persons' health after sex reassignment. It does not, however, address whether sex reassignment is an effective treatment or not.

Methods

National registers

The study population was identified by the linkage of several Swedish national registers, which contained a total of 13.8 million unique individuals. The Hospital Discharge Register (HDR, held by the National Board of Health and Welfare) contains discharge diagnoses, up to seven contributory diagnoses, external causes of morbidity or mortality, surgical procedure codes, and discharge date. Discharge diagnoses are coded according to the 8th (1969–1986), 9th (1987–1996), and 10th editions (1997) of the International Classification of Diseases (ICD). The register covers virtually all psychiatric inpatient episodes in Sweden since 1973. Discharges that occurred up to 31 December 2003 were included. Surgical procedure codes could not be used for this study due to the lack of a specific code for sex reassignment surgery. The Total Population Register (TPR, held by Statistics Sweden) is comprised of data about the entire Swedish population. Through linkage with the Total Population Register it was possible to identify birth date and birth gender for all study subjects. The register is updated every year and gender information was available up to 2004/2005. The Medical Birth Register (MBR) was established in 1973 and contains birth data, including gender of the child at birth. National censuses based on mandatory self report questionnaires completed by all adult citizens in 1960, 1970, 1980, and 1990 provided information on individuals, households, and dwellings, including gender, living area, and highest educational level. Complete migration data, including country of birth for immigrants for 1969–2003, were obtained from the TPR. In addition to educational information from the censuses, we also obtained highest educational level data for 1990 and 2000 from the Register of Education. The Cause of Death Register (CDR, Statistics Sweden) records all deaths in Sweden since 1952 and provided information on date of death and causes of death. Death events occurring up to 31 December 2003 are included in the study. The Crime Register (held by the National Council of Crime Prevention) provided information regarding crime type and date on all criminal convictions in Sweden during the period 1973–2004. Attempted and aggravated forms of all offences were also included. All crimes in Sweden are registered regardless of insanity at the time of perpetration; for example, for individuals who suffered from psychosis at the time of the offence. Moreover, conviction data include individuals who received custodial or non-custodial sentences and cases where the prosecutor decided to caution or fine without court proceedings. Finally, Sweden does not differ considerably from other members of the European Union regarding rates of violent crime and their resolution.[31]

Study population, identification of sex-reassigned persons (exposure assessment)

The study was designed as a population based matched cohort study. We used the individual national registration number, assigned to all Swedish residents, including immigrants on arrival, as the primary key through all linkages. The registration number consists of 10 digits; the first six provide information of the birth date, whereas the ninth digit indicates the gender. In Sweden, a person presenting with gender dysphoria is referred to one of six specialised gender teams that evaluate and treat patients principally according to international consensus guidelines: Standards of Care.[3] With a medical certificate, the person applies to the National Board of Health and Welfare to receive permission for sex reassignment surgery and a change of legal sex status. A new national registration number signifying the new gender is assigned after sex reassignment surgery. The National

Board of Health and Welfare maintains a link between old and new national registration numbers, making it possible to follow individuals undergoing sex reassignment across registers and over time. Hence, sex reassignment surgery in Sweden requires (i) a transsexualism diagnosis and (ii) permission from the National Board of Health and Welfare.

A person was defined as exposed to sex reassignment surgery if two criteria were met: (i) at least one inpatient diagnosis of gender identity disorder diagnosis without concomitant psychiatric diagnoses in the Hospital Discharge Register, and (ii) at least one discrepancy between gender variables in the Medical Birth Register (from 1973 and onwards) or the National Censuses from 1960, 1970, 1980, or 1990 and the latest gender designation in the Total Population Register. The first criterion was employed to capture the hospitalization for sex reassignment surgery that serves to secure the diagnosis and provide a time point for sex reassignment surgery; the plastic surgeons namely record the reason for sex reassignment surgery, i.e., transsexualism, but not any co occurring psychiatric morbidity. The second criterion was used to ensure that the person went through all steps in sex reassignment and also changed sex legally.

The date of sex reassignment (start of follow up) was defined as the first occurrence of a gender identity disorder diagnosis, without any other concomitant psychiatric disorder, in the Hospital Discharge Register after the patient changed sex status (any discordance in sex designation across the Censuses, Medical Birth, and Total Population registers). If this information was missing, we used instead the closest date in the Hospital Discharge Register on which the patient was diagnosed with gender identity disorder without concomitant psychiatric disorder prior to change in sex status. The reason for prioritizing the use of a gender identity disorder diagnosis *after* changed sex status over *before* was to avoid overestimating person years at risk of sex reassigned person.

Using these criteria, a total of 804 patients with gender identity disorder were identified, whereof 324 displayed a shift in the gender variable during the period 1973–2003. The 480 persons that did not shift gender variable comprise persons who either did not apply, or were not approved, for sex reassignment surgery. Moreover, the ICD 9 code 302 is a non specific code for sexual disorders. Hence, this group might also comprise persons that were hospitalized for sexual disorders other than transsexualism. Therefore, they were omitted from further analyses. Of the remaining 324 persons, 288 were identified with the gender identity diagnosis *after* and 36 *before* change of sex status. Out of the 288 persons identified *after* changed sex status, 185 could also be identified *before* change in sex status. The median time lag between the hospitalization *before* and *after* sex change for these 185 persons was 0.96 years (mean 2.2 years, SD 3.3).

Gender identity disorder was coded according to ICD 8: 302.3 (transsexualism) and 302.9 (sexual deviation NOS); ICD 9: 302 (overall code for sexual deviations and disorders, more specific codes were not available in ICD 9); and ICD 10: F64.0 (transsexualism), F64.1 (dual role transvestism), F64.8 (other gender identity disorder), and F64.9 (gender identity disorder NOS). Other psychiatric disorders were coded as ICD 8: 290 301 and 303 315; ICD 9: 290 301 and 303 319; and ICD 10: F00 F63 as well as F65 F99.

Identification of population-based controls (unexposed group)

For each exposed person ($N = 324$), we randomly selected 10 unexposed controls. A person was defined as unexposed if there were no discrepancies in sex designation across the Censuses, Medical Birth, and Total Population registers *and* no gender

identity disorder diagnosis according to the Hospital Discharge Register. Control persons were matched by sex and birth year and had to be alive and residing in Sweden at the estimated sex reassignment date of the case person. To study possible gender specific effects on outcomes of interest, we used two different control groups: one with the same sex as the case individual at birth (birth sex matching) and the other with the sex that the case individual had been reassigned to (final sex matching).

Outcome measures

We studied mortality, psychiatric morbidity, accidents, and crime following sex reassignment. More specifically, we investigated: (1) all cause mortality, (2) death by definite/uncertain suicide, (3) death by cardiovascular disease, and (4) death by tumour. Morbidity included (5) any psychiatric disorder (gender identity disorders excluded), (6) alcohol/drug misuse and dependence, (7) definite/uncertain suicide attempt, and (8) accidents. Finally, we addressed court convictions for (9) any criminal offence and (10) any violent offence. Each individual could contribute with several outcomes, but only one event per outcome. Causes of death (Cause of Death Registry from 1952 and onwards) were defined according to ICD as suicide (ICD 8 and ICD 9 codes E950 E959 and E980 E989, ICD 10 codes X60 X84 and Y10 Y34); cardiovascular disease (ICD 8 codes 390 458, ICD 9 codes 390 459, ICD 10 codes I00 I99); neoplasms (ICD 8 and ICD 9 codes 140 239, ICD 10 codes C00 D48), any psychiatric disorder (gender identity disorders excluded); (ICD 8 codes 290 301 and 303 315, ICD 9 codes 290 301 and 303 319, ICD 10 codes F00 F63 and F65 F99); alcohol/drug abuse and dependence (ICD 8 codes 303 304, ICD 9 codes 303 305 (tobacco use disorder excluded), ICD 10 codes F10 F16 and F18 F19 (x5 excluded); and accidents (ICD 8 and ICD 9 codes E800 E929, ICD 10 codes V01 X59).

Any criminal conviction during follow up was counted; specifically, violent crime was defined as homicide and attempted homicide, aggravated assault and assault, robbery, threatening behaviour, harassment, arson, or any sexual offense.[32]

Covariates

Severe psychiatric morbidity was defined as inpatient care according to ICD 8 codes 291, 295 301, 303 304, and 307; ICD 9 codes 291 292, 295 298, 300 301, 303 305 (tobacco use disorder excluded), 307.1, 307.5, 308 309, and 311; ICD 10 codes F10 F16, F18 F25, F28 F45, F48, F50, and F60 F62. Immigrant status, defined as individuals born abroad, was obtained from the Total Population Register. All outcome/covariate variables were dichotomized (i.e., affected or unaffected) and without missing values.

Statistical analyses

Each individual contributed person time from study entry (for exposed: date of sex reassignment; for unexposed: date of sex reassignment of matched case) until date of outcome event, death, emigration, or end of study period (31 December 2003), whichever came first. The association between exposure (sex reassignment) and outcome (mortality, morbidity, crime) was measured by hazard ratios (HR) with 95% CIs, taking follow up time into account. HRs were estimated from Cox proportional hazard regression models, stratified on matched sets (1:10) to account for the matching by sex, age, and calendar time (birth year). We present crude HRs (though adjusted for sex and age through matching) and confounder adjusted HRs [aHRs] for all outcomes. The two potential confounders, immigrant status (yes/no) and history of severe psychiatric morbidity (yes/no) prior to sex

reassignment, were chosen based on previous research [18,33] and different prevalence across cases and controls (Table 1).

Gender separated analyses were performed and a Kaplan Meier survival plot graphically illustrates the survival of the sex reassigned cohort and matched controls (all cause mortality) over time. The significance level was set at 0.05 (all tests were two sided). All outcome/covariate variables were without missing values, since they are generated from register data, which are either present (affected) or missing (unaffected). The data were analysed using SAS version 9.1 (SAS Institute Inc., Cary, NC, USA).

Ethics

The data linking of national registers required for this study was approved by the IRB at Karolinska Institutet, Stockholm. All data were analyzed anonymously; therefore, informed consent for each individual was neither necessary nor possible.

Results

We identified 324 transsexual persons (exposed cohort) who underwent sex reassignment surgery and were assigned a new legal sex between 1973 and 2003. These constituted the sex reassigned (exposed) group. Fifty nine percent (N = 191) of sex reassigned persons were male to females and 41% (N = 133) female to males, yielding a sex ratio of 1.4:1 (Table 1).

The average follow up time for all cause mortality was 11.4 (median 9.1) years. The average follow up time for the risk of being hospitalized for any psychiatric disorder was 10.4 (median 8.1).

Characteristics prior to sex reassignment

Table 1 displays demographic characteristics of sex reassigned and control persons prior to study entry (sex reassignment). There were no substantial differences between female to males and male to females regarding measured baseline characteristics. Immigrant status was twice as common among transsexual individuals compared to controls, living in an urban area somewhat more common, and higher education about equally prevalent. Trans sexual individuals had been hospitalized for psychiatric morbidity other than gender identity disorder prior to sex reassignment about four times more often than controls. To adjust for these baseline discrepancies, hazard ratios adjusted for immigrant status and psychiatric morbidity prior to baseline are presented for all outcomes [aHRs].

Mortality

Table 2 describes the risks for selected outcomes during follow up among sex reassigned persons, compared to same age controls of the same birth sex. Sex reassigned transsexual persons of both genders had approximately a three times higher risk of all cause mortality than controls, also after adjustment for covariates. Table 2

Table 1. Baseline characteristics among sex-reassigned subjects in Sweden (N=324) and population controls matched for birth year and sex.

Characteristic at baseline	Sex-reassigned subjects (N = 324)	Birth-sex matched controls (N = 3,240)	Final-sex matched controls (N = 3,240)
Gender			
Female at birth, male after sex change	133 (41%)	1,330 (41%)	1,330 (41%)
Male at birth, female after sex change	191 (59%)	1,910 (59%)	1,910 (59%)
Average age at study entry [years] (SD, min max)			
Female at birth, male after sex change	33.3 (8.7, 20 62)	33.3 (8.7, 20 62)	33.3 (8.7, 20 62)
Male at birth, female after sex change	36.3 (10.1, 21 69)	36.3 (10.1, 21 69)	36.3 (10.1, 21 69)
Both genders	35.1 (9.7, 20 69)	35.1 (9.7, 20 69)	35.1 (9.7, 20 69)
Immigrant status			
Female at birth, male after sex change	28 (21%)	118 (9%)	100 (8%)
Male at birth, female after sex change	42 (22%)	176 (9%)	164 (9%)
Both genders	70 (22%)	294 (9%)	264 (8%)
Less than 10 years of schooling prior to entry vs. 10 years or more			
Females at birth, males after sex change	49 (44%); 62 (56%)	414 (37%); 714 (63%)	407 (36%); 713 (64%)
Males at birth, females after sex change	61 (41%); 89 (59%)	665 (40%); 1,011 (60%)	595 (35%); 1,091 (65%)
All individuals with data	110 (42%); 151 (58%)	1,079 (38%); 1,725 (62%)	1,002 (36%); 1,804 (64%)
Psychiatric morbidity* prior to study entry			
Female at birth, male after sex change	22 (17%)	47 (4%)	42 (3%)
Male at birth, female after sex change	36 (19%)	76 (4%)	72 (4%)
Both genders	58 (18%)	123 (4%)	114 (4%)
Rural [vs. urban] living area prior to entry			
Female at birth, male after sex change	13 (10%)	180 (14%)	195 (15%)
Male at birth, female after sex change	20 (10%)	319 (17%)	272 (14%)
Both genders	33 (10%)	499 (15%)	467 (14%)

Note:

*Hospitalizations for gender identity disorder were not included.

doi:10.1371/journal.pone.0016885.t001

Table 2. Risk of various outcomes among sex-reassigned subjects in Sweden (N = 324) compared to population controls matched for birth year and birth sex.

	Number of events cases/controls 1973–2003	Outcome incidence rate per 1000 person-years 1973–2003 (95% CI)		Crude hazard ratio (95% CI) 1973–2003	Adjusted* hazard ratio (95% CI) 1973–2003	Adjusted* hazard ratio (95% CI) 1973–1988	Adjusted* hazard ratio (95% CI) 1989–2003
		Cases	Controls				
Any death	27/99	7.3 (5.0 10.6)	2.5 (2.0 3.0)	2.9 (1.9 4.5)	2.8 (1.8 4.3)	3.1 (1.9 5.0)	1.9 (0.7 5.0)
Death by suicide	10/5	2.7 (1.5 5.0)	0.1 (0.1 0.3)	19.1 (6.5 55.9)	19.1 (5.8 62.9)	N/A	N/A
Death by cardiovascular disease	9/42	2.4 (1.3 4.7)	1.1 (0.8 1.4)	2.6 (1.2 5.4)	2.5 (1.2 5.3)	N/A	N/A
Death by neoplasm	8/38	2.2 (1.1 4.3)	1.0 (0.7 1.3)	2.1 (1.0 4.6)	2.1 (1.0 4.6)	N/A	N/A
Any psychiatric hospitalisation‡	64/173	19.0 (14.8 24.2)	4.2 (3.6 4.9)	4.2 (3.1 5.6)	2.8 (2.0 3.9)	3.0 (1.9 4.6)	2.5 (1.4 4.2)
Substance misuse	22/78	5.9 (3.9 8.9)	1.8 (1.5 2.3)	3.0 (1.9 4.9)	1.7 (1.0 3.1)	N/A	N/A
Suicide attempt	29/44	7.9 (5.5 11.4)	1.0 (0.8 1.4)	7.6 (4.7 12.4)	4.9 (2.9 8.5)	7.9 (4.1 15.3)	2.0 (0.7 5.3)
Any accident	32/233	9.0 (6.3 12.7)	5.7 (5.0 6.5)	1.6 (1.1 2.3)	1.4 (1.0 2.1)	1.6 (1.0 2.5)	1.1 (0.5 2.2)
Any crime	60/350	18.5 (14.3 23.8)	9.0 (8.1 10.0)	1.9 (1.4 2.5)	1.3 (1.0 1.8)	1.6 (1.1 2.4)	0.9 (0.6 1.5)
Violent crime	14/61	3.6 (2.1 6.1)	1.4 (1.1 1.8)	2.7 (1.5 4.9)	1.5 (0.8 3.0)	N/A	N/A

Notes:

*Adjusted for psychiatric morbidity prior to baseline and immigrant status.

‡Hospitalisations for gender identity disorder were excluded.

N/A Not applicable due to sparse data.

doi:10.1371/journal.pone.0016885.t002

separately lists the outcomes depending on when sex reassignment was performed: during the period 1973–1988 or 1989–2003. Even though the overall mortality was increased across both time periods, it did not reach statistical significance for the period 1989–2003. The Kaplan Meier curve (Figure 1) suggests that survival of transsexual persons started to diverge from that of matched controls after about 10 years of follow up. The cause specific mortality from

suicide was much higher in sex reassigned persons, compared to matched controls. Mortality due to cardiovascular disease was moderately increased among the sex reassigned, whereas the numerically increased risk for malignancies was borderline statistically significant. The malignancies were lung cancer (N = 3), tongue cancer (N = 1), pharyngeal cancer (N = 1), pancreas cancer (N = 1), liver cancer (N = 1), and unknown origin (N = 1).

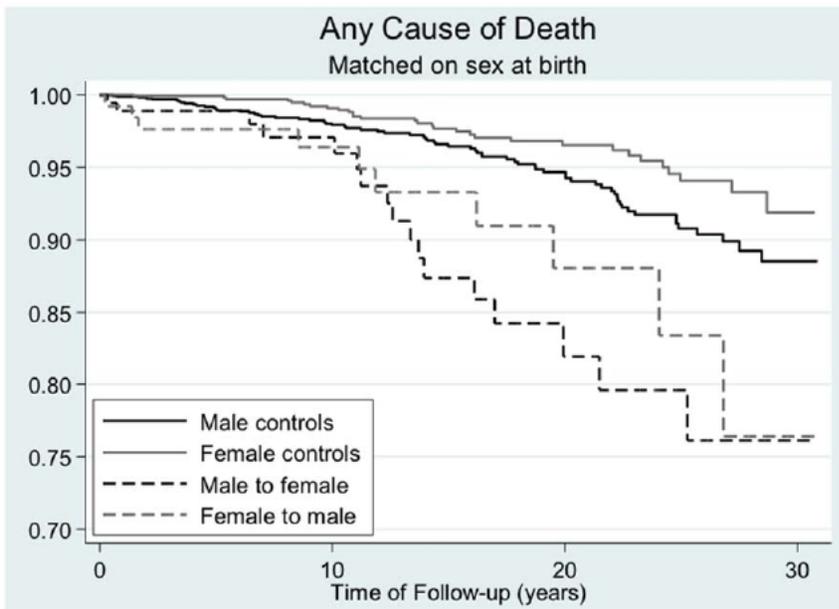


Figure 1. Death from any cause as a function of time after sex reassignment among 324 transsexual persons in Sweden (male to female: N = 191, female to male: N = 133), and population controls matched on birth year. doi:10.1371/journal.pone.0016885.g001

Psychiatric morbidity, substance misuse, and accidents

Sex reassigned persons had a higher risk of inpatient care for a psychiatric disorder other than gender identity disorder than controls matched on birth year and birth sex (Table 2). This held after adjustment for prior psychiatric morbidity, and was true regardless of whether sex reassignment occurred before or after 1989. In line with the increased mortality from suicide, sex reassigned individuals were also at a higher risk for suicide attempts, though this was not statistically significant for the time period 1989–2003. The risks of being hospitalised for substance misuse or accidents were not significantly increased after adjusting for covariates (Table 2).

Crime rate

Transsexual individuals were at increased risk of being convicted for any crime or violent crime after sex reassignment (Table 2); this was, however, only significant in the group who underwent sex reassignment before 1989.

Gender differences

Comparisons of female to males and male to females, although hampered by low statistical power and associated wide confidence intervals, suggested mostly similar risks for adverse outcomes (Tables S1 and S2). However, violence against self (suicidal behaviour) and others ([violent] crime) constituted important exceptions. First, male to females had significantly increased risks for suicide attempts compared to both female (aHR 9.3; 95% CI 4.4–19.9) and male (aHR 10.4; 95% CI 4.9–22.1) controls. By contrast, female to males had significantly increased risk of suicide attempts only compared to male controls (aHR 6.8; 95% CI 2.1–21.6) but not compared to female controls (aHR 1.9; 95% CI 0.7–4.8). This suggests that male to females are at higher risk for suicide attempts after sex reassignment, whereas female to males maintain a female pattern of suicide attempts after sex reassignment (Tables S1 and S2).

Second, regarding any crime, male to females had a significantly increased risk for crime compared to female controls (aHR 6.6; 95% CI 4.1–10.8) but not compared to males (aHR 0.8; 95% CI 0.5–1.2). This indicates that they retained a male pattern regarding criminality. The same was true regarding violent crime. By contrast, female to males had higher crime rates than female controls (aHR 4.1; 95% CI 2.5–6.9) but did not differ from male controls. This indicates a shift to a male pattern regarding criminality and that sex reassignment is coupled to increased crime rate in female to males. The same was true regarding violent crime.

Discussion

Principal findings and comparison with previous research

We report on the first nationwide population based, long term follow up of sex reassigned transsexual persons. We compared our cohort with randomly selected population controls matched for age and gender. The most striking result was the high mortality rate in both male to females and female to males, compared to the general population. This contrasts with previous reports (with one exception[8]) that did not find an increased mortality rate after sex reassignment, or only noted an increased risk in certain subgroups.[7,9,10,11] Previous clinical studies might have been biased since people who regard their sex reassignment as a failure are more likely to be lost to follow up. Likewise, it is cumbersome to track deceased persons in clinical follow up studies. Hence, population based register studies like the present are needed to improve representativity.[19,34]

The poorer outcome in the present study might also be explained by longer follow up period (median >10 years) compared to previous studies. In support of this notion, the survival curve (Figure 1) suggests increased mortality from ten years after sex reassignment and onwards. In accordance, the overall mortality rate was only significantly increased for the group operated before 1989. However, the latter might also be explained by improved health care for transsexual persons during 1990s, along with altered societal attitudes towards persons with different gender expressions.[35]

Mortality due to cardiovascular disease was significantly increased among sex reassigned individuals, albeit these results should be interpreted with caution due to the low number of events. This contrasts, however, a Dutch follow up study that reported no increased risk for cardiovascular events.[10,11] A recent meta analysis concluded, however, that data on cardiovascular outcome after cross sex steroid use are sparse, inconclusive, and of very low quality.[34]

With respect to neoplasms, prolonged hormonal treatment might increase the risk for malignancies,[36] but no previous study has tested this possibility. Our data suggested that the cause specific risk of death from neoplasms was increased about twice (borderline statistical significance). These malignancies (see Results), however, are unlikely to be related to cross hormonal treatment.

There might be other explanations to increased cardiovascular death and malignancies. Smoking was in one study reported in almost 50% by the male to females and almost 20% by female to males.[9] It is also possible that transsexual persons avoid the health care system due to a presumed risk of being discriminated.

Mortality from suicide was strikingly high among sex reassigned persons, also after adjustment for prior psychiatric morbidity. In line with this, sex reassigned persons were at increased risk for suicide attempts. Previous reports [6,8,10,11] suggest that transsexualism is a strong risk factor for suicide, also after sex reassignment, and our long term findings support the need for continued psychiatric follow up for persons at risk to prevent this.

Inpatient care for psychiatric disorders was significantly more common among sex reassigned persons than among matched controls, both before and after sex reassignment. It is generally accepted that transsexuals have more psychiatric ill health than the general population prior to the sex reassignment.[18,21,22,33] It should therefore come as no surprise that studies have found high rates of depression,[9] and low quality of life[16,25] also after sex reassignment. Notably, however, in this study the increased risk for psychiatric hospitalisation persisted even after adjusting for psychiatric hospitalisation prior to sex reassignment. This suggests that even though sex reassignment alleviates gender dysphoria, there is a need to identify and treat co occurring psychiatric morbidity in transsexual persons not only before but also after sex reassignment.

Criminal activity, particularly violent crime, is much more common among men than women in the general population. A previous study of all applications for sex reassignment in Sweden up to 1992 found that 9.7% of male to female and 6.1% of female to male applicants had been prosecuted for a crime.[33] Crime after sex reassignment, however, has not previously been studied. In this study, male to female individuals had a higher risk for criminal convictions compared to female controls but not compared to male controls. This suggests that the sex reassignment procedure neither increased nor decreased the risk for criminal offending in male to females. By contrast, female to males were at a higher risk for criminal convictions compared to female controls and did not differ from male controls, which suggests increased crime proneness in female to males after sex reassignment.

Strengths and limitations of the study

Strengths of this study include nationwide representativity over more than 30 years, extensive follow up time, and minimal loss to follow up. Many previous studies suffer from low outcome ascertainment,[6,9,21,29] whereas this study has captured almost the entire population of sex reassigned transsexual individuals in Sweden from 1973–2003. Moreover, previous outcome studies have mixed pre operative and post operative transsexual persons,[22,37] while we included only post operative transsexual persons that also legally changed sex. Finally, whereas previous studies either lack a control group or use standardised mortality rates or standardised incidence rates as comparisons,[9,10,11] we selected random population controls matched by birth year, and either birth or final sex.

Given the nature of sex reassignment, a double blind randomized controlled study of the result after sex reassignment is not feasible. We therefore have to rely on other study designs. For the purpose of evaluating whether sex reassignment is an effective treatment for gender dysphoria, it is reasonable to compare reported gender dysphoria pre and post treatment. Such studies have been conducted either prospectively[7,12] or retrospectively,[5,6,9,22,25,26,29,38] and suggest that sex reassignment of transsexual persons improves quality of life and gender dysphoria. The limitation is of course that the treatment has not been assigned randomly and has not been carried out blindly.

For the purpose of evaluating the safety of sex reassignment in terms of morbidity and mortality, however, it is reasonable to compare sex reassigned persons with matched population controls. The caveat with this design is that transsexual persons before sex reassignment might differ from healthy controls (although this bias can be statistically corrected for by adjusting for baseline differences). It is therefore important to note that the current study is only informative with respect to transsexual persons health after sex reassignment; no inferences can be drawn as to the effectiveness of sex reassignment as a treatment for transsexualism. In other words, the results should not be interpreted such as sex reassignment *per se* increases morbidity and mortality. Things might have been even worse without sex reassignment. As an analogy, similar studies have found increased somatic morbidity, suicide rate, and overall mortality for patients treated for bipolar disorder and schizophrenia.[39,40] This is important information, but it does not follow that mood stabilizing treatment or antipsychotic treatment is the culprit.

Other facets to consider are first that this study reflects the outcome of psychiatric and somatic treatment for transsexualism provided in Sweden during the 1970s and 1980s. Since then, treatment has evolved with improved sex reassignment surgery, refined hormonal treatment,[11,41] and more attention to psychosocial care that might have improved the outcome. Second, transsexualism is a rare condition and Sweden is a small country (9.2 million inhabitants in 2008). Hence, despite being based on a

comparatively large national cohort and long term follow up, the statistical power was limited. Third, regarding psychiatric morbidity after sex reassignment, we assessed inpatient psychiatric care. Since most psychiatric care is provided in outpatient settings (for which no reliable data were available), underestimation of the *absolute* prevalences was inevitable. However, there is no reason to believe that this would change the *relative risks* for psychiatric morbidity unless sex reassigned transsexual individuals were more likely than matched controls to be admitted to hospital for any given psychiatric condition.

Finally, to estimate start of follow up, we prioritized using the date of a gender identity disorder diagnosis *after* changed sex status over *before* changed sex status, in order to avoid overestimating person years at risk after sex reassignment. This means that adverse outcomes might have been underestimated. However, given that the median time lag between the hospitalization before and after change of sex status was less than a year (see Methods), this maneuver is unlikely to have influenced the results significantly. Moreover, all deaths will be recorded regardless of this exercise and mortality hence correctly estimated.

Conclusion

This study found substantially higher rates of overall mortality, death from cardiovascular disease and suicide, suicide attempts, and psychiatric hospitalisations in sex reassigned transsexual individuals compared to a healthy control population. This highlights that post surgical transsexuals are a risk group that need long term psychiatric and somatic follow up. Even though surgery and hormonal therapy alleviates gender dysphoria, it is apparently not sufficient to remedy the high rates of morbidity and mortality found among transsexual persons. Improved care for the transsexual group after the sex reassignment should therefore be considered.

Supporting Information

Table S1 Risk of various outcomes in sex-reassigned persons in Sweden compared to population controls matched for birth year and birth sex.

(DOCX)

Table S2 Risk of various outcomes in sex-reassigned persons in Sweden compared to controls matched for birth year and final sex.

(DOCX)

Author Contributions

Conceived and designed the experiments: CD PL AJ NL ML. Performed the experiments: MB AJ. Analyzed the data: CD PL MB AJ NL ML. Contributed reagents/materials/analysis tools: PL NL AJ. Wrote the paper: CD PL MB AJ NL ML.

References

1. World Health Organization (1993) The ICD-10 Classification of Mental and Behavioural Disorders. Diagnostic criteria for research. Geneva: WHO.
2. American Psychiatric Association, ed (1994) Diagnostic and Statistical Manual of Mental Disorders. Washington, DC: APA.
3. Meyer W, Bockting W, Cohen-Kettenis P, Coleman E, DiCeglie D, et al. (2002) The Harry Benjamin International Gender Dysphoria Association's Standards of Care for Gender Identity Disorders, Sixth Version. *Journal of Psychology & Human Sexuality* 13: 1–30.
4. Cohen-Kettenis PT, Gooren LJG (1999) Transsexualism: A review of etiology, diagnosis and treatment. *J Psychosom Res* 46: 315–333.
5. Wälinder J, Thuwe I (1975) A social-psychiatric follow-up study of 24 sex-reassigned transsexuals. Göteborg, Sweden: Scandinavian University Books.
6. Eldh J, Berg A, Gustafsson M (1997) Long-term follow up after sex reassignment surgery. *Scand J Plast Reconstr Surg Hand Surg* 31: 39–45.
7. Johansson A, Sundbom E, Höjerback T, Bodlund O (2010) A five-year follow-up study of Swedish adults with gender identity disorder. *Arch Sex Behav* 39: 1429–1437.
8. Sørensen T, Hertoft P (1982) Male and female transsexualism: the Danish experience with 37 patients. *ArchSex Behav* 11: 133–155.
9. De Cuypere G, T'Sjoen G, Beerten R, Selvaggi G, De Sutter P, et al. (2005) Sexual and physical health after sex reassignment surgery. *Arch Sex Behav* 34: 679–690.
10. van Kesteren PJ, Asscheman H, Megens JA, Gooren LJ (1997) Mortality and morbidity in transsexual subjects treated with cross-sex hormones. *Clin Endocrinol Oxf* 47: 337–342.

11. Gooren LJ, Giltay EJ, Bunck MC (2008) Long-term treatment of transsexuals with cross-sex hormones: extensive personal experience. *J Clin Endocrinol Metab* 93: 19–25.
12. Smith YL, van Goozen SH, Cohen-Kettenis PT (2001) Adolescents with gender identity disorder who were accepted or rejected for sex reassignment surgery: a prospective follow-up study. *J Am Acad Child Adolesc Psychiatry* 40: 472–481.
13. Smith YL, Van Goozen SH, Kuiper AJ, Cohen-Kettenis PT (2005) Sex reassignment: outcomes and predictors of treatment for adolescent and adult transsexuals. *Psychol Med* 35: 89–99.
14. Leavitt F, Berger JC, Hoepfner JA, Northrop G (1980) Presurgical adjustment in male transsexuals with and without hormonal treatment. *J Nerv Ment Dis* 168: 693–697.
15. Cohen Kettenis PT, van Goozen SH (1997) Sex reassignment of adolescent transsexuals: a follow-up study. *J Am Acad Child Adolesc Psychiatry* 36: 263–271.
16. Newfield E, Hart S, Dibble S, Kohler L (2006) Female-to-male transgender quality of life. *Qual Life Res* 15: 1447–1457.
17. Landén M, Wälinder J, Lambert G, Lundström B (1998) Factors predictive of regret in sex reassignment. *Acta Psychiatrica Scandinavica* 97: 284–289.
18. Hepp U, Kraemer B, Schnyder U, Miller N, Delsignore A (2005) Psychiatric comorbidity in gender identity disorder. *J Psychosom Res* 58: 259–261.
19. Murad MH, Elamin MB, Garcia MZ, Mullan RJ, Murad A, et al. (2010) Hormonal therapy and sex reassignment: a systematic review and meta-analysis of quality of life and psychosocial outcomes. *Clin Endocrinol (Oxf)* 72: 214–231.
20. Landén M, Wälinder J, Lundström B (1996) Incidence and sex ratio of transsexualism in Sweden. *Acta Psychiatrica Scandinavica* 93: 261–263.
21. Lobato MI, Koff WJ, Manenti C, da Fonseca Seger D, Salvador J, et al. (2006) Follow-up of sex reassignment surgery in transsexuals: a Brazilian cohort. *Arch Sex Behav* 35: 711–715.
22. Bodlund O, Kullgren G (1996) Transsexualism-General outcome and prognostic factors. A five year follow-up study of 19 transsexuals in the process of changing sex. *Arch Sex Behav* 25: 303–316.
23. Lindemalm G, Körlin D, Uddenberg N (1986) Long-term follow-up of "sex change" in 13 male-to-female transsexuals. *Arch Sex Behav* 15: 187–210.
24. Rauchfleisch U, Barth D, Battegay R (1998) [Results of long-term follow-up of transsexual patients]. *Nervenarzt* 69: 799–805.
25. Kuhn A, Bodmer C, Stadlmayr W, Kuhn P, Mueller MD, et al. (2009) Quality of life 15 years after sex reassignment surgery for transsexualism. *Fertil Steril* 92: 1685–1689 e1683.
26. Zimmermann A, Zimmer R, Kovacs L, Einodshofer S, Herschbach P, et al. (2006) [Transsexuals' life satisfaction after gender transformation operations]. *Chirurg* 77: 432–438.
27. Rehman J, Lazer S, Benet AE, Schaefer LC, Melman A (1999) The reported sex and surgery satisfactions of 28 postoperative male-to-female transsexual patients. *Arch Sex Behav* 28: 71–89.
28. Hepp U, Klaghofer R, Burkhard-Kubler R, Buddeberg C (2002) [Treatment follow-up of transsexual patients. A catamnestic study]. *Nervenarzt* 73: 283–288.
29. Lawrence AA (2003) Factors associated with satisfaction or regret following male-to-female sex reassignment surgery. *Arch Sex Behav* 32: 299–315.
30. Kaube H, Biemer E (1991) [Results of sex change operations in 30 transsexual patients: psychosocial and sexual adaptation surgical complications]. *Handchir Mikrochir Plast Chir* 23: 276–278.
31. Dolmén L (2001) Brottsligheten i olika länder (Criminality in different countries). Stockholm: Brottsförebyggande rådet (the Swedish National Council for Crime Prevention).
32. Fazel S, Grann M (2006) The population impact of severe mental illness on violent crime. *Am J Psychiatry* 163: 1397–1403.
33. Landén M, Wälinder J, Lundström B (1998) Clinical characteristics of a total cohort of female and male applicants for sex reassignment: a descriptive study. *Acta Psychiatrica Scandinavica* 97: 189–194.
34. Elamin MB, Garcia MZ, Murad MH, Erwin PJ, Montori VM (2010) Effect of sex steroid use on cardiovascular risk in transsexual individuals: a systematic review and meta-analyses. *Clin Endocrinol (Oxf)* 72: 1–10.
35. Landén M, Innala S (2000) Attitudes toward transsexualism in a Swedish national survey. *Archives of Sexual Behavior* 29: 375–388.
36. Mueller A, Gooren L (2008) Hormone-related tumors in transsexuals receiving treatment with cross-sex hormones. *Eur J Endocrinol* 159: 197–202.
37. Vujovic S, Popovic S, Sbutega-Milosevic G, Djordjevic M, Gooren L (2009) Transsexualism in Serbia: a twenty-year follow-up study. *J Sex Med* 6: 1018–1023.
38. Rehman J, Lazer S, Benet AE, Schaefer LC, Melman A (1999) The reported sex and surgery satisfactions of 28 postoperative male-to-female transsexual patients. *Arch Sex Behav* 28: 71–89.
39. Ösby U, Brandt L, Correia N, Ekblom A, Sparén P (2001) Excess mortality in bipolar and unipolar disorder in Sweden. *Arch Gen Psychiatry* 58: 844–850.
40. Tidemalm D, Langstrom N, Lichtenstein P, Runeson B (2008) Risk of suicide after suicide attempt according to coexisting psychiatric disorder: Swedish cohort study with long term follow-up. *Bmj* 337: a2205.
41. Toorians AW, Thomassen MC, Zweegman S, Magdeleyns EJ, Tans G, et al. (2003) Venous thrombosis and changes of hemostatic variables during cross-sex hormone treatment in transsexual people. *J Clin Endocrinol Metab* 88: 5723–5729.